

**The Proceedings of the
9th Congress of the
Association of Sports Medicine of
Balkan**

The Book of Abstracts

Edited by

Editor in Chief

**Professor Vladimir K. Yorga, Ph.D. M.D.
Chief of the Chair for Sports Medicine
University of Belgrade, School of Medicine**

Assistant Editors

**Professor Stanoje Stanojevic, Ph.D, M.D.
Vesna Ljutic, M.D.**

**THE ASSOCIATION OF SPORTS MEDICINE OF BALKAN
Belgrade, Athens, Nicosia, Bucharest, Sofia**

June 1995

1
THERAPEUTIC EFFECTS OF HIGH FREQUENCY MAGNETIC FIELD IN SPORTSMEN WITH SOFT TISSUE INJURY
M.Pavićević-Stojanović, M.Manjlović-Opačić, V.Vesović-Potić

This paper presents the cases of patients with sport injuries who were treated by the high frequency impulse magnetotherapy. 35 patients with soft tissue injuries were treated. After 3, 6 and 10 days of therapy the following parameters were studied: pain, swelling and function recovery. The results were compared to those obtained for the group of 35 patients treated with classical physical procedures.

The therapy with the high frequency pulsed electromagnetic field caused no complication in any of the patients from the control group. After the 10 days' magnetotherapy there was a considerable decrease of pain and swelling compared to the control group. Compared to the classical physical procedures, application of electromagnetic field shortened the time necessary for the function recovery by one third. The earlier applied treatment resulted in more rapid function recovery.

On the basis of this, it can be concluded that the high frequency pulsed magnetotherapy is the superior therapy in the treatment of soft tissue injuries.

2
INTERFERENT CURRENTS IN TREATMENT OF INJURIES IN SPORTSMEN
Obrenović M., Vidaković P., Mujović N., Vesović-Potić V.

By applying interferent currents of constant frequency of 100 Hz, 50 sportsmen were treated for the soft tissue injury. Most patients had muscle and ligament distortion: 32.2% of them, then followed joint distortion: 35.5% and, finally, contusion: 27.5% of the patients. Analyzing the age, the majority of patients belonged to the age group between 20 and 30 years. Taking into account the period of time passed from the injury up to the treatment initiation by interferent currents, the authors indicate it as a highly significant factor in treatment of the soft tissue injuries by interferent currents. Also, the results are considerably better in patients who started physical treatment in as short a period of time as possible since the injury.

Based on the analysis of the course and outcome of treatment, the interferent currents of constant frequency of 100 Hz were confirmed to be a suitable agent in treating fresh soft tissue injuries due to their powerful analgesic and anti-inflammatory effect.

3

EXPOSURE OF FOOTBALL PLAYERS TO AIR POLLUTION DURING TRAINING AND COMPETITION PERIODS

R. Djurašković, D. Nikić, M. Nikolić

Sportsmen need considerably greater amounts of oxygen during the periods of training and competition. The requirements are even 60 times higher while training most intensively compared to those while resting. In order to satisfy these needs, the training processes and competitions have to be held in the least possibly air-polluted environment.

The aim of this research was to define the concentration of sulphur dioxide (SO₂) to which the sportsmen are exposed at their sports - fields and also to notice its possible consequences on the exposed sportsmen's health and sports results.

SO₂ concentration tests, being the basic parameter of air pollution, were carried out by the WHO method on seven sports fields in Niš and Niška Banja where ten football teams had their training and competitions in the period from 1990 to 1994.

It was found out that the concentration of SO₂ was very high and often above upper value limits of emission (UVLE) i.e. above 50 micrograms per a cubic meter during 24 hours.

The highest level of concentration was noticed in the area of the sports hall Čair where the average concentration value was 64 microgr/m/24 hours. The level of concentration was considerably higher during the winter (colder) months and it sometimes rose even up to 1196 microgr/m/24 hours.

Sportsmen's respiratory infections during the testing period were evident. However, the percentage of the infections was lower if compared to that among the total urban population.

4

AIR QUALITY IN SPORTS FACILITIES

Nikić D., Djurašković R., Kocić B.

Many training sessions and matches are organized indoors. Air quality in sports facilities is usually bad because of poor ventilation, inadequate cleaning and overload.

The aim of this paper is to establish indoor air quality in a few sports facilities in Niš.

We examined bacteriological contamination and air pollution through establishing total dust fall concentration in five sports halls in elementary schools and in Čair sports center.

The research was done at the beginning, in the middle and after the end of training sessions.

The results indicate that the dust fall quantity is very high - often over 100 mg/m/24 h. We have also found out that inadequate ventilation and cleaning contribute to a very high bacteriological contamination.

High air pollution in these facilities is a factor which affects sportsmen's health, especially the respiratory system, and therefore the air quality must be improved in order to protect sportsmen's health.

5

RELATIONSHIP BETWEEN LEVEL OF URBAN DEVELOPMENT OF ENVIRONMENT AND SPORTS ACTIVITY IN 18 YEARS OLD POPULATION IN BELGRADE

Živanić S., Životić-Vanović M., Dimitrijević B., Mijić R.

Analysis of the data obtained in pool of 6,570 Belgrade 18 years-old men (90% of the total number of the subjects' population) show that 36% of them are actively engaged, or have been going engaged in competitive sports for more than two years. The frequency of active sports practicing is lower in central (31.8%) than in other city (37.9%) and suburb (37.2%) areas. However, with a lower level of urban development of the environment, the dispersion of sports activities becomes poorer. Football, as the most popular sport among 18 years old people who practice sports, is represented by 25.7% of the subject population in central city areas, 42.5% in other city areas, and even 73.2% in suburb areas.

Belgrade 18 years old men from different parts of the city also differ in their basic body measures. Subjects from central parts of the city are significantly taller and heavier than those from other city suburb areas, who also differ significantly between themselves in these indexes.

The obtained data indicate that the level of urban development of the environmental phenomena, which are connected with specific features of numerous ecological, social, economic, cultural, motivational and other phenomena, even within one city, significantly affect body measures, frequency of active practicing of sports, and dispersion of sport activities.

6
SPORTSMEN THE FALLEN GODS FROM OLYMPUS
P. Kovačević

Only the most efficient survive in the Nature. Plants and animals are constantly adjusting to the cruel survival fight. The weak do not live long and do not leave young behind themselves. People fight their survival battle themselves, becoming stronger each and every day, thanks to their mental and technological achievements.

The latest period of civilization diminished what is most precious in a man: the vitality and beauty of his body and wide and deep space of his soul. There is an important battle to be fought - for the lost powers to be returned. Sportsmen are those who lead such a battle, determined and enduring kind of people. Unlike animals which live according to their natural maximum, or unlike people who have been losing their progress year by year, pushing the limits of human maximum further.

Sport is the Olympus of spiritual and psychical health. Sportsmen have now taken the old gods' place on the mount of Olympus. Day by day they get higher and closer to the sky, reaching the unattainable aims, becoming faster than any wind, getting increasingly further from any beginning. Sportsmen compete with Nature itself as well as with themselves. They merge into the Nature itself both within and outside their bodies, on the increasingly wider circles of life and on increasingly higher harmonies of the living. Let us announce the birth of the Ecology Goddess within and out of us. Oikos means a church of God and of men, that is. Oikia means a home or a temple under the sky and within us. Sportsmen are those who are getting nearer the Ecology Goddess each day, and we are those who should follow them in practice, in profession, science, philosophy, love, determination and wisdom, setting off together with sportsmen for the Olympus of ours.

7
THE POSSIBILITIES FOR USING OF THE RIVER NIŠAVA FOR SPORT AND RECREATION
M. Nikolić, B. Ćirić, N. Milošević

According to the existing legal regulations, the rivers which belong to the first and second class can be used for swimming, recreation and growing of certain kinds of fish. According to the regulations, the river Nišava is in the second class.

Constant examination of the water quality of the river Nišava has been done in Public Health Center, Niš, related to the examination of environment. The aim of this paper is to establish whether the river Nišava really belongs to the second class, namely whether it could be used for sport and recreation.

Results have shown that the river Nišava at more than 50% of sites does belong to the second class, according to its physical and chemical composition; heavy metals were above the permitted limits, but it was found that E. coli and most probably a number of coliforms in 100 ml of water were increased at every spot. It is a permanent hazard for the health of people.

Due to this facts, the public must be informed about the quality of the river. We don't suggest swimming and water sports, but fishing is allowed. It should be insisted that people should rather go to swimming pools than to the river.

8
ORGANIZED SPORTS AND JUVENILE RHEUMATIC DISEASES
Petrović I., Nikolić D., Zamaklar D., Ćirović D.

Modern therapeutic principles of juvenile rheumatic diseases are based on the team work of pediatricians and physiatrists with simultaneous medicamentous and physical therapy. The treatment must be individually adjusted and sufficiently long with surgical treatment if necessary, to complete psychosocial protection and education.

Physiotherapy can be applied as: positioning, kinesitherapy, work therapy, hydrotherapy, thermotherapy, electrotherapy, balneo-climatotherapy, with different orthosis appliances.

Physical activity and recreation as well as individual and organized sports have a great role in this spectrum of activities, because moving and running are in the nature of children. But what kind of physical activities and which sport we recommend? Only organized sports as swimming, bicycle riding, chess, table tennis we advise to these patients to prevent muscle atrophy and to enable motility maintenance and skin elasticity, static disorder correction, better function of respiratory muscles, as well as to improve general psychophysical condition. This is the greatest guarantee for the preservation of joint function and for avoiding disability.

9
EVALUATION OF THREE MARTIAL ARTS PROTECTIVE SHIELDS USING THE CYBEX, FASTEX FORCE PLATFORM
A.Karrant, M.V. Stricevic, P. McGinn, B. French, M Siegel, E. Spatz, B.M. Stricevic, D. Skrbic, B. Goldstein

In 1970 the world union of karate-do organizations (wuko) was formed to unify the competition rules of sports karate. Shortly after, they mandated the use of protective equipment in international tournaments. Since then, there has been a proliferation in protective equipment available for both training and competition.

The purpose of this study was to investigate the behavior of three different trunk shields commonly used in the USA. Two shields are usually worn for protection during sparring training and occasionally in competition, while the third is purely a training tool.

Nine male karate practitioners above first degree black belt volunteered to participate in the study. The shields were tested by dropping an eight pound and a sixteen pound bowling ball from a height of one meter onto them as they lay across a cybex fastex force platform. The shields were then retested while being worn by the subjects as they lay supine over the force platform. Subjective data was also recorded in the perceived impact of each test condition as compared to the impact of no protection.

The results showed that the training shield, the thickest of the three, afforded the most protection both subjectively and objectively.

The first competition shield, comprised of only a thin layer of foam, was least effective subjectively, but objectively was comparable to the second competition shield for the eight pound impact. However, for the sixteen pound drop it afforded the least protection both subjectively and objectively.

The second competition shield was made out of a double layered material that deforms on impact. Objectively the shield behaved similarly under both test conditions although subjectively this was not the case.

10

RELATIONSHIP BETWEEN GUARD, MOVEMENT TIME AND REACTION TIME WHEN BODY SHIFTING IN KARATE

M.V. Stricevic, P.McGinn, A. Kurrant, B.French, V.K.Jorga, M. Siegel, E. Spatz, B.M. Stricevic, D. Skrbic, T. Miyazaki

The origins of karate date back to the sixth century, A.D. Until 1957, the essence of karate practice and occasional public displays included basic techniques and kata. The first organized karate sparring/fighting competition was held in Tokyo, Japan in 1975.

If our knowledge and understanding of the basic techniques is less than perfect, our understanding of the newer sparring techniques is minimal.

In an attempt to shed some light on the movement components of sparring, this study investigates the relationship between body position, direction of movement and reaction time.

Ten male karate practitioners above first degree black belt volunteered for the study. The study was conducted using the Fastex system, Cybex Inc.

Using a left front stance, right lateral movement was compared to left lateral movement for reaction time (RT), transit time (TT) and stabilization time (ST). The left front stance was utilized again to compare forward and backward movement for reaction time, ground force time (GFT), transit time and stabilization time.

The results indicate that for reaction time there is no significant difference between the four movements. However, time to stabilization between right and left movements and forward and backward movements were both found to be significantly different ($P < 0.05$). GFT defined as the time taken from the end of reaction time to the clearance of the foot from the platform was not significantly different when moving backwards and forwards.

The required time to move from position to position (TT), was significantly shorter when moving to the right. In contrast, TT for forward and backward movements was not statistically significant.

11

RELEASING STUDENTS FROM PHYSICAL TRAINING WITH SPECIAL EMPHASIS ON STUDENTS WHO SUFFER FROM EPILEPSY

Č. Timovski, I. Timovski, S. Trajkovski, A. Timovska

Physical training plays a very important part in the psychophysical development of the pupils, but it also has biological and hygienic importance because of the effects it has on the physical development of the body and the health of the students. That positive effects is considered as the most successful way for the improvement of the students health. Physical activity has noticeable effect on the physical development on the students only if it is reasonable, systematically programmed and performed. If the effort is too strong it can cause severe dislike and fear in the pupils. Variety in the exercises is also very important. Routine and monotonous exercises make the students tired and lower their interest for doing them. It is very important to make difference in programming exercises for boys and girls especially for the girls who have their own biological characteristics.

The pupils are either released from certain exercises or completely, but only temporarily until the improvement of the results.

We have put permanent release out of use because it produced inferiority complex and interrupted the normal physical development of the students. We paid special attention to epilepsy as an illness which is a big problem from the medical point of view. It may be even bigger sociological problem starting with the patient, then the family, school, health and society as a whole. The permanent releasing from physical training is replaced with special temporary exercises connected with the health status.

CONCLUSION:

Releasing from physical training is an important complex problem which should be considered from many aspects. It should not be treated as a routine but each case should be treated separately, otherwise it can lead to unnecessary releasing from the physical training and can damage the development of the organism of the pupil. The releasing should be done only at the school or university clinics, not at the clinics for sportsmen.

Otherwise there comes to mingling of healthy sportsmen with sick students. It will stimulate the inferiority complex of the ill students.

The term epilepsy should be replaced with some other name of code.

The students from the school should be explained to that the illness is not dangerous for the others.

12

THE HEALTH CONTROL RESULTS OF THE JUNIOR FOOTBALLERS WHO WERE ALLOWED TO PLAY IN THE VARSITY COMPETITIONS

D. Nikolić, B. Marušić, S. Tošić

Because of the fact that biological and chronological age of children is not identical, health care regulations of Football Association of Yugoslavia and Football Association of Serbia allow issuing of the permits to juniors for playing in varsity competitions, provided that certain criteria of biological maturity are satisfied.

In the twenty-year period (1972-1992) sixty-four such requests were submitted to Sport Medicine Dispensary in Zaječar. Forty of the juniors (sixty-five per cent) got the permits after the special medical check-up. Development of their anthropometric, physiological and functional characteristics was continually followed until they were nineteen.

The results showed us that higher degree of psychophysical load in the varsity competition did not have any adverse effect to their health condition, frequency of hurting, physical development and development of their functional capabilities.

A great percentage of the boys from this group continued their sports careers successfully in higher-rank competitions.

13

OTITIS MEDIA WITH EFFUSION IN CHILDREN AND SWIMMING

B. Mikić

Otitis media with effusion is frequent otopathologic condition in children. More than 20% of children aged 3-8 years have such problem, but it is not rare in older children as well. It is of vital importance to make a right decision as to the sports training, especially swimming, in such children. Basically, there are two groups of children. The first group consists of children involved in active training of swimming or water polo. Otitis media with effusion was frequently linked with recurrent episodes of URI. We support the opinion that such combination should be actively treated and that swimming should be avoided for approximately a fortnight or until URI is cured. Such attitude is essential especially during the winter.

In children with grommets, water-tight ear plugs are necessary in order to prevent hydric infection during active training of swimming, water polo or diving, as well as during recreational swimming. Otherwise, treated otitis media with effusion should not be consider contrary for recreational swimming. Diving or scuba diving should be discouraged by otorhinolaryngologist because the underlying eustachian tube dysfunction can provoke inner ear damage in such children.

14

ESTIMATION OF THE LEVEL OF AEROBIC CAPACITY IN BOYS ACTIVELY ENGAGED IN SPORTS

Virčburger V., Stojanović I., Životić-Vanović M., Živanić S., Radivojević Lj.

With the aim to estimate the level of aerobic capacity in 371 boys, aged 13, 14 and 15, who have been actively going in for sports for two years, and who take part in team-sports contests (handball: n=178; basketball: n=133, rowing: n=60), absolute and relative values of maximal oxygen consumption (VO₂ max) were measured by indirect method as per Astrand. The level of aerobic capacity was estimated on the basis of two classifications for sportively inactive population of the same age: as per absolute values of (VO₂)max, significantly larger number of subjects belonged to higher categories, and as per relative values - to lower categories ($p < 0,001$). Due to the specific anthropometric requirements in handball, basketball and rowing, which are observed at selection, body mass of the tested boys was significantly higher than average body mass of boys of the same age inactive in sports. That is why, in order to estimate the level of aerobic capacity in children actively engaged in sports, it is necessary to make specific classification for particular sports groups. On the basis of the results obtained, the authors offer a proposal of such a classification.

15

THE PUBLIC FEEDING OF PRE-SCHOOL CHILDREN - THE POSSIBLE FACTOR OF PHYSICAL AND HEALTH CONDITION

D. Stojanović, R. Mitrović, Ž. Kostić, D. Živković

The feeding of a child must be adequate both in quantitative and structural sense, so as to provide a normal physical, psychological, emotional and social development of a child.

The aim of the research:

To establish the facts which would show to what extent the feeding in pre-school institution satisfies the needs of a child in respect to energy, nutritious and protective substances.

Method:

During the 1983-1994 period, the research of the public feeding in the kindergartens of Niš was conducted, including the chemical analyses of food and a questionnaire based on the storehouse lists.

Results:

The results of the survey show that the energy value of a single meal varies (823-1371 calories) in the 12-year observed period. The considerable decline of values was established in 1993 (876 calories) and in 1994 (1094 calories). The protein content varied from 26-65 grams - with the lowest value reached in 1993 - 26 grams, with the inadequate protein structure (the advantage of vegetable source proteins was 3:1). The contents of minerals and vitamins in meals varied, too, but the insufficiency of all minerals and vitamins was established in 1993 and 1994 - Ca (241-657 mg), Fe (4.5-6 mg), A (184-385 mg), B1 (0.37-0.5 mg), B2 (0.12-1.1 mg), C (36-47 mg), PP (3.3-6.2 mg).

Conclusion:

Such a public feeding of pre-school children, during 1993 and 1994, could not have satisfied the nutritional needs of any child, which may give negative results with regard to the growth and development of children, their physical and health condition.

16

A MODEL FOR ACQUIRING TECHNICAL-TACTICAL INFORMATION IN SPORTS SCHOOLS AND IN THE INSTRUCTION OF PHYSICAL EDUCATION

N.Branković, S. Stojiljković, A. Hanić

Correct mastering of the rational techniques and tactics is one of the goals of the training process of children and the young. The authors stress that the process of mastering the techniques of a particular sports branch should be carried out in four phases ensuring that the program of motor movement can be activated automatically, that is, that the motor skill shall become a habit (automatism). The general aim of this paper is to increase the level of methodical apprehension of coaches and teachers of physical education. It is concluded that the hierarchical structure of the mastering of technical-tactical tasks should follow the pattern: introduction, description, demonstration and explanation of the new motor movement; performance of the motor movement; correction of errors; repetition, mastering and individual exercise; observation and assessment of the effects; motivation, simulation and mobilization measures.

17

SOMATOTYPE CHARACTERISTICS OF OVERWEIGHT PUPILS

M. Toteva, N. Yordanova

Obesity is a major clinical and social problem both in pediatric and adult age. The objective of this study was to determine the somatotype of overweight school children and to follow alterations in somatotype characteristics as resultant from physiotherapy. 288 subjects aged 9-17, divided into three age sub-groups and in accordance with degree of their obesity, were investigated by the Heath-Carter anthropometric method. Obese school children had extremely high endomorphy, accompanied by high mesomorphy. The latter was determined by massive skeletal structure. In the course of one school year, the subjects followed (twice a week) a specialized physiotherapy program. By the end of experiment, body mass and endomorphy were significantly reduced, while ectomorphy increased, but without substantial changes in general somatotype characteristics. Our results provide grounds to recommend incorporation of specialized physiotherapy programs in the general strategy of treatment of obesity.

18

SOME BIOMEDICAL PROBLEMS OF EARLY SPORT SELECTION OF CHILDREN

D. Jeremić, D. Arunović

Child
training
load
development
health

In order to make as great as possible success in a sport, apart from receiving advanced training, increasing of the volume and intensity of training, and a special schedule of nutrition and health control, a tendency to the earlier beginning of the organized and specific training with younger age of children has been noticed.

However, incorrectly proportioned training and inadequately proportioned load could have a negative influence on the development and health of children.

The dynamics of the development of the skeletal system, the circulatory system and the muscular system and the damages which could appear because of the incorrectly proportioned training will be presented in this work. Because of an extraordinary sensitivity, the training with children should be practiced by the outstanding specialists in sports field.

19

SCHOOLCHILDREN'S SPORTS INJURIES OF EXTREMITIES, ON TERRITORY OF DOLJEVAC

L. Panić, O. Kostić, Lj. Milosavljević, R. Filipov, V. Petronjević

Musculoskeletal system's injuries which occur during the growth process of children could be fatal not only for their sports career, but also could leave serious consequences on their physical and mental health.

The purpose of this work is to show how frequent schoolchildren's sports injuries of extremities are.

Retrospective analysis of case records was made in Medical Center of Doljevac for 1993 and 1994.

46 children, 26 boys and 20 girls (aged 6-18) were analyzed. 24 children had injuries of the upper limbs, and 22 had injuries of the lower limbs. Fractures of the long bones were most common injuries - in 21 children of which 15 had upper limbs fractures, and 6 had lower limbs fractures. Distortions were second most frequent injuries. 14 children had distortions (3 of them had distortions of upper limbs, and 11 of them had distortions of lower limbs). Next most frequent injuries were dislocations. 6 children had these injuries (4 of them had dislocations of upper limbs, and 2 of them had dislocations of lower limbs). The least common injuries were muscle injuries. There were 4 injured children only (2 of them had muscle injuries of upper limbs, and 2 of them had muscle injuries of lower limbs).

20

SOME INDICATORS OF HEALTH STATUS OF SCHOOLCHILDREN AND THE ROLE OF PHYSICAL ACTIVITIES IN THE PROCESS OF PROPER DEVELOPMENT AND LEARNING

Lj. Sokal-Jovanović, N. Košela

Basic biological feature of schoolchildren and adolescents is their intensive growth and development. School has a definite role in this process as a social and working environment of such children and influences it in numerous specific ways.

The aim of this paper is to show the frequency of certain diseases and conditions established through systematic pediatric examinations in this population, using the health statistics as data source. We have chosen such pathological states in schoolchildren which were significantly caused by life regimen within school combined with the conditions of too extensive and intense curriculum and insufficient physical activity.

Results of our research show that every fifth pupil has bad posture. Scoliosis and kyphosis rate highest among most frequent deformities of spinal column (with 5-6 cases

per 100 examined pupils). About 30% of pupils has signs of dropped sole. In high-school adolescents we have observed greater degree of deformities of spinal column than in primary-school pupils.

Incessant mutual influence and inter-relatedness of school program and learning with the process of growth and physical/mental development demand joint engagement of health care services, school and parents so that our children can achieve the goal of being both good students and healthy individuals.

21.

KAYAK CLUB AS A PREVENTION OF MENTAL DISORDERS IN ADOLESCENCE

M. Leštarević

The protective role of the common community factors (parents, school) is sometimes insufficient in the prevention of some disturbances of the young Ego. One of the additional possibilities for its protection may be the psychotherapeutic activity in the sport club. Our experience in the kayak club "Drina", Bajina Bašta, confirms this hypothesis.

Psychotherapeutic approach is based on the dynamism of the group. Since every year a new generation (aged eight) begins with training, groups are opened. Increased emotional tension caused by exposure to displeasure, as the frequent contents of the group work, was resolved by guiding it to the sublimation in some of the competitive possibilities each of the kayakers. If satisfactory sport results cannot be expected at present, he (or she) may still satisfy his (or her) Ego by successful organization of travelling, camping or competitions. The correct ranging of results with gratifications (in due time), along with offering opportunities to take part in especially significant (also abroad) competitions for all interested (competitors, organizers) made in possible for the club to provide efficient protection from the unpleasant and damaging frustrations of the idealized Ego.

Following 214 active kayakers during 16 years (1979-1995), we observed the formation of the negative identity only in two cases (alcoholism and non-age delinquency). The abnormal behavior of these kayakers was not reflected on the group. Two (three) years later these boys again found their place in our club as very successful competitors.

Conclusion: a well organized sports group readily rejects possibility of the development of a collective negative identity. It produces directly opposite effect helping its associates to reach their own identity and good mental health.

22

20 YEARS OF SPORT AND RECREATION IN THE CENTER FOR CEREBRAL PALSY AND DEVELOPMENTAL NEUROLOGY

P. Mitić

The Center for Cerebral Palsy and Developmental Neurology, introduced Sport and Recreation activities as a part of treatment of children disabled with Cerebral Palsy between 1972-1974. About 35 patients are covered by daily work in the course of three years. A follow-up of these patients has shown improvement of general mobility, coordination and balance. The study also covered the patients in wheelchairs, in whom the strengthening of upper extremity muscles is noticed.

According to introduction of the principles of sports elements from easier to more difficult ones, from simple to complex, from known to unknown, from individual to group games, most of our patients are able to pass through the whole program.

A certain number, regarding the seriousness and the type of handicap, remains at the level of individual activities of elemental and recreative type, which are in these cases useful as a supplement and alternative to the kinesi-therapeutical methods, especially with the patients who because of the long-term habilitation program have shown signs of being fed up with treatment.

A certain number of our patients, showing special affinity towards group games, attained rather better success in the fields of individual competitive disciplines. Five of our patients, as the representatives of Yugoslavia, have won 17 Olympic Medals.

23

SPORTS OFFER IN PREVENTION DRUG ADDICTION AMONG PUPILS

V. Kebin, D. Ban, M. Zobenica

Since the beginning of the nineties, in the time of current social crisis, there has been a growth in consuming drugs (including the so-called heavy narcotics) among pupils in Sombor. According to the official medical records, up to 3% of the pupils (aged 11-19) succumb to some form of consuming drugs (polytoxic drug addiction). According to the data on registered consumers (Zobenica, 1994), dominant causes are "the feeling of emptiness and boredom", identity crisis and difficulties in self-realization, (reduced cultural offer for the young favors that). It is maintained that practicing sports (although a non-specific form of prevention) could be a positive stimulus in this domain, too. An earlier research (Kebin, 1986) has shown that secondary school pupils in Sombor have about 3 hours of leisure a day, that they go in for sports recreation individually (63% of the pupils) more often than through some organized activity (only 5%), and that 45% of the pupils think that there is no adequate sports offer in their town. That is the reason the research in sports offer in the function of prevention of juvenile drug addiction has

been undertaken, and the preliminary results present current inclusion of pupils in sections and clubs. In 1994/95 school year in 6 primary schools (out of 7), there are 22 sports sections with 494 members (21.5% are older pupils). In 5 secondary schools (out of 6) there are 471 pupils in 18 sections (which is only 12.5%). All school sports sections include 16% of the pupils in the town. On the other hand, the involvement in village primary schools in the region is three times greater (58.7%). It has been estimated that 24 sports clubs in the town have about 1000 pioneer and junior members, which makes 13.4% of the town pupils older than 11, or 10% older than 7. Section and club engagement cannot be summed because about 50% of the pupils - sportsmen are included in both forms at the same time. If we take into consideration the earlier findings (Kebin, 19865) that it is the children from wealthier and higher educated families who mostly go in for sports, we can state that practicing sport is not available to the majority of children in Sombor.

24

BASIC ANTHROPOLOGICAL PREREQUISITES FOR SUCCESSFUL SPORTS PRACTICING AT 7-10 YEAR-OLD CHILDREN

V. Ivanić, S. Ivanić

This work is another attempt to present to professional and scientific, and especially sports circles, basic starting points that should be taken into consideration when estimating children's abilities to expose themselves to and achieve top sports efforts and results. Basic parameters which define children's abilities for practicing sport are not well known today. The notion of pre-selection is hardly known and it is not in use at all. Children are accepted or rejected by the method of "taking a look" by "heaven-sent" and "omniscient" coaches who most often do not have even elementary professional education. That's why this work gives basic parameters of the variables of physical development: height, weight, subcutaneous fat, average breast volume, and physical abilities: explosive strength of the leg muscles, explosive strength of the arm muscles, strength of the hand and wrist flexors, general body strength, general speed ability, running speed, endurance, skillfulness and preciseness, of the 7-10 year-old children, male and female, as the criteria that can help in defining the abilities of treated children for the successful practicing of sports in the so-called pre-selection. The criteria are described in four tables, given as limiting values so that they can be directly applied in practice.

25

CHILDREN'S INJURIES IN BICYCLE RIDING

A. Komarčević, M. Komarčević, S. Milošević

This report describes children's injuries occurring during bicycle riding, sports activity or playing. The most frequent way of injuring is falling from a bicycle, crash by handlebars, or by putting foot into the wheel. In this way, a number of organ injuries and organ's systems injuries can be distinguished: traumatic disorders of the head, traumatic disorders of the limbs and soft tissues in various degrees, injuries of the intra-abdominal, hollow or solid organs, blunt renal injuries etc. We are giving special attention to the injuries of the talo-crural region of children who are driven on bicycle, behind or in front of the driver (injuries occur when throwing foot by the wheel and sticking it between spokes and bicycle forks). Injuries of soft tissues which are caused in this way may be severe to various degrees, and are rarely associated with bone fractures. Recently, there has been an increase in incidence of underestimation of soft tissue injuries (excoriations of skin, contusions, subdermal hematomas). Also, often there is an inadequate treatment of these injuries, which may look insignificant at the first moment, but may cause many functional and aesthetic deformities. Therefore, we emphasize need for initially more active treatment of and attitude toward these injuries.

26

MARCH FRACTURE: THE DARK SIDE OF EARLY SPECIALIZATION IN SPORTS

S. Soldatović

The very rare, but illustrative case of a typical march fracture of the third metacarpal bone of a ten years old gymnast girl with a seven years long sportive practice (!) drastically shows the projection of the P.A.T. (Pain - Agony - Torture) program in the training of sports champions during early specialization.

March fracture represents a specific border (the break-down of the morphological structure of the organism), and materializes the sum of effects of apparently minor traumas which the organism endures for a longer period, with the free will of the person. March fracture (Stress fracture, Fatigue fracture) represents the overrating of the one's own possibilities and a possible sum of oversights and mistakes, i.e. the negation of pedagogical, physical and health culture in sports.

The early specialization, in early childhood means that one wins the race with the time in attempting to form a future super-athlete, but one loses the period of quiet childhood, so necessary for a multi-field development, which is a precondition for health and a later general prosperity. Although unacceptable in the training of children in early youth categories, the march fracture, because of the very often indefinite and hidden

pathological state, becomes more and more often the reason of unpleasant oversights and time loss in sports and in medical practice in sports. This intensifies the question of preventive and team cooperation between sports and medical experts.

27

SPORTS AND PHYSICAL ACTIVITIES AMONG PRIMARY SCHOOL CHILDREN IN YUGOSLAVIA

Živković M., Vuković D., Bjegović V., Jusframić A.

The aim of paper was to estimate the reasons, the frequency and the amount of time spend in sports and physical activities by elementary school children; the parents were also included in order to assess whether they recognize the need for stimulating their children on being physically active.

The sample of school children from 15 elementary schools in Yugoslavia was inquired in 1993 as a part of "Healthy school project". Total of 812 fifth- and eighth-grade pupils and 666 of their parents were included.

It has been shown that 60.0% of children are regularly involved in sports activities while 24.7% are never, and lead totally passive life. As the very important reason to practice sports and recreation 82.2% of children indicate improvement of health.

Parents also recognize the importance of physical activity and 24.9% of them believe that children should be animated to be physically active, but only approximately one quarter of them are physically active.

It can be concluded that the majority of both children and parents recognize the importance of physical activity for health, but a substantial number of parents and a significant percent of children do not behave according to their knowledge.

28

REFLEX SYMPATHETIC DYSTROPHY AND SPORT INJURIES IN CHILDREN

Nikolić G., Maršavelski A., Petronić I., Marković M., Čirović D.

Reflex sympathetic dystrophy (RSD) or SÜdeck atrophy, had been recognized since 1864, the American Civil War.

As an entity, in recent years, RSD has been recognized in children in 1972 (Caron Harold et al.) as a sequel of bone fracture, orthopedic disorders and rheumatic disease. RSD is characterized with pain in extremity associated with autonomic dysfunction.

We report on the experience with our first 62 patients who had RSD, in whom sport injuries were present in 8 cases (12.9%). The average time from the initial injury to the diagnosis was 1-3 months. The sport injury was sustained during different sport

activities, organized or individual as: gymnastics, running, basketball, football, swimming, predominantly on lower extremities.

Early diagnosis and conservative treatment with physical therapy were effective in all cases.

29

MOUNTAINEERING AND OUTDOOR GAMES AS COMMUNICATION SUPPORT

N. Milojević, M. Jerotijević, I. Pavlović, J. Erceg-Đuračić

As a part of the program for stimulating communication in children with the elements of autism through motor activities, a ten day therapy and recreation session was organized at Kopaonik in June 1994. It was intended to achieve the aims of the program through a specific stay at the mountain.

The intensive work with the children and their families consisted of long group walks, of spontaneous and organized games, and of group psychotherapy as well.

As a result of the implementation of the program, there were improvements in the communication of those children as well as in their overall motor skills.

30

WATER-GAMES AS A COMMUNICATION SUPPORT FOR AUTISTIC CHILDREN

I. Pavlović, V. Hohlov-Živković, M. Jerotijević, J. Erceg-Đuračić

A part of the treatment program for children with the elements of autism was carried out in the swimming pool. The intention was to utilize water as a part of the natural environment. Most children, and especially children with the elements of autism like water (except those who are afraid of water).

The aim is to increase the readiness of those children to adopt changes of place, activities etc., to improve their communication, to stimulate them to adopt rules of group behavior, to enrich the variety of their movements, and in that way to contribute to the improvement of their health and physical development, and have them and the members of their families encounter the joys of life.

The program is based on a number of games and activities in water. In both the games and activities elements of swimming movements are included.

Little by little, all the children accepted the new surrounding and activities with joy. During their stay in the pool, the children accepted body contact with other persons and partially enriched the variety of their movements. The number of their stereotype

movements decreased and they adopted rules of group behavior - generally, their behavior became more harmonic than before.

The most important thing was that none of the children acted indifferently in the pool (a necessary requirement in accomplishing elementary communication) and that the whole group underwent a common positive experience.

31

COMMUNICATION SUPPORT PROGRAM FOR AUTISTIC CHILDREN THROUGH MOTOR ACTIVITIES

M. Jerotijević, V. Hohlov-Živković, J. Erceg-Đuračić, N. Milojević, I. Pavlović

A specific treatment program for children with elements of autism is carried out at the Institute of Psychophysiological Disorders and Speech Pathology. The basic characteristic of this developmental disorder is the problem of communication with other persons, as well as stereotype movements and pacing.

The program is based on the fact that the motor activity is the first to occur in the process of development, that it lasts throughout our lives and that it underlies most activities that represent communication and interaction among people.

Through motor activities, the aim of the program is to stimulate communication with other persons in children with the elements of autism and to diminish stereotype movements replacing them by appropriate ones, thus improving their general psychophysiological functioning.

The results, after three years of the implementation of the program, are as follows: the children's communication with adults and with children of their own age improved; stereotype movements decreased; general skills for performing different motor activities substantially increased.

32

HANDICAPPED CHILD AND SPORTS

J. Erceg Đuričić, M. Jerotijević, V. Hohlov - Živković, I. Pavlović, N. Milojević

There is a category of children which is not encompassed by the program of physical activities of the regular system of education. It is the young population of handicapped children which has failed to satisfy the criteria to be enrolled in school.

The UN Convention of the Rights of the Child applies to these children as well regarding the rights to recreation and sports. The United Nations General Assembly adopted, at its 48th session on 20 December 1993, "The Standard Rules on the Equalization of Opportunities for Persons with Disabilities", also accepted by the Yugoslav Ministry of Health, Work, and Welfare. Rule 11, Paragraph i, reads "States

will take measures to ensure that persons with disabilities have equal opportunities for recreation and sports".

Having in mind the importance of sports and recreation in the physical, intellectual and social development of a person, the paper points out that the work with handicapped children should be better organized and that a more tolerant attitude should be adopted concerning the access of those children to sports and recreation centers all over the country.

33

PREVENTION PROGRAM AND CORRECTION OF POSTURAL DEFORMITIES AND DEFORMITIES OF THE FOOT IN CHILDREN

N. Košela, Lj. Sokal-Jovanović

For many years, results of systematic examinations of primary and high school children have been constantly showing the problem of postural deformities and deformities of the foot.

Deformities of the spine such as kyphosis, scoliosis and lordosis are registered in 15.6% of examined primary schoolchildren and at 17.7% high schoolchildren during 1992/93 school year.

Special attention should be paid to and concern showed for the fact that the number of pupils with spine deformities in the last grade is twice the number of such pupils in the first grade. This trend continues through high school, which points out the magnitude of the problem and the need to take organized and planned preventive measures.

Every third pupil (29,9% of examined) in primary school and 14,3% of the examined high-school pupils have lower foot arches. All this mentioned above shows that there is a need for multi-disciplinary approach and organization in prevention and correction of postural deformities and deformities of the feet in children. In this paper we present the program which would be conveyed by team of experts who would encompass primary and high schoolchildren as to prevent examined deformities and to develop the habit of regular physical activities and at the same time to stimulate children for their schoolwork.

34

ASTHMATIC CHILD AND SPORT

N. Bokan - Erdeljan

Should the asthmatic child be allowed to practice sports? The child with well-controlled asthma may practice sports. Clinicians, coaches, parents and the child must be aware that the lung tissue response to different stimuli under different conditions may be very

different. This makes it advisable even in the clinical practice to use lung function tests to obtain information on both the airway and parenchymal mechanics of the lungs. If they are within the normal limits, children with asthma can take exercises. Children improve in strength with training and participation in sport. Heavy weight training is not generally recommended in skeletally immature children. A common experience of coaches and clinicians is that strength improvements come about both through training and participation in sports. A number of health benefits of exercise have been documented. Exercise is felt to reduce anxiety and tension as well as improve self-esteem. Aerobic exercise has been shown to improve mood. Improvement of muscle strength improves respiratory function and posture of the body, strengthened muscles around a joint are also protecting that joint. Appropriate exercise also contributes to joint stability and can increase bone density. Exercise can minimize osteoporosis as well as improve cardiovascular fitness.

35
MENTALLY IMPAIRED CHILD AND SPORTS
V. Hohlov-Živković, I. Pavlović, J. Erceg-Đuračić

Pupils of higher grades of the elementary school "Anton Skala" participate, apart from school sports activities, in different sports (soccer, volleyball, basketball, gymnastics, etc.) as well.

In order to enable the handicapped children to successfully participate in those activities, it is important to start developing their physical capabilities (strength, speed, skills and agility) at lower grades. Motor skills of those children are limited by the handicap itself, since their spontaneous motor activity is poor and monotonous. As a consequence, their overall physical capabilities are diminished resulting in a poor body posture and various deformities. As a consequence, their overall physical capabilities are diminished resulting in a poor body posture and various deformities. As a consequence of the weak muscular system those children are clumsy, inert, their movements being disorganized. Such children have no motivations for games and additional stimulations are needed in order to develop their actual potentials.

Mentally handicapped children should be taught to play games from early childhood. If optimal conditions for playing games are provided, mentally handicapped children will succeed in playing games in a similar way as healthy children of the same mental age.

From the fifth grade on, through playing games the children not only develop their physical capabilities, but also learn to master specific sport skills. The program is individually structured. The child is able to set higher and higher demands to himself, and follow up his own progress. Improvement of such characteristics as persistence, cooperation, tolerance, adaptation to others, respect of the rights of theirs, acceptance of victory and defeat, was noticeable.

If handicapped children are not offered a chance to play games and to exercise, their disability will be even greater than the disability caused by their handicap itself.

36

ATRIAL SEPTAL DEFECT, AS A FREQUENT CONGENITAL HEART DISEASE, IMPORTANT RISK FACTOR OF MYOCARDIAL ISCHEMIA IN YOUNG UNTRAINED PERSON

Terzić M., Velimirović D., Vasiljević D.J., Puškoš L., Milisavljević M., Dimitrijević I., Đukić S.

During 1924-1994, 54,365 autopsies were done, including 1,585 (5.68%) cases of congenital heart diseases (CHD). Atrial septal defect (ASD) was diagnosed in 353 (0.64% or 24.91%) cases (146-0.27% or 10.30% and 207 - associated with other CHDs - 0.37% or 14.6%. In 12/147 (8.84%) cases isolated ASD was diagnosed. The following 12 entities of congenital anomalies of coronary arteries associated with other congenital anomalies of coronary arteries were found: primary congenital anomalies of coronary arteries - 7 cases and anomalies of coronary arteries which came from aorta - 4 cases.

I Primary congenital anomalies of coronary arteries:

1. Atresia of ostium and proximal part of left coronary artery - 1 case
2. Agenesis of right coronary artery with the independent beginning of left circumflex coronary artery and left anterior descending coronary artery from left aortic sinus - 1 case
3. Agenesis of left circumflex coronary artery - 1 case
4. Extreme hypoplasia of left circumflex and left anterior descending coronary artery - 1 case
5. Extreme hypoplasia of right coronary artery - 1 case
6. Extreme hypoplasia of left circumflex coronary artery - 1 case
7. Extreme hypoplasia of left anterior descending coronary artery - 1 case

II Anomalous origin of coronary artery from aorta

1. Anomalous origin of left coronary artery from the right aortic sinus - 1 case
2. Anomalous origin of right coronary artery from the left aortic sinus - 1 case
3. Independent origin of left circumflex coronary artery with its own origin from the right aortic sinus - with retroaortic flow - 1 case
4. Left circumflex coronary artery with retroaortic flow as a branch of the right coronary artery from the right aortic sinus - 1 case.

The medial findings show high incidence of congenital anomalies of coronary arteries in cases of isolated atrial septal defects (8.84%).

Many primary congenital anomalies of coronary arteries have very negative influence on the function of the myocardium and damage its regular work, which has negative implication during surgical corrections. In this analysis, it is very important to post ischemia of myocardium as most important negative effect of primary congenital anomalies of coronary artery in isolated atrial septal defects.

Ischemia of myocardium in congenital anomalies of coronary arteries associated with atrial septal defect is very important in sudden death in young, healthy people, where it was not diagnosed, in case of higher physical strain. Sudden death in case of atrial septal defect, as a frequent congenital heart disease (especially if this anomaly is associated with congenital anomalies of coronary arteries) is very important in sport's medicine.

Many persons who practice sports actively must be taken to detailed cardiology examination, with selective coronagraphy being done where necessary. This invasive diagnostic method consolidates regular status of the left coronary artery system and qualifies active sportsmen for projected physical strain.

It is very important to stress that precise verification of the condition of the complete heart (special condition of status coronary artery) is imperative, before any other sports activity, not only for top sportsmen, but in school physical education and recreation as well.

37

SIGNIFICANCE OF CONGENITAL HEART DISEASES IN YOUNG PEOPLE DURING THEIR PRACTICING OF RECREATION SPORTS ACTIVITY

Velimirović D., Vasiljević J.D., Bošković D., Dimitrijevi I., Peruničić J.

We studied 1,565 autopsied cases of congenital heart diseases.

Those hearts are separate and safe in the Institute of Pathology, Medical school, University of Belgrade, and constitute a permanent science fund of this Institute. Analysis was done to establish the type of congenital heart disease, age at the time of death, as well as the influence of congenital heart diseases.

In over 40% of our cases, the patients' age was between 14 and 18 years.

Congenital heart diseases, earlier diagnosed or not diagnosed - especially, if they have mild clinical intensity - directly contribute to sudden heart arrest.

Congenital heart diseases are very frequent and their incidence is between 5 and 10 percent of general population. There are numerous congenital heart diseases which are of less serious character and whose existence does not compromise regular everyday life.

There is a high percentage of young people either engaged in recreational sports or just involved in sports activity in connection with regular school activity.

Many of these young people do not know that they have some congenital heart diseases, especially if that congenital heart diseases is of weaker intensity and compatible with everyday regular physical activity.

However, in cases when school sports physical activity are of higher intensity, or when young are deceptively healthy people, during uncontrolled recreational sports activity, the existence of mild congenital heart diseases which have not been cardiologically diagnosed, can be fatal for young apparently healthy people.

Hence, a very mild congenital heart diseases which has not been cardiologically diagnosed can be a cause of sudden cardiac arrest in young, supposedly healthy people during higher-intensity physical activity, while practicing sports recreationally or during regular physical education classes.

38

SUDDEN DEATH IN CASES OF HYPOPLASIA OF THE LEFT CORONARY ARTERY IN YOUNG PEOPLE DURING SPORTS ACTIVITY

Velimirović D., Vasiljević J.D., Bošković D., Dimitrijević I., Peruničić J.

During 1966-1994 period 54,365 autopsies were done, including 249 cases of congenital anomalies of coronary arteries. Extreme hypoplasia of the whole left coronary artery (LCA) was diagnosed in 19 cases.

In 6 cases (4 men and 2 women; aged at the moment of death 29, 32, 39, 62, 67 years), extreme hypoplasia of LCA was isolated as anomaly. Its origin was in the stenotic and thick-walled main trunk, with stenotic lumen, 3.5 mm long. Both main branches were also very thick-walled and also had stenotic lumen. Left circumflex coronary artery (LCxA) ended in the medial half of the left anterior atrio-ventricular sulcus, and anterior descending coronary artery - LAD dominated and ended as posterior descending coronary artery. In all 3 cases, the cause of death was massive transmural infarction of myocardium of left ventricle which occurred suddenly without previous clinical symptoms.

In 13 cases (9 male and 4 female, aged between 45 minutes and 4 years, average age at the time of death 6.5 months), extreme hypoplasia of SCA was accompanied with other congenital heart diseases (CHD): complete transposition of great arteries - 4 cases, atresia of aorta - 3 cases, hypoplasia of the left heart - 2 cases, aortal and mitral atresia - 1 case, double outlet of right ventricle - 1 case, mitral atresia - 1 case, and anomalous connection of all pulmonary vein in left vein antonym - 1 case. In one case, the cause of death was ischemia of myocardium of the left ventricle.

Sudden death in case of hypoplasia of LCA has specific significance in young, healthy people, where it was not previously diagnosed, in case of higher physical strain.

Sudden death in case of hypoplasia of LCA is very important in sport medicine. Many persons who are actively engaged in sports must be taken to detailed cardiology

examination, where it is necessary to carry out selective coronarography of the left coronary artery. This invasive diagnostic method consolidates the regular status of the left coronary artery system and qualifies active sportsmen for projected physical strain.

It is very important to stress that precise verification of regular condition of ICA is imperative before any sports activity, not only for top sportsmen, but in physical education classes and recreation as well.

39

SUDDEN CARDIAC DEATH IN ANOMALOUS ORIGIN OF THE LEFT CIRCUMFLEX CORONARY ARTERY WITH SEPARATE ORIGIN FROM RIGHT AORTIC SINUS, CAUSED WITH PHYSICAL EFFORT DURING RECREATIVE SPORTS

Štimac B., Velimirović D., Vasiljević J.D., Borzanović M., Čelović Ž., Dimitrijević I., Đukić S.

During 1977-1994 period, 11 cases of the anomalous origin of the left circumflex coronary artery (LCxA) from the right aortic sinus (RAS) by separate ostium were diagnosed upon autopsy.

The anomaly was isolated in 7 adult cases, in 5 of which accompanied with severe atherosclerosis most pronounced on the proximal portion of the anomalous SCxA. In all 7 cases, all coronary ostia were in RAS, i.e., the ostium of right coronary artery (RCA) and the ostium of LCxA. The left anterior descending coronary artery (LAD) had its ostium: 1. separate ostium in RAS - 1 case, 2. branch of RCA - 3 cases, and 3. was absent - 3 cases. LCxA ostia were behind the RCA ostium and the proximal portion of LCxA had retroaortic course - 3 cases. In 4 cases, LCxA ostia were placed anteriorly and to the left of the RCA ostium and LCxA had anteropulmonary course - 3 cases and interarterial course (between the aorta and pulmonary artery) - 1 case.

In 4 cases (retroaortic and interarterial course of the proximal segment of LCxA) the cause of death was massive transmural infarct of the myocardium in the whole area of distribution of the anomalous LCxA. The death happened suddenly, without any significant previous symptomatology.

The anomaly was associated with other congenital heart diseases in 4 cases: complete transposition of great arteries - 2 cases, ventricular septal defect - 1 case and atrial septal defect - 1 case. LCxA had retroaortic course. Death began suddenly because of the fatal atelectasis with ischemia of the myocardium.

Sudden cardiac arrest in anomalous origin LCxA with separate ostium in RAS (72%), usually occurs in young, asymptomatic, presumably healthy people, especially in insufficiently trained sportsmen in the moment of intensive physical activity.

40

ANGINA PECTORIS IN CONGENITAL ANOMALIES OF CORONARY ARTERIES IN ISOLATED ATRIAL SEPTAL DEFECTS, WHICH ARE NOT CLINICAL DIAGNOSED IN SPORTSMAN

Štimec, B., Velimirović D., Vasiljević J.D., Dimitrijević I., Đukić S., Borozanović M., Čelović Z.

Atrial septal defect (ASD) is a partial defect of atrial septum, which means that a valvular foramen in the atrial septum throughout blood can potentially move from the one chamber to the other. According to the pathological and anatomical classification, ASD can be localized as: A) ASD in the fossa ovalis. 1. Types ostium secundum, 2. Caused by the defect of the septum primum out of the ostium secundum, 3. Near the ostium of the Inferior vena cava - "Inferior Caval" or "Inferior" ASD, and 4. Caused by the transformation of the passing foramen ovale covered by the competent valvula. B) ASD out of the fossa ovalis. 1. Types sinus venosus - "Superior Caval" or "Superior" ASD, 2. Types sinus coronarius, 3. Typus ostium primum - isolated.

The aim of the study, material and methods. The aim of this study was precise evaluation of the macroscopic visualization as well as dissection of the coronary arteries of the macroscopic heart sections, with the diagnosed ASD. This investigation comprised all the mentioned types of ASD, in order to detect the presence, frequency, types of origin and distribution of the congenital anomalies of the coronary arteries (CACA).

Results. Between 1926-1993, 54,365 autopsies were performed, including 1,147 (2.60%) cases of congenital heart disease (CHD). ASD existed in 353 (0.64% or 24.91%) cases (146 isolated - 0.27% or 10.30% and 207 associated with other CHD - 0.37% or 14.61%). In 12/147 (8.84%) cases of isolated ASD the following 12 entities of CACA were found (isolated or associated with other CACA): I Primary CACA - 7 cases, II Anomalous origin of coronary artery in aorta - 5 cases.

Conclusion: Our findings indicate the high incidence of CACA in cases with isolated ASD (8.44). Many primary CACA have a significant influence on myocardial function of the already altered heart, as well as negative effects during surgical correction.

In cases of angina pectoris in congenital anomalies of coronary arteries in isolated atrial septal defects, which are not clinically diagnosed in sportsmen it is very important to stress that precise verification of condition of the complete heart (special condition of status coronary artery) is imperative, before any sports activity, not only for top sportsmen, but in school physical education and recreation as well.

41

SHORT TRUNK OF THE LEFT ANTERIOR DESCENDING CORONARY ARTERY AS THE CAUSE OF ISCHEMIA OF THE MYOCARDIUM IN YOUNG HEALTHY PERSONS DURING HIGHER PHYSICAL STRAINS

Terzić M., Velimirović D., Vasiljević D.J., Puškaš L., Milisavljević M., Dimitrijević I., Đukić S.

Short trunk of the left anterior descending coronary artery is a special entity, to which no great significance is given during coronary arteriography. However, extreme cases of short trunk of the left anterior descending coronary artery (LAD), mean anatomical condition in which this very important artery is ending in the beginning or first of the upper third of the anterior of interventricular sulcus of the heart. After that, it leaves the middle and lower part of the anterior part of the interventricular sulcus and the neighbouring area of the anterior wall of the left and right ventricle deprived of artery supply, which is a potentially fatal cause of myocardial ischemia during strenuous physical efforts, especially in young, clinically healthy people who have not been exposed to special cardiology examination before taking part into sports activity. This cardiology procedure is necessary in order to establish the exact condition before beginning to practice any kind of sports activity.

In 10/1071 (0,91%) cases of congenital heart diseases (CHD) (7 man and 3 women, aged between 7 days and 78 years), we diagnosed extremely short trunk of: tetralogy of fallot - 3 cases; complete transposition of great arteries of the heart TGA - 2 cases; atrioventricular septal defect - 1 case; atrial and ventricular septal defect - 1 case; interruption of the aortic arch - 1 case; bivelar aortic valve - 1 case, and aneurysms of posterior aortic sinus - 1 case. The origin of LAD in left coronary (LCA) is stenotic, its trunk is with very short flow (ending in the upper third of the anterior interventricular sulcus), its lumen is very stenotic, and its wall is very thin. LCA is in 6 cases usually left from the left aortic sinus (LAS), including and a case with bivelar aortic valve, in 3 cases from the right aortic sinus (RAS), and in 1 case from the posterior aortic sinus (PAS), in case of the aneurism f PAS. The right coronary artery was in 8 cases departing from RAS, and in 2 cases from PAS (2 cases of TGA).

In cases with associated other CHDs, extreme short trunk of LAD, as special lesion, has negative influence on the function of the already damaged heart, increased the negative effect of the already existing CHD and making a potential positive result of total anatomic surgical correction of basic CHD more improbable.

The short trunk of the left anterior descending coronary artery is the cause of ischemia of myocardium in young, healthy persons during physical efforts. Also, it is a frequent cause of sudden death in young healthy people, win whom it was not diagnosed, in case of more intensive physical effort.

Sudden death in case of the short trunk of LAD is very frequent (specially, if this variation or anomaly of coronary arteries has been associated with other congenital

anomalies of coronary arteries of other, congenital heart diseases) and very important in sports medicine.

Many persons who are involved in active sports must be subjected to detailed cardiological examination, with selective coronarography being done where necessary. This invasive diagnostic method consolidates the regular status of the left coronary artery and qualifies active sportsman for projected physical strain.

It is very important to stress that precise verification of the condition of complete heart (especially condition of coronary artery) is imperative, before any sports activity is engaged in, not only for top sportsmen, but in school physical education and recreation as well.

42

A BRIEF GENEALOGY OF THE NEED TO BE PHYSICALLY ACTIVE

D. Macura

The general problem of "development and progress" is revealed to us in the most direct manner by the side effect principle.

The side effect principle has such a strong influence in all segments of "development and progress" that we can ascertain from this that "development and progress" are not actually what they should be but are rather wholly contradictory. Self-contradictory in their very definitions.

And it is this very realisation that confronts us time and again with the impression that no correction of procedures or any shunning of the gravitations of the side effect is possible without a (radical - ?) change of human awareness.

Yet, it is more than obvious that a change of human awareness cannot be brought about by the contemporarily most employed manner of "creating awareness" - simple persuasion, but rather by employing the extremely refined procedures of those who have the opportunity of determining the hierarchy (ranking) of these procedures.

As regards health, the environment we live in and the role man plays, not only in the world, but in nature as well, we can, with sufficient arguments, (transdisciplinarily) scientifically study one of the most intimate, elementary, human phenomena - the phenomenon of the need to be physically active.

43

MAXIMAL OXYGEN UPTAKE OF YUGOSLAV TOP ATHLETES AT SPORTS GAMES

S. Savić, P. Marković, M. Mihajlović

One hundred and fifty-seven top athletes have been researched: members of the National Team and candidates for Yugoslav National Team in basketball, handball and water polo - sports games in which the greatest international sports success has been attained - in the Olympics, World championships, European championships.

Spiro-ergometric researches have been done by using the continued series of the load on the treadmill with a slope, *vita maxima* method.

The values of maximal and relative oxygen uptake and maximal and relative oxygen pulse were observed.

The statistical significance of the difference in the arithmetical mean of the observed index for tested groups of athletes has been established by ANOVA methods, except for the variable - relative oxygen uptake.

The suitable relation of functions of cardiorespiratory system for these sports, which is conditioned by the characteristics of choice and specificity of the training, has been presented.

44

CHANGES IN THE STATE OF HEALTH OF ATHLETES AFTER THE SUDDEN DISCONTINUANCE OF SPORTS ACTIVITY

R. Đorđević, M. Mirić, A. Stančulović, P. Marković, P. Naumović

S U M M A R Y

The training of an active athlete has as its aim to gradually adapt the athlete's organism to great strains by means of the systematic and dosed increase of the intensity and duration of training. It is important that the increase of the strain be gradual, but perhaps even more important is the gradual decrease of strain theafter the discontinuance of sports activity.

In the material set forth in this paper, we have monitored the state of health of a group of active competing athletes who discontinued active training and competitions abruptly. According to the data gathered in the survey, we have divided them into three groups:

Group 1 - those whose who discontinued abruptly and completely all physical activity.

Group 2 - those who continued to engage in certain forms of physical activity from time to time.

Group 3 - those who continued to engage regularly in various physical activities.

We noted the following: the first group of athletes suffered certain changes in their state of health in the form of subjective discomforts and objective findings on the cardiovascular system, other organs, and the organism in general. Depending on the length of the discontinuation of sports activity, the aforesaid changes are less noticeable in the second group, while they do not exist in the third group. The above mentioned results indicate that an active athlete, even after the discontinuance of competitive sports activity, has a permanent need for physical activity in order to preserve his health.

45

TOTAL DAILY ENERGY EXPENDITURE OF HEALTHY, FREE RANGING OBESE CHILDREN AS A CRITERIUM FOR LEVEL OF PHYSICAL ACTIVITY

Lj. Mladenovski, D. Plečaš, G. Mirić

The study presents the estimates of energy expenditure of a group of 12 obese children. Indirect estimation of VO₂ by the use of heart rate was used to estimate energy expenditure while awake (EEA). Resting energy expenditure (REE) was estimated employing the same method while the children sitting. In all cases, nighttime energy expenditure was estimated from the tables of the basal metabolic rate (BMR).

These measurements permitted estimates of maintenance energy expenditure (MEE) when $MEE = (REE \times \text{time out of bed}) + (BMR \times \text{time in bed})$; total daily energy expenditure (TDEE) when $TDEE = MEE$ to be made. Mean TDEE for boys was 2164 kcal/d; mean EAc for girls was 434 kcal/d. All differences are statistically significant and with exception of EAc, remain so when expressed in terms of lean body mass. The lower TDEE in girls suggests that the recommended dietary allowances for energy should be lower than for boys. The level of the organised and increasing physical activity during the diet therapy can be adjusted to the individual estimated EAc.

46

ENERGY EXPENDITURE BEFORE AND DURING ENERGY RESTRICTION IN OBESE ADOLESCENTS AND THE LEVEL OF PHYSICAL ACTIVITY

Lj. Mladenovski, G. Mirić, D. Plečaš

Twenty-four-hour energy expenditure (24 EE), resting metabolic rate (RMR), spontaneous and organised physical activity and body composition were determined in 10 obese subjects (4 boys and 6 girls), on two different occasions: before weight reduction and after 12-16 weeks on a hypocaloric diet as outpatients. The recommended energy intake varied from 3500 to 4700 kJ/d depending on the subject.

Mean body weight loss was 12.6 $\pm$ 1.9, i.e. 13% of the initial body weight. When expressed in absolute values, both 24 EE and RMR decreased during the hypocaloric

diet from 9819 $\pm$ 442 to 8229 $\pm$ 444 and from 7262 $\pm$ 583 to 6591 $\pm$ 547 kJ/d respectively.

Approximately one half of the 24 EE reduction (1590 KJ/day) was accounted for by a decrease in RMR, the latter being mainly accounted for by a reduction in the fat mass.

Most of the remaining decline in 24 EE can be explained by a decreased thermic effect of food, and by reduced cost of the increased physical activity mainly due to a lower body weight.

47

THE EFFECTS OF TIMING ON ENERGY EXPENDITURE DURING REST AND EXERCISE IN OBESE WOMEN

D. Plećaš, Lj. Mladenovski, G. Mirić

The metabolic rate of obese woman and the control group was established by indirect estimation of VO₂ by the use of heart rate monitoring.

Each subject in resting state and during ergometer cycling test was examined three times a day, before meals. The resting metabolic rate of both groups increased during the day. During exercise the energy expenditure of obese subjects was significantly higher than that of the control group. The presented results show that, in obese subjects, the highest energy expenditure appeared in the evening and in the late afternoon. This point has a practical value as to how to suggest organised physical activity during the diet period.

48

OBESITY CONTROL BY MEANS OF DIET AND PHYSICAL TRAINING IN MIDDLE-AGED WOMEN

G. Ristić-Mirić, D. Plećaš, Lj. Mladenovski, N. Vasiljević

In 45 women aged 36 $\pm$ 7 years a 14-day lasting dietetic protocol consisting of 1300 kcal together with physical training - 2 hours of aerobic exercises and 2 hours of mountain climbing per day was applied.

All participants have been moderately overweight (Body mass Index- BMI 28.2 $\pm$ 4.1) at the onset of the study. They were already well trained (participants in the community exercise program for more than one year). During exercise their working pulse was in the range of 97 $\pm$ 14 beats/minute. During the study we never experienced any major medical problem.

After the 14-day regimen the BMI in the observed group changed to 23.4 $\pm$ 3.2 (16.5%).

We suggest that middle-aged women could benefit a lot from physical training by means of simple aerobic exercising (for one hour three times a week), but control of their body weight sometimes requires constant surveillance and medical support.

So our results suggest that it would be good to combine dietetic treatment with physical training in community studies as to achieve better control of nourishment in these subjects.

49

SCHOOL CHILDREN PARTICIPATING IN LONG-DISTANCE RUNNING WITH NO PREVIOUS PHYSICAL TRAINING

G. Ristić-Mirić, Lj. Mladenovski, D. Plećaš, N. Vasiljević

During the spring of 1995 in Belgrade, school children were participating in community programs of cross-country running (2 km) and a "little marathon" (5 km) with no serious previous physical training.

It was mostly the children aged 10-15 years who took part in these programs. After these events, in a group of 34 younger children (5th grade - 11 to 12 years of age) a number of leg muscular cramps together with 3 collapses due to dehydration were observed. We suggest that participating in such community programs must be preceded by serious physical training for a certain period (at least one month) before the event as well as selection of those who are already trained and their inclusion in such events instead of the current practice.

Also, we suggest the organizing of community physical training schemes that would cover the whole school population and would be carried out all the year round and popularized through school system and mass media.

The number of complications ranging from simple muscular cramps through dehydration and its manifestations to the extreme cases of acute myocardial dilatation can be lowered and even completely annulated by combining systematic selection and organized physical training.

50

MEDICAL APPLICATIONS OF ANTIOXIDANTS

V.M. Mujović, S. Volkovski, T. Jovanović and T. Maličić

Free radical (the superoxide, the hydroxyl, and peroxide) are atoms or groups of atoms that can cause damage to cells, impairing immune system and leading to infections and various degenerative diseases. They may be formed through the action of various metabolic processes, such as the use of stored fat molecules for energy. Free radicals are normally kept in check by the action of free radical scavengers. Four important scavenger enzymes that neutralize free radicals naturally are superoxide dismutase (SOD), methionine reductase, catalase, and glutathione peroxidase. The body makes

these as a matter of course, but the work of these scavenger enzymes can be supplemented by a diet rich in antioxidants. Thus, a group of vitamins, minerals, and enzymes called antioxidants helps to protect the body from the formation of free radicals.

If the system is overwhelmed by free radicals, in sports medicine we can take the following supplements to aid the body in destroying free radicals: (1) Beta-carotin and vitamin A; (2) Vitamin C which is a very powerful antioxidant and in addition increases interferon production and is a potent stimulator of T-effector cell activity; (3) Vitamin E which is a powerful antioxidant and improves oxygen utilization and enhances immune response; (4) Gama-linoleic Acid (GLA) which is a key regulator of T-lymphocyte function in the body; (5) L-Cystein which is a powerful detoxifier of alcohol, tobacco smoke, and environmental pollutants, all of which are immune suppressors; (6) L-Glutathione which is also a powerful antioxidant; (7) selenium which is a partner/synergist with vitamin E and each molecule of the key enzyme - glutathione peroxidase - contains four selenium atoms; (8) superoxide desmutase (SOD). This last enzyme revitalizes the cells and reduces the rate of cell destruction. SOD also aids in the body's utilization of zinc, copper and manganese. Free radical production increases with aging, while SOD levels are reduced (less then 5 million units daily). The potential of SOD to slow the aging process and improve work performance is currently being explored. There is the SOD supplement in pill, and it should be able to provide a daily amount of about 5 million units or higher. In conclusion: Medical Applications of antioxidants to aid the body in destroying free radicals are widely accepted.

51

ANABOLIC STEROIDS AND OTHER ERGOGENIC AIDS IN SPORTS

V.M. Mujović, I. Jorga, V. Jorga, R.Tišma and T. Jovanović

It is well known that some athletes are Willing to risk their health and even life just to be the best. Many athletes, too many to mention, have been seriously injured and even killed as the result of taking illegal drugs to enhance their performance. An ergogenic aid is any substance, process or procedure which may enhance performance through improved strength, speed, response time, or endurance of the athlete. Athletes have been using various forms of ergogenic aids for years, probably from the first Olympics up to now.

This review report is intended to provide an up-to-date assessment of some of the better documented aspects of the ergogenic aids by turning them into five classifications:

1. Nutritional aids: amino acid supplements, water and carbohydrate loading.
2. Physiological aids: blood doping and oxygen supplementation.
3. Pharmacological aids: amphetamines, anabolic steroids and caffeine.
4. Psychological aids: hypnosis, imagery and stress management.

5. Mechanical/biomechanical aids: clothing and equipment.

We will discuss whether some ergogenic aids such as training methods, uses of water, carbohydrate loading, improved equipment, warm-up techniques, mental relaxation and cool-down techniques are clearly safe and appropriate. On the other hand, such aids as amphetamines, anabolic steroids, and some other agents are clearly illegal and against all the principles of the spirit of competition. Drug use in sports continues to be a major problem, but we have to educate our athletes to be strong and smart by making the good ones better, and the better ones best without using illegal ergogenic aids.

52

PREMATURE VENTRICULAR BEATS IN CHILDREN AND SPORT

Simeunović S., Vukomanović G., Gajić Ž., Čeranić Lj., Đukić M., Parezanović V., Stojisavljević M., Pavlović S., Živković M., Milašinović G., Milinčić Ž.

Premature ventricular beats (PVB-s) is a frequent rhythm disorder and may present a cardiac disease, but it also occurs in children with otherwise normal heart.

The aim of the study is to evaluate whether children with ventricular arrhythmia and echocardiographically normal heart may actively participate in sports.

51 children (57% male), aged 5-16 years (mean 12.4 +/- 4.09), with echocardiographically normal heart and PVBs underwent protocol that included: clinical examination, ECG, Holter monitoring and treadmill stress test.

Based on treadmill stress test results, the children were classified into two groups: group A (44 patients 87%): PVBs were not recorded under strain and were not recorded at the submaximal frequency (normal stress test); group B (7 patients - 13%); PVBs were recorded or increased in number during exercise. The parameters which limit activities are also (pre)syncope ventricular tachycardia (V'I'), multiform PVBs, which were significantly more often present in group B (p<0.01). Of 44 group A children, 41 were allowed to participate in sports (three were not allowed: one child had long QT syndrome and 2 non-sustained V'I'). Children in group B were not allowed to take active participation in sports.

We conclude that clinical examination, echocardiography, Holter monitoring and stress test play a key role in the evaluation of children with PVBs. The children without symptoms, with echocardiographically normal heart, normal stress test, normal QT interval, without presence of V'I' may actively participate in sports. Regular six-months cardiological examinations, including Holter monitoring and stress test, are recommended.

53

BIOMECHANICS OF THE INJURY OF THE ACROMIOCLAVICULAR ARTICULATION

D. Jeremić, S. Gvozdenović

biomechanic

injury

acromioclavicular articulation

ligamentum coracobrahiale

The injury of a shoulder articulation holds a very significant place in sport.

Shoulder articulation is a very frequent predilection place at the injuring of the upper part of the body in sports which involve direct contact.

A review of mechanisms of injuring will be presented in this work, either the direct effect of the power or the indirect one, which produces the injuries of the acromioclavicular articulation.

A good knowledge of the anatomical characteristics of the shoulder articulation makes possible to comprehend the biomechanics of the injuries acromioclavicular articulation, because the different levels of the injuries of this articulation can be grasped only in this way.

54

THE MOST COMMON CAUSES OF AVOIDANCE OF PHYSICAL EDUCATION CLASSES IN ADOLESCENTS

Dražić V., Petrović Lj., Radović A.

CONCLUSION

All information and resulting analysis show that resistance to physical education classes is stronger among girls than among boys. Fundamental objections are related to necessity of greater freedom in choice of exercises, to not being under the pressure of being graded, to being forced to achieve fixed results which are de-stimulating and psychically burdening.

Adequate equipment also contributes to a more positive attitude towards being taught. All this points to pupils' more active attitude towards being taught especially in the period of their adolescence. They want some of their requests to be respected.

One of the possible solutions is to introduce elective teaching which would stimulate all kinds of sports activities according to the pupils interest.

In all this one has to keep in mind both conditions of work and equipped rooms, which are not always at a proper level. All this makes the teacher's work more difficult.

55

INFORMATION SYSTEM AND COMPUTER SUPPORT IN EVALUATION OF PHYSICAL CONDITION

T. Dragičević, D. Stanisavljević, D. Babić, M. Ille

Information system and computer support are more than necessary in different medical branches.

The aim of this research is to find and suggest an appropriate model for the best evaluation of physical condition.

We analyzed present models for evaluation of physical condition. The following tests were observed: 1. physician's examination 2. anthropometric measurement 3. functional examinations of different systems: ECG, Harvard step test etc. 4. tests for special fitness, ability and skills: test and index of muscle power; test of quickness; test of endurance and stamina and index of skills.

Results showed that each of those tests gives us a lot of important information. But each piece of information individually does not have the same significance as they could have if presented together. All tests have to be defined with a particular index of significance. In that way we can better differentiate between their results. Some of them must have elimination character. There must be special criteria for good and bad results.

Information and computer support system in sports medicine can be very effective and useful for evaluation of physical condition.

56

PHYSIOLOGIC ASPECTS OF SPECIFIC PREPARATIONS OF ATHLETES

Đ. Stefanović, Z. Ćurković, M. Milošević, M. Blagojević, V. Šiljak

Specific fitness (conditional) preparation of athletes will be treated in this paper as a provoking problem of adaptation and transformation changes in the organism of an athlete by specific stimuli and methods based on examples from field- and track disciplines and judo. In that sense particularly constructed special stimuli aimed at provoking transformations in the sphere of manifesting different forms of power given in utmost values of speed, at modulating of included motor units of different power, of aerobic capacity as well as of development of compensational mechanism for maintaining of inner part of organism, of the cell adaptation development in hypoxia conditions, speed development of energy mobilisation from primary energy sources and described physiological mechanisms being initiated in given sorts of specific

conditioning and which influence on structuring of specific stimuli at certain trainings will be treated .

57

COMMERCIALIZATION OF THE SPORTS MEDICINE - BUSINESS AND MEDICAL ETHICS

V.Ljutić, B. Ljutić

The present system of health, social and invalidity insurance is facing near bankruptcy stage due to the lack of funds, concepts and clear leadership. To so-called socialist system of health protection for all, only remained on the paper and heads of general public, but in the real word of medical and related services, the bottle neck is budgetary constraints and very unfavorable economic climate with the GNP per capital less than US 1,000. The reality is as it is, so there is not a lot of space for manoeuvring, especially when only the basics and fundamentals should remain on the list of medical priorities of primary health care. So, based on the present legal framework, only the narrowly defined primary health care of the professional and amateur sportsmen and sportswomen shall be covered by the insurance policy. While the top athletic and sports clubs and federations shall be in position to offer to their members the best additional health care counselling and services of sports medicine, the private sector clinics, diagnostic centers and individual and partnership medical practices in sports medicine should strive towards international standards in services and equipment. The demand for such approach shall increase, while it could be expected that many young doctors entering sports medicine field of practice, in the beginning of their professional careers, shall be engaged as volunteers as sports doctors at schools, amateur and recreational clubs and sport centers. It could be envisaged that with a clear concept in the heads of strategists, the real room for development of sports medicine, improvement of its quality of services will indeed exist, if the field of sports medicine is able to define its prospective future interests. Also, it is very important to protect the professional status of the sports medicine physicians, and especially to enable other medical professions and specialization to enter into our traditional field of activity and earnings. Any profession which is not able to define its perspective, to form strong and influential professional organization, and to fight for its place in the society and on the market, does not have bright perspectives.

58

POSSIBLE OCCURRENCE OF SPONTANEOUS PNEUMO-THORAX UNDER EXTREME PHYSICAL LOADS

P. Milenković, V. Ljutić

During physical medical examination and health check-up physical constitution and shape of the body of examined karate athletes-"karatekas" should be specially observed. If the shape of the thorax region is prolonged during the auscultation phase respiratory crackling and popping-up sounds may be heard. When the measuring of the vertical and transversal values on the radiogram equipment shows the ratio is higher than 2 to 1, it could point out to a possible change in the lungs. Such athletes are then send on additional medical tests. Due to the impact of the earth gravitation forces, as well as the alveoli are progressively changing and transforming from the tops to the bottom bases, there occurs a possible creation of the so called "bullae" at the tops. Especially, in cases of extreme physical loads during a very loud shout in karate called "kyai", the bullae could really explode, and lead towards a spontaneous pneumo-thorax. It has been proved that the perfused alveoli of the lungs at the top of the lungs of tall people are more easily thorn out under the impact of the earth gravitation forces. This mechanism contributes towards a genesis of apical bullae. A higher prevalence of pneumo-thorax in taller men is rather attributed to the impact of complex synergetic conditions, as are inherited weakness of the connecting tissue, to a higher influence of the forces directed in the vertical orientation, in the tall and narrow rib cage-thorax area, than to the "worn-out" state of non perfused lung alveoli. All that together is contributing towards a development and ruptures of the apical bullae in the lungs of karate athletes. Sudden pain in the chest, the deficit of the breathing air, suffocation, cold sweat, and cyanosis during the karate training, are certain sings that a spontaneous pneumo-thorax had occurred, and such an athlete should be immediately transferred to the hospital emergency ward. Our study of the medical records has shown that men are more prone to the spontaneous pneumothorax than women, in the ratio of 5 to 1.

59

WISHES AND OPPORTUNITIES OF THE CHILDREN AT THE AGE OF 10-14 FOR THE SPORTS ACTIVITY PARTICIPATION

R. Gašić, S. Radović, S. Gašić-Pavišić, M. Beleslin

At the age of elementary school, all children are equally involved in regularly scheduled physical activity. However, the children's needs for the physical activities unified through the sporting activity surpass the volume of curriculum. The aim of this research is to establish the degree of engagement of the school children at the age of 10-14 in the sports activity and the degree of their desires to go in for sports. In the "Jovan Jovanović Zmaj", Belgrade, elementary school a questionnaire has been conducted in the

sample of 389 pupils (286 boys and 203 girls). In almost equal percent both boys and girls wish to go in for sports. Many more of boys (61.83%) realised their wishes, compared with the girls (34.48%). During the time there is an increasing percentage of boys who go in for sports and a decreasing percentage of girls. The enjoyment in the sports activity and the achievement of the top results are the most frequent motives for the children to go in for sports. The great interest, the positive motivation and the low percent of children, particularly the girls, involved in the sports activity, deserve special attention and engagement of society.

60.

SPORTS AS A METHOD IN REHABILITATION OF PSYCHIATRIC PATIENT

Lj. Krasojević

Taking into consideration that personality is an inseparable whole, the author emphasizes the important role of sports and recreation in the rehabilitation of a psychiatric patient as a link in the chain of sociotherapeutic methods which has been increasingly used for its positive effects.

Sports activities have been mainly characterized as group activity demanding individual's total psychophysical engagement, which may have psychotherapeutic effects. There are several factors operating at all levels within a group: educational factor, verbal and non-verbal communication as well as the phenomenon of transfer and counter-transfer. As a member of a sports group, a patient realises that other persons have the same motive - victory, feels that he is accepted (as a member) by a group and shares their eagerness towards meeting the objective, which generally negates any tendency towards isolation even when patients with schizophrenia are concerned.

During a game, a patient's creativity and individuality may be observed but his destructive and aggressive tendencies may be noticed as well.

As a matter of fact, sports activities may help a patient to:

- adjust to the life in hospital,
- relieve his pent-up irritations and discontent,
- preserve and stimulate his normal interests and social contacts,
- have fun, and
- develop his working potentials in an indirect way.

Sports meetings of people suffering psychiatric illness show results of the work of each specialized psychiatric institution and provide continuation. Such meetings increase interest of various institutions to enhance their work on the physical rehabilitation of their psychiatric patients.

61

DYSBARIC OSTEONECROSIS AND HYPERBARIC OXYGENATION A THERAPEUTICAL APPROACH

Abramović D., Živković M.

Dysbaric osteonecrosis is a disease of professional divers and caisson workers with exceedingly variable incidence, ranging from 2.5% to doubtful 65%.

The exact etiopathogenesis has not been fully understood yet. Further on, crippling osteoarthritis as a sequel of juxta-articular lesions and modest results of contemporary therapeutic procedures, make dysbaric osteonecrosis an actual problem.

The rationale for the use of hyperbaric oxygen is based on favorable events that occur when the partial pressure of oxygen is raised. These include increases in collagen formation and fibroblastic proliferation, capillary budding, osteoblastic and osteoclastic activity, callus formation and mineralization. Numerous studies, both in animal man, have documented this.

Authors presented three cases of dysbaric osteonecrosis in divers treated by hyperbaric oxygenation.

Finally, authors recommend the use of hyperbaric oxygenation as an adjuvant therapeutic modality in the treatment of other forms of aseptic osteonecrosis as a means of reducing lengthy rehabilitation and long-term disability.

62

HYPERBARIC OXYGENATION IN TREATMENT OF SOFT TISSUE INJURIES OF LOCOMOTOR SYSTEMS IN SPORTSMEN

Živković M., Abramović D., Sremčević D., Simović M.

Soft tissue injuries of locomotor system during training and competition take significant place in morbidity of sportsmen.

In most cases, after adequate treatment, healing is prompt and complete.

Unfortunately, such injuries often prevent champion sportsman or even a winning team to gain maximum results in crucial moments.

Further on, due to high incidence, such injuries have cumulative effects.

Hyperbaric oxygenation is an adjuvant method aimed at faster, more complete and more comfortable cure with a lower percentage of complications or sequels.

Finally, in this specific population, faster return to the field of competition is the most important goal.

The rationale for the use of hyperbaric oxygenation is based on the following effects:

- reduction of posttraumatic vasogenic oedema
- faster elimination of pain mediators
- restored oxygen dependent function of leucocytes, fibrocytes and macrophages
- support of energetic requirements of the injured tissue

There are no recognized adverse effects for standard HBOT protocols concerning either general health of sportsman or his performance later on.

On the contrary, this population is very suitable for HBOT due to the lack of previous pathology and reality of group therapy in multi-place chamber.

63

USE OF REINFORCED COMPOSITES IN CURING FRONTAL TEETH INJURIES IN SPORT

Lj. Petrović, S. Primović

SUMMARY

OBJECTIVES:

The adhesive bonding of composite materials is clinically proved in preventive and restorative procedures in stomatology. Experimental evaluations of etched-enamel bonding systems have showed excellent strength in glass-fiber reinforced composites (Superlux universal - hybrid, light-curing composite by ICN Galenika for anterior and posterior restorations) in immobilization and curing common luxation of front teeth.

METHODS AND RESULTS:

In a prospective study, 22 patients with luxation of front teeth were examined (football, and other sports). Twelve patients were treated with Superlux universal hybrid glass-fiber reinforced composites. The method of treatment in the control group was the same, but without glass-fiber component. In this group in 4 cases immobilization did not prove to be sufficient, bonding material happened to break, so the result was the loss of injured teeth. In relation to control group, all injured teeth healed correctly and no break-down of immobilization appeared when reinforced composites were used.

CONCLUSION:

The application of Superlux glass-fiber reinforced composites has a great advantage compared to the procedures without glass-fiber component. Therefore, we recommend the use of this technique for urgent interventions when injuries of frontal teeth in sport happen.

64

COMBINATION OF LASER THERAPY AND INFILTRATION OF CORTICOSTEROIDS IN TREATMENT OF EPICONDYLITIS HUMERI LATERALIS

Konstantinović Lj., Antonić M.

The prospective study included 32 patients suffering from epicondylitis humeri lateralis. The patients were divided by a single blind controlled trial in three groups: the group treated by laser therapy at a dose of 2 j/cm², on trigger points (n-11); the group treated subperiosteal infiltration of corticosteroids (n-10); the group treated with combination of laser therapy and infiltration of corticosteroids. Helim Neon source of laser beams has been used. Evaluation of the effects was preformed by following up subjective troubles (modifications of Mc Guil pain questionnaire). Results in the first control examination, after 7 days, have shown significant decrease in the intensity of pain in 70% patients treated by combination of laser therapy and infiltration of corticosteroids. Similar results have been registered in two other groups after repeated course of the same treatment.

65

SPAS AND CLIMATE RESORTS IN YUGOSLAVIA AS ECOLOGICALLY PURE ENVIRONMENTS FOR SPORT AND RECREATION ACTIVITIES

Mališić T., Tišma R., Kostić S., Mujović V.M.

In the Federal Republic of Yugoslavia, there are about 5 hundred mineral, thermal and thermo-mineral springs, that are balneologically worked out. In the mountain areas with the height above the sea level of 1,000-1,500 meters and higher, we have at our disposal sport and recreation centers and sanatoriums.

The best quality thermo-mineral waters have been used for prevention, treatment and rehabilitation in our well-known spa centers. The most of the medicinal/healing springs are patented, and protected.

Besides the old spa architecture, there are modern buildings with complete communal infrastructure, so that the spa environment has been protected and preserved.

The spas and sanatoriums from either the first or the second class have at their disposal sport and recreational centers like the Vrnjačka spa, Niška spa, "Selters" Mladenovac, Zlatibor, Kopaonik and other. In the sea area with mediterranean climate, that has a well-know medicinal effect, important health and sport-recreational centers have been built, such as Igalo, "Vrmač" in Prčanj, Kotor, Budva, Ulcinj and so on.

Attractive spa architecture, up-to-date sport centers for different sport disciplines are refined and ennobled with varied horticultural contents. Pure air, healthy water and healthy and pure land and terrain, favorable climate conditions all the year round, the urban protection with good traffic communications, have classified these places into our

first-class or top-class ecologically clean environments that are regularly visited by all kinds of sportsmen.

66

PELOIDOTHERAPY IN PROPHYLAXIS AND TREATMENT OF SPORT INJURIES

Kostić S., Tišma V.R., Vrvić M.M., Mališić T.O.

Peloids are natural medicinal remedies that have been used for centuries in balneology. According to their origin, they could be of marine, lake, swamp or volcanic source and they are often formed close to thermo-mineral springs. They consist of sandy-dusty-clayey components with more or less minerals, organic extrabil substances in which many microorganisms and seaweeds exist.

However, they are used in native form under moderate/tropical climate or, which is more frequent, after being heated as a thermo-therapeutic procedure.

The basic mechanism of their medicinal effect is based on thermic, mechanical and chemical effects, that together initiate numerous reactions on the skin, nerve ends, underskin capillaries, joint capsules, ligaments, tendons and muscles, strengthening cellular tissue and circulatory mechanisms.

In the course of prophylaxis, they can be used in the form of warm local packaging at the temperature of about 45°C, every day or every second day, as well as in a form of peloid baths half dissolved with the sea or thermo-mineral water.

As for sport prophylaxis, peloidotherapy has been used mainly for those groups of muscles, tendons, ligaments and joints, that with regard to the sport competitive aspects sustain the maximum load.

It is the same with different sport injuries, where the peloid therapy serves as the basic procedure which we use in the form of warm coverings, 1 to 3 cm thick at the temperature of 45-47°C, with a duration between 20 to 30 minutes, at one region. With sport injuries, indifferent and hyperthermal peloid baths have been used with different peloid dilutions.

67

CLIMATOLOGICAL AND ECOLOGICAL VALUES OF ZLATIBOR

Tišma R., Kostić S., Mališić T., Djordjević S., Čutović R., Mujović V.M.

Zlatibor is the biggest serpentine massif in the Balkan Peninsula, with a lot of floral and geographical specificities. In a geographical sense, it is a plateau, with an average height above the sea level of 1,000 m and with the highest peaks. The Čigota (1,422 m) and the Tornik (1,495 m).

The openness of the Zlatibor plateau enables fast movement of the air masses, that results in the purity of the air and intensive sun radiation.

After 30 years of following of hydrometeorological data, we emphasize the basic climate characteristics of Zlatibor. As a matter of fact, Zlatibor has got a mountain subalpine climate. The temperature conditions correspond to the height above the sea level. So, the average month temperature of the air is 3.3°C in January, 6.4°C in April, 16.4°C in July, 8.1°C in October, and the average annual temperature is 7.1°C . The relative annual humidity of the air is higher than 70% during the whole year.

Zlatibor has an average of 50 sunny days (n-2/10) and 123 cloudy days (N-8/10).

As for the serenity, it is characteristic in the morning and in the afternoon. Spells of rainy weather are characteristic in spring and winter months. Snow usually covers the mountain from November up to the mid-April. The most frequent wind belongs to the southwest quadrant and in July and October to the Northern one. Permanent air streams bring fresh and pure air. The average number of hours with sunshine in each month is high, ranging between 71 hours in December and 262 hours in July, with an average annual radiation of 1,933.6 hours. The relief, the climate and the vegetation, along with the created structures and built facilities, present a pure ecological oasis for both winter and summer sport activities.

68

SPA AND CLIMATOLOGICAL SIGNIFICANCE OF ULCINJ FOR SPORTSMEN.

Tišma R., Kostić S., Mališić T., Djordjević S., Mujović V.M.

Ulcinj has got a clear sea climate, that is characterized with short very mild winter, pleasant spring, warm summer and agreeably warm autumn. The average monthly temperature of the air in January is 6.9°C , in April 13.6°C , in July 24.3°C and the annual average temperature is 15.5°C .

The air pressure shows very small changes of average monthly values, being about 1004.9 2 mb all the year long.

According to monthly averages, humidity of the air is rather stabilized at 69.3% with small increases in spring (71.5% in April, 74.0% in May and 71.0% in June) and in winter months (72.5% in November and 70.6% in December).

The average monthly speed of the wind is the highest during the winter months - 3.6 m/sec in January and the lowest is in June, July and August with 2.33 m/sec.

The region of Ulcinj has the lowest rainfall in the Southern part of the Adriatic Coast - only 43.8 mm. The sun shines in Ulcinj riviera during the annual average of 2,553.2 hours. According to this average value, it is the most sunny continental beach in Europe.

The beaches of Ulcinj have a specific tiny sea-sand, whose diameters are from 0.250-0.088 mm, covering the length of 18 km, with a width protruding up to 150 meters into the sea.

This natural base, both on the ground and the sea bottom, is very favorable for different sport exercises and self-therapy. The peloid of Ulcinj belongs to sandy-powder-clay structure with a lot of extrabil organic substances. It has been used with excellent results in variety of diseases and conditions after injuries. The sea-climate, the sea-water, specific sand, the sea-mud and thermo-mineral springs present a unique natural sanatorium and an oasis for sports events organization all the year round.

69

USE OF MINERAL SPRINGS OF THE "SELTERS" SPA, MLADENOVAC IN THE PROGRAM OF BASIC SPORT PREPARATION

Kostić S., Tišma V.R., Mališić O.T., Mujović V.M.

The natural thermo-mineral water "Selters" is used in the Institute for Rehabilitation in Mladenovac, that is situated at a distance of 50 km from Belgrade.

According to the International Classification, it belongs to the category of sodium-hydrocarbonate-chloride-bromine-iodine-fluoride-borate, carbon acid hyperthermal mineral waters. It has been used for drinking, bathing, swimming, inhalation, bedewing/sprinkling and rinsing, with a wide diapason of indicated diseases. On the basis of its natural physico-chemical characteristics and distinctions, it is balneologically considered to be among the most valuable, first-rate waters in the world. Besides the everyday use in treating various diseases, it has been used in the course of all sport preparations by consuming in order to compensate the lost minerals as well as for swimming. Also, it has been used for bathing of the sportsmen in order to achieve faster muscle strength, optimal metabolism, especially in terms of the muscles. In addition, it has been used for strengthening of the capsulo-ligament and tendon apparatus, with a view to injury prevention in the course of different sports preparations.

Applied independently as a medical resource and combined with other physical procedures, it offers a great safety in the course of the preparation/training of each sportsman. In the course of basic sport training and preparation, when various injuries usually happen, it has a preventive role as well. In insufficiently cured and old injuries, in combination with balneotherapy and the prescribed doze of loading, optimal functional results have been achieved regarding top sport competitions. Up-to-date hematological-biochemical labs and cabinets for functional diagnostic of the system, enable at the same time an expert and medical follow-up of the achieved results as well as the evaluation of individual psychosomatic abilities of each sportsman or athlete.

70

THE INFLUENCE OF THE LONG-LASTING TRAINING ON THE BONE DENSITY AND BONE MASS OF THE HUMERUS BONES IN TENNIS PLAYERS

Bashalis S., Konstans A., Nikolakakos L., Fikouras N., Kouki V.

The purpose of this study is to measure if the long-lasting training has influence on the increase in the bone density and bone mass of the humerus bones.

For this purpose, 30 competitive athletes (15 males, 15 females) aged 20-26 years, with an average of 8 years of systematical competitive activity, were measured.

For this measurement we used the method of DEXA with the instrument NORLAND.

In each athlete both of the humerus bones were measured in a distance about 5.5 cm from the humeral condyle.

Estimating the results of the measurement, we found increase in both the bone density and bone mass. The bone density increased by 15% in both males and females.

The bone mass increased by 22% in males and 16% in females.

71

ANABOLIC STEROIDS IN SPORT

Stanojević S., Dračić V., Nikić M., Arandjelović A., Zlatař M.

Motivation for doping in sport is a complex one, both for the commercial interest and national prestige. There are various methods in application, difference in ideas of athletes, coaches and unfortunately physicians. The stimulations means which are most frequently in use among athletes are anabolic steroids. These are compounds similar to testosterone which increase synthesis of albumen in the skeleton muscles and deposit nutritive materials, giving positive balance of nitrogen, phosphate, potassium, calcium and water in the muscle of the cells and leads to their hypertrophy. Investigation done on experimental animals proved that they induce side effects such as liver damage, testes atrophy, reduced number of spermatozooids. Upon experiments done on sportsmen by means of anamnesis and examinations, breast growth has been proved at the beginning, to be followed by the increase of libido, skin rash, paranoid ideas, increased aggression, carcinomatous changes on the liver and prostates, while in sportswomen, we can notice disorders in the menstrual cycle, masculine-type of hairiness and changes in their voice. These changes are evident with higher doses of the said substances.

All these point out to the danger accompanying the use of anabolic steroids in sport.

72

SIGNIFICANCE OF ARTHROSCOPY IN FRESH KNEE INJURIES WITH HEMARTHROSIS

Nikolić D., Popović Z., Drašković V.

Knee joint injuries with hemarthrosis are very frequent during sport activities. Such an injured knee is often a diagnostic enigma because of the effusion and pain. Development of diagnostic arthroscopy made correct diagnosis possible in these cases.

We analyzed the results of diagnostic arthroscopy of 150 knees with fresh twisting injuries and present blood effusion. Anterior cruciate ligament (ACL) tears were prevailing and were found in 90 knees (60%). Meniscus tears were found in 74 knees (49.4%). Isolated ACL tears were present only in 28 knees. In other cases, ACL tears were followed by meniscal tears, osteochondral fractures and posterior cruciate ligament tears. The most frequent were ACL and lateral meniscal tears. In the knees without ligamentary and meniscal tears, the medial retinaculum tears was the main cause of hemarthrosis.

73

ARTHROSCOPIC KNEE MENISCECTOMY

Nikolić D., Đdrašković V., Popović Z., Rajović J.

Development of the arthroscopic knee joint surgery brought qualitative shift in meniscal injury treatment, specially in young athletes. Hospitalizations is shortened, operative risk is reduced to minimum and rapid come-back to sport activities is possible.

We analyzed early results of 349 arthroscopic meniscectomies in 320 patients (19 female and 301 male). Patients in the second and third life decade dominated. Tears of "bucket handle" type were present in 217 knees. Other tears were: pendular tears, horizontal cleavage ruptures, pericapsular, transversal or multiple tears. The total of 214 medial, 74 lateral and 28 bilateral meniscectomies were performed. There were no surgical arthroscopic wound infections in postoperative period. Serous synovitis with effusion was present in 5 and postoperative hemarthrosis was present in 3 knees.

Patients were allowed to walk without crutches and with full bearing on the operated leg in the very afternoon of the day of operation. The duration of hospitalization varied from 1 to 3 days. Resumption of sport activities is possible in the third week after the surgery.

74

COMPUTERIZED TOMOGRAPHY IN DIAGNOSTIC OF COXARTHROSIS

Ateljević M., Mališanović M., Marković S., Bogunović P., Markovski S., Lučin S., Vasilski M.

The computerized tomography (CT) appeared as a new method in diagnosing coxarthrosis. Our experiences to date and our comparative studies show that radiography enables an overall insight into the relation of surfaces; tomography tries to improve the analysis of joint, but CT provides detailed information about joint capsule, about the presence of the effusion in the hip joint and about bone structure. CT examination demonstrates the third, transversal level of the hip joint as well and thus gives us the opportunity to observe the additional contours of the hip joint. It is certain that this method can results in more precise information of the congruency of joint surfaces, of the state of bone structure and of the relation of the periarticular soft tissue and musculature as well.

CT also represents a reliable method which enables us to observe the evolution of degenerative changes of the hip joint. It can be applied in all cases of coxarthrosis, and represents an advanced method in the study of coxarthrosis.

75

OBJECTIVE FUNCTIONAL ASSESSMENT OF NASAL INJURY IN SPORT

Janošević Lj., Stošić S., Ješić S., Janošević S.

Nasal fractures in cases of nasal trauma are said to make up approximately 49% of all facial fractures. In a number of cases they may results in external deformities and nasal obstruction. The evaluation of nasal airway function is usually based on information gained from patient's history, standard ENT-examination and X-ray findings.

The aim of the paper is to give a brief presentation of a recently developed computerized rhinomanometrical method for nasal patency objective assessment.

The principle of the method is summarized and the standardized procedure for fixed nasal resistances is described. Characteristic clinical examples in patients with nasal trauma before and after functional nasal surgery are discussed together with the benefits and limitations of the method on the basis of the authors' personal experience.

The information gathered on 105 patients with nasal trauma displayed the reproducibility and validity of the method. The method was confirmed as an objective and dynamic monitor in selection of nasal trauma patients for operation as well as in the control of the achieved postoperative result.

76

SPORT TRAUMA OF THE CERVICAL SPINE - RADIOLOGICAL DIAGNOSIS

Stošić-Opinčal T., Borota Lj., Stanković D., Stojanović-Birovljev V., Pešić B.

A special type of cervical spine trauma can occur among recreative sportsmen who are plunging into water headfirst. During the period between 1991 and 1994, in the Emergency Center in Belgrade we had 35 patients with this type of injury, so the aim of this work was to highlight the contribution of radiological methods to the diagnosis of these sport traumas.

Our patients were mostly young males with cervical spine trauma that occurred during summer recreative swimming. Most of our patients had quadriplegia on admission, and two of them died immediately after that. Radiological diagnostic procedures included: native cervical spine radiographs, myelography, computed tomography (CT) and CT-myelography.

We confirmed that typical damages of the cervical spine were osteoarticular and spinal cord injuries.

Emergency radiological diagnosis is necessary for therapy planning and successful recovery of these seriously injured young patients.

77

RADIOLOGICAL ANALYSIS OF THE LOW BACK PAIN SYNDROME (LBPS) IN RECREATIONAL SPORTS ACTIVITY

Smiljanić P., Goldner B.

Purpose:

To estimate the diagnostic value of conventional radiography (CR) in diagnosis of low back pain syndrome (LBPS) in recreation sports activity and compare it with radiculography (RG), CT, US, and MR imaging.

Methods and materials:

Eighty-four patients (74 male and 10 female, mean age 36 years and mean working years 15 years) with clinical findings of LBPS were examined applying CR, RG, US, and MR imaging.

Amateur sports activities such as running, jogging, walking tours, swimming, volleyball, indoor fieldball, basketball, tennis were examined by CR (PA, lateral, oblique views L-S spine). Radioculography was performed with non-ionic Omnipaque (Jobeksol) contrast to determine the level and type of herniated discs.

CR was used in all patients, CT in 38, US in 10, MR in 6 patients.

Results:

In our study (N=84) herniated disc was commonly found in L5/S1 level (34,5%) then on the L4/L5 level (13,4%) and finally the "joint type" L2/L3/L4 in 2,5% of the patients. Other degenerative changes were found in 7,43% patients suffering from LBPS.

Conclusion:

According to our results, diagnostic value of CR, RG, CT, US and MR imaging in early diagnosis LBPS is very significant. All methods are complementary, and CR should be used as the starting point. A correctly made diagnosis of the LBPS allowed precise determination of the allowed recreational sports activity.

78

THE RESULTS OF ARTHROSCOPIC MENISCECTOMIES IN ATHLETES

Milankov M., Vukosav B., Jovanović A., Miličić A., Gvozdenović Lj., Savić D., Stanković M., Mitrović M.

With the development of the arthroscopic surgery, diagnosis and treatment of knee injuries have been significantly changed and improved. The arthroscopy enables a surgeon to visualize the entire knee joint both at rest and in movement.

In 1993 and 1994, 56 patients involved in sport activities underwent arthroscopic investigation and surgery. 10 of them were members of teams from the first division. The average age of the patients was 29.34 years. In 28 of them the right knee was involved and in 28 it was the left knee. 44 patients had a lesion of the medial meniscus and 11 had a lesion of the lateral one. One patient had both medial and lateral meniscus ruptured. 21 patients had a bucket-handle rupture and in 14 bucket-handle fragments were locked. 7 patients had lesion of the posterior horn, 3 of them had a flap tear and in one patient there was a radial tear. 14 patients had a rupture of the anterior cruciate ligament. Average time for arthroscopy was 42 min. (20-65).

Patients usually spent two days in the hospital. The average time for physiotherapy was 12 days either at home or at the center for sport injuries and diseases. The average time for the follow-up was 15 months (4-24) and, according to the Lysholm's scale, the average result was excellent (91.4). Athletes resumed training after 7 days and took part in vigorous activities 30 days later.

Arthroscopy gives an opportunity for a quick and a precise diagnosis and treatment of the meniscal lesions. On the other hand, the patients spend only a couple of days in hospital and the time for physiotherapy is reduced significantly. In a short time, athletes are able to compete again.

79

THE SIGNIFICANCE OF ARTHROSCOPY IN THE CASE OF KNEE JOINT TRAUMA

Ivanović S., Nikolić D.

The exposed position, the significant requirements as well as the complicated anatomic structure make the knee the most vulnerable joint. The way of living of a modern man, his professional and recreative engagement in sports activities and traffic-accidents caused injuries have increased the frequency and gravity of knee traumas. Since in knee traumas it is not only one mechanism that is involved, it is not possible for only one interior structure of the knee to be hurt. In the context of the injuries of this kind, the menisci and ligaments, representing the basic functional units, are most likely to get hurt. The results of medically treated and non-treated capsulo-ligament injuries of the knee proved that the consequences of menisci and ligaments insufficiency are often of catastrophic impact.

The pain, a patient's defensive attitude and hemarthrosis prevent even top, experienced orthopedic surgeon from making the exact clinical medical check. In these cases the diagnosis ranged from "interior injuries of a knee" to diagnosis of based arthrotomies.

80

COMPLICATIONS UPON THE ARTHROSCOPIC SURGICAL INTERVENTIONS ON KNEE JOINT

Ivanović S., Nikolić D.

The advantages of arthroscopic approach to diagnosing and medical treatment of both old and newly suffered injuries of knee joint have been confirmed on many occasions. The method of arthroscopy offers high level of precision in diagnosis, possibility of simultaneous surgical intervention as well as short hospitalization followed by quick postoperative recovery.

There are few reports on complications that may happen during these endoscopic procedures. The literature of the kind does not offer any significant series of complications limiting the number to particular examples.

One of the complications described refers to the break of optica or instruments during arthroscopy practicing. However, an experienced physician performing arthroscopy who has reached the necessary level of manual technique makes this kind of examples very rare.

One of very exceptional complications is the appearance of synovial fistula of the knee and only specific cases are described. This problem does not represent much of a trouble as this type fistula may, within a short time, become spontaneously shut. Infections rarely appear and in most cases ???.

81

LOCAL ANAESTHESIA AND ANALGOSEDATION FOR THE DIAGNOSTIC ARTHROSCOPY AND MINOR ARTHROSCOPIC SURGERY

Gvozdenović Lj., Milankov M., Janjić Dj., Somer T., Janjić Z., Brankov M., Kovačević S.

Diagnostic and operative procedures are now most often combined applying general or spinal anaesthesia, as only minor arthroscopic surgical procedures are at present possible under local anaesthesia and analgesedation. The purpose of the paper is to present the results of arthroscopy under local anaesthesia with analgesedation in a selected group of outpatients, and to comment on some problems and limitations of the method.

Arthroscopy of the knee was carried out under local anaesthesia with analgesedation in 30 patients. Our technique for local anaesthesia was a modification of Eriksson's method. Analgesedation has been done with Midazolam and Fentanyl. 87% patients were satisfied with our method, and there was no statistical difference between local and spinal anaesthesia. All patients were able to return to work within a week.

Both general and spinal anaesthesia have a low but unavoidable risk of nausea, vomiting, headache and general malaise. Aspiration pneumonia is also a hazard. Arthroscopy under local anaesthesia with analgesedation is a simple, safe, reliable and inexpensive alternative to arthroscopy under general or regional anaesthesia for patients in whom clinical examination suggests intra-articular disorders requiring diagnostic arthroscopy and possibly minor arthroscopic surgery.

82

ANGIOGRAPHIC ANALYSIS OF THE ARTERIA PROFUNDA FEMORIS (APF) PERFORATING BRANCHES FOR THE LATERAL PART OF THE THIGH

Mališ M., Jovanović M., Mrvaljević D., Velimirović D., Milisavljević M., Puškaš L.

The APF arises laterally from the femoral artery about 3-5 cm distal to the inguinal ligament. This artery is very important in vascularization of the lateral part of the thigh.

The examination was carried out in 35 legs of living persons of both sexes, aged 23-76 years, 21 male, 14 female, 18 left, 17 right. Angiography was performed by percutaneous injection of the femoral artery. Seventy-six percent urographin was used as a contrast medium.

On the roentgenograms, we investigated parameters related to the APF perforating branches: caliber of the APF perforating branches at their beginning ("a"), length of the vascular stem ("b"), number of lateral ("c"), terminal ("d") and anastomotic branches ("e"). Standard statistical analysis of the parameters shows that $X \pm SD$ is: 3.20 ± 0.80 mm (for "a"), 103.00 ± 42.70 mm (for "b"), 4.19 ± 1.31 (for "c"), 2.48 ± 0.56 (for "d") and 3.03 ± 1.18 (for "e"). Linear and rank correlations show that there are very

significant "a" - "b" and "c" - "e" correlations ($p < 0,01$) while correlation "a" - "c" is significant ($p < 0,05$). We did not find any male-female and right-left differences by t-test ($p > 0,05$).

83

VASCULARIZATION OF THE FEMORAL NECK BY THE MEDIAL (MCFA) AND THE LATERAL CIRCUMFLEX FEMORAL ARTERY (LCFA) - ANGIOGRAPHIC ANALYSIS

Jovanović M., Mališ M., Velimirović D., Dragičević T., Milisavljević M., Puškaš L., Rončević R.

The femoral neck, about 5 cm long, has numerous vascular foramina. It is vascularized by the MCFA and LCFA.

The examination was carried out in 35 legs of living persons of both sexes, aged 23-76, 21 male, 14 female, 18 left, 17 right. Angiography was performed by percutaneous 76% urographin contrast injection of the femoral artery.

On the roentgenograms, we investigated parameters related to the MCFA and the LCFA femoral neck branches: their caliber at the beginning ("1") and number of lateral ("2") and terminal branches ("3").

The MCFA always gives 1 femoral neck branch while the LCFA (74,29%) gives 1 in 26 cases and 2 branches in 9 cases (25,71%). We also noticed that the MCFA femoral neck branch is mainly parallel to the intertrochanteric line in all cases (100%). That is why the distance between the middle of this line and the MCFA femoral neck branch was measured at the right angle (parameter "x").

Standard statistical analysis of these parameters shows that $X \pm SD$ for the MCFA is: 2.12 $\pm$ 0.30 mm (for "1"), 2.54 $\pm$ 1.23 (for "2"), 2.23 $\pm$ 0.59 (for "3") and 13.01 $\pm$ 3.43 mm (for "x"), while for the LCFA it is 1.42 $\pm$ 0.45 mm (for "1"),

1.85 $\pm$ 0.72 (for "2") and 1.58 $\pm$ 0.49 (for "3"). There are no significant correlations between all these parameters ($p > 0,05$). Also, no male-female nor right-left difference was found by t-test ($p > 0,05$).

Standardization of the parameter "x" of the MCFA can be of importance for the surgery of the hip joint.

84

BLOOD SUPPLY OF THE TENSOR FASCIAE LATAE MUSCLE BY THE ASCENDING BRANCH OF THE LATERAL CIRCUMFLEX FEMORAL ARTERY (LCFA) ANGIOGRAPHIC ANALYSIS

Jovanović M., Mališ M., Mrvaljević D., Velimirović D., Milisavljević M., Puškaš L., Rončević R.

The tensor latae muscle arises from the iliac crest and is inserted into the iliotibial tract. This muscle is vascularized by the superior gluteal artery and the LCFA.

We carried out our examination on 35 legs of living persons of both sexes, aged 23-76 years, 21 male, 14 female, 18 left, 17 right. Angiography was performed by percutaneous injection of the femoral artery. Seventy-six percent urographin was used as a contrast medium.

On these angiograms, we examined parameters related to the ascending branch of the LCFA: distance between its terminal and greater trochanter ("I"), caliber of its terminal ("II"), length of the vascular stem ("III") and number of terminal ("IV") and anastomotic branches ("V"). Standard statistical analysis of these parameters shows that $X \pm SD$ is: 19.91 $\pm$ 7.50 mm (for "I"), 2.44 $\pm$ 0.40 mm (for "II"), 66.21 $\pm$ 16.00 mm (for "III"), 2.66 $\pm$ 0.71 (for "IV") and 3.43 $\pm$ 1.15 (for "V"). There are no significant correlations among these parameters ($p > 0.05$). We have found significant male-female difference by t-test for the parameter "III" ($p < 0.05$). Significant differences (male-female and right-left) for the rest of the parameters analyzed by t-test do not exist ($p > 0.05$). The ascending branch of the LCFA has anastomoses with the superior gluteal artery (71% of anastomoses) and the medial circumflex femoral artery (29% of anastomoses).

85

SPORTS INJURIES IN THE LIGHT OF VISUALIZATION DIAGNOSTIC

Goldner B., Mijović Z., Stević R., Poleksić Lj., Borota Lj.

All visualization techniques are not capable of offering satisfactory information on the type and degree of injury, and therefore diagnostic procedure is frequently associated with unnecessary time wasting. X-ray diagnostic procedures are used to verify only bone system injuries, either using standard methods or, in more subtle injuries, computerized tomography. Ultrasonography, as the fastest and simplest diagnostic procedure is capable to verify injuries of all soft tissue structures and joints accessible by the probe.

Magnetic resonance imaging (MRI) is generally most sensitive and most specific diagnostic procedure for all types of injuries owing to its spacial and contrast resolution and multi-planar projection. It is superior in evaluation of joint cartilage integrity, injuries of meniscus, synovial injuries as well as those affecting muscles and tendons. Lesions of the patellar ligament and anterior crucial ligament of the knee are best

visualized upon MRI, particularly in their acute stages. Perilesional edema and haemorrhagia are optimally visualized in T2 sequences. MRI is considered superior for complete evaluation of traumatic lesions in the shoulder region. Muscle injuries, either contusions, fatigue, rupture or fibrosis, i.e. myositis ossificans, are well differentiated using MRI. Intramuscular hematoma has non-specific signal, and therefore diagnosis of this entity indicates clinical findings. In addition to its diagnostic value, MRI also has its role in therapeutical effects monitoring, since the altered signals from the lesion regain normal structure intensities.

In spite of all MRI advantages in sports trauma, our objective capabilities do not allow its wider application (financial limitations, small number of the appliances, distance). Ultrasonography is suggested as the first diagnostic choice, after which only a minority of injuries must be subjected to additional imaging diagnostic techniques.

86

COMPARATIVE ANALYSIS OF MUSCLE FORCE CHARACTERISTICS IN TOP MALE YUGOSLAV ATHLETES - COMPETITORS AT VARIOUS SPORTS GAMES

Dopsaj M., Miljuš D.

The aim of this study is to evaluate whether muscle force/strength and of which muscle groups are dominant for successful playing in various sports games. In the presented study, the subjects comprised the top Yugoslav basketball (N=43), volleyball (N=33), handball (N=41), football (39) players and control groups (N=49). All of the athletes and control were tested in the Yugoslav Institute of Physical Education and Sports Medicine under the same testing conditions.

The strength/muscle force testing program consisted of maximal isometric force of knee extensor, trunk extensor, trunk flexor, dominant hand grip, standing vertical (counter movement) high jump and arms strength.

All the results were transformed in relation to morphological characteristics of the subjects. Results were analyzed by analyses of variance (ANOVA) and Students t-test.

Quite few statistically significant differences between mean values of muscle force of monitored muscle group were found. The results were discussed in view of the possible use of the monitored characteristics in evaluation of skill, player selection, training process effectiveness and creating the model state for athletes in the observed sports games.

87

THE TEAM CRISIS SOLUTION DURING COMPETITION

S. Nikić

The aim of this article is to show how we have solved a table-tennis team crisis in the course of a competition.

After a successful start in the super league by winning nine matches in a row, "Sintelon" team has lost next five games. This has been recognized as a deep emotional crisis by the management. According to that conclusion, they asked for help.

Aiming to find the main causes and having observed one match and discussed the problems with the president of the club, coach and players, we found that the main causes of the crisis were in the relations between the coach and the players.

To solve the problems we reorganized the team leadership and the roles of the players and the coach.

As a consequence of our intervention, the team returned to its winning form and continued its way to the top.

88

SOME GENETIC CHARACTERISTICS OF MONTENEGRIN POPULATION

Boljević N., Boljević A., Mandić P., Đurović T.

The research of genetic characteristics has been performed on the territory of Montenegro, and it encompassed subjects from the two most numerous populations: Montenegrins and members of Albanian nationality. A total of 1,574 persons were examined: 704 males and 870 females, of which 1,240 were Montenegrins: 520 males and 720 females. We examined 253 members of Albanian nationality, of which 132 male and 118 female subjects.

In this paper, we have presented the most essentially significant traits of dermatoglyphic (genetic) structure of both groups and comparative results within one and within both groups. A survey of some genetic traits of other Yugoslav populations as well as of some populations of Europe and Asia has been given. The following variables have been investigated: L, L, UP and RP of the filts ridge number, line A and atd angle on fingers and palms of both hands.

The sequence of occurrence of patterns of fingers for both populations has been presented in the paper. The index values (of indexes according to Poll, Dencomajer, Furuhat, Cummins and Steggerd) of the mentioned patterns, especially on all fingers within the examined group and between the groups have been presented, comparing ours with the results of other authors. The number of ridges on every finger for both groups of subjects was given and the results were compared with those of other authors. In this

paper, some recessive traits of Montenegrins and members of Albanian nationality have also been presented (earrings, hair, structure, hair color, eye color).

The results gained by this research point to the resemblances and differences among peoples, both those living in a common area, and those from distant meridians.

89

AIDS PREVENTION IN SPORT ACTIVITIES

Sbutega-Milošević G., B. Sbutega

The WHO data warn that there are more than 13,000,000 of persons infected with HIV virus worldwide. All of them are a real hazard for transmission of this fatal disease.

Special attention has to be paid in relation to this disease simply because of the fact that the great majority of the risk population is of the age when all life activities are vigorous, including sport and sex life.

As far as contact sports and all other ones with possible risk of HIV transmission are concerned, athletes must be under the strict preventive control which includes wearing protective devices as well as standby equipment.

All this is just the first step in keeping in mind all the time the necessity of sero-laboratory tests which must be strictly conducted under the supervision of the National and Olympic committees as well as the European and World Championships Associations.

Top professional sportsmen have special lifestyle which involves frequent migration as well as possibility of changing a partners.

This fact prompts us to respect all given recommendations and to keep in mind the fact that the infection with HIV virus surpassed of the framework of risk groups and that it is linked with risk behavior.

90

STUDIES REGARDING SOME EFFECTS OF LEGALON^R IN PATIENTS SUFFERING FROM CHRONIC HEPATITIS

Dragan I., Atanasescu R., Georgescu E.

The authors performed a trial on Legalon^R in patients suffering from chronic hepatitis, 8 elite athletes and 14 non-athletes, in order to make evident some beneficial effects of this medicine. In non-athlete patients, 3 month treatment, especially by 420 mg/day (6 tablets x 70 mg each), induced some beneficial effects on some liver tests (serum Ty, TGP, TGO, Ig A, Ig M, urine NH₃) but these effects decreased under placebo treatment. In elite athletes suffering from chronic hepatitis, 6 month placebo treatment did not

change liver tests, which were normal prior to the trial: 3-month Legalon^R treatment also did not influence liver tests significantly.

On the basis of these data, the authors suggest the use of Legalon^R in endurance of top athletes during hard training sessions, especially in those presenting viral hepatitis antecedents.

91

CHARACTERISTICS OF A PERSONALITY PROFILE OF YUGOSLAV SOCCER PLAYERS WITH DIFFERENT LEVELS OF PERFORMANCE

Baćanac Lj., Mihajlović M.

In order to explain a complex relation between the personality characteristics, sports and success in sport, in the period between the late 60-ties and 70-ties, more than a thousand studies were made. Even though the results were often controversial, primarily due to many flaws in the methodological approach as well as due to the absence of theoretical models, they address the fact that there is a mutual conditioning between a personality and a sports activity.

Our intention was to try to identify a personality model of a soccer champion, examining 136 Yugoslav soccer National Team players and 228 less successful players (members of the 1st and 2nd National Division). We wished to find out whether there are some personality factors and motivations that make the difference between successful and less successful soccer players. In examining personality characteristics, we used Cattell Sixteen Personality Factor Questionnaire - 16 PF. For motivation of sport performance, we used questionnaire MSP (Havelka, Lazarević, 1976), and for competition anxiety, the Martens test - SCAT (Martens, 1977).

The results the ANOVA show that the psychological profiles of the best soccer players, i.e. national team players, significantly differs from those of less successful ones in four out of 16 personal factors (E, G, L, Q4), in one factor of motivation (negative emotion - NE), and the level of competitive anxiety (SCAT).

The elite soccer players, compared to the less successful ones, are characterized by a stronger super-ego (G factor), i.e., they are more conscientious, responsible and reliable, emotionally more disciplined, more persistent, diligent and moralistic. They are less suspicious and jealous, express more trust and adaptability. They are more cooperative when working in the team (L factor); they are less aggressive, less imposing on others, less stubborn and dominant (E factor); they are less tense, or in other words - calmer, steadier, and more relaxed (Q4); they express fewer negative emotional reactions during performance, such as discouragement, fear, inhibition (NE factor), and possess a lower level of competitive anxiety (SCAT).

92

SYMPHYSIS PAIN SYNDROME IN SPORTSMEN AND ITS TREATMENT...

Nešović B.

Groin pain in sportsmen, especially football players, is so frequent that it may be freely considered epidemic. This disorder has been known for several decades and it presents a great dilemma to the physician, in terms of its etiology, diagnosis, treatment and ways of getting the sportsmen back into the shape for training and competition. Nominal polypragmatism of this pathological condition (20 of them) and administration of various methods of conservative therapy and surgery points out to its complexity. Conservative treatment did not yield desired results, lasting several months, with relapse. The numerous attempts of surgical treatment have failed. After many years of work and experience, it is safe to state that groin pain in the abdomino-inguino-femoral region in sportsman is now successfully solved. In 1967 we have performed our first surgery, using a modified Bassini technique. The operation was named "Plastica tegmentis abdominalis et canalis inguinalis sec. Bassini cum modificatio Nešović". From 1967 to 1994, over 1,500 operations were performed, both unilateral and bilateral. We had no relapses. The rehabilitation and patient training last from 1 to 2 months.

93

SURGICAL TREATMENT OF A DISTENDED ACHILLES' TENDON UPON AN INADEQUATE TREATMENT TO ITS RUPTURE. NEW TENDOPLASTICS

Nešović B.

This study presents results of the surgical treatment of old Achilles' tendon ruptures and the consequences of poor diagnose and inadequate therapy. The new operative technique was administered for abbreviation and strengthening purposes of the scarified and deformed Achilles' tendon. We have performed a "frog mouth" type technique of plastics in 21 patients. After liberating the tendon from strong adhesions and cutting it on the desired site, the upper part of the tendon is cut 2 - 4 cm lengthwise, using the "frog mouth" method, after which the lower part is imbedded into the proximal portion of the tendon and sutured with chrome catgut, silk thread, catgut, dextron or a combination of the above. Postoperative functional results, especially the correction of foot hyperdorsoflexion, were satisfactory in all our patients. There were no complications. We recommend the new technique as a choice therapy in the treatment of old Achilles' tendon ruptures. All of our patients could engage in sports later on. As to the fresh Achilles' tendon ruptures, we recommend conservative treatment with adequate immobilization. In our practice, 123 patients have undergone surgery over a time period of 2 - 4 months, with successful recovery.

94

DIAGNOSTICS, TREATMENT AND REHABILITATION OF MUSCULAR INJURIES

Nešović B.

The diagnostics and treatment of muscular injuries are quite complex. Considering the "nobility" of muscular tissue and the fact that their total regeneration is virtually impossible, as well as the occurrence of various complications (scarification, ossification, herniation, cyst formation), the therapy of these injuries requires knowledge and experience. They are a consequence of poor diagnostics, inadequate treatment and far too early resumption of training procedures. A conservative treatment lasts 1 to 3 months, with carefully dosed training. Surgery is recommended in case of consequential complications. Therapy and rehabilitation of the injured sportsmen demand great patience since they last 4 to 6 months. We have treated 300 sportsmen conservatively, and 143 underwent surgery. Most frequently, we have performed a removal of the formed upper leg, upper arm and lower leg muscle scars and their plastic surgery, fascia plastic in muscular herniations and, in 3 cases, a removal of a cyst with a scarred tissue. We have successfully treated ossified hematomas with X-ray therapy. In our 30-year long practice, we have gained immense experience in the treatment of various muscle injuries, so this presents our modest contribution.

95

OUR EXPERIENCES IN ACUTE BURSITIS TREATMENT WITH THE USE OF URBAZON ELECTROPHORESIS IN SPORTSMEN

Vesović-Potić V., Vidaković P., Obrenović M., Grbić L.

The authors state their experiences in acute bursitis treatment in sportsmen, with use of urbazon electrophoresis.

The work covers 40 sportsmen with acute bursitis. All of them were treated with urbazon electrophoresis, with 10-20 applications, dependent on the level of sickness. Control medical check-ups were done every five days. The control group was made of patients with acute bursitis, who were treated with stable galvanization only. After the final series of urbazon electrophoresis application and stable galvanization treatment, the authors conclude that all the patients bore the treatment pretty well. There were no unwanted effects, and much better results were achieved in patients who were treated with urbazon electrophoresis, that is, as the result of strong urbazon anti-inflammatory effect united with the effect of applied medicine and galvanic current, hence the authors recommend this way of treatment in sportsmen who suffer from acute bursitis.

96

APPLICATION OF BIOSTIMULATIVE LASER IN TREATMENT OF LOCOMOTOR SYSTEM INJURIES

Vesović-Potić V., Matanović D., Obrenović M., Mujović N., Grbić L.

Biostimulative laser therapy has recently been found increasingly significant in treatment of locomotor system traumatic injuries.

At the Department of Physical Medicine and Rehabilitation, CCS Belgrade, biostimulative laser was applied in the last two years in treatment of locomotor system injuries ("ORMED" type laser, the wave length of 604 nm). The therapeutic effect of the laser was monitored on the group of 64 patients of both sexes out of whom the majority included active sportsmen. The local technique of applying the laser rays was applied at the point of the strongest pain and four nearest sensitive spots in duration of 10 min in total. During this procedure, the energy of 4-4.5 J/cm² frequency 6400 impulses per second, was applied using H form (15 W) providing the beam penetration of 3.5 cm. All patients were treated daily.

In all the patients treated, the effect of biostimulative laser beams was noticed to have led to reduction of swelling, pain relief, increase in movement range, as well as significant reduction of therapy duration as compared to the previously applied methods.

97

CONSERVATIVE TREATMENT IN ACHILLES' TENDON RUPTURES

Dašić Ž., Aligrudić V., Pepić Dž., Vukčević N., Jušković A.

In this paper the authors report the results of conservative treatment in eight patients with Achilles' tendon ruptures.

In seven patients the restitution was complete, while in one patient, with re-rupture of the Achilles' tendon, weakened plantar flexion remained.

Return to sports activities was achieved after six months on average.

98

MUSCLE SORENESS AFTER EXERCISES - PREVENTION, PREPARATION FOR TRAINING AND COMPETITION - THERAPY AND TYPE OF EXERCISES AND PRINCIPLE OF TRAINING

Lučić Z.

Introduction and method

Subjects in this observation were 15, 18 to 28 years old basketball players and 10 untrained people. Basketball players trained 3 times a day. The untrained individuals were classified on the basis of their age. They were 20 to 30 years old, and exercised 3 times a week. Both of the groups had downhill - running in their program.

Results and discussion

In both trained and untrained subjects, the appearance of the muscle soreness was observed. Trained subjects had muscle soreness after 24 hrs (9 athletes) and after 48 hrs (3 athletes). They felt stiffness and weakness and discomfort. Excessive exercises in the trained subjects, and incorrect stress and insufficient training can also play a role in both untrained and trained subjects. Sorenesses were given an arbitrary subjective classification and the results show that the most severe pain occurred after the second exercise day, in both trained and untrained subjects. Muscle soreness, tenderness, discomfort and prevention, exercises, method for training and competition. Incorrect training process and insufficient training caused intense and strong pain in both groups of subjects. The method of prevention, therapy, exercises for training and competition was suggested. In the present study, the regimen of eccentric contraction in training process is the most important issue.

99

THE EFFECTS OF EARLY PHYSICAL TREATMENT IN SPORTSMEN WITH SPORTS INJURIES OF SOFT TISSUES

Veljković M., Jevtić M., Milosavljević D.

The aim of this research was to study and document the effects of early physical treatment in most frequent sports injuries, such as contusion, distension, distortion.

During a two-year period, we have been using physical agents in the treatment of 105 subjects suffering from sport injuries.

In order to examine the effect of age upon the length of treatment, we allocated the sportsmen to four groups: under the age of 19 years, between 20 and 24, between 25 and 30, and above 30.

We have used Magnetic therapy, Electric therapy (IFS-Vacuumed, EF novocaina i KJ) and Active movement.

Length of therapy in relation to age

Age	N	Length of Phys.therapy
< 19	15	5 days
20 -24	44	6
25 - 30	37	6,8
> 30	9	8

Total time of therapy in days

N	Mean	S.D.	C.V.	Median
105	6.3	3.0	47.6%	5.7

Effect of Early Physical treatment

Successful	Improvement	Unsuccessful
76 (72%)	16 (15%)	13 (13%)

Conclusions

An early physical treatment with magnetic, electric, vacuum impulses and kinetic energy induces recovery from sports injuries faster than the use of drugs and basic treatment only.

This treatment is more successful if applied with a minimum of time-lag between injury and treatment.

100

THE TREATMENT OF POST-TRAUMATIC DISEASES HIGH PERFORMANCE ATHLETES WITH ATHERMAL LASER

Untea G., Petrescu O., Randasu I.

The authors assessed the efficiency of the treatment with athermal laser in post-traumatic diseases in top athletes, studying its efficiency during the year of 1994 (in all, 1,118 athletes).

An apparatus with pulsed emission in the field of the close infrared was used, type IR 95 Cosmogamma - Italy, with a Ga-As laser diode with 20 Watt max peak power of the pulse and a possibility of frequency adjustment from 5 to 5120 Hz.

The laser therapy was associated with other physico-therapeutical procedures in 436 athletes.

The following diseases were treated: sprains and their sequelae (32.4%), muscular lesions and sequelae scars (18.9%), tendinitis (13.5%), arthrosis (4.5%), contusions (3.6%), etc.

The clinical evolution was as follows: a) in athletes treated only by laser - 27% clinical remissions, 39.6% clear amelioration, 25% moderate amelioration and 8.4% stationary; b) in athletes treated by laser in association with other procedures: 41.5% clinical remissions, 37.7% clear amelioration, 17% moderate and 3.8% stationary.

Clear amelioration appeared after the fourth application in 32% of the cases, in 29% after the sixth application and the best results were obtained after the eighth one. In conclusion, we may assert this therapy is an efficient mean in the rehabilitation of post-trauma.

101

EPISTAXIS FOLLOWING SPORTS INJURY

Mikić A., Petrović Ž., Dimitrijević M.

Epistaxis is bleeding from the nasal cavity whether from anterior or posterior portions. Loosing small or moderate amounts of blood is not dangerous for sportsmen, but such bleeding is annoying, disturbing and eliminates nasal breathing. Abundant epistaxis represents most dramatic and urgent condition not only in otorhinolaryngology, but in medicine as a whole. Fortunately, only a few injuries require emergency otorhinolaryngological intervention.

We have treated 36 sportsmen because of the abundant nasal bleeding following injury in the Institute of otorhinolaryngology and maxillofacial surgery of the Clinical Center of Serbia from 1990 to 1995. The reason for the bleeding has been the fracture of the nasal bones in 21 patients, while in 15 patients the bleeding was due to the contusion. Eight patients were treated by anterior nasal packing, but another two patients needed posterior packing as well. Urgent and adequate treatment prevented serious complications of the nasal bleeding.

102

FINAL TREATMENT OF FRONTOETHMOIDAL FRACTURES MANAGED IN SPORTS

Stefanović D., Pendjer I., Vujičić Z., Stojičić G.

Within the last ten years 251 patients with isolated fractures of frontoethmoidal region, of which 11 (4.4%) patients with sports injuries, were treated in the Institute for Otorhinolaryngology and Maxillofacial Surgery. All injuries occurred in collective sports (direct shove with elbow or knee, head crash or fall on the forehead region); there were

no injuries of the frontoethmoidal region in fighting sports. Only injuries of active sportsmen are presented while recreationists are exempted from our series.

All the patients were cured by surgical therapy, primary and definitively, by the osteoplastic operation with osteosynthesis and bilateral ethmoidectomy. Our indications for operative treatment were: wall fracture of frontoethmoidal sinuses, without breaking of dura, where it was possible to carry out reconstruction of the rear wall. Bilateral ethmoidectomy has been performed in all patients irrespective of fractures of ethmoidal sinuses, because it enables better draining of the operative cavity and particularly because in the majority of patients (7/11, 63.6%) the fracture of ethmoidal labyrinth has been also intraoperatively established.

Complications directly after the operative treatment within the stated period have not appeared, but there were neuralgic and other disorders connected to the injury. The most frequent were: headaches (3/11, 27.3%), smell disorders (2/11, 18.2%), while eye disorders, posttraumatic epilepsy and cosmetic defects after operation have not been encountered.

103

THE LOWER EXTREMITIES' TRAUMAS IN SKIERS

Nikitović S., Ivanović S., Vukčević V., Košutić M., Matić M.

The aim of this study is to analyze the type and the frequency of the lower extremities' traumas (LET) in skiers treated in Anlavo KOP surgery on Kopaonik.

The most frequent LET were the injury of the knee, chiefly ligaments rupture or distension. It occurred in 49 patients (pts): ligamentum collaterale mediale was involved in 46/49 pts (93.9%), ligamentum collaterale laterale in 2/49 pts (4.1%) - $p < 0.01\%$, and in 1/49 pts (2%) both ligaments were involved.

Tibia's fracture (usually spiral fracture of the medial or distal third of the bone occurred in 11 pts (8 boys and 3 girls).

Malleolar's fracture occurred in 9 pts (5 males).

CONCLUSION: The most frequent lower extremities' trauma in skiers is the trauma of the knee, probably because it is not adequately protected.

104

SPORT BLUNT DUODENAL TRAUMA - URGENT US DIAGNOSIS

Stojanović-Birovljev V., Čivčić M.

A 21 year old boy was admitted to the Gastroenterology department of the Emergency Center, Belgrade because of the increasing pain, nausea and vomiting 24 hours after sport trauma. During tae-qwan-do training, his friend accidentally kicked him with his extended and abducted left foot in the upper abdominal region.

During emergency ultrasound examination, transverse ultrasonic scan showed fluid accumulation containing some echogenic materials in front of lumbar vertebra and diagnosis of intramural hematoma was established. We used SONOLINE SL 1 (Siemens) ultrasound machine and sectorial probe (3.5 MHz). Also, an upper GI series demonstrated a classic appearance of intramural duodenal hematoma with complete obstruction.

As his vomiting and pain increased, the patient was operated. On operation, hematoma submucosum in pars D₂ and D₃ duodeni was found, so a gastro-entero-anastomosis with serosation of duodenum was done. Post-operative course was uneventful and the patient was discharged after 10 days.

Ultrasound is quick, effective, easy to perform, and not expensive diagnostic modality that can be used as primary diagnostic procedure in cases of blunt abdominal trauma.

105

ISOKINETIC TRAINING - REHABILITATION KNEE JOINT

Čolak S., Mićević D.

Up-to-date training and rehabilitation of the muscle function until they reach their normal strength and volume also involve isokinetic methods. The term ISOKINETIC means contraction of the muscle against ideal adapted resistance, when the speed is constant.

Because of their objectivity, security, accuracy and efficiency isokinetic devices have a special place in the sports medicine, traumatology, orthopedics, rehabilitation, in terms of clinical and research work.

In our work we used the isokinetic machine CYBEX 340 with the Jonson antishear device. Patients were six male and two female of average age 30.5 +/- 7 years, with lesion of the ligaments or meniscus knee joint. The patients were being treated conservatively or surgically before they underwent isokinetic training. All they had subjective unsure knee joint, low strength, hypotrophy of the muscles and poor sports and work effects.

We used individual isokinetic training five times a week, 40 min per day, during 21 days. The first and the last day, we were testing the function of the knee joint. We measured peak torque (PT-Nm), torque acceleration energy (TAE-Nm), average power (W), total work (J), work fatigue protocol (%).

CONCLUSION: Through the three weeks of isokinetic training we significantly improved function of, returned strength and safety to the knee joint. This confirms the statement made in many studies that isokinetic training improves results by increasing glycolytic and mitochondrial enzymes activity in the muscles.

106
COMPARTMENT SYNDROME IN SPORT
Đurđević M., Čarapić V., Kovač M.

In sports traumatology, the compartment syndrome represents an ischemic muscle necrosis caused by the circulation disorders resultant from the increased pressure in the closed space of the extremities.

In sportsmen it is most frequently caused by premature sporting activity, bones fractures and circular burns of III degree.

Predominating in localization are the front, lateral, back and plantar compartments of the lower leg, gluteal region and volar muscle groups of the forearm and fist.

The ischemic muscle necrosis is created due to the compression of muscle-nerve elements and obstruction of blood vessels.

Microcirculation is suppressed much before the main artery occluding, so that on periphery the pulse may be palpated which may deceive and result in oversight of proper diagnosis.

The early symptoms are swelling and smooth tonus of skin. The pain occurs suddenly, a few hours after the burdening and becomes increasingly unbearable, present even at rest and overnight.

The seized group of muscles is hard on palpation, the motions are limited and painful. Already thirty minutes later the symptoms by nerves leasia occur in form of paraesthesia and hypoesthesia.

The disappearance of the arterial pulse is a late symptom in developed muscle necrosis.

When there is suspicion of this syndrome, sporting activity must be stopped and the painful segment permanently controlled.

In its early stage conservative treatment with resting, elevation of the extremity, antiflogistics and vasodilators is undertaken.

Compulsory hospitalization of sportsmen and surgical fasciotomy with wide opening of the muscle capsule, performed in proper time, enables a complete recovery of sportsmen.

107

RUPTURE OF THE TENDO CALCANEUS: A FUNCTIONAL REPAIR

Tubić M., Jovanović A., Miličić A., Milankov M., Savić D., Stanković M.

The aim of this work is to point at the advantage of the applied operative technique and early physical treatment. During a ten-year period, 23 patients has been treated operatively using the double Bunnell technic. Sutures were made in two layers in coronal section, one behind the other. The electromagnetic therapy was applied immediately after the surgery. The leg was immobilized only two days followed with progressive kinesitherapy in the next twelve years. Apart from the electromagnetic therapy, the ultrasound treatment was also applied starting from the forth week. Thiomucase was used to prevent adhesions. In this way excellent results were achieved avoiding at the some time negative consequences of immobilization.

108

STRESS FRACTURES OF THE METATARSAL BONES FOLLOWING STRENUOUS RECREATIONAL ACTIVITY

Miličić A., Jovanović A., Milankov M., Savić D., Stanković M.

This is a report of the authors' personal experience with stress fractures of the metatarsal bones in subjects undergoing basic recreational training program.

Stress fractures following strenuous activity are uncommon and have been observed infrequently. During an investigation of 5-year duration, 8 male persons had developed stress fractures of II, III and IV metatarsal bones. Most patients were usually in the first month of their training and were referred to a medical facility 14 - 21 days after the onset of progressive exertional pain in the foot. All of these fractures were undisplaced and were treated successfully by plaster of Paris spica immobilization for 4 - 6 weeks.

It is suggested that difference in programs and intensity of efforts during training may explain development of stress fractures of metatarsal bones following recreational activity.

109
LESIONS OF VOLAR PLATE IN SPORTSMEN - DILEMMAS AND CONTROVERSIES
Janjić Z., Somer T., Janjić Dj., Brankov M., Gvozdenović Lj., jovanović M., Marjanović S., Petrović T.

Closed lesion of hand in sportsmen are not rare. Lesion of volar plate's small articulation are described and diagnosed among closed injuries of hand, whether they are isolated or together with lesion of collateral ligaments and bone system, in the sports with ball, ski sports and boxing. Some hesitations in diagnosis resulted from different approaches to the treatment of these lesions. The most frequent treatment was conservative, with more or less satisfying results. Hesitations in diagnosis together with inadequate treatment (or unrecognized injury) resulted in permanent consequence - non-functional finger. Considering very important influence of every finger to the entire function of the hand, it is obvious that diagnostics and treatment of these injuries are of great significance. In the sense of better understanding this injuries, we have done some experiments on dogs in which we have imitated lesion of volar plate of the same type of lesions as we encounter in our clinical practice. Some of them were treated conservatively and some of them were operated. Observing the animals during postoperative care period, and evaluating macroscopic and microscopic changes in articulations with lesions after we have sacrificed them, we concluded that operative treatment is imperative in this sort of injuries.

110
THE SPORT INJURIES IN OPHTHALMOLOGY
Čupić S.

The author presents various eye injuries in many sports, sports with balls, fighting sports, winter sports and so on, which occur during training or competitions.

The adequate diagnosis and medical treatment, applied timely, enable satisfactory eyesight, except in eye rupture which ends in blindness.

111
THE EFFECT OF THE INTERFERENT CURRENT AND KINESITHERAPY IN THE ATHLETES WITH ANKLE INJURIES
Sarajlić-Živanović A., Conić S.

We present results obtained by application of interferent current and kinesitherapy in the athletes with ankle injuries. The study was carried out in 36 athletes (19 male, 17

female, mean age 22.4 +/- 3.5) with different ankle injuries (9 distentions, 9 slight and 9 severe distortions, 7 simple and 2 compound fractures). Series consisted of 2 times 10 therapies, with a break in between.

Application of therapy brought about significant reduction of ankle swelling ($P < 0,0001$) and increased the circumference of dorsal movement ($P < 0,0001$), plantar flexion ($P < 0,0001$), inversion ($P < 0,0001$) and foot eversion ($P < 0,0001$). Significant reduction of ankle swelling and the increasing circumference of movement appeared after both 10 and 20 applications ($P < 0,05$). Administered therapy led to significant reduction of pain after 10 ($P < 0,0001$) and after 20 therapies ($P = 0,0001$).

Different effects of therapy between the groups with different severity of ankle injuries are not statistically significant.

Combination of the interferent current and kinesitherapy has a positive influence on functional preparation and rehabilitation in all kinds of ankle injuries in athletes.

112

THE IMPORTANCE OF TIMELY SURGICAL TREATMENT OF THE BROKEN OLECRANON

Timotijević S., Baščarević Lj., Radoičić Lj., Grbić R., Bojović P., Baščarević V.

Fractures of olecranon as intra-articular fractures require an adequate and timely reposition.

At the Orthopaedic clinic of KBC Priština, during the period between 1990 and 1994, 35 patients were hospitalized for olecranon fractures of which 29 (82.8%) were surgically treated.

The following surgical methods were used: Osteosynthesis with two Kirschner needles and wire 100 p, with screw and wire 100 p and only screw.

We did not use olecranotomy as one of possible solutions.

We subjected to conservative treatment only those patients 6 (17.2%) who had extra-articular fractures without dislocations of fragments, when separation of bone fragments was less than 2 mm wide.

These treatments resulted with pseudoarthrosis in one case, elbow arthrosis in 2 and infection in 2 cases.

We maintain that a correctly chosen and timely performed surgical technique which provides good stability of fragments, along with correct plaster immobilization and early activation, gives excellent functional results of the elbow and gives rise to relatively few complications.

113

ETIOLOGY SPECIFICS OF SPORTS INJURIES - ISOLATED FRACTURES OF THE NOSE PYRAMID

Milojević Lj., Erić M.

According to the statistics of medical documentation, in the ORL Ward of the CHC Kragujevac, during five years, of 375 hospitalized patients who had isolated fractures of the nose pyramid, sports etiology was established with 53 patients (14%) and it is in the 3rd place, after injuries in fight and traffic.

Among the most frequent sports injuries there were: 19 (35%) in football, 12 (23%) in basketball, 11 (21%) in handball.

They are closely followed by the injuries in fighting arts: karate 6 (11%), boxing 4 (7%), wrestling 2 (4%).

At the end only 1 person (2%) was injured by falling from the bicycle.

They appear mostly after head-on collisions - 22 (41%), elbow blows - 15 (28%), kicks - 12 (23%), fist blows - 3 (6%) and in other way - 1 (2%).

The male sex dominates with 50 cases (94%).

The key words:

sports injuries,

nose pyramid.

114

MULTIDISCIPLINARY APPROACH TO THE PROBLEM OF PNEUMOTHORAX IN SPORT

Janković G., Stojković B., Ranković G., Radjo I., Trajkovski S.

Pneumothorax is an acute lungs incident, which develops at the same time with the rupture of the lungs and visceral pleura when the air breaks through from the alveoli into the intrapleural space. It also appears in contact and non-contact sports with the marked component of persistence. It is most frequently the consequence of the contact trauma in sports such as boxing, karate, football, basketball or results from falling down on the playground, but it also appears as a consequence of some non-contact effect in terms of strenuous effort in athletics, swimming or weight lifting, on the already prepared, vulnerable terrain of the damaged lungs and visceral pleura by some lung disease or congenital defect. Clinical picture of the acute painful thorax with pain, dyspnea and coughing begins torpedo-like, often brutally and it removes, without any ambiguity, the sportsman from the sport until his recovery. Lung function is compromised by a restriction and not rarely by an obstruction because of the

compression and the collapse of the lungs, so that the lungs volumes and capacities are reduced because of the reflexible immobilization. A tragic outcome for a sportsman is possible through the development of the clinical picture of ventilable pneumothorax, when his life is endangered because of the cardiorespiratory arrest, when urgent aspirational, closed drainage is to be applied. So, it is our opinion that the consultative work of the coach, the sport doctor, the surgeon, the pulmonary doctor and doctor for physical medicine and rehabilitation, together with the multidisciplinary approach to this problem, is an irreplaceable alternative for successful work in sports in general. We emphasize the importance of the radiology examination through which the causes of pneumothorax can be easily pinpointed.

115

INJURIES IN BOXING ARE MORE FREQUENT CAUSES OF INVALIDITY AND DEATH OF BOXERS

Janković G., Stojković B., Ranković G., Radjo I., Trajkovski S.

It is the specificity of boxing that an accidental injury is allowed. The injuries are important because of their severity and consequences which lead to invalidity and not so rarely to the death of the boxers. The injury of the head is dominant, for the head itself is the target of every boxer. The precisely directed hit and dosed knock on the head, from the sports point of view, leads to the crown of the boxing skill - the knock-out. Frequent hits on "chin drunks", as well as in the temporal region, lead to micro traumas of the brain without the required loss of consciousness, which are called concussions and which develop incidental pathophysiological mechanisms with micro-hemorrhages and diffusible swelling of the brain. These, together with the increase of the intracranial pressure, damage the brain irreversibly and lead to the death of the boxer. An already well-known irreversible change, the posttraumatic encephalopathy or so-called "punch drunks" or "weiche birne" (the condition which disturbs the comfort and comfortable life of the boxers who, having finished their sports career suffer from constant headaches and dizziness) has been developed in 5% of the boxers. Writing this report, we appeal to coaches and doctors to monitor the boxers' health condition constantly and strictly, to be rigorous while examining them, because their role is crucial in the boxers career. They must notice psychophysical changes of their disciples in time. They also have to apply and use preventive, depistage methods in their work. The head injuries are in 70% of cases (by Poschl) the causes of the death of the boxers.

116

A STUDY ON THE INCIDENCE OF HYPERFUNCTIONAL INJURIES IN A BRASOV FOOTBALL TEAM OVER A 5- YEAR PERIOD (1990-1994)

Ovidiu I. Pecurariu, Oana-Gabriela Pecurariu

The aim of this study is to present the cases of hyperfunctional injuries in a first national league football team of Brasov over a five-year period of time.

Football offers a rich traumatic or hyperfunctional pathology; according to many authors, it ranks among the sports with highest incidence of such phenomena. Out of all 286 traumas reported within the 5-year period in the "I.C.I.M." Brasov football team, 158 were hyperfunctional injuries (55.24%), the remaining 128 cases being macro- or micro-traumatic injuries (44.76%).

Within the total of 158 hyperfunctional injuries, we found:

- enthesitis	41 cases (25.94%)
- myositis	37 cases (23.41%)
- myoenthesitis	26 cases (16.45%)
- tendinitis	23 cases (14.55%)
- teno-synovitis	8 cases (5.06%)
- synovitis	7 cases (4.43%)
- meniscitis	5 cases (3.16%)
- apophysitis	5 cases (3.16%)
- aponeurosis	
and ligamentitis	6 cases (3.79%)

CONCLUSION: Hyperfunctional injuries studied statistically and within their range of incidence in the current practice of sports medicine show biochemical, enzymatic and histochemical changes in their etiology. Such changes are localized in anatomical structures, without the existence of a proper traumatic element, often as result of excessive strain under particular conditions and on the background of general body disorders. Diagnosis was based on clinical, echomyographic and biochemical examinations. This being a specific part of sports medicine pathology, we wish to outline the importance of a proper diagnosis and treatment of all cases with hyperfunctional injuries.

117

SKI SPORT - RECREATION SKIERS' INJURIES

Marinković M., Milovanović A., Milovanović J., Stijačić A., Ilić P., Bubanja T.

SUMMARY: Skiing is a very popular sport with a long tradition. In the last twenty years it became one of the most favorite sports in many parts of the world, in our country as well. With the increased number of the recreation skiers, the number of injuries has been also increased. No study was published in the area of new Yugoslavia, so we wanted to present in this work the number, the type of injuries and the special way of injuring in our biggest ski-center - Genex-Kopaonik. We used injury list made by the members of the Mountain Rescue Squad - Belgrade department, in the last five ski seasons. In this period, the Mountain Rescue had 984 interventions: male persons made 51.2% of the total number of the injured persons, whereas 48.8% of the injured were female. Distribution of injured people by age was: 28-50 years - 38% and 16-27 years - 33.4%. The most frequent kind of injury was distortion with 40.5% and fracture with 18.6%. The part of the body which had been hurt most often was the leg with 66.6% (more than a half of that number were knee injuries). 74.9% of the accidents happened in good weather conditions and most of them in the period between 11 a.m. and 03 p.m. (70.4%).

CONCLUSION: On the basis of the information, we conclude that there was no difference between male and female casualties, that most of them were 16-50 years old and had distortions or fractures of lower extremities.

118

RATIONALIZATION OF RADIOGRAPHIC DIAGNOSIS OF MAXILLOFACIAL SPORT INJURIES

Bakočević Z., Todorović Lj.

Sports traumatic injuries in the maxillofacial region account for approximately 10% of all traumatic injuries in this region. Precise determining of bone fracture is the essential diagnostic problem concerning these injuries. The easiest way to achieve this is by correct selection of appropriate radiographic techniques when examining the patient. However, radiographic diagnosis of bone fractures in the maxillofacial region is not always easy due to the anatomic characteristics, the presence of different bones in a relatively small area, superimposition phenomena etc., all of which considerably complicate the procedure.

It is a routine in diagnosing particular bone fractures of the face to apply several standard and special radiographic techniques. By doing so, series of radiographs of the same anatomic region are made, in fear of overlooking a fracture, thus unnecessarily exposing the patient to greater radiation doses. Rationalization of radiographic diagnosis

of maxillofacial sport injuries, which the authors suggest in this paper, enables rapid and precise diagnosis of bone fractures (influencing the rehabilitation process and period necessary for the injured to resume sports activities) with minimal exposure to ionizing irradiation.

Based on the complete radiographic analysis of 228 patients with bone fractures in the maxillofacial region, applying 10 extra-oral radiographic techniques aimed at detecting at least one of the certain criteria of the fracture (the presence of a fracture line; interruption of continuity of the bone margin; dislocation of fragments), the authors suggest a protocol to choose the most appropriate radiographic diagnosis of a fracture of particular bones in the maxillofacial region which 1. contribute to more precise diagnosis of bone fractures and 2. maximally reduce the exposure of the patient to ionizing irradiation.

119

RADIOGRAPHIC DIAGNOSIS OF ZYGOMATIC ARCH FRACTURE IN HANDBALL PLAYERS

Todorović Lj., Bakočević Z.

Due to the prominent position of the zygomatic arch, it is prone to be injured, especially in sports characterized by the mutual contact of players. Various radiographic techniques play an important role in the process of diagnosing fractures. However, a plethora of radiographic technique modalities for this region may impede the choice of the most appropriate radiographic method in diagnosing these injuries.

It is shown that occipitomental and submentovertex projections are the most convenient for diagnosing the zygomatic arch fracture. The aim of this investigation was to compare the efficacy and precision of the mentioned radiographic techniques in analyzing the fracture line and determining the number and position of fragments after sport injuries in 9 handball players.

Analyzing performed radiograms, the authors concluded that zygomatic arch fractures may be more reliably diagnosed by submentovertex projection (full axial projection of the skull) according to all radiologic criteria of the fracture (fracture line, number and position of fragments).

120

ACUTE SPORTS INJURIES IN CYPRUS: OBSERVATIONS - A 3-YEAR SURVEY

Costas Christodoulakis

A unique situation exists in Cyprus. All the elite athletes are covered by medical insurance for injuries, so all the accidents are reported.

It is from the records of this medical insurance scheme that this survey was made. 1,381 athletes from 19 sports were involved.

The injuries were recorded according to sports and certain conclusions can be reached.

As in every study the results are affected by certain known factors but also by others outside the recognized ones.

The type of sport and also the role of the attending physician and psychology of the athlete play an important role in the severity of the injury and the number of accidents reported.

From this survey, it becomes clear that the severity of injury has absolute correlation to the kind of sport and the number of injuries go parallel to the psychology of the athlete and the character of the treating physician.

121

TRAUMATIC MEMBRANE TYMPANI RUPTURES IN SPORT

Ješić S., Stošić S., Janošević Lj., Glišović Lj.

Traumatic membrane tympani ruptures are common, and in forensic medicine sense they represent a serious physical injuries. The mechanism of injury is the compression of the ear in the external meatus during the blow and positive blast wave. These injuries usually skin over spontaneously and they pose no therapeutic problem. The seriousness of those injuries is in the possibility of infection of cavum tympani and in the beginning of chronic otitis media.

The series of 95 patients with membrane tympani rupture which have been examined in the Institute for Otorhinolaryngology, Clinical Center in Belgrade, during the period of the last five years, are presented. The most common types of ruptures are those caused with the blow (89%), but rarely with the explosion and in sport. The ruptures originating in sport have been present in swimmers, divers, ball players.

Membrane tympani ruptures originating in sport were usually smaller than those caused by a blast wave. All sport ruptures skinned over during several weeks without any operation or auditive complications. The therapy consisted of systematically administered antibiotics and sterile gaze placed in the external meatus.

122

SPORT INJURIES OF THE NOSE AND FRONTOBASAL REGION

Stošić S., Janošević Lj., Ješić S., Pejović B., Pavlović D., Stojičić G.

All traumas of the middle floor of the facial massive can be caused in the traffic accidents (60%), at work (25%), by violence (10%) and in the recreation and

professional sport (5%). There are light injuries (hematomas, contusions, light bleeding, injuries of the skin, mucosa, cartilages, small chips, different types of fractures and severe bleeding in soft tissues and epistaxis). The nose is much more resistant to fracture from direct frontal blows than it is from lateral injuries. More rarely, there are injuries both of the nose and the frontal sinus, and/or ethmoidal sinus. In that case, we obviously performed closed reduction or open reduction of the nasal dorsum and septum. When the fracture of the frontal or ethmoidal sinus was present, we performed osteoplastic operation of sinus frontalis with ethmoidectomy and open reduction of the nasal pyramid and septum.

During the last ten years, we encountered more than 1,200 injuries of the nose and frontobasal region, but only 25 fractures of the nose in sport, and 5 frontobasal injuries which we solved by osteoplastic operation in general anesthesia. Authors offer comparison of all methods of treatment and methods of anesthesia and results with some literature data.

123

THE TIBIAL MEDIAL SYNDROME

Butković I., Vučković V.

Well localized pain along the medial distal two-thirds of the tibial shaft without any radiation, typical for the athletes, recruits and joggers is known as the shin splint or the tibial medial syndrome.

In the beginning, pain occurs only in the early stage of training or at the end of a run, disappearing within a few weeks, but the condition may also become chronic, with fits of pain recurring over period of several months.

In many cases, however, the pain becomes so severe that affects walking and sometimes is felt even at rest. No swelling is visible with correct neuro-circulatory status of the foot.

Plain radiographs show irregularity and new bone formation at the attachments of both the tibialis posterior tendon and interosseus membrane and sometimes signs of stress fracture of the tibia.

Etiology is explained as the tibial posterior tendinitis or ischemic pain in a deep posterior crural compartment.

The initial treatment includes rest, ice massage, wrapping or operative treatment - fasciotomy of the deep crural compartment.

In authors' experience, resumption of the effective training is in non-operative treatment within 4-6 and in operative 2-3 weeks.

124

AVULSION FRACTURES OF ANTEROSUPERIOR AND ANTEROINFERIOR ILIAC SPINE - TYPICAL FOOTBALL INJURIES

Sremčević D., Brdar R., Abramović D., Rakić I.

The paper discusses distinctive mechanism of avulsion fractures of anterosuperior and anteroinferior iliac spine as typical injuries in soccer players.

Characteristic elements of clinical presentation, important for prompt and correct diagnosis, are described.

X-ray studies were found sufficient for diagnostic confirmation.

Based on the experience gained on 11 cases of their own, the authors are suggesting the therapeutic approach.

125

ELECTROCARDIOGRAPHIC AND ECHOCARDIOGRAPHIC STUDIES REGARDING THE ROLE OF THE RIGHT VENTRICLE IN TOP ATHLETES

Pufulete E., Stoian I., Carp C.

Several top performance athletes out of a large pool under study presented a special ECG aspect. T waves inverted in precordial derivations V1, V2, V3 and sometime in V4 as well. They were very few as compared to the total number of athletes investigated in 20 years (12 cases for about 15.000 athletes).

Mention should be made of the following: 1 - a low incidence: 0.08% (the most frequent troubles of re-polarization athletes occur in the hind inferior and hind-inferior-lateral walls); 2 - they appear late in the sport career, alongside their involvement in large volume-high intensity training, necessary to reach performance peaks; 3 - at maximal effort, ECG variations decreased or became normal; 4 - they were most frequent in swimmers (58.33%); 5 - a higher frequency was present in females (75%).

The sports practiced by our subjects consist of efforts of long endurance (type I and II Neuman) and increased intensity. The aerobic capacity was medium and good, but none of these athletes managed top results. Echocardiographic studies (M and 2D) suggest not so many morphologic changes, but mostly certain disfunction of the right ventricle, a possible consequence of the inadequate pre-load reserve of the right ventricle.

The possibility that the right ventricle may play a significant part in limiting the effort capacity (in certain cases) should be given attention to.

126

SOME ECG DISCOVERIES IN RECREATIVE, ACTIVE AND FORMER SPORTSMEN

Stanić R., Đorđević J., Stevanov V.

There are many young people in our vicinity engaged in different kinds of sport activities (e.g. recreative and active sportsmen). The trend of everyday growth in their number is evident!

In ECG taken during the first, selected examination for later controls, certain irregularities in relation to normal results can be registered.

It is important to be familiar with these irregularities in order to learn the physical exertion influence on CVS and proper interpretation of ECG in order not to proclaim the young and healthy sportsmen ill!

In rich casuistry, in descriptive style, only some of the most striking cases of disorder in rhythm and conduction are shown (Vagotonia, Syndroma hyperkyneticum cordis, SVES and VES arrhythmia, Syndroma LGL and WPW, Ramus block dextri, A-V block I^o, A-V block II^o - Wenkenbachii transitoria etc.).

127

MITRAL VALVE PROLAPSE AND VENTRICULAR RHYTHM DISORDERS IN ASYMPTOMATIC PATIENTS - COMPETITIVE ATHLETES, YES OR NO?

Arandelović A., Cvetković Z., Dražić V., Stanojević S., Ugarković D., Marković P.

Heart rhythm disorders are very frequent in patients (pts) with mitral valve prolapse (MVP). They are more impaired with hemodynamic significant mitral regurgitation (MR) and not in correlation with the degree of anatomic changes. In its most serious form, dysrhythmia can cause sudden death. The aim of this study was to establish ventricular rhythm disorder (VRD) frequency in MVP syndrome in asymptomatic pts - athletes and to emphasize the importance of these changes as a decision process in competitive sport.

We have examined 60 pts (48 male and 12 female), aged 17 - 26 years (21 +/- 4.2 years) in different sport fields (6 fieldball, 8 handball, 17 basketball, 9 swimming and 20 soccer). MVP diagnosis was established by clinical examination and 2D/Doppler echocardiography. Dysrhythmia presence was established by classical ECG and confirmed by 48 hour ECG Holter monitoring. The degree of dysrhythmia was evaluated by Lown classification of VRD. MVP was found in 18/60 (30%) pts. Significant MR was found in 2/18 (11.1%), VRD in 12/18 (66.6%) pts. Lown I - II were found in 9/12 (75%); Lown III in 3/12 (25%), Lown IV - V were not established. Pts with Lown III arrhythmias had hemodynamical significant MR.

CONCLUSIONS:

1. VRD in asymptomatic pts with MVP athletes are not rare (66.6%).
2. Competitive sport is prohibited in pts with VRD and significant MR due to possible valve rupture and is not recommended in pts with arrhythmias Lown III - IV group (without significant MR) with required antiarrhythmic therapy (PAT).
3. Competitive sport is allowed in Lown I - II category of pts with PAT if VRD are frequent.
4. Avoid antiarrhythmic drugs with prolongation of Q-Tc interval; Beta adrenergic blockers (Propranolol) have favorable effect in mild dysrhythmia regulation.

128

LEFT VENTRICULAR WALL STRESS DURING EXERCISE IN ATHLETES, SEDENTARY MEN AND HYPERTENSIVE PATIENTS

Arandelović A., Cvetković Z., Stanojević S., Ugarković D., Dražić V., Marković P.

The aim of our pilot study was to assess whether hypertrophy of the left ventricle contributes to wall stress during exercise.

Upright treadmill exercise was performed by 30 male subjects (10 trained athletes; 10 sedentary men; 10 hypertensive pts); of mean age of 32 +/- 4.2 years. We assessed left ventricular (LV) hypertrophy by 2D/M-mode echocardiography during submaximal exercise.

LV contractility and wall stress were not significantly different between groups, at rest.

With higher heart rate (110-140 beats/min), wall stress decreased in athletes (9/10 pts) and sedentary men (7/10 pts) but in hypertensive patients (pts) it was higher, although not significantly (3/10 pts, $p>0.5$).

We supposed that wall stress in sedentary men is a normal physiological reaction. The same situation was in the athletes because cardiac enlargement in this group enables a greater stroke volume for the performance of sustained, intense exercise.

The differences between athletes and hypertensive pts were probably due to different mechanisms of hypertrophy.

In athletes, hypertrophy occurs symmetrically in both right and left cardiac chambers, reflecting bilateral hemodynamic loading.

The symmetry of the athletes cardiac enlargement differs from pathologic conditions which have heterogenous effect on specific cardiac chambers.

129

ARRHYTHMOGENIC RIGHT VENTRICULAR DYSPLASIA IN YOUNG SPORTSMAN

Milošević M.M., Grujić M.Ž., Mrdja S.B., Radojković B.,

INSTITUTE CARDIOVASCULAR DISEASE

Arrhythmogenic right ventricular dysplasia (ARVD) characterized by massive replacement of the right ventricular myocardium with fibro-adipose tissue ("diffused" form) or localized replacement of muscular tissue ("localized" form). ARVD has been described in an increasing number of young athletes who died suddenly or who had potentially lethal or lethal arrhythmias. In the original description of the first four cases, there were three sudden deaths. ARVD seems to be an important cause of sudden death in young people and sudden death has frequently been the first manifestation of the disease.

The subject is a 24-year-old soccer player who was for the first time referred to our center for recent history of mild and brief palpitations during physical activities. 12-lead ECG showed negative T-wave from V1 through V4, ventricular premature single beats of left bundle branch block configuration. Exercise test showed non-sustained ventricular tachycardia at the end of the test. Echo-cardiogram showed an enlarged, hypokinetic right ventricle with systolic dyskinesia in a thin wall of the ventricle, and diagnosis of ARVD was established *infra vitam*. Signal averaged ECG showed late ventricular potentials and antiarrhythmic drugs were prescribed (Amiodarone plus Propranolol). The patient is still alive, with moderate heart failure.

130

PATELLOFEMORAL ARTHROSIS AS A DELAYED COMPLICATION OF MENISCECTOMIZED KNEE - CLINICAL, RADIOLOGICAL AND BIOCHEMICAL ANALYSIS

Šćepanović G., Drašković V.

Up to now, research on the delayed complications of meniscectomized knee have been mostly related to tibiofemoral cartilage, while patellofemoral cartilage has been left out, or only mentioned in passing.

Since the meniscus is a passive stabilizer of the knee, it is realistic to expect changes in the knee axis after meniscectomy, so medial meniscectomy offers varication and lateral meniscectomy offers knee valgization.

We have performed analysis of delayed results after the total meniscectomy in 56 patients out of 627 patients operated in the 1965-1975 period. We have controlled only patients with the other knee healthy, and we have made optimal conditions for forming the control group. We have taken into consideration only patients who, apart from the mentioned meniscus injury, had no other changes on the knee. There were 44 medial

meniscectomies were and 11 lateral ones. 41 meniscectomies were performed on the right knee and 15 on the left.

In assessing the results, we have taken data obtained from case histories, clinical pictures and X-ray findings.

In 45.5% we have found radiological changes in patellofemoral joint. In intact meniscus the compressive powers perform equal distribution of average pressure on the surface in patellofemoral and tibiofibular joint. After the removal of the meniscus, there occurs a decrease in contact surface with the asymmetrical distribution and strain concentration in the joint cartilage.

131

OBSERVATIONS OF STRUCTURAL CHARACTERISTICS OF THE ARTERIAL WALLS CONTACTED WITH BONE

Mrvaljević D., Djordjević-Čamba V., Teofilovski-Parapid G., Bumbaširević V., Ranković A.

The wall structure of the arteries contacting the bone with one part of their wall were investigated by light microscopy. The numerous segments of vessels were taken from the following arteries: a. meningeal media (from its intracranial part), a. ophtalmica (from its segment located in the optic canal), a. basilaris (while situated on the clivus), and from a. vertebralis (in the contact with the posterior arch of the atlas and in transversal canal). The specimens were taken from persons of both sexes and different ages. The blocks underwent the routine procedure for light microscopic examination and were stained with hematoxylin - eosin.

The changes of the structural plan of the segment attached to the bone referred to the decreasing number of elastic fibers and smooth muscle cells. That was combined with the increased number of collagenous fibers in the media of the arterial wall.

The authors are convinced that the mentioned structural changes were caused by the functional adaptation of the wall to the mechanical-circulatory phenomena in the segments contacted with the bone. Having in mind such a structure of the wall the impossibility of spontaneous hemostasis as well as the more frequent appearance of the aneurism of the paraosseal arteries could be explained. In the fetus, the mentioned changes were not observed, while the changes become more frequent with the age. They are likely to be the consequence of the pressure of the arterial wall on the bone, particularly in the case of the changed arterial pressure.

132

THE PREPARATION OF HEALTH INVENTORY: PROBLEM-ORIENTED MEDICAL RECORD IN SPORTS MEDICINE

V. Jorga, V. Ljutić

The core of the strength of modern and efficient medicine is medical records. In sports medicine, medical records also have been kept for years in a more traditional way, and have frequently failed to fulfil their main purpose; that is, effective and efficient lucid communication, education and rapid retrieval of stored sports medicine information about professional athletes and recreational sportsmen. Computer and information technology gives us opportunity to create modern Problem-Oriented medical Record in Sports Medicine (POMRSM) which eliminate poorly supported diagnoses and incomplete progress notes. The laboratory results and sports medicine management plans of treatment could be adequately recorded and closely monitored. We have devised this approach with the object of providing a means whereby the sports medicine medical record will better and more precisely reflect the health condition and problems of sportsmen and patients, and professional responses to them on the part of the sports medicine doctors, nurses, and other major participants in the sport medicine care. The central and focal point to its formulation is the view that the sportsmen record must be designed in such a way as to express specifically what sports medicine physicians deal with most frequently - the problems of the sportsman. The sports medicine adopted the ultimate goal of clinical taxonomy directed toward identification of etiology, pathology, and pathological physiology, in view of their importance as guides in therapy. The starting point is the creation of sports medicine computer data base. POMRSM must stress the importance of a careful and complete history and physical examination which are of fundamental value to sports physician. The POMRSM stress the importance of this traditional but irreplaceable approach to data collection, consisting of four building blocks; e.g. data base, problem list, plans (by problems: diagnostic, therapeutic, patient education, etc.), and progress notes (by problem). The process of preparation of health inventory list will be based on the following building blocks: screening examination, history/physical forms, qualification/disqualification process, specific disqualifying conditions, chronic conditions. This sophisticated modern approach which is soundly based on the traditional approach of clinical medicine is an adequate answer in the process of determination of whether a particular sport is appropriate for an athlete with particular medical conditions. The POMRSM gives a sports physician an invaluable opportunity for problem solving in the finest tradition of the sports doctor/patient relationship.

133

CLINICAL OUTCOMES FOLLOWING TARSAI TUNNEL DECOMPRESSION

Baltopoulos P., Douvis S., Koskinas A., Sgantzos M., Konstans A.

This study includes 11 athletes (7 males, 4 females with an average age of 25 years) who suffered from tarsal tunnel syndrome in the 1988-1994 period. The diagnosis was based on the clinical feature. Electrodiagnostic studies were abnormal in five cases.

The operative technique which was utilized for all cases consisted of decompression of the posterior tibial nerve and its branches.

Division of the deep abductor hallucis fascia was performed as a rule.

Postoperatively the foot and ankle were immobilized with a plaster splint for 10 days. All the athletes were followed for one to six years' period.

Over-all of the 11 athletes we had excellent results in 8 athletes and good results in 3 athletes, who complained about intermittent pain during training at the latest follow-up examination.

134

THE USE OF SAFETY EQUIPMENT FOR BICYCLING

Sgantzos M., Mistidis P., Vamvakas F., Fikouras N., Bashalis S.

It is a great challenge for the physician to understand how to treat bicyclists.

The bicycle trauma is a major problem especially in recent years.

Head injuries account for the serious injuries and deaths.

The mechanical condition of the bicycle, the control of speed and the special safety equipment are risk factors.

Especially, head injuries are generally preventable with the use of a good bicycle helmet.

The helmet crushes to absorb the shock of severe impact.

If a helmet has sustained a significant crash it should be replaced.

In this study we have examined the injuries for a period of three years (1991-1994) in Greek National Bicycling Federation. The use of proper protective clothing, helmets and other safety equipment has been compared with the seriousness of injury.

We analyze the special strategies that followed to prevent bicycle trauma.

Our experience saw that there is a good evidence to recommend helmets and other safety equipment to prevent bicycle injuries.

135

THE IMPORTANCE OF PHYSICAL TRAINING IN PREGNANCY

Dragičević T., Babić D., Stanisavljević D., Ille M.

The maintaining of physical condition is very important in the life.

The aim of this research is to show the importance of moderate physical training in pregnancy. To explain whether there is a relationship between physical training, pregnancy and child delivery.

The study is based on comparison of two groups of healthy pregnant women of almost same age and psycho-physical condition at the beginning of pregnancy ($p > 0,05$). One group attended organized and moderate physical training twice a week, and second group had no physical training. The results were statistically analyzed.

The results showed that at the end of pregnancy the women who have attended physical training are much better physical condition. All their clinical, physiological and biochemical results are much better than in the other group ($p < 0,05$). The pregnancy problems are more frequent in the group of women without physical training. During delivery the muscle contraction is better in trained women ($p < 0,01$).

We can make conclusion that there is an important relationship between physical training in pregnancy and delivery. The role of physical training is very important and it is in many ways very useful to practice some moderate physical activities during pregnancy.

136

THE EFFECT OF HBO ON THE RECOVERY OF THE SPECIFIC ENZYMES TO NORMAL VALUES IN BLOOD AFTER THE WEIGHT-LIFTER'S TRAINING

Vujanović D., Isaković R.

In weight-lifters muscle tissues are exposed to extremely high strains at extremely short intervals. Namely, in short time intervals the whole muscle mass is contracted, remaining in that state for a certain longer period after which it is again relaxed. In the stage of maximum contraction, the nutritive blood vessels are compressed and partial oxygen pressure in them is very low. The recovery of muscles in these conditions demands longer duration.

The starting hypothesis was that the administration of HBO after the training will shorten the period required for the recovery of muscles. Two groups were selected, of 10 weight-lifters each. The protocol included follow-up of their specific ENZYMES (CK, CK MB and LDH), and specifically:

- in state of rest

- after a training.

One group received HBO therapy after the training while the control was without it. The above values were respectively measured again.

In the analysis of the obtained results the curve of the CK MB values showed significantly more rapid decrease in the group receiving hyperbaric therapy than in the control group.

137

ANTHROPOMETRIC CHARACTERISTICS OF ARMED FORCES RECRUITMENT PERSONNEL

Milojević M., Obradović B., Rađen S., Pavlica M., Paunović P.

In this paper, the authors have presented some of basic anthropometric measures and indexes, which are relevant to make an estimate of physical development and nutritional status in a selected group of armed forces recruitment personnel (n=217), aged from 18 to 20 years.

The following parameters were measured: body height, body weight, circumference of arm, skinfold thickness at ten different parts of the body, muscle strength, vital capacity. The following values were calculated: the Devenport-Kaup index, the percentage of body fats and the arm diameter. Maximal oxygen consumption was estimated by a continuous submaximal load using an ergometer bicycle. The muscle strength was determined applying a mechanical dynamometer.

The mean body height was 177.6 +/- 7.3 cm, body weight 72.1 +/- 7.7 kg, percentage of body fat 15.5 +/- 2.3, Devenport-Kaup index 2.28, VO₂ 43.3 +/- 7.6 ml/kg/min.

Anthropometric measurements and determination of maximal oxygen consumption show that 69% of armed forces recruitment personnel were normally nourished and with aerobic capacity within the range of "Very good" category.

138

MALONDIALDEHYDE AND SOME ELEMENTS OF ANTI-OXIDATIVE DEFENSE IN THE SERUM OF PATIENTS SUFFERING FROM ACUTE HEMATOGENIC OSTEOMYELITIS

Grbić R., Mirić D., Baščarević Lj., Vasić A.

Twenty-four patients suffering from acute hematogenic osteomyelitis and forty patients suffering from chronic hematogenic osteomyelitis, hospitalized in 1994 in the Clinic for Orthopedic surgery, KBC Priština, have been studied. Routine laboratory analyses and microbiologic verification of the bacterial agents' profile have been done.

For the purpose of examination, the appearance of the stable product of lipid peroxidation in the sera, as well as actual status of some elements of antioxidative defense, the concentrations of malondialdehyde (MDA), Vitamin C, albumin, IgG, CRP and the catalase activity have been determined.

Control material comprised sera from healthy blood donors with no evident clinical signs of inflammatory or degenerative bone and joints disorders.

There were significantly higher values of MDA and IgG concentrations as well as catalase activity within the patients suffering from acute hematogenic osteomyelitis, compared with the control, although no significant changes in albumin and Vitamin C concentrations have been found.

Among the patients suffering from chronic hematogenic osteomyelitis MDA, IgG and catalase values were similar to those among the control, although near the upper limits. The significant depletion of albumin and Vitamin C concentrations took place in the group with chronic hematogenic non-specific osteomyelitis.

139

THE RESEARCH OF THE LEVEL AND CONNECTION OF GENERAL AND SPECIFIC HAND ABILITY IN VOLLEYBALL PLAYERS

Madžarac M., Đorđević S.

We made a research of the level, connection and differences in general and specific hand ability on the sample of 133 junior volleyball players, aged 18 (123 were right-handed and 10 left-handed). We measured their general hand ability by MODEOV DEXTERIOMETER and specific hand ability by the following three tests:

- consecutive return of the ball by fingers (CRF)
- consecutive return of the ball by "hammer" (CRH)
- precise return of the ball by fingers (PRF).

The results of the research show that:

- the right-handed juniors have better results in specific hand-ability,
- general ability of the hand of the left-handed is better than the ability of the right-handed and vice versa,
- established differences between the left-handed and the right-handed volleyball players in the observed space do not reach the level of statistical significance of 0.05.

Connection of the left hand ability with the right hand ability is very high, significant and positive. Connection of (CRF) and (PRF) is very important and positive in the left-handed juniors. In the right-handed juniors there is a low, important and positive

connection of (PRF) with the general right hand ability on the level of statistical significance of 0.05.

140.

BASIC PREPARATION OF ORGANS OF THE LOCOMOTION APPARATUS

Čarapić V., Vujadinović O.

In transition period, the active muscle-ligament and capsular elements of the locomotion system weaken in tonus, strength and sturdiness.

Basic preparations of sportsmen in mountainous conditions are performed with the objective of regaining their lost physical and sporting capability and its increase needed for surpassing the previously obtained sports achievements.

Phylogenetically younger extensors, abductors and supinators are by far weaker, they have smaller muscles reserve, and therefore, through the basic preparation, they demand a special training with gradual increase of the load. This has been based upon the level of dynamogenous ability, local energetic depot and existing conditions of peripheral circulation.

Phylogenetically older flexors, adductors and pronators, and especially the muscles of the compartment of the trunk and legs are more engaged in regular training.

Through the basic preparation, the contracting and decontracting ability of the muscle is modified by a specific training. This is being achieved in correlation of the mitochondria enzyme activity and functional-performance parameters between the fast, white muscle fibers responsible for speed, elasticity and explosive power, and red, slow muscle fibers responsible for endurance and efforts.

During the acclimatization, there occurs the increase of myoglobin contents and muscle tissue capillarization in muscles, with the improvement of oxygen usage in mitochondria and positive morphological-structural effects for longer-lasting sport burdens on the lower altitudes, where the sport training and competitions take place.

141

EMERGENCY INTUBATOR

Prlija V., Prlija S.

Intubation is beneficial method for help in to respiration at stoppage in to upper respiratory system and coma. Similar help in intubation is necessary at practice of anesthesiologists at difficult conditions and modified anatomic relations because of disease or deformation. Tracheotomy, which is in alternation relation in intubation, seldom is possible for realization without adequate conditions that is, instruments, operation room and professional personnel. In this way, urgent intubation as a beneficial

method is managed with much difficulty. All these difficulties are resolved with the set named "Emergency intubator" which belongs to the class of optical tools for intubation and was patented in 1990. Indications for the use of the "Emergency intubator" are routine, difficult, urgent, urgently difficult intubations, as well as those performed in conditions of coma, on terrain (in the street) and in transport. Advantages of the Emergency intubator are: it fits in a single bag, its mobility, its independence from the source of electrical power, its applicability in adults and children, in hospitals, on terrain and in transport, its evasion of the tissue damage, the precision with which the tube can be positioned without necessity for any auscultatory control, its compatibility with respirators and balloons, the possibility of its use by nonmedical personnel, its operation by a single person (without assistants), education in intubation, small weight and lower price in comparison to previous systems.

142

FITNESS SOFTWARE

Pavlović M., Kadvan A., Pavlović N.

The program was designed for use in fitness and health centers for aerobics and body building section. Included in this software program, there are integrated modules that keep record of personal information on members, capture time for exercise, visiting, assess body composition, etc.

All modules are organized so that the data can be stored in retrievable files that can be appended and edited, and a variety of summary screens/printouts can list data cross-sectionally or longitudinally. The program automatically produces file averages on all variables, so that the individual data can be compared to group mean values.

The body composition module evaluates anthropometric parameters, body height, weight, triceps skinfold, mid-arm, waist, and hip circumference. The program automatically assesses the body mass index, desirable weight, waist/hip ratio, % body fat, caloric requirements according to body weight, physical activity level and occupational activity, and artery hypertension according to international reference values, for age and sex.

Target heart rates, 65% and 85% target heart rates are computed automatically using the factors of members' age, sex and resting pulse rate to improve aerobics conditioning and gain aerobic points.

The software can be used with little or no microcomputer experience. A manual is included.

The program will be demonstrated during the congress.

143.

IDENTIFICATION OF PROBLEMS IN SCUBA DIVING WITH THE ANALYSIS OF RECOMPRESSION THERAPY REPORTS

Roganović M., Roganović M., Bogdanović S.

Recompression therapy is an urgent method of the causal treatment of the specific acute diver's sickness. Decompression sickness and air embolism develop after the irregularly rapid coming out of SCUBA diver's under a relatively low environmental pressure. These sicknesses are usually accompanied by incidental dives where technical causes are sporadic. The recompression was conducted with "PDK2M" chamber producer by Russia, by modification of the standard recompression regime of the US Navy, proper reports were made about them. The sample is represented by 42 successively treated divers during the period of fourteen years. Our hyperbaric chamber was installed in Pula until 1992 when it was moved to Kumbor, where it is in function now. We identified problems by analyzing correlation group variabilities, where we have classified authentic data: personal and anthropometric; about diving and about equipment; developing symptoms and previous treatment; recompression and the result of the treatment. Doctrinally, the main reason for incidents in diving is "3U", but we should add: Unskillfulness causes unfitting and carelessness; Untrainedness causes unpreparedness and unwariness; Undiscipline causes disorganization and insatiability. Therefore, in self-taught divers ("professionals", adventurers, and the curious) we encounter quick manifestation of the severe forms of decompressive sickness and air embolism.

144.

VARIATIONS OF STATURE IN SPORTSWOMEN OF NOVI SAD

Kovačević B., Feldi A., Gavrilović Ž.

A sample of 100 sportswomen from Novi Sad analyzed the values of their body height according to sports disciplines. Body height was measured with medical anthropometer always in the morning hours. It was established that the tallest are basketball players (174.33 cm), handball players (173.50 cm) and volleyball players (173.95 cm) and the shortest the divers (167.30 cm) and skittle alley players (163.76 cm). The majority of those examined was between 19-35 years of age, and the skittle alley players were over 40 year of age. This is the first survey of body height in sportswomen in Novi Sad.

145

BODY CONSTITUTION OF FOOTBALL PLAYERS IN NOVI SAD

Vukosav B., Gavrilović Ž.

The body constitution was examined in a group of 17 football players in the club Vojvodina, Novi Sad according to the method of Šljajmer M. Firstly anthropometric measurements of football players were taken and constitutional and truncal index was calculated. On the basis of indices obtained, the football players were classified into certain categories according to Šljajmer M. It was established that these sportsmen are of average mesoeurismic and hyponormosthenic constitutional type. The football players are, according to their stature, very tall men according to Martin, which is a priority for this kind of sport.

146

DAILY PLANNING OF SPORTS MEDICINE NUTRITION

V. Jorga, V. Ljutić

The end of the 20th century saw a dramatic increase in sports and recreation activities at all levels. The recent studies and estimates expect that this interest in sports and recreation will continue. At the same time, interest in education in proper sports nutrition has been increasing. Many sports physicians see this attitude of healthy lifestyle as integrating the modern and proven concepts of tested and certified exercise and good nutrition. The starting point are general considerations (food guide pyramid, a guide to daily food choices); then calories (recommended dietary allowances for energy), and formula to estimate ideal body weight shall be examined, also with formulas how to determine calorie requirements. Vitamins shall be covered with vitamin sources and functions, along with their toxic effects, followed with the iron and trace minerals. Then we are examining the age considerations, weight loss, weight gain, body estimates for high school athletes, carbohydrate loading followed with precise percent body fat averages for various sports, and 2000 calorie weight body reduction plan. The concepts of pre-game meal, and fluid replacement have also been examined. Then follow the requirements for a balanced diet consisting of the four major groups which must be composed of protein, carbohydrate and fat. Such proven sports medicine nutritional approach differs very little for the performing professional athlete and other groups of non-athletes, e.g, recreation sportsmen. Because of the athlete's increased activity and training, calorie requirements must be adjusted in the nutrition management program depending on type and level of activity in which he/she is involved. As an athlete grows from childhood through adolescence and into adulthood, the exact requirements for added calories vary due to the normal growth and development. With proper education program managed by sports physician, the athlete, family and coach, many myths and wrong beliefs regarding sports nutrition and sports activities are being

dispelled. Only through the well prepared, organized and implemented efforts of the sports medicine team will the realities of the effects of nutrition on athletic participation continue to be disseminated to an active society.

147

THE USE OF THE LOW FREQUENCY PULSATING ELECTROMAGNETIC FIELD IN TREATMENT OF PATIENTS WITH ANKLE INJURIES

Simić M., Striković J., Janković S., Janković M.

Patients with ankle injuries represent a significant problem in traumatology, especially when in case of sports injuries, and considering their frequencies, possible complications and consequences, either with soft tissue injuries or fractures. In addition to other complications which can prolong rehabilitation treatment, algodystrophy is very frequent (M.Sudeck), and that is quite logical because every aggression on neuro-vegetative nervous system reflects on the periphery. Regardless of the etiological factor that provokes the algodystrophy syndrome, the theory of sympathetic reflex arc presumes that the reflex arc is restored and that by the use of sympathetic system it causes vascular disturbances on the periphery which are responsible for various clinical signs such as oedema, pain, osteoporosis, fibrosis of soft tissue etc.

Application of LFPEMF in such patients and adequately to biological activity would be the method to chose in addition to other applied methods. By using LFPEMF we intended to improve the local circulation as well as the utilisation of oxygen, activating the enzyme system etc. All that leads to certain regression of algodystrophy, and to a functional recovery. Our first aim was to prevent changes that are irreversible. Favourable biological influences of physical procedures are shown in the velocity of recovery and in the completeness of the same.

In order to compare the profitable influence of physical procedures we observed two groups of patients. Group A - an experimental group consisting of 50 patients with fractures on ATC level, where the LFPEMF was applied; Group B - the control group consisting of 50 patients with same type of injuries, where the classical physical procedures were applied (DD,IFS, EF vasodilators etc.). Parameters of the LFPEMF therapy have been as follows: in all the patients of the group A trains quasi-squared pulses were used to produce 1mT peak value homogenous magnetic field with frequency 15 Hz burst in the wounded region. A significant statistic difference in favour of the experimental group was noticed, in terms of shortening of the time of healing. Also, the number of cured patients increased, as well as the number of patients with satisfactory functional recovery.

148

DEFINING THE LEVEL OF CONCENTRATION OF UREA, IN THE BLOOD OF SPORTSMEN AS ONE OF THE CRITERIA OF RECOVERY

Doko Z.

The irritations because of training are only effective if the process of regeneration is brought into accord with the training load. The limiting factor for training loads is the speed of regeneration-recovery. There are numerous biological indicators of recovery of the organism after the effort. The determination of level of UREA in the blood may be used as an indicator providing the information when it is possible to undertake the long-lasting effort again. (12)

The level of UREA was followed in the group of bicyclists after a two-hour strenuous training. It was found that the increase in the concentration of UREA in the blood after 2 hours from the final effort in relation on the value at rest was substantial.

That is to indicated that the working capability of the subjects is still incompletely recovered, that is, it did not come to the complete restitution of the organism.

In the period of longer rest, relaxing, (6 hours) the level of UREA shows increase in some individuals, but in some it remains at the level fit reached after 2 hours, and in some other subjects one could notice reduction. After 24 hours, in all subjects the level of UREA is reduced to the approximate established value in relax.

Different changes of the contents of UREA in the blood are testimony of the rapid, quick way of recovery.

149

ETIOLOGY AND SPECIFICITY OF THE SPORTS INJURIES IN RUGBY SPORT

Naumović P., Mirić M., Djordjević-Maksimović R., Stančulović A.

The specificity of the incidence of the sports injuries in rugby sport as a contact game is directly in the function of the contact between the players.

The factor of the contact is here fundamental factor and it is the most frequent, although others also existsuch as: untrained sportsmen, insufficiency of condition, the warming of the body on time before the match, regular and legal proceedings, sports grounds (stadiums), body weight, control of the trainers and referees, inadequate protection of the different regions of the body.

Speaking about the contact between the players and where we expect the injuries, we have to mention that the goal of the game in rugby is ELIMINATION of the player with the ball (to push him down and before him to continue the game). As the evident material we used the presence (ours) on the 27th world Junior Rugby Championship (April 1995, Bucharest, Rumania), where we made the photo-diapositives before, in the

course, and after the rugby match, to explain the conditions under which the injuries and the expositions to the injuries, which are very heterogeneous, occur.

150

SYSTOLIC AND DIASTOLIC BLOOD PRESSURE CHANGES IN NORMOTENSIVE AND MILDLY HYPERTENSIVE INDIVIDUALS DURING THE EXERCISE TEST

Jakovljević, Avramović DM., Stojanov V., Šaranović, Avramović DD.

The study is aimed at determining possible differences between the two groups of subjects, normotensive and hypertensive according to measurement and monitoring of systolic and diastolic blood pressures and cardiac frequency during the exercise test. The study included 30 males averagely aged 45 $\pm$ 3 years, classified into two groups according to the arterial blood pressure values: normotensive (N, n=10) and hypertensive (H, n=20) subjects. Average values of the systolic (SP) and diastolic (DP) pressures and cardiac frequency (CF) obtained before the test are presented in Table 1.

Table 1

group	SP	DP	CF
H	143 $\pm$ 19	95 $\pm$ 5	76 $\pm$ 6
N	123 $\pm$ 8	75 $\pm$ 6	69 $\pm$ 5

The groups were adjusted according to their age and BMI. All subjects underwent the progressive, continuous, multi-step exercise test at 50, 75, 100 and 125 W. Table 2 presents average SP values at loading of 125 W.

Table 2

	H2	N2	p values
SP (mmHg)	217 $\pm$ 6	178 $\pm$ 10	< 0,01
DP (mmHg)	105 $\pm$ 6	87 $\pm$ 9	< 0,01
CF (n/min)	153 $\pm$ 6	142 $\pm$ 13	< 0,05

The highest load test (125 W) was tolerated by 17 subjects (85%) with elevated arterial pressure values and by all normotensive subjects.

According to the obtained results, it may be concluded that the individuals with elevated arterial pressure values reacted to the same physical exercise with significantly higher

increase of SP, DP and CP, when compared to the individuals with normal blood pressure levels.

151

SPORTS PEDAGOGUE - HEALTH COUNSELLOR

Janjić M., Djokić D.

The paper presents a theoretical discussion concerning the general health and physical education involved in a common pedagogic process, and its contribution to the development of healthy body and sound and strong personality.

The paper postulates that the health is primarily the function of an interrelation between man and his environment; of the already formed behavioral style; and of the struggle with numerous risk factors surrounding him. Since the health and physical education are an inseparable entity of the development process of a young organism, far greater importance should be attached to these areas within the primary health care. This was accomplished so far as health education is concerned but, however, the physical education has not yet found its proper place. Therefore, there is much to be done to make the physical education and sport, and thereby the sporting organizations, too, become the center of activities for health care and its promotion in the entire population, and not only in those organizations which strive to achieve the highest scores at any rate.

In such attempts, the sports pedagogue, through his work in the school, work, and sporting organizations, assumes great responsibility as a partaker in the personality formation of the young people, which also means that he, in addition to being the trainer must also act as a link between these young people and their families, the school and work organizations. This cannot be achieved solely through a direct contact with their trainees, but also by serving as an example to these young individuals who, through identification with their trainer should also exercise healthy patterns of behaviour. Therefore, the sports pedagogue must be familiar not only with the principles of physical education and sports activities but also with the rationale of the pedagogic and health education program where a personal example plays an important role.

152

IMPORTANCE AND FREQUENCY OF THE TOOTH CARIES AT THE YOUNG SPORTSMEN

Naumović-P., Mirić M., Djordjević-Maksimović-R., Stančulović A., Čvertkov I., dr Todorović M.

The sports medical control of the sportsmen at the competitive sport, besides the physical clinical examination, also consists of dentist's control of the teeth and mouth, in each first examination, and in each subsequent control.

In the course of the 23-year period of the sports medical work in sports medicine, our medical team of the Institute for Sports Medicine, Belgrade, including the dentist service, observed that, of all teeth, the teeth 6 (molar) are very frequently attacked by the bacteria (caries), more often than the other ones.

On the pattern of 1,216 sportsmen of different sports disciplines, of both sexes, and of average age of: $X=14.5$ years, in the January-May 1995 period, we obtained the statistical data that there were 180 (or 14.80%) patients-sportsmen with healthy teeth number 6, and with changes also on the same teeth (plumb, caries, gangrene, pulpitis, extraction) - 1,036 (or 85.22%).

An attempt was made to explain such frequency of the genesis of pathological process in the teeth 6, in relation on the other teeth, and the great number of the attacked teeth number 6, with the etiology of the development of the caries, prevention, hygiene, and the complications, which happened with non-systematical dental control of the teeth by the young sportsmen.

153

THE SPORTSMEN' NODAL RHYTHM.

Erić M.

The sportsmen's or athlete's heart has its morphological, functional and electrophysiological characteristics. One of these characteristics less treated and studied is the Nodal Rhythm or Junctional Rhythms. In this disorder of rhythm, the role of the guide is performed by the atrioventricular, nodal or Achoff-Tawarin's node.

In this work, the frequency of nodal rhythm appearance is shown, which has been discovered at the sportsmen by former routine or periodical systematic medical check-ups.

Our of 4,746 checked persons, 34 or 0.7% had nodal or junctional rhythm. Sportsmen were from different sport branches and at different levels of trainedness. These junctional rhythms have been provoked by physiological bradycardia i.e. by vagus

overweight. At the same time, one should be very cautious since the nodal rhythm can appear at pathological conditions which is a contraindication for overall sports activities.

Key words: Nodal Rhythm in Sportsmen
Junctional Rhythms in Sportsmen

154

COMPARATIVE EVALUATION AMONG THREE DIFFERENT THERAPEUTIC PROTOCOLS IN ATHLETES WHO SUFFERED FROM PLANTAR FASCITIS

Baltopoulos P., Vamvakas F., Mistidis P., Douvis S., Kouki V.

This study includes 44 long-distance runners (28 males, 16 females with an average age of 23 years). The athletes were divided into three groups and in every group, different conservative treatment was put into practice, with a follow up of

1-3-6 and 9 months.

The first group (n=23) was treated with the use of orthotic insoles in combination with anti-inflammatory drugs. The second group (n=12) was treated with the use of orthotic insoles in combination with xylocaine + corticosteroid injections.

In the third group (n=10) we used only injections of xylocaine + corticosteroid.

According to the results of this study in the group of athletes where the conservative treatment was based on the orthotic insoles, we had no pain. In cases where the conservative treatment included only injections we had no significant improvement in a period of 6 months in 40% cases.

The results in this study lead us to the conclusion that the use of orthotic insoles as therapeutic and protective means plays an important role in this group of athletes.

155

RELATIONSHIP BETWEEN ARM STRENGTH PARAMETERS AND SOME SPECIFIC PERSONALITY TRAITS

Perić B.D., Perić S.D.

Research has proved that as much as one-third of the overall pyramidal zone of the cortex, which is responsible for human locomotion, belongs to the arm musculature regulation centres. The pyramid system is directly connected with the lower subcortical motor centres (the extra-pyramidal system). In view of the topographic proximity of the extra-pyramidal and the subcortical centres responsible for the affective sphere of the personality (emotions and conative dispositions), and with awareness of the fact that active exercise can result in substantial enhancement of the musculature of arms, it is

possible to express a hypothesis on the existence of a possible positive relationship between these two variables. In this research an experiment was carried out on a sample of 57 top athletes for the purpose of partial confirmation of the hypothesis.

Maximum isometric force of three muscle groups (hand flexors, flexors and extensors in the elbow joint) was measured and some of the characteristic traits and states of an athlete's personality (neuroticism, psychosis, extroversion and anxiety) were assessed. By applying rank correlation it was established that athletes with greater arm musculature strength possess a lower degree of neuroticism and anxiousness, while no statistically significant connection between maximum isometric force of the observed muscle groups and the remaining two psychological dispositions was found. The obtained results open a way for further research that could establish whether exercise to enhance strength can also influence some specific personality traits.

156

URBANIZATION, HYPOKINESIA AND BEHAVIORAL DIETARY PATTERNS

Angelova K., Vatrlova K., Kadijska A., Ovcharova D., Lipova M.

A study of urban community professional groups - 161 subjects, mean age 40.2 +/- 10.0 yrs, with light intensity of occupational activities, has been conducted in the city of Sofia. Seven-day records of food intake, anthropometric indices and the level of occupational and discretionary activities according to WHO methods and criteria have been investigated. The energy expenditure, $34.48 \text{ kcal.kg}^{-1}.\text{d}^{-1}$, has a mean 24-h metabolic constant $mk_1=1,550\pm0.132$ and 52.8% of the persons experience a reduced daily physical activity versus the level to maintain the functional capacity of cardiovascular system and physical fitness. Anthropometric indices determine 22.5% overweight and 8.8% obesity. The structure and the nutrient density of the dietary pattern indicate a substantial increase of total fat intake (45.4%) and a counterbalance of reduced carbohydrate intake. The progressive decline in energy expenditure and the affluent dietary pattern - risk factors for development of chronic noncommunicable disease, impose the formulation of a preventive health policy.

157

THE WORK OF SPORT MEDICINE DISPENSARY IN BANJA LUKA UNDER WAR CONDITIONS AT THE AREA OF THE FORMER REPUBLIC OF BOSNIA AND HERZEGOVINA

Gaćeša N.

SUMMARY:

This Dispensary is the only active health-care facility of this kind in Republic of Srpska. Taking into consideration the fact that it works under war conditions, we have to adapt

our work to the recent needs. In accordance with the conditions some changes in the work have occurred in the structure of patients as well as in relation to the number and kinds of the service the Dispensary offers.

158

THE NEW METHOD OF FUNCTIONAL AND ORGANIC DISORDERS
CORRECTION IN SPORTSMEN

Sitko S., Groubnik S.

Treatment efficacy and rehabilitation of sportsmen remain important problems because of the strenuous schedule of contest as well as intensiveness of the training and competition process.

Therefore, new ways of solving the problem attract meticulous attention of specialists, especially when the ways are actually new and free of defects pertaining to traditional kinds of treatment.

Being developed in SRC Vidhuk on the bases of fundamental research in the Physics of the Life field, Microwave Resonant Therapy (MRT) consisting in the action of mm range superlow intensity electromagnetic irradiation on biologically active points of the human body, provides not only correction of disordered functional states of body organs but also the treatment of diseases with effects guaranteed.

The use of MRT while treating severe injuries as well as during rehabilitation and suffering from diseases considerably speeds up athlete's return to the normal training process. MRT initiates immuno-modulating action, rapidly normalizes micro-circulation, speeds up reparation processes, especially in bone, epithelium and connective tissues.

Analgetic and sedative effects of MRT are caused by the intensive reaction of neuro-endocrinal system which is perceived in an increased concentration of endogenous opiates in blood.

As results of the treatment, the balance between stress and anti-stress hormones as well as defence and aggression factors in gastrointestinal tract recover which prevents appearance of stress ulcerous processes.

Researches conducted in SRC Vidhuk show that MRT causes a complex integral reaction of practically all organs and systems of the body. Dynamics of changes depends on the state of initial indices, although necessarily towards the normalization of every particular index and their ratio optimization.

Experience of MRT usage allows to conclude that an effective, secure and noninvasive new method of athlete's treatment and rehabilitation is now at disposal of sport doctors.

159

THE USE OF MICROWAVE RESONANCE THERAPY IN SPORTS MEDICINE - EXPERIENCES OF IBN SITKO CENTRE IN BELGRADE

Milojević T.

Microwave resonance therapy cabinet cures sick and injured people by a non-drug method, by means of electromagnetic waves of small intensity and super low frequency, which effect biologically active points. For treatment process, a device of the following characteristics is used: power from 10^{-9} to 10^{-10} W, wave-length from 5-10 mm, frequency from 50-75 Ghz. The treatment is conducted continuously every day, each therapy lasts from 5 to 25 minutes. During therapy, there is neither contact between patient's body and device, nor the integrity of skin covering is disturbed, which speaks about painlessness and comfort of the method. With 40% patients, pain disappears after the first or second therapy, while with the rest of them the same happens after fifth or sixth therapy.

By achieving sedative and analgetic effect, psychological instability decreases. Since micro-circulation is improved, periphery swellings decrease - thus, muscle nourishment is improved, as well as the whole body motion. That way, reparation processes become intensified, which speed up recovery process. Twenty to thirty days upon the completion of the therapy, the relation between populations and subpopulations immunocompetent cells becomes constant, which points out immunomodular, i.e. immunostabilizing effect of this method of curing. All these processes prepare an organism for maximal efforts.

Up to now, the patients have been cured from the following diseases: enthesitis of various locations; post distorsio articulatio talocruralis condition; musculus semitendinosus rupturae; Dupuytren contracture; gonartropathia; peroneus paresis; neck spondilosis; lumbo-scatilal troubles; soft tissues contusions and numerous other diseases which do not belong to sports medicine domain.

Frequency adjustment, correct selection and duration of affecting each particular biologically active point, as well as defining the total time period of therapy are parameters which determine the final result of treatment.

During the therapy, patients sensed decrease of pain, improvement of blood circulation, muscle contractions and swelling decrease were visible. Besides improvements in treating basic diseases, some other effect were noticed as well: improved quality of sleep, increase of appetite and better sight sharpness.

160

THE ROLE OF SPORTS IN PREVENTION OF PRE-DELINQUENT BEHAVIOUR IN CHILDREN

Samardžija M., Milosavljević I., Jovanović Lj.

Expansion of juvenile criminal behavior in our country for the last few years shows that it is necessary to intensify the work on primary prevention programs.

In the Stari Grad unit of the city Center for Social Work for more than one year we have been applying a special model of group work (with juvenile delinquents) in the so-called form of socio-therapeutical club, which is organised around various activities related to sports, such as: contacts and meetings with successful people in sports: practicing sportsactivity, visiting sports contests, etc. We believe that primary preventive activities in the current situation are best to be organized in school environments because they get through the "mechanism of hidden message" and they can be best provided with the help of professionals workers in centers for social work (Social Service); students who study sports, through well-organized sport tournaments covered by media (TV) through brief information. Subsequently, the main aim of the program is to develop the mechanism of positive identification with athletic idols. We believe that this kind of work is very useful, because its methodology consists of primary and secondary prevention of juvenile delinquency.

161

PHYSIOTHERAPY OF THE ORGANIZED HEMATOMA M.QUADRICEPS FEMORIS (A HANDBALL PLAYER'S CASE)

Kostić O., Panić L., Cvetković B.

Injuries are frequent during competition and also during training. A 21-year old handball player P.D. injured her thigh and knee joint. After 45 days of immobilization she came for check-up and physical therapy.

Status localis: On the lateral side of the thigh the palpable tumour was noticed, 17 cm long, and 6 cm wide, clearly shaped, moveable (not fixed to either skin or bone).

The size of the right knee was 4 cm larger than of the left. Knee extension was 180°, and flexion was 175°. According to clinical and X-ray findings, the diagnosis was found:

1. Tumour m.quadriceps femoris dex. post contusionem (ossificatio/calcalcificatio haematoma),
2. Synovitis geni dex. post contusionem.

We started with the following therapy: the cryotherapy for thigh and knee joint, stable galvanization with inversion of terminals for the knee, electrophoresis kalium iodide,

after that thiomucase, and ultrasound, kinesitherapy and occupational therapy. After the knee swelling disappeared, we started with paraffin for the right thigh and knee.

After 30 days of physical therapy all the injuries were cured, which was confirmed by X-ray.

The purpose of this work was to show that the physiotherapy used in time shortened the recovery period and that the patient suffered no consequences.

162

SOME OBSERVATIONS ON RELATIONS OF BODY DEFORMITY AND DISORDERS OF REFRACTION, ACCOMMODATION AND EYE MOTION

Gaćeša N.

Our work has shown that children with body deformities and disorders of posture have more disorders of refraction, accommodation and eye motion in comparison to the other children, and that there is some coincidence among kinds of the stated disorders.

Our observation supports the theory of possible significant role of the central nervous system in the etiology of body deformity.

In addition to all these observations there is the supposition that the cases of more frequent occurrences of body deformities, should be sought, among other reasons, in conditions of embryo development during pregnancy.

The aim of our work and casual procedure is to contribute to complex recognizing and researching causes of etiology of body deformities of children.

The author is a teacher of physical training and a doctor of sports medicine.

163.

CARDIOVASCULAR CONDITIONS AND RECREATIONAL SCUBA DIVING

Živković M., Abramović D., Radojević R., Bajčević P.

The existence of a serious cardiovascular disease disqualifies the candidate from diving.

However, medical standards for recreational scuba diving, leave greater room for flexibility and are harder to define in absolute terms.

In assessing the cardiovascular system, in addition to exercise ECG testing, authors recommend ECG controlled, modified Flack test introduced by dr Živković.

Some of our conclusions are:

- An active search should be made for coronary artery disease prior to medical approval for any activity. Those with a genuinely positive stress test should be advised against diving.

- Not all arrhythmias and conduction defects preclude diving, so they should be carefully assessed.
- Congenital abnormalities which interfere with exercise capacity or reduce the response to exercise preclude even recreational diving.
- Valvular heart disease, with the exception of asymptomatic mitral valve prolapse, is a contraindication to diving.
- To the mildly hypertensive persons, restricted recreational diving can be permitted.
- An experienced diver who has undergone coronary or pace- maker surgery and has a normal stress test, causes problems because of an increased risk of myocardial infarction or malignant arrhythmias during diving.

164

SPORT INJURIES IN WATER - SKIING

Filipović A.

Water-skiing is a very popular sport with a large number of recreative sportsmen. This sport has some specialties: boat, water as medium and sportsmen. Most injuries in this sport come from this specialties.

Injuries in water-skiing are the results of: falling down, hitting the ski with some part of the body, at the water, damage caused by cord, or drowning caused by syndroma commotiale. The number of injuries is directly dependent on the boat speed. Most common lesions are contusion, distortion of joints, ankles, knees, meniscus lesions, different types of wounds, sindroma commatiale, rectum and vagina lesions when sportsmen fall down on perineal region, vertebral lesions and distortion of wrist joints in very fast start. There are differences in the level of injuries in recreative and professional skiing, because severe lesions in professional skiing come with high speed.

This study is made at the experience of water-ski school St.Stefan in period of five years where author was an instructor.

Reduction of injuries in water-skiing accidents can be by: Protecting clothes, shorts, special equipment that means ski, cord with special length and quality, special boat with ski form, calm water, life jacket and good healthy skier.

165

EXISTENCE OF CAUSE-AND-EFFECT LINKS BETWEEN THE TRAINING LEVEL AND THE SEVERITY OF SKIING INJURY

Ugarković D., Eremija M., Dražić V., Arandjelović A.

In our analysis, we have succeeded in proving the existence of cause-and-effect links between the training level (mastership) and severity of skiing injury. We, therefore, propose prof.V.Smodlaka's classification, to include one more category-level of mastership, as recorded cause of injuries in their most severe form, in addition to heavy injuries.

Based on comparative analysis of types of injuries, according to diagnosis, we are of the opinion that it is an obvious process of changing injury structure, which is the most evident in changes according to severity of the injuries - fractures.

166

REVIEW OF "ARE SCUBA DIVERS IN YUGOSLAVIA WELL INFORMED ABOUT HEALTH AND EMERGENCY CARE FOR DIVERS?" QUESTIONNAIRE

Dostanić N.

During the period between January and April of 1995, questionnaire among more than one hundred of active SCUBA-divers was made, and answers were evaluated in different categories of divers.

Principles of health and emergency care are not known to the majority of lower categories of SCUBA-divers. Diving instructors are better informed, although they do not implement their knowledge, which is not as vast as they think it is.

Majority of the divers also did not know what the DAN (international organisation dedicated to diving safety and research) is, although they think that there is the need for such an organisation in Yugoslavia.

167

THE ESTIMATE OF HEALTH ABILITIES OF STUDENTS FOR ATTENDING CLASSES OF PHYSICAL EDUCATION

Sikimić S., Milosavljević N.

The University Department of Physical Education of Students programs, organizes and realizes classes of physical education for the freshmen students of every college of Belgrade University.

At the beginning of each school year (first semester) every student has to take a swimming test. Non-swimmers are obliged to attend only swimming training classes, the others are the opportunity to choose one of the sports which they are going to attend.

In the Institute for Health Protection of Students of Belgrade University, for every school year there is a commission which is formed on the basis of the medical documents, additional and supplementary researches, which estimate the ability of students for attending physical education classes.

According to the results of the seven-year research and statistical data, several groups of most common different diseases are formed. According to these data, the proposal has been given for formation of a special program of exercise and specialists control for diseases of: locomotion, pulmonary, cardiovascular, and urogenital systems.

168

PHYSIOLOGICAL PARAMETERS DURING SIMULATE ROWING

Mitrović D., Grujić N., Stanić M., Dražić V., Djordjević-Nikić M.

Ninety subjects divided into three groups were put to the test. The first group (30 examinees) consisted of senior rowers, the second group (30 examinees) consisted of junior rowers, and in the third group (30 examinees) were non-sportsmen (students).

The test was carried out in the Laboratory for Functional Diagnostics of the Medicine University in Novi Sad.

For physiological parameters checking, a six-minute load test ("all-out") was used, respecting the protocol used for these sorts of laboratory testing.

The subjects were rowing on the rowing ergometer type CONCEPT II. The loading was realized by air-resistance of the wheel with built-in blades.

The number of wheel rotations was recorded by an electronic counter and the loading was counted in Watts, by the curve gained adjusting the wheel with electro-engine of the predetermined power.

The duration of the test, type of loading and muscle-engaging fully simulate rowing in the boat.

The following physiological parameters were registered: pulmonary ventilation, oxygen expenditure, heart rate, loading in Watts and the number of strokes.

The aim of the research was to check the physical working ability of non-sportsmen and senior and junior rowers, and also to analyze the gained distribution value of the physiological parameters during the six-minute test, because of the specific way of the rowing course.

Comparing the tested groups, information useful for selection and training process were gained.

169

INFLUENCE OF MILITARY TRAINING UPON THE NUTRITIVE STATUS AND PHYSICAL CAPABILITY OF MILITARY RECRUITMENT PERSONNEL

Obradović B., Milivojević M., Radjen S., Pavlica M., Obradović G.

Our investigation objective was to determine the impact of four-month military training upon the nutritive status and physical capabilities of soldiers. The parameters we measured were the following: body weight, body height, circumference of arm and skinfold thickness at ten different parts of the body.

The following values were calculated: the Devenport-Kaup index, the percentage of body fats and the arm diameter. The maximal oxygen consumption was estimated by a continuous submaximal load test using an ergometer bicycle. The muscle strength was determined applying a mechanical dynamometer.

The test results suggested there were positive changes in body build, nutritive status and muscle strength, but not relevant statistically, within a group of soldiers under test during the said military training. The test revealed an increase in maximal oxygen consumption, but still in category "very good", which could be considered statistically significant. That was the result of physical activity of soldiers trained specifically for duties requiring a good level of oxygen consumption.

170

BODY COMPOSITION OF BOYS IN VARIOUS SPORTS

Ugarković D., Drašković D., Eremija M., Nikić M., Arandjelović A.

The main aim of the research is to establish the possible existence of morphological differences among children who are engaged in sport for a rather long time (3 years and over) in relation to their coevals, who are not engaged in sports in the premature period. A part of the morphological field which reflects the effects of outside influence (sport training) are transversal dimensions of the body, muscle mass, total body mass and the volume of the fat-tissue. Any possible differences in these domains of the existence of morphological field of the examined groups are in support of the existence of sports training influence on growth and biological development of the children engaged in the aforesaid sports.

The general conclusion is that a three-year period of sports training has no evident effect on the biological development of boys and their body composition.

171

**MOVEMENTS PERFORMED UNDER DIFFERENT MECHANICAL CONDITIONS:
A TEST OF MOTOR CONTROL THEORIES ON POST-PUBERTY CHILDREN**
Ilić B.D., Jarić S.

The main aim of this work was to investigate the learning process of fast self-terminated movements. Its objective was to analyze their variant kinematic variables. According to the current motor control theories, those variables could be either movement time (according to the impulse theory - IT) or terminal position (according to the equilibrium point hypothesis - EPH).

Two groups of subjects ((6+6) males, 16-18 year old) practised rapid, single-joint movements to a target without visual feedback, over 500 trials. Distance group (DG) performed movements over different distances, while load group (LG) performed movements over the fixed distance, but with different inertial loads. The differences in distance and load had been previously calculated in order to provoke similar differences in movement duration. The results demonstrated that LG significantly improved the movement accuracy over the practice, while the same process did not appear in DG. In addition, DG demonstrated significant systematic errors over the entire learning process: subjects tended to overshoot close and to undershoot distant targets. Taken together, these results suggest that it is the terminal position rather than the movement time that is the controlled variable of the motor program. Therefore, these data speak in favor of motor control theories advocating the role of muscle co-activation as a fundamental variable of motor program for executing movements under different mechanical conditions.

All these data generally suggest that the motor task of movement over different distance reproduction and movement time are harder than the motor task of terminal position reproduction making over the different external loads. The cause could be in the different number of controllable variables used in the corresponding motor programs execution. Therefore, it could be concluded that motor programs of fast self-terminated movements behave in line to the EPH, where is the main role of muscle co-activations as fundamental variable of motor program for executing movements under different mechanical conditions.

The presented results could be of importance for various disciplines concerning motor learning, such as physical education, sport, medical sciences et. These results suggest that an important variable in various processes of motor skill acquisition (e.g. motor learning, athletic training, fight training etc) should be a space coordinate of final position of execution, rather than variables related to movement time, such as initial position, movement distance, external load or movement torque.

172

ANKLE DISTORTION OCCURRING AFTER BICYCLE RIDING

Stanojević S., Dražić V., Arandjelović A.

Out-teaching activities program embraces bicycle riding, among other things. This kind of entertainment is useful not only because of the bicycle which is a transportation means, but as a recreational entertainment and means for improvement of physical shape.

However, careless riding may cause injuries due to falling, as well as distortion injuries of the ankle. In order to prevent these undesirable consequences, the teacher of physical education and instructor of the recreation program should carefully approach teaching and assistance until the child is completely freed from fear and is ready to enjoy bicycle riding. He must not allow other persons to assist children in riding.

Analyzing distortions of the ankle in children riding bicycle, our purpose is to put them aside with the special sort of injuries both due to mechanism of origin and according to clinical diagnosis. Generally, injuries occur primarily because some other person, rider, instructor or teacher of physical education was not careful enough.

173

HEART RATE DURING VARIOUS PEDALLING RATE AND RESISTANCE COMBINATIONS IN BICYCLE ERGOMETER LEG EXERCISE

Ilić N., Nikolić Z.

Sixty male physical education students (20.8 +/- 0.7 yrs, 180 +/- 6 cm, and 74.5 +/- 6.6 kg) divided into two groups of 30 each, exercised on a Monark bicycle ergometer. In group I the pedalling rates were fixed at 40, 50, 60 and 70 rpm and the used resistances were at 15, 20, 25 and 30 N. In group II the work intensities of 75, 100, 150, and 175 W were achieved with combinations of the given pedalling rates of 40, 50, 60 and 70 rpm and corresponding resistances. The heart rate (HR) was measured in the 6th min of each work period by telemetry, if the power outputs were the same in two groups of tests, the HR values were almost the same regardless of the way the given work output was achieved. The HR reacts more strongly to changes in work intensity achieved by variations in pedalling rate at fixed resistance than when the resistance changes at fixed pedalling rates.

174

AEROBIC POWER, VENTILATORY THRESHOLD AND SWIMMING RESULTS IN FEMALE SUBJECTS

Nikolić Z., Ilić N.

This study was performed on 19 female physical education students. Their mean age, height, and body mass were 19.2 yrs, 164.6 cm, and 55.9 kg. The aerobic power ($\text{VO}_{2\text{max}}$) and ventilatory thresholds (VT) in arm cranking and leg exercises were determined during 1-minute progressive exercise tests on a mechanically braked ergocycle. The VT was assessed from the gas exchange plots of VE, VO_2 , VCO_2 , VE/VO_2 and VE/VCO_2 . It was defined as VO_2 at which VE/VO_2 increased without a simultaneous increase in VE/VCO_2 . The subjects swam 100 m front crawl style in a 50 m swimming pool, at maximal speed. The mean $\text{VO}_{2\text{max}}$ values were 2.68 l min^{-1} and $44.0 \text{ ml kg}^{-1} \text{ min}^{-1}$; the leg VT values were

1.57 l min^{-1} and $24.8 \text{ ml kg}^{-1} \text{ min}^{-1}$, while those for the arms were 0.68 l min^{-1} and $11.44 \text{ ml kg}^{-1} \text{ min}^{-1}$. Significant negative correlation coefficients were obtained between $\text{VO}_{2\text{max}}$ and VT values and swimming results.

175

DIABETES AND RECREATION ACTIVITIES

Djurdjev D., Mileusnić M., Djurdjev Z., Jevtović R.

The study presents the importance of sports as a part of some daily activities for persons suffering from diabetes. Physical exercise as an important factor concerning the muscle cells, which consume glucose, in the case of healthy persons as well as the diabetic ones was researched. While enduring physical strain, muscles use mainly glucose from the blood, which is 75 to 90 percent of the complete consumption of carbohydrates. There has to be even the smallest amount of insulin in order to have some results after the physical activity. It is necessary to enforce the activities of the muscles to get a better function of the diabetic's organism. Being active in sports gives the same effect as an additional injection of insulin; thus, in order to avoid a hyporeaction of glucose it is necessary to reduce the dose of insulin. Therefore, one should check on the glucose regularly and, if necessary, during intensive sports activities, small amounts of sugar should be taken before, during or after the exercises. The work also emphasizes the ability of an athlete to estimate his own possibilities. Choosing a specific kind of sport among the young is also stressed, as well as recreation activity among elderly people. It is stressed that it is important for a human organism suffering from some types of diabetes, especially for those who are dependent on insulin, to go in for sports. Recreational activity is also important, especially for diabetics who are not engaged in any physical activity, including the choice, amount and adjustment of that activity.

176

EVALUATION OF DIFFERENT MEDICAL STANDARDS AND MAKING NEW CRITERIA FOR MEDICAL TESTING OF DIFFERENT TYPES OF DIVING IN YUGOSLAVIA

Dostanić N., Ivković D., Živković M., Marković T., Srdić S., Trajković D., Djordjević-Maksimović R.

Before 1995 in Yugoslavia, medical standards for diving were based on military standards inherited from SFRJ. They were not flexible, insufficiently precise, same for all kinds of SCUBA-diving and snorkelling, and, worst of all, they were seldom used.

Yugoslav Underwater and Hyperbaric Medical Society Expert Committee evaluated medical standards for different kinds of SCUBA-diving and snorkelling, with intention to make new criteria for medical testing of divers in Yugoslavia.

177

CYBERNETICS AND THE SPORTS FORM MANAGEMENT

Branković M., Janković M.

Since recently, the principles of cybernetics have a special application in the increase of the level of the sports form which represents the training status of the sportsman for the successful performance at competitions. The aim of this work is to explain the theoretical basis which is leading the fitness according to the cybernetic knowledge of the management of the complicated dynamic system. The authors show the cybernetic model for managing the fitness based on communication of the managing subsystem (the coach) and the object of managing (the sportsman). The authors come to the conclusion that by using cybernetic knowledge the proper transformation of the actual dimensions of the anthropological space of the sportsman is enabled, and its correcting during the work due to back-information of the reactions of the sportsman at the applied devices, methods and strain.

178

THE IMPORTANCE OF SELF-CONTROL IN THE PROCESS OF TRAINING

Janković M., Branković M.

After the empirical research the role of self-control in the training process has been discussed in this work.

The condition of the organism can be estimated by the most important criteria as the functional abilities of the energetic substances and the informative mechanisms, which are created after and along the training. In most cases these changes are evident at the

periodical medical controls, which is insufficient because they do not pinpoint the health and level of training condition of the sportsman. The value of self-control depends on the ability of the information of the sportsman about the changes which are due to the training strain. The observation of changes should include special physiological parameters such as pulse, body temperature, body weight, training loads, breathing, mood level of fatigue, climate and atmosphere factors.

179

PRO-SOCIAL ORIENTATIONS OF CHILDREN WHO GO IN FOR SPORTS

Gašić-Pavišić S., Beleslin M., Suzović V., Gašić R.

The aim of this research is to establish the existence of correlation between sporting activity and pro-social orientation of students at the age of 14 to 18. Pro-social orientation is defined as a taking care about the compassion for the other people and has been tested on the basis of the following indicators: social responsibility, taking care about others, willingness for cooperation and empathy. The starting point was the assumption that the pro-social orientation is more expressed in the young sportsmen in comparison to the persons of the same age but inactive in sports. This could be explained as the positive socializing effect of the sports on the young people. By the testing, the sample of the students from the elementary and secondary school who go in for sports (football, basketball, water polo players) has been encompassed, as well as the sample of the young people of the same age but inactive in sports. The scales for the pro-social orientation measurement have been applied. In the paper, the main findings of the comparison of pro-social orientation of the students-sportsman and the students inactive in sports are presented. The results are analyzed and explained within the framework of the theoretical concept of the role of the sports in the process of socialization in our contemporary society.

180

RECREATIONAL PHYSICAL EXERCISE AS A REGULATOR OF THE ESSENTIAL ARTERIAL HYPERTENSION

Suzić-Todorović B., Perunović D., Stjepanović S.

We have been observing, for several years, how recreational physical exercise influenced our patients suffering from the essential arterial hypertension. The examined sample of patients was rather small but it nevertheless confirmed our experience thus far.

Recreational physical exercise is an activity practiced over a longer period of time, 1 to 3 times a week, in a regular recurrence (every second or third day). The recreational exercise class is held by a physical education trainer for a period of 45 minutes. The class consists of: a warm-up, a shape-up, and relaxation.

We have divided our sample of patients who exercised into three groups:

1. Medicated hypertonics,
2. Non-medicated latent hypertonics - who occasionally have a moderate rise in the blood pressure,
3. Normotonics - control group.

From our observations, we have concluded that all three groups reacted similarly to physical exercise - a decrease in blood pressure. The slight differences between groups were as follows:

- Normotonics have undergone a decrease in blood pressure within a normal range,
- Non-medicated hypertonics have stabilised their blood pressure to normal, after 4 to 6 exercises,
- Medicated hypertonics have also undergone a decrease and stabilisation in blood pressure after 4 to 6 exercise classes.

The aim of this observation was to demonstrate the great importance of moderate physical exercise as one of the preventive factors in fighting against blood pressure and coronary disease.

181

EVALUATION OF MAXIMAL DISTANCE REACHED IN APNEA DIVE AND ITS DEPENDANCE UPON MAXIMAL TIME SPENT IN STATICAL APNEA DIVE
--

Dostanić N.

Divers training for depth records try to increase their times spent in statical apnea dive. In a prospective study, those times were compared with maximal distances reached in apnea dive, before and after the training period.

Results show that there is no dependance between these two factors, if the conclusion is tried to be made by comparison of results achieved by different divers, although increase in one of them had influence on increase of the other one, when factors were compared in the same diver, before and after the training period.

182

MEDICAL ASPECTS OF TECHNICAL, EMERGENCY AND MEDICAL CARE AND SECURITY OF APNEA DIVES MADE WITH THE INTENTION TO MAKE DEPTH RECORDS

Dostanić N.

Worldwide popularity of the "Big Blue" movie, along with "superhuman" records of deep apnea dives, were major causes for higher incidence of drowning among divers in the last few years.

Although this diving activity is not official diving sport, there are a lot of divers and spear-gun fishers who are practicing it all over the world.

This article presents minimal requirements for such activities, concerning proper technical, emergency and medical care, and the role of a diving physician in them, because it is much better than to leave them to be conducted by divers alone.

183

KINDS OF FITNESS ESTIMATES IN THE TRAINING PROCESS

Branković M., Bubanj R., Stojiljković S.

As the base of the training process is the law of managing the exercises, it is necessary, the authors stressed in the method of work, to know the fitness of the sportsman who is defined by the characteristics, such as knowledge and skills he has at every developing level of his sports career. The general aim of this work is to explain the typical forms and state of sportsmen, their relation and the way to estimate the anthropological characteristics. The authors conclude that in every closed system (cycle) of exercising, the coach should give the diagnoses of the initial, transit and final states of the anthropometrical, motoric and functional characteristics of the sportsman; and the information about the cognitive, connotative factors as well as health conditions is to be estimated by other departments the coach should cooperate with.

184

COMPARATIVE ANALYSIS OF THREE APPROACHES IN MEASURING PHYSICAL WORKING CAPACITY IN ROWERS

Grujić N., Jovanović T., Mitrović D., Bjelović M.

Three approaches have been used in order to measure physical working capacity of rowers - tests of maximal workload in duration of 6 minutes on rowing ergometer (RE), on bicycle ergometer (BE) and running time for 2000 meters (RT). Twenty rowers aged 19.4 yrs, BH 188 cm, BW 81 kg, sports experience 3.5 yrs, participated in the experiment. All 3 tests have been performed at the beginning of the training process as well as during the competition season. The ergometer with flywheel resistance was used

in RE and BE tests. During the performance of both tests cardiorespiratory parameters were also registered. The running time and heart frequency were registered during the RT test. The value of the total work in RE test has been increased during the season from 88.3 kJ to 99.2 kJ, while that increase in BE test was from 84.2 kJ to 94.3 kJ. The running time of 2000 meters decreased from 7,10 min to 5,56 min. All differences in registered values during the one training year were statistically significant ($P < 0.0001$). But, there was no significant difference in (VO₂) max gained on rowing and bicycle ergometer. It indicates their equal validity. Correlation analysis shows high relation between RE and BE ($r = 0.89$) and no correlation among RE:RT and RB:RT. It means that running tests are not valid enough for measurement of the physical working capacity of the rowers.

185

DEVELOPMENT OF ENERGY CAPACITY DURING SPORTS EXPERIENCES

Grujić N., Secher H N., Baćanović M., Lukač D.

During ten years of the follow-up of development of physical working capacity in rowers, more than 1000 tests have been performed on rowing ergometer. "All-out" test in duration of 6 minutes was applied, because this kind of test best reflects the condition of sports efforts of rowers. The complete test were included registration of cardiorespiratory parameters. Among tested sportsmen there were 26 elite rowers. Compared results have shown linear increase of energy capacity during the first 6-7 years of sports experience. After that period of time, energy capacity remained on the achieved level. In that way, we get the time which is necessary to be spent in training process, in order to achieve the genetic maximum. (VO₂) max ranged from 3.92 L/min in beginners to 6.15 L/min in elite rowers. Total work (Wt) has developed from 71.5 kJ to 118.6 kJ; maximal power (Wmax) from 234 w to 386 w; maximal oxygen pulse from 20.1 ml/b to 30.7 ml/b; (VO₂) cost during first 6 minutes of recovery from 7.1 L to 9.8 L. In comparison to other parameters, only (VO₂) max/kg BW has achieved maximum value after 3 years, which means that this parameter is not so relevant for rowing as for running. A higher increase of Wt (66%) than of (VO₂) max (57%) has been noticed. That indicates that both anaerobic capacity and mechanical efficiency were included in the result of Wt too.

186

FOLLOWING ERGOMETRIC AND ECHOCARDIOGRAPHIC PARAMETERS DURING ONE YEAR OF THE TRAINING PROCESS IN ROWERS

Andrić M., Grujić N., Kovač M., Lukač D.

Our research includes a group of fourteen rowers with average sports results, aged 14-23 years (mean 18), and with the duration of physical training period from one to seven years (mean 2,7) in the course of one year of the training process, with the accent on value measured before the season (in this case - winter period), and in the top of the season (august), which means that time distance between the measuring amounted to about 8 months. We have followed ergometric parameters on the rower's ergometer with the spirometer, during the warming-up, and the charging in duration of 6 minutes (all-out test), and in the course of the recovering also through 6 minutes. Hemodynamic parameters for the estimation of functional capacity of the left ventricle were estimated by echocardiography. The results of this examination show that training induced a rise in the functional capacity, with morphological changes of the myocardium:

- Total work realized on the ergometer is increased from 93,36 kJ to 113,15 kJ, (21,17%). Mean maximum oxygen uptake is also increased from 4,831 l/min to 5,245 l/min (8,57%). Heart frequency is decreased in the rest and during the exercise.
- Echocardiographic studies demonstrated that training induced a significant increase in left ventricular mass index (46,42%), the thickness IVS and PLW (about 22% - $P < 0,001$).

187

THE POSSIBILITY USING OF HYPERBARIC OXYGENATION IN SUBJECT TRAINING

Živković M., Sremčević D., Simović M., Abramović D.

Maximal oxygen consumption (VO_2 max) is influenced by the changes in the oxygen content of the arterial blood (CaO_2). Increasing CaO_2 by breathing gas with the increased oxygen concentration by raising the ambient air pressure will increase (VO_2) max. Maximal oxygen consumption is significantly higher in hyperoxia than in the breathing room air condition. Physical performance changes in parallel with (VO_2) max. Maximal cardiac output (Q_{max}) is similar in hyperoxia as in control. There is a correlation between (VO_2) max and transported oxygen, thus suggesting that central circulation is an important limiting factor for human maximal aerobic power. The data in the hyperoxia experiments suggest that the working muscle can utilize "extra" oxygen during maximal exercise. Furthermore, they possibly indicate a more effective peripheral O_2 utilization and/or distribution of cardiac output in the hyperoxia situation. The evaluation of physical work capacity in humans in hyperbaric environments and conditions of hyperoxia shows an elevation of oxygen uptake, depression of pulmonary ventilation, decrease in heart rate, decrease in ventilatory equivalent, and less severely

developed metabolic acidosis for identical work carried out at increased ambient pressure in air and oxygen, respectively, compared to normal ambient pressure in air. However, our authors have shown that hyperbaric oxygenation (HBO) influences for a certain period of time increased oxygen uptake and performance capacity in normobaric conditions, without any change in efficiency ventilation. Immediately following HBO there appears to be a profound vasodilatation and a more prolonged period of hyperoxia than using O₂ in normobaric conditions. In addition, HBO induces bronchodilatation; increases hemoglobin and plasma saturation; stimulates erythropoiesis and anti-oxidative defense; activates biosynthesis of systemic and tissue hormones; increases the number of mitochondria, myoglobin and glycogen concentrations in the muscle cells. On the basis of general positive metabolic effects of HBO we recommend the use of hyperbaric oxygenation in subject training in accordance with the kind of sport and a plan of training.

188

SYMPATHO-ADRENAL SYSTEM ACTIVITY OF TABLE TENNIS PLAYERS

A. Poštić-Gruin, H. Lončar-Stevanović

The activity of sympatho-adrenal system of table tennis players was assessed by determination of urinary adrenaline and noradrenaline during the resting day, training day, first and second day of competition. Catecholamines were determined by fluorometric Bio-rad technique on chromatographic columns with cations exchange resin. The average level of adrenaline during the day of rest was $3,543 \pm 2,53$ nmol/h and during the training it was $3,88 \pm 2,93$ nmol/h. The excretory level of adrenaline ($10,51 \pm 5,23$ nmol/h) was statistically significantly higher ($p < 0,05$) during the first day of competition, but during the second competitive day determined levels of adrenaline were higher during the training time. There was a higher level of noradrenaline excretion during the first competitive day, but during the second day of competition the level of noradrenaline excretion was lower in comparison to the excretion rate during the first day of competition.

The obtained results of catecholamine excretory rate showed identical excretory charges with the only difference in the absolute levels in different conditions of investigation during the resting day, training day and the competition. The activation of sympatho-adrenal system assessed during the training is being increased during the competition. The correlation between sympatho-adrenal activity, on the one hand, and the physical activity, emotional state, the level of fatigue and attained results, on the other, was noticed.

189

AEROBIC AND ANAEROBIC CAPACITIES OF THE YUGOSLAV NATIONAL FOOTBALL TEAM PLAYERS

R.Brdarić, M. Matic, N.Stojić, V.Dordević

Examinations of aerobic and anaerobic capacities of the Yugoslav football national teams junior and professional players have been carried out. Maximal aerobic power was examined by means of treadmill ergometer. Spiro-ergometric data and heart rates (VO_2 max, Ve max, f_h max, O_2 - pulse, R) at maximum running speed on treadmill and with 5% inclination have been presented. Anaerobic metabolism was examined during football matches. The concentration of lactates in blood by means of enzymatic method and acid-base balance (PH, BE and SBC) was defined.

190

BIORHYTHM AND COMPETITION-PHYSIOLOGICAL ASPECTS AND CLINICAL EXPERIENCES ABOUT INFLUENCES OF HYDROTHERAPY

Olga Kostić, Goran Ranković, Lidija Panić, Obrad Kostić, Milena Dimić

Hydrotherapy significantly lowers arterial blood pressure with normotensive and also with hypertensive patients. The mechanisms of hypotensive effects of hydrotherapy are partly known and they are seen as the results of the atrium-Na-uric peptide effects.

Also, hydrotherapy influences circadian rhythm and changes it, which is manifested by the syndrome of the so-called balneo-therapeutical reaction, which disappears after a couple of days of therapy.

This study shows that circadian rhythm of blood pressure is disordered during hydrotherapy. Two groups of patients were tested, the first group was with normal blood pressure, and the other one was with higher blood pressure.

The procedure of chronobiological analysis of cosine function has been used:

$$f(t) = M + A \cos (t - \phi),$$

legend:

$f(t)$ = measurement according to time

M = mesor (average)

A = circadian oscillation amplitude

ω = angular frequency (ω/t)

ϕ = acrophases

It has been found that circadian oscillation amplitude of TA is decreased when the hydrotherapy is used in the positive phase of the circadian rhythm of TA. When the hydrotherapy is used in the negative phase of the circadian rhythm of TA, this amplitude increases.

The results of this study are important to consider during the training and preparation of competitors for swimming disciplines.

191

PLETHYSMOGRAPHIC INTERPRETATION OF THE CIRCULATION OF BLOOD IN SPORTSMEN

Jovanović S., Savić V., Radenković M., Savić D., Stanojević G.

Exercise is associated with very extensive alterations in the circulatory and respiratory systems. Peripheral arterial circulation was investigated in fieldball players, basketball players and volleyball players. 31 sportsmen (15 fieldball players, 8 basketball players and 8 volleyball players) and 33 students were entered into the study. Blood flow was determined by plethysmography of the distal phalanges of the forefinger, before and after exercise on bicycle ergometer. 128 plethysmographic curves were registered and examined. Systolic parameters plethysmographic curves (tb, ts) registered before exercise in sportsmen were lower compared with control group. After exercise blood flow increased. The parameters plethysmographic curves (tb, ts) were higher in sportsmen. These results highlight the importance of the intrinsic mechanical properties of the cardiovascular system, particularly arterial elasticity, in human adaptation to muscular exercise.

192

CHARACTERISTIC OF PERIPHERAL ARTERY CIRCULATION OF BLOOD IN FOOTBALL PLAYERS

Savić V., Jovanović S., Đurašković R., Savić D., Stanojević S.

The purpose of this study was to examine the effect of training on circulatory function in fingers of the arm. 99 males (aged 18 to 30 yrs) participated in the study (66 football players and 33 students). Strain gauge plethysmography was used to measure blood flow of the forefinger. Blood flow was determined before and after exercise on bicycle ergometer. Before exercise systolic parameters plethysmographic curves (tb, ts) were lower in football players and diastolic parameters (ta, td) were higher. Parameters plethysmographic curves registered after exercise were increased in every subjects. The greatest changes were seen in the group of football players. We conclude that training results in adaptation in the peripheral circulatory function.

193

SOME QUESTIONS OF THE INTENSITY , REST INTERVAL, EXERCISE DURATION IN PHYSICAL EDUCATION

N. Branković, S. Branković,

The authors emphasized that the basic tasks of the physical education lessons are the stating the condition of the subject, planning procedure, programming, realization and control of the exercising process. Such concept gives an important place to the volume based on intensity, rest intervals and work duration in the function of positive transformation of the dimensions of the anthropological status. The authors conclude that the work intensity should be in the function of the actual state of the subject and kind of the aim which should be gained. The rest intervals are important because of renewal of the energy spent in the process of exercising, while exercise duration depends of the organism quality of the subject, abilities and motoric skills, where the age as well as sex have the main roles as the limiting factors of the level of application.

194

THE IMPORTANCE OF THE OXYGEN LIMITATION IN SPORTS

D.Đurđev, Z.Đurđev, M. Mileusnić, R.Jevtović

The limits of human knowledge widen with every day. In order to achieve the best spots results possible we need the highest activation of all the mental and physical strength in the human organism, which brings the athlete to the highest level of endurance. Contemporary medicine enables us to change that highest level with the help of premeditated training. Energy, as a basic element for intensive exercises in sports, is supplied by sources which do or do not contain oxygen.

The study concentrates on processes which do not contain oxygen, as a source of energy. The increase of lactate is an indicator for the presence of such processes and the limit of oxygen-absence presents the point on which the sources of energy without oxygen start to take place.

The work aims to show that using the limit of oxygen-absence one could estimate the state of one's condition, the possible results one could achieve and plan activities on various levels of intensity. A group of seven experienced swimmers, who swam at a given speed, was tested; after the swimming their pulse was taken and the quantity of lactate in their blood measured. The same experiment took place after a month's training and the results were compared. They show that after one month the lactate in the blood of the swimmers increases slower and that the breaking of the oxygen-limit takes place later. In other words, with the same quantity of lactate swimmers can swim more intensively. The swimmers increased the presence of oxygen during more intensive swimming by increasing their oxygen-absent abilities.

195

SOME BIOCHEMICAL CHARACTERISTICS IN THE SERUM OF THE PATIENTS SUFFERING FROM CHRONIC OSTEOMYELITIS

Miric D. Grbic R. Bascarevic Lj. Katanic R.

Forty patients suffering from chronic forms of osteomyelitis, hospitalized in 1994 in the Clinic for Orthopaedic surgery and in the Clinic from Transmissible Diseases, KBC Priština have been studied. By means of microbiologic assays and immunologic tests, those were classified as chronic non-specific, tuberculous and Brucella osteomyelitis.

For the purpose of evaluation of the actual status of lipid peroxidation, the concentration of the stabile product - malondialdehyde (MDA) has been determined. Some elements of anti-oxidative defense, namely, Vitamin C concentration and catalase activity have been assayed, as well as the actual albumin, immunoglobulin and CRP concentrations.

The control group provided healthy blood donors with no evident clinical signs of inflammatory or degenerative bone and joints disorders.

There were significant higher values of the malondialdehyde and IgG concentrations and catalase activity among the patents suffering from TBC and Brucella osteomyelitis compared to the chronic non-specific osteomyelitis and with control groups. In the sera of those suffering from chronic pyogenic osteomyelitis, mda, IgG and catalase values were like among the control group, although near the upper limits.

Vitamin C and albumin concentrations were significantly lower in all patients groups, regardless of the infectious agent.

196

THE INFLUENCE OF FORCED TRAINING ON HYPERSECRETION OF STOMACH MUCOUS

D.Čeliković, D. Madžarac, M. Jovanović, V. Antić, B. Veljković

We have done twenty gastroscopies on sportsmen with stomach problems after forced training. At the same time, we have determined the acidity of the stomach juice. After thirty days of treatment with M1 blockers we have done a control gastroscopy and acidity check. In all the sportsmen we have found pathological changes on the mucous: hyperemia 70%, hyper-secretion contents (90%), erosions of the stomach mucous (20%), duodeno-gastric reflux (20%), bulbitis (30%), ulcer (5%), acidity of the stomach fluid 30/60 +/- 10.

The patients were treated as non-ulcer dyspepsia.

Muscarine M1 blockers (Gastrozem), a regulator of the intestine movements and digestive movements (Cisaprid) and cyto-protectives of the stomach mucous (Sucralfat) for thirty days. All the sportsmen were on a reduced regime of training without the use of the weight-lifting room and exercises for gaining form.

After the treatment period a control gastroscopy and acidity check have been done. Mucous hyperemia has been found in 30%, hypersecretional contents in 30%. There were no erosions; duodenal reflux was 5%, bulbitis 5%. There were no ulcers. The medium value of acidity was 15/40 5%. The treatment was prolonged for two weeks because of the sportsmen's pathological changes.

Forced training with exercises for gaining form increases the amount and acidity of the stomach juice with inflammatory changes on the mucous by neurological mechanisms by n. vagus and muscarine receptors.

Our opinion is that all the persons are constitutionally predetermined for the ulcer disease. (Positive family anamnesis 90%).

In people with positive family anamnesis of ulcer disease we have to be cautious with forced training because complications may occur.

Forced training as a physical stress can be a cause for gastric disturbances in ulcer predetermined sportsmen.

197

INFLUENCE OF EXERCISING TO CHANGE OF SOME BIOCHEMICAL AND HEMATOLOGICAL PARAMETERS ON FOOTBALL PLAYERS

S. Stojković, S. Spasić, Đ. Stojković

In 20 amateur football players, aged 17-19, concentrations of haemoglobin in blood, number of erythrocytes, values of hematocrit, MCV, MCH, MCHC, concentrations of glucose, uric acid, ferrum, total bilirubin and activities of CK, AST, ALT in serum before and after two-month training period are defined. During that period, the examined individuals had programmed food or they followed the given instructions about food, hygiene and the way of life.

Besides activities of serum CK, achieved values of analyzed parameters were mainly within physiological boundaries. The results were statistically prepared by Student t test.

After the training period, there were neither statistically important differences in the concentration of ferrum, total bilirubin, uric acid and activities of ALT in the serum nor in hematocrit value. On the contrary, in that tested period, statistically significant increase in number of erythrocytes occurred, as well as in the concentration of haemoglobin in blood, the concentration of glucose and activity of CK and AST in serum.

After the end of the training period, a significant increase in MCH and MCHC was observed, while MCV decreased and is found to be within physiological boundaries.

With regard to the physiological boundaries, there is a question about those boundaries in individuals subjected to intensified physical activities.

Determination of some biochemical and hematological parameters could help in estimating the degree of sportsmen's exercising.

198

DIETARY INTAKE AND LIPID PROFILES OF THE ELITE FEMALE HANDBALL PLAYERS DURING THE INTENSIVE TRAINING PERIOD

Simovska V., Vidin M.

This research compared nutrient intake data with plasma lipids and lipoprotein and anthropometric data in 12 female handball players, during 10 days of intensive training. Height (H), weight (W), body mass index (BMI), six circumference measurements for estimating body fat (%F), maximum oxygen uptake ($\text{VO}_2 \text{ max}$) and lipid profiles after the 10 days training were compared between the handball players (TW: n=12, aged 24,5 (19-32) yrs, H=174,6 cm, W=69,1 kg, BMI=22,5 $\text{VO}_2 \text{ max}$ =44,8 ml.kg⁻¹.min⁻¹) and the age-matched untrained women (UW:n=45, aged 29,3(21-37) yrs, H=161,0 cm, W=64,1 kg, BMI=24,7).

Mean energy intake of the female handball players during training period was 3445 kcal/day(49,8 kcal/kg). Mean resting metabolic rate (RMR) was 1510 kcal/day and represented 43% of the energy intake. The energy cost of training (2x90 min/day) was 1190 kcal (6,6 kcal/min). Protein, fat and carbohydrate provided about 12, 20, and 68% respectively, of total energy intake. The recommended daily intakes (RDI) of vitamin-C, the vitamin B-complex and iron were provided partly by diet and partly by supplements. Numerous studies provided little evidence of any effect as to the improvement of athletic performance for athletes consuming the dietary RDIs. The lipids measured were total cholesterol (TC), HDL-cholesterol (HDL-C), LDL-cholesterol (LDL-C) and plasma triglyceride concentration (TG). Plasma lipids and lipoproteins were compared in female handball players (TW:TC = 3,95 $\pm$ 0,85 mmol/l, TG = 0,39 $\pm$ 0,54 mmol/l, HDL-C = 1,24 $\pm$ 0,72 mmol/l, LDL-C = 2,53 $\pm$ 0,66 mmol/l) and untrained women (UW:TC=5,42 $\pm$ 1,44 mmol/l,TG=1,01 mmol/l). There were significant differences in index of atherosclerosis between the two groups.

199

COMPARATIVE STUDY CONCERNING TWO ANAEROBIC TEST IN TOP ATHLETES

Anca Rosetti, Ilana Barbu, Mariana Georgescu, Haralambie V.

A trial was performed in 220 top male athletes, from 16 sport disciplines, mean age 25,8 years $\pm$ 2,08, mean height 197 cm $\pm$ 9,85 and mean weight 73,62 $\pm$ 12,38.

All athletes were under medical supervision, healthy, at the beginning of the training season, had the same practice program, food and medication.

Tests were performed at rest, in the same day including Bosco-ergojump tests, in terms of the method suggested by the author and after 60 min of our test, the total work performed 15 sec. (T.W.P.), on cycle ergometer (kgm/kg).

- Bucharest - Institute of Sports Medicine - origin test 1971-

The two tests were compared between them as absolute values and reported to the ideal theoretical values for each sports disciplines, taking into account the athletes' body weight in kg.

Based on the high degree of correlation between the tests, we can conclude that both of them can be used for estimating the power output in anaerobic conditions, especially depending on the specificity of exercise like Bosco test in gymnastics, basketball, volleyball and so on and T.W.P. 15 sec, in rowing, kayak-canoe, football and others.

200

PULMONARY VENTILATION TEST RESULTS IN SOCCER PLAYERS OF A FIRST DIVISION CLUB

Pavlović M., Kostić G., Butković M.

In addition to cardiovascular function examinations, pulmonary function tests were also important in order to evaluate physical performances of the athletes. At the same time, determination of pulmonary ventilation parameters was of the utmost importance, particularly for sports associated with increased oxygen consumption. Since the soccer is among such sports, we intended to examine pulmonary ventilation among soccer players of a Belgrade first division club. Therefore, we have tested 35 soccer players with their age ranging from 18-27 years, 21.7 +/- 2.9 years on average, with average height of 180.2 +/- 5.1 cm. Pulmonary ventilation was evaluated using spirometry and body plethysmography. Spirometric tests (VC, FEV1 and FEV1/VC) were performed by water "Expirograph" spirometer and parameters of body plethysmography and forced expirium flow-volume curve by constant volume body plethysmograph manufactured by the firm "Godart".

Mean values of the spirometric tests expressed in liters and percentages in comparison to CECA 1971 standards and Cherniack's standards were the following: VC(lit.)-6.04 +/- 0.59, VC%-101.9 +/- 7.6, FEV1 (lit) -5.3+/- 0.51, FEV1% -108.1 +/- 8.1, FEV1/FVC-86.7 +/- 5.2, PEF (lit)-9.95 +/- 1.4, PEF%-100.1 +/- 14.6, FEF 50 (LIT) -6.19 +/- 1.12, FEF 50%-95.8 +/- 18.2, FEF 25 (LIT) -3.08 +/- 1.07 and FEF 25% -82.9 +/- 29.

Mean values of the body plethysmography parameters were the following: TGV (lit.)-3.78 +/- 0.57, TGV%-125 +/- 17.5, Raw -1.63 +/- 0.75 cm/1/sec. Sraw-6.8 +/- 2.1, SGaw-0.16 +/- 0.05 and SGaw%-149.9 +/- 47.8.

These studies revealed that the average results of all given tests accomplished by our soccer players exceeded the standard values, except for FEF50 and FEF25 tests. All the studied parameters related to pulmonary ventilation were normal in all soccer players.

201

THE EXERCISE PROGRAMS - MUSCLE FIBRE TYPES AND OBESITY**I. Jorga, J. Tankosić, M. Stričević, V. Ljutić, D. Pakaški**

It is generally accepted that there are no simple explanations for the relative ease or difficulty with which individuals can maintain a constant body fat content. It is known that counting calories is not the single answer, the balance of major nutrients in diet also being important. We can assume that some people are born with a relative disadvantage to be less able to burn up fat without deliberately fasting or dieting. Their dietary fat content might be more critical to energy balance, than it is the case in others. In literature it is suggested that this difference may have its origin in the skeletal muscle, specifically in the proportions of fast and slow muscle fibers, in the major muscles and in the metabolic profiles of those fibers during energy production. The fact is that metabolic behavior of most fibers of both types is "trainable" by regular aerobic activity.

In our paper we have examined the relationship between fiber type proportions and body mass index (BMI), using data available in the literature. By gathering data from 8 studies - all fiber type assessments being derived from samples of the vastus lateralis of male subjects, we found a highly significant negative correlation between the proportion of the slow fibers reported and BMI ($r=-0.411$; $P<0.001$). The statistical rate of correlation between fatness and BMI itself is only $r=0.76$.

202

THE EFFECTS OF DIFFERENT EXERCISE PROGRAMS ON THE BASAL METABOLIC RATE AND BODY COMPOSITION**I. Jorga, J. Tankosić, V. Ljutić, D. Pakaški**

It is an established scientific fact that different exercise programs and schedules may increase basal metabolic rate (BMR). There are two recognized mechanisms. The first, with short time effects, is sometimes referred to as an excess post-exercise oxygen consumption (EPOC). This is manifested as a slight elevation of metabolic rate, for as long as 24 hours after the exercise. The effect is subtle, and it requires several hours of very intense exercise ($>70\%$ Vo_2 max), to elicit even a 10% enhancement of the BMR. The second mechanism is mediated through changes in body composition. An absolute increase in lean body mass (mostly muscles) is associated to the absolute increase in BMR. But the effect is smaller than it might be expected, since the specific metabolic activity of the resting muscles is much lower than the average for lean tissue, which includes the metabolically more active visceral organs. The relative increase in lean body mass - through a decrease in body fat - will not significantly alter absolute BMR but will be associated with and increase in BMR expressed relative to body weight.

Based on our research findings, exercise alone is a poor means of weight loss. Medically tested and guided programs of exercise incorporated into the diet plan, do improve weight loss. The biggest obstacle to the success of this proposed model is the simple fact that most of the obese people simply cannot be persuaded to pursue the physiologically reasonable bouts of individually prescribed exercise.

203

CONDITION OF ENERGY CAPACITY OF FOOTBALLERS AT VARIOUS COMPETITION LEVELS

Vukosav B., Grujić N., Lukac D., Becejac R.

Fifty-two footballers from three clubs took part in the experiment of energy capacity determination. The first club competed in the First Division (n=18), the second club in the Second Division (n=16), and the third in the Third Division (n=18). The basic personal data of the footballers are: age (23; 24.2; 21.3 years); height (182.7; 180.5; 179.81 cm); weight (77.8; 76.0, 74.5 kg); years of playing (10.3; 10.6; 10.4 years). Measurements were taken at the peak of the season. Aerobic power (VO₂ max) was determined by an "all-out" test, with the maximal intensity loading on the bicycle ergometer lasting six minutes. Anaerobic capacity was determined by a Wingate test, i.e. maximal loading on the bicycle ergometer lasting 30 sec. The aerobic capacity results in the clubs were: total work W (87.378; 86.920; 86.502 KJ), maximal oxygen consumption (VO₂) max (4.669; 4.250; 4.288 l/min), maximal oxygen consumption in relation to body weight (VO₂) max/kg (52.439; 51.200; 50.969 ml/min). The anaerobic capacity results were: peak loading Wp (670; 650; 643; watt) and total work in 30 sec Ws (14.542; 14.053; 13.837; KJ). The results have shown that football, compared with other kinds of sports, is on the medium level of aerobic capacity. It seems that the development of anaerobic capacity is of greater importance than it has been thought of up to now, and the Wingate results prove this. No significant differences have been found in either aerobic or anaerobic capacities in the groups tested. This proves that other factors also influence sports results in football to a great extent.

204

STRUCTURAL AND BIO-MECHANICAL ANALYSIS OF SPORT WALKING

Bubanj R., Branković M., Raković A.

The basic aim of this research was to analyze motoric manifestations of sport walking from the biomechanical aspect. The authors point to the fact that during walking, the walker and the base jointly affect (the leg on the ground) the supported leg. That is why the information about the supported leg reaction have the greatest importance for the analyses of the walking as a whole. There are charts (figures) that show the results of the top walkers on 400 m and biomechanical parameters of the step span, duration of

the double support and the relation of the double support and span. The authors conclude that by the excessive increase of the step frequency the length of the steps is decreased, which causes the decrease in speed as well, and vice versa, which also causes the loss of energy and contact with the basement. However, there is stronger relation between the step frequency and walking speed than between step span and the walking speed, so walking speed should be increased due to frequency not to the step span.

205

BODY IRON STATUS IN FEMALE ATHLETES

Radén S., Obradović B., Milivojević M., Pavlica M., Stojanović S.

The aim of this study was to evaluate body iron status and maximal oxygen intake in female active athletes playing various sports in national division. There were 36 female athletes divided into two groups. Group A consisted of 21 female handball players, whereas group B consisted of 15 female volleyball players. All subjects had determinations of red blood cells count (RBC), hematocrit (HCT), hemoglobin concentration (Hb), mean corpuscular hemoglobin (MCH), mean corpuscular volume (MCV), mean corpuscular hemoglobin concentration (MCHC), serum iron concentration (I), total iron binding capacity (TIBC), transferrin saturation (TS) and maximal oxygen intake (VO₂ max).

Low hemoglobin concentrations were found in both groups (group A 10.7 +/- 1.1 g/dl; group B 11.4 +/- 0.8 g/dl). Our findings show that 83% female athletes have anemia and 8% female athletes have latent iron deficiency. Maximal oxygen intake did not significantly differ between the two groups (group A 38.2 +/- 5.2 ml/kg/min; group B 41.4 +/- 6.9 ml/kg min). The decline in body iron status may affect the performance of the athletes during training. We suggest that the iron status of female athletes engaged in intensive training be examined regularly and that iron supplementation should be considered in cases of latent iron deficiency.

206

THE ROLE OF THE PSYCHOLOGICAL REACTION AND PHYSICAL TRAINING IN THE GENESIS OF CARDIOVASCULAR AND OTHER LEADING CHRONICAL

DISEASES OF BASKETBALL PLAYERS IN BERANE

Dr Smajo Šobotić

In this research we have defined the psychomatic system with two mechanisms; the mechanism of negative feedback and the dynamic balance of the opposite reaction. We maintain that the physical and psychic factors of the risks react to the psychomatic system with the same mechanisms. The only differences occur in the input into the psychomatic system, and in the same way they have been arranged into various levels of presentation, which are moved by the anterograde or retrograde ways in the central nervous system (CNS), in which they are presented by processes of excitation and inhibition.

The appearance of a certain disease or their prevention or improvement of health, which requires a new systematization of the stress, depends on the intensity, duration and rhythm of the stimulation.

Negative reactions in the mechanism of the dynamic balance of opposite reactions may cause intense stimulations which include exaggerated physical training, which, depending on the type of the psychological reaction, according to the RGM classification, may cause mild stimulations, including moderate physical training that leads either to prevention of a disease or to improvement of health.

Having tested basketball players in Berane with an RGM test, we determined the types of psychological reactions and the disposition for the stress.

In the examined group, in relation to the controlled one, we examined the possibility of removing harmful effects of exaggerated training. By learning the methods of autonomous self-regulation, it is possible to pass from the risky ones to the IV-type RGM classification. Therefore, this method can be used for psychological preparations of sportsmen.

207

THE INVESTIGATIONS OF PHYSICAL FITNESS AND DURATION QT INTERVAL BY HARVARD STEP TEST IN YOUNG SPORTSMEN

Miljković D.

Determination of physical fitness groups in young footballers is done by Harvard step test. Included are 20 active footballers aged $X=17 \pm 0.89$ years on average, $CV = 5.2\%$, mean body weight 65.6 ± 7.0 kg, $CV = 10.6\%$ mean body height 173.9 ± 4.5 , $CV = 2.6\%$.

The obtained results were subjected to statistical analysis by the Student t test and the correlation coefficient as determined. The obtained mean value index of the general physical fitness is excellent ($Q=101.8$). The QT interval is shortened in sportsmen after step testing. The statistical analysis of the obtained results showed that differences are significant for duration QT interval before and after step testing (QT before: $X = 0.39$

sec; QT after: $X=0.36$ sec; $t=3.0$ $p<0.01$). The results of statistical analysis showed high negative linear correlation between duration QT interval and the level of the heart rate after step testing ($r=-0.85$). QT interval changes during efforts dependent of heart rate, dependent on changes in sympathetic tonus and changes in blood catecholamine level. The obtained results have shown statistically significantly increased mean arterial pressure by comparison with initial values ($t=5.4$ $p<0.01$). The correlation coefficient shows complete positive connection between index general physical fitness and mean arterial pressure ($r=1$). The obtained results have shown no statistically significantly decreased diastolic mean blood pressure by comparison with initial values ($t=1.0$ $p<0.05$). Stroke volume is determined to Starr formula approximate. The statistical analyses of obtained results showed that differences are significant for stroke volume before and after step testing (stroke volume before $X=71.3$ ml; stroke volume after $X=89.3$ ml $t=10.8$ $p<0.01$).

Harvard step test is applicable for investigation of physical fitness of sportsmen.

208

VALIDITY OF NEW, ERGOMETRIC STEP TEST FOR INDIRECT ESTIMATION MAXIMAL AEROBIC CAPACITY

Životić, Vanović M., Dimitrijević B., Živanić S., Šelmić R.

In order to determine validity of ergometric step test, in 30 healthy men (21-43 years; 64.2-109.8 kg), the maximal aerobic capacity - (VO_2) max was: 1) measured directly in Bruce treadmill test (B); 2) predicted from Astrand's bicycle ergometer test (A); 3) predicted from Dobeln's bicycle ergometric test (D); 4) predicted from new ergometric step test (ST). Work loads in ergometric step tests were 6, 8, 10 and 12 kJ. Bench height (h) was determined as per the formula: $h=W/2 \text{ mgn}$ (W = work load in joules; m = subject's body mass in kg; $g = 0.81 \text{ m/s}$; n = number of steppings/minute - 25). Duration of a single test was 6 min. Values of (VO_2) max were predicted from auscultatorily measured pulse rate between the 15th-30th second during the first minute of recovery (original table according to earlier proved hyperbolic relationship between pulse rate and directly measured (VO_2) max. Average values of (VO_2) max were: 1) B: $3.2 \pm 0.4 \text{ l/min}$; 2) A: $2.7 \pm 0.3 \text{ l/min}$; 3) D: $2.9 \pm 0.3 \text{ l/min}$; 4) ST: 3.2 ± 0.5 , 3.2 ± 0.4 , 3.2 ± 0.5 and $3.2 \pm 0.5 \text{ l/min}$, from step test with work loads of 6, 8, 10 and 12 kJ, respectively (Fig. 1). Values of (VO_2)max predicted from step test were not significantly different from directly measured ones, but they were significantly higher than the values predicted from the Astrand's and Dobeln's test ($p<0.001$). All coefficients of linear correlations (r) were statistically significant ($p<0.001$): $r(B:ST) = 0.689$, $r(A:ST) = 0.703$, $r(D:ST) = 0.696$. We have concluded that the new, ergometric step test is specific and valid method for indirect estimation of (VO_2) max, and can be used for easy and quick prediction of maximal aerobic power in large population.

209

PHYSIOLOGICAL BASIS FOR INDIRECT ESTIMATION (VO₂)_{max} IN ERGOMETRIC STEP TEST

Životić-Vanović M., Šelmić R., Dimitrijević B., Živanić S.

The results of our earlier research show that work in step test (W) is equal to the double product of body mass (m), acceleration due to the gravity ($g=9.81 \text{ m/s}^2$), and bench height (h). Therefore, the work load in the step test can be standardized by changing bench height according to the individual body mass, and in that way the step test can be ergometric. The aim of our work was to make physiological basis for indirect estimation of (VO₂)_{max} in such ergometric step test. Thirty healthy men (aged 35.8 ± 7.6 ; BW $87.8 \pm 11.45 \text{ kg}$) underwent seven ergometric step tests with work loads of 2, 4, 6, 8, 10, 12 and 14 kJ. For each work load (W), bench height (h) was determined according to individual body mass: $h=W/2 \text{ mgn}$ (n=stepping rate - 25/min). Pulse rate (fc) and oxygen intake (VO₂) were measured simultaneously during the last minute of each test (Fig.1). For all tested subjects we found the following linear regression: (VO₂) (ml/min)= $19.62 \text{ fc}-722.16$; coefficient of linear correlation was 0.844 ($p<0.001$) (Fig. 2). The values of the individual coefficients of correlation ranged from 0.958 to 0.999. These results show that, at different work loads in the step test ranging from moderate to maximal ones, there is a linear relationship between growth of pulse rate and oxygen intake. The same basic principle of indirect estimation of individual VO₂ max was proved in the step ergometer as in bicycle ergometer tests.

210

"X SYNDROME" AND PHYSICAL ACTIVITY

Dragojević R., Živanić S., Životić-Vanović M., Dimitrijević B.

Hyperinsulinism, hypertension and hypertriglyceridemia, together with decreased HDL cholesterol values, designated as "X syndrome", are a significant risk factor of the arising and development of arteriosclerosis. To the present knowledge, the etiological basis of this syndrome is in genes abnormalities, clinical appearance of which is helped by aging, obesity and decreased physical activity. In conditions of controlled clinical experiment, in 15 subjects (43-56 years of age), individually prescribed everyday physical activity of 45 min/day in 10-day period resulted in: increase of initially low values of (VO₂)_{max} by 13.2%, decrease of insulinemia (the basic one by 23.5%, and the stimulated one by 33.1%), triglyceridemia by 43.1% and cholesterolemia by 23.4%, and increase of HDL cholesterol concentration by 23.3%. By increasing (VO₂)_{max}, characteristics of X syndrome disappeared in our subjects.

The results show that low aerobic ability is a reversible factor in atherogenesis.

211

BIOCODA - COMPUTERIZED DEVICE FOR AUTOMATIC DETERMINATION OF (VO₂) MAX AND THE INTENSITY OF PHYSICAL ACTIVITIES**Dragojević R., Životić-Vanović M., Živanić S., Vuksanović M.**

Low level of aerobic power is designated as an independent reversible risk factor of arising and development of many chronic degenerative (metabolic and cardiovascular) diseases, and individually dosed physical activity is the basis of preventive and therapeutic access to the decrease and /or elimination of the risk. For application of the dosed physical activity, it is necessary to determine: first, individual (VO₂) max, and second - intensity of the chosen type of physical activity at the level of 50-80% (VO₂) max. As the standard means of this procedure are available only in specialized laboratories, we have designed and produced a device which can be built into any electric bicycle ergometer. This device completes automatically, autonomously, simply and safely diagnostic procedures of determination of (VO₂) max, and then, using that information, it programs a desired intensity and duration of the physical activity. In all elements of the work, the pulse rate - which is an input signal controlling the specific level of loading in order to maintain the desired level of internal loading (working pulse rate) - is continuously measured. Specific software solutions make application of specifically intended programs (for reduction of body mass, hyperglycemia, hypercholesterolemia, etc) possible. This device, valuable in diagnostics, is an original instrument for the application of individually dosed physical activity, with great possibilities for application not only in medicine but also in sports and recreation.

212

HOW TO DETERMINE INTENSITY OF PHYSICAL ACTIVITY DEPENDING ON THE ACTUAL TERRAIN**Mijić R., Životić-Vanović M., Živanić S., Dimitrijević B.**

The intensity of physical activity is a key factor for achieving optimum effects in different programs intended for sports-recreation, therapy, rehabilitation, and other purposes. It must be determined according to individual maximum ability of each participant. When the program consists of walking/running activity, to determine its intensity we use data from literature on experimentally obtained energetic costs for different speeds of moving on flat surface and at different slopes. However, these data cannot be applied when the activity is performed in a field of specific configuration. Our results show that: 1) directly measured values of oxygen consumption in such a field significantly differ from energetic requirements estimated on the basis of literature data; 2) out of 292 participants on one program during walking/running activity only 27.7% were loaded in compliance with their maximum abilities. On the basis of the above, we can conclude that, for the dosage of intensity of the subject activities in

natural conditions, it is a must to measure directly energetic requirements of each terrain first.

213

THE INFLUENCE OF THE BALANCED FITNESS ON INSULIN SENSITIVITY OF PERIPHERAL TISSUE IN YOUNG INSULIN-DEPENDENT DIABETICS

Aida Sarajlić-Živanović, Vladimir Jorga and Dragan Micić

Physical exercise is traditionally considered beneficial in the treatment of insulin-dependent diabetics. Many examples of world-class athletes and participants in the Olympic Games with diabetes serve as impressive evidence, but, on the other hand, there are many young diabetics with different complications. The goal of this study was to evaluate a program termed "Balanced fitness" on insulin sensitivity of peripheral tissue in young insulin - dependent diabetics.

The "Balanced fitness" is a combination of aerobic exercise and strength training. Young diabetics exercised 3 times per week: on day 1 and day 3 they practiced aerobic exercise, and on day 2 strength training was carried out with free weights. They exercised for 55 minutes at 80 percent of estimated maximal heart rate. Insulin administration was 90 minutes before training, and insulin reduction was 30% before exercise and 20% after exercise. The "Balanced fitness" was carried out 6 weeks.

Before and after the "Balanced fitness" we measured insulin sensitivity by Minimal model with 5 μ g of insulin at the 20th min. Aerobic capacity was measured by Astrand test before and after the training, and strength was measured by Durak test at the same time.

The combination of aerobic exercise and strength training improved insulin sensitivity in young diabetics. In other words, the true improvement was in creating and maintaining a body that would let them live a life they would enjoy to live.

214

THE POSSIBILITIES OF ESTIMATION OF FUNCTIONAL ABILITIES OF YOUNG SPORTSMEN BY MODIFIED STEP-TEST

G. Škeljić, D. Perić, D. Radojević

The aim of this research is to enrich our knowledge and to reach uniformity in the field of techniques of research work and modifications of one insufficiently processing instrument. To be exact, this is a modification of Harvard's step-test, first as a global procedure of testing, and then as the very instrument with which the information has been collected.

The basic idea in the work is to establish what is the influence of different anthropometric characteristics on the results obtained by the step-test (according to the estimate of general cardiovascular endurance) and to measure these relations with a certain mathematical model. The attempt in this research is to redefine one of the traditional measuring instruments and to standardize it for the numerous needs of physical education (selections, diagnostic in the training process, etc.).

215

THE RESPIRATORY QUOTIENT AS A MEASURE FOR MONITORING THE PERFORMANCE CAPACITY IN ROAD CYCLISTS

R. Milić, M. Bravničar

We investigated the possibility to use the respiratory quotient (RQ) as a parameter for a qualitative estimate of the muscle glycogen content during training period and to establish the extent to which the RQ can be used as a parameter to monitor both nutrition and training. The amount of carbohydrates (CH) in the nutrition was reduced from 65%-70% (previously estimated by 7 day recall method using computerized analysis with Food Processor II Software by ESHA, USA) to cca 35%-40% of the daily calories intake in 22 young road cyclists, during 5 days. Measurements of the RQ (computerized spirometric system, Mijnhardt Oxycon Beta, breath-by-breath method for estimating CO₂/O₂ relationship) during mild exercise (bicycle ergometer, electronically braked Mijnhardt Ergoline 900, 100 W for 15 min) were performed daily. The maximum lactate production after an exhaustive exertion of short duration (bicycle ergometer, increase in workload 0.5 W/kg BW every 1 min) served as an estimation of the muscle glycogen content. During CH reduction, RQ decreased in all athletes from 0.820 $\pm$ 0.076 to 0.730 $\pm$ 0.046 and increased to 0.860 $\pm$ 0.069 in the first day after the restart of CH intake. This increase in RQ was accompanied by an increased ability to produce lactic acid (i.e. lactate) from 7.2 $\pm$ 1.6 to 10.3 $\pm$ 1.8 mmol/l, indicating the increase in muscle glycogen content. All measured differences were statistically significant (p between less than 0.05 and 0.01). We concluded that regular determination of the RQ during training of the road cyclists should be a useful non-invasive tool for the control of the muscular glycogen status. Possible applications of the method, e.g. for the monitoring the actual performance capacity, or monitoring and detecting of the early signs and symptoms of overtraining, are open for further investigation.

Key words: respiratory quotient, lactate, muscle glycogen content, road cyclists, carbohydrates.

216

CARDIOVASCULAR AND VENTILATORY RESPONSE TO SUDDEN EFFORT

R. Milić, N. Rotovnik, M. Horvat

In the present study the parameters of the cardiovascular, gas exchange and ventilatory response to individually adapted sudden effort (SE) were analysed in a group of alpine climbers (n=28; 24 men and 4 women). The level of SE was workload setting of 85% of the individual maximal oxygen consumption (VO₂ max) previously determined with the Maximal Cycle-ergometer Test (Giessen protocol by Prof. Dr Paul Nowacki; i.e. 0.5 W/kg BW, every 2 min.). In the second test, the duration of SE test was four minutes. Parameters of ECG, HR, VO₂, VCO₂, V_e, TV, f and RQ were continually monitored by Mijnhardt Oxycon Beta and Schiller EKG Exec System. In the second SE test, there were no ischemic changes or any other pathological ECG's signs. Mean values of heart rate (HR), VO₂, VCO₂, minute ventilation (V_e), tidal volume (TV) and resp. frequency (f) were in the first minute of SE test significantly lower compared to the first minute at the equivalent warm-up effort (WE). HR and systolic blood pressure (SP) were approaching steady state in the final two minutes of SE. The steady state value of HR was significantly higher than HR during the same level of WE. TV mean value at the end of SE was significantly higher than TV max at the end of the multi-stage Maximal Cycle-ergometer Test. VO₂ (Oxygen consumption) in the fourth minute of the SE test was close to VO₂ max values. We have concluded that during the first two minutes of the sudden effort (strenuous exercise with a sudden beginning), hemodynamic and ventilatory parameters do not reach the same values as in the equivalent exercise after the warming-up session. In continuation of exercise, i.e. in the next two minutes, values were higher and VO₂ and TV are at the level of maximal exercise.

Key words: sudden effort, cycle-ergometer test, cardiopulmonary system

217

BALLISTIC MUSCULAR POTENTIAL CHANGES UNDER THE INFLUENCE OF ISOMETRIC MUSCULAR STRAINS IN YOUNG SPORTSMEN

M. Janković

The aim of the research has been to examine whether there have been muscular potential changes under the influence of isometric muscular training strain and at which moment of the training the best positive effect of ballistic muscular work has been achieved. Isometric type of training has been applied upon the sample of 30 sportsmen at various time intervals. The results of the research show that there have been significant positive changes in ballistic muscular potentials in all examined sportsmen. The greatest increase has been achieved during the period when the treatment of muscular strain has been applied upon the sportsmen.

218

ASSESSMENT OF EXERCISE FITNESS BY ON-SITE LACTATE PRODUCTION

MEASUREMENT

S. Ivanović, Z. Vujović, R. Babić

Measurement of lactate production in skeletal muscles during exercise is a validated method for evaluation of functional aerobic capacity. Objective of the study was to assess capabilities of on-site assessment of lactate production with a portable instrument.

Lactate concentrations were measured from a single blood drop following almost painless skin pierce by enzymatic/spectrophotometric method applying hand-held battery operated Accusport system (Boehringer Mannheim). The study encompassed 10 male well-trained marathon runners (experimental group) and 10 male students of medicine who were not training regularly (control subjects). Experimental group was of significantly older age ($p < 0.01$). Both groups completed bicycle exercise test from 50 to 150 Watts in 25 Watts/2 minutes increments. Lactate production was assessed by subtraction of pre-exercise concentrations from the post-exercise values. Significantly higher lactate production was found in the control group compared with the experimental one ($p < 0.01$).

We conclude that on-site measurement of lactate production during exercise is feasible applying Accusport system. It offers a practical way for quick and adequate assessment of exercise fitness. Also, we confirmed that regular exercise training improves aerobic capacity regardless of the age.

219

FITNESS - A FASHION OR A NEED: EXPERIENCE ACQUIRED DURING THE WORK IN THE FITNESS STUDIO AND IN "LOKICA ON 3K" SHOW

Lokica Stefanović

Once my fitness and recreation studio was the only in its kind in Belgrade. I had seen and practised these exercises during my stay in New York, but here I worked them out and fashioned them to suit our mentality. At that time, there were many women who decided to start exercising and felt that their body became more elastic and their mood better after a few days already.

A couple of months later, upon the order of the then republican Ministry of Health, dr Predrag Milošević, from the Hygiene Institute of Serbia, was sent to see what (possibly detrimental activities, were happening in my studio. Having watched the exercises and measured the heart rate and asked some questions of the exercisers, the doctor left declaring that there was nothing wrong, that the exercises were safe and the strain adequate for the physical condition of this population stratum.

Even then, the magazines published photos of the exercises and ads for various aids and products intended to achieve a loss in body weight. As today, there were also women who were coming to the studio only because it was fashionable to do so, but there were also those who persisted in exercising. Such was the fitness scene of 1982/1983.

Today, there is a flood of tapes with exercises recorded by many celebrities, who in most cases practice these exercises only for the purpose of and during the taping. In our country, however, many people exercise guided by these video cassettes and hence numerous injuries occur.

Since the exercising with these video tapes are performed at home, it is not possible to react and correct anything. But, when these tapes fall into the hands of the untrained, quasi fitness instructors, who today open aerobics and fitness centres without any problem, it is clear what awaits the unfortunate exercisers who happen to come into the hands of such "experts".

And where are the doctors, inspectors and other authorities now to come, see, close, open, or at least warn?

220

THE USE OF HOLTER-ELECTROCARDIOGRAPHY IN DETECTING RHYTHM AND CONDUCTANCE DISORDERS IN SPORTSMEN

Vidaković S., Mališić T., Mujović M.V.

The disorders of the heart rhythm may be present in all the aspects of the ischemic heart diseases (IHD) and they can also be the only way in which such diseases may be displayed. The interference in conductance of the heart impulses are most frequently the consequence of ischemia, although they may also be the consequences of the inflammatory, degenerative or congenital conditions in the conductance system.

A sudden drop in the electric potential in the ischemic cells may result in ectopic impulses in terms of frequent chamber extrasystoles, occurrences of supraventricular and ventricular tachycardias, and, not rarely, even fibrillation of the chambers. The studies, which research the suddenly deceased, have shown that in 80% of the subjects the cause of sudden deaths was the chamber tachy-arrhythmia and chamber fibrillation.

The incidence of sudden death has also been noticed among active athletes, who are generally considered healthy population. Traditional methods of ECG and load tests are not always capable of registering even some very malign rhythm and conductance disorders. That is why continual Holter-electrocardiography represents a valuable non-invasive method for detection of heart arrhythmias and conductance disorders and monitoring of the results of their treatment. In addition, it enables timely detection of the susceptibility to rhythm disorders.

The results obtained by Holter method in 30 active athletes are analyzed. These results indicate that Holter-electrocardiography is a non-invasive method which, along with the load test, should be widely applied in health control of active sportsmen.

221

APPLICATION OF BAYLEY AND PENNEAN INDEXES IN PROJECTING DEFINITIVE HEIGHT IN SELECTION OF BASKETBALL PLAYERS

Marković P., Stančulović A., Mirić M., Đorđević R., Naumović P., Dražić V., Arandelović A., Ljutić V., Đurakić M.

Contemporary top sports achievements require studious and programmed work in which timely selection is one of the important components.

Basketball, as a very attractive and dynamic sport, requires timely recourse to selection, especially from the standpoint of defining definitive height of the players, since body height is one of the dominant factors in this game.

That is why we began to apply Bayley and Pennean indexes in projecting definitive body height. The test was applied on a group of basketball players taken from pioneer to senior teams. It has been found that the correlation between the projected and actual height of the mentioned group of basketball players is very high.

In addition, on several individual examples, we attempted to monitor the increase in the body height and to compare them with the results projected with Bayley and Pennean indexes in order to form an individual diagram with probable variations.

222

MONITORING OF HYPERTENSIVE AND NORMOTENSIVE INDIVIDUALS AGED UNDER 40 DURING PHYSICAL LOAD TEST

Stojanov V., Jakovljević, Šaranović, Avramović DM., Avramović DD

The study is aimed at determining possible differences between the two groups of subjects, normotensive and hypertensive, through measurement and monitoring of systolic and diastolic blood pressures and cardiac frequency during the physical load test. The study included 30 males aged under 40, classified into two groups according to the arterial blood pressure values: ten normotensive (N, n=10) and 20 hypertensive (H, n=20) subjects. All subjects underwent the progressive, continuous, multi-step exercise test at 50, 75, 100 and 125 W loads.

Average values of the systolic (SP) and diastolic (DP) pressures and cardiac frequency (CF) obtained at the 125 W load are presented in the table.

	H1	N1	p values
SP (mmHg)	202 +/- 5	168 +/- 10	< 0,01
DP (mmHg)	105 +/- 6	94 +/- 1	< 0,01
CF (n/min)	152 +/- 5	146 +/- 9	< 0,05

The highest load test (125 W) was tolerated by 17 subjects (85%) with elevated arterial pressure values and by all normotensive subjects.

According to the obtained results, it may be concluded that the individuals with elevated arterial pressure values reacted to the same physical exercise with statistically significantly higher increase of SP, DP and CF, when compared to the individuals with normal blood pressure levels.

223

LOAD TEST IN HYPERTENSIVE AND NORMOTENSIVE INDIVIDUALS AGED OVER 50

Šaranović, Avramović DM., Stojanov V., Avramović DD, Jakovljević B.

The study is aimed at determining possible differences between the two groups of subjects, normotensive and hypertensive, according to measurement and monitoring of systolic and diastolic blood pressures and cardiac frequency during the exercise test. The study included 30 males aged over 50, classified into two groups according to the arterial blood pressure values: normotensive (N, n=10) and hypertensive (H, n=20) subjects. Average values of the systolic (SP) and diastolic (DP) pressures and cardiac frequency (CF) obtained before the test are presented in Table 1.

Table 1

group	SP	DP	CF
H	153 +/- 4	94 +/- 1	73 +/- 5
N	122 +/- 12	76 +/- 5	71 +/- 8

The groups were adjusted according to their age and BMI. All subjects underwent the progressive, continuous, multi-step exercise test at 50, 75, 100 and 125 W. Table 2 presents average SP values at loading of 125 W.

Table 2

	H	N	p values
SP (mmHg)	211 +/- 5	175 +/- 8	< 0,01
DP (mmHg)	102 +/- 5	87 +/- 3	< 0,01

CF (n/min)	158 +/- 6	142 +/- 7	< 0,01
------------	-----------	-----------	--------

The highest load test (125 W) was tolerated by 12 subjects (80%) with elevated arterial pressure values and by all normotensive subjects.

According to the obtained results, it may be concluded that the mildly hypertensive individuals reacted to the same physical exercise with statistically significantly higher increase of SP, DP and CF, when compared to the individuals with normal blood pressure levels.

224

SPORTS MEDICINE CONTROL AND HEALTH CONTROL OF SPORTSMEN

Đorđević R., Mirić M., Stančulović A., Naumović P., Marković P.

Contemporary sports achievements require ever-increasing intensification of training. In order to protect sportsmen's health, the Law on health protection and the Law on physical Culture mandates compulsory health control of sportsmen.

In compliance with the Laws and specificity of particular sports disciplines, some sports associations also passed their health statutes and established health-care committees.

Sports medicine control and health supervision of the competing sportsmen is carried out in JZFKMS, Department for Health Protection of Sportsmen.

Our paper presents the methodology of a specialist systematic examination of sportsmen, as well as a special part of the examination according to the specificity of sports discipline (fighting sports, under-water sports, air-borne, auto-moto sports, etc.).

With a view to adequate and continual health control of sportsmen and on the basis of our results, it is necessary to:

1. supplement and enlarge the methodology of medical examination of sportsmen,
2. to form health-care committees to pass health protection statutes in those associations which have not passed the statutes yet,
3. to make participation in the work of the health-care committees of physicians-sports medicine specialists compulsory,
4. to establish better cooperation between sportsmen/trainers and sports medicine socialists.

225

ECOLOGY AND SPORT

V. Jorga

Top results and records in contemporary sports are practically even more dependent on the influence of the micro and macro climatic factors. The environment in which the sports take place, e.g. natural and indoor, have a very large impact on the health status of the top athletes. Practically, we can now even more pronounce the importance and impact of the factor of ecology on the health status and achievement of the top athletes. The outdoor sports are largely dependent on the influence of the ecological status and environment in which the sports training and competition is taking place. We are stressing the level of air pollution (the levels of: nitrous gases, carbon monoxide, lead, air-ionization, ozone, etc.); air: velocity, humidity, temperature, ionization; insulation; regarding the influence on the respiratory system, body immunity and sport performance. In water sports, besides these factors, are also present the influence of the level of water: turbidity, disinfection (level of chlorine compounds, chloro hydrogen and organic compounds, etc.). The process of indoor training and competition have even more rigorous effects on the sport performance and results. The training cycle is especially exposed to the harming effects of the environmental factors. Today, the doctrine of modern training for the top athletes is including and stressing all the before mentioned ecological and other related factors. Only, the integral planning of the sport training and training oriented towards competition and achievement of top results and even records, is the real solution and attainable perspective in the future of sport and sport medicine. Because, we are deeply convinced, based on our studies and prolonged research, that the starting equation in this area is as follows: $\text{SPORT} + \text{MEDICINE} + \text{ECOLOGY} = \text{SPORTS MEDICINE} = \text{HEALTHY ATHLETES} = \text{TOP RESULTS}$. More than that is not necessary, less is not adequate.

226

CREATINE: ITS ROLE IN KARATE TRAINING AND ITS APPLICATION AS SPORTS FOOD SUPPLEMENT

V. Jorga

During last two years, in the scientific literature, the positive effects of the creatine ingestion mechanism have been verified. It has been established a positive effect of the creatine on the sport performance in the variety of the experimental conditions. The exact mechanisms, e.g. intake of the creatine how it influences the sport performance is not quite clear. We have observed karate sportsmen as a study group while they have been exposed to the intake of creatine, by performing double blind placebo test studies.

During the experimental period we have examined the daily intake of 4 times a day dosage of 5 grams, during the period of five days. We have established that this quantity is significant to amount of work which can be performed by healthy karate athletes during repeated bouts of maximal exercise. It was performed in CYBEX power machine. These findings are similar to the results which have been obtained (Balsom et al. 1993, Birch et al. 1994). It is clear from preliminary research conducted on the top karate athletes the ingestion of creatine during five days period at a rate of 4 times 5

grams per day, has significantly increased the mass of creatine and phosphocreatine concentration prior to exercise and facilitate phosphocreatine re synthesis during recovery. Based on ours experimental findings creatine ingestion is clearly a mechanism which is enable immediate significant improvement to athletes which are involved in karate as extremely explosive sport. Creatine may also allow karate athletes to benefit to been able to train with a lower level of exhaustion, at intensity higher than that they are normally accustomed. We can compare this achievement with a discovery of carbo hydrate loading in the 1960-ties. We are deeply convinced that the supplementation of the creatine is a possible one of the most important developments in sport nutrition.

227

INFLUENCE OF CARBO HYDRATE INGESTION ON BLOOD GLUCOSE IN PROLONGED EXERCISES AND PERFORMANCE IN SPORT

I. Jorga, V. Ljutić, J. Tankosić, D. Pakaski

The influence of increase carbo hydrate (CHO) intake on endurance capacity of karate athletes were investigated following of boat of 90 minutes kata exercise (e.g. specific form of karate training) at 70% VO₂ and 25.5 hours of recovery in 21 male karate subjects, who were divided in two matched groups as control (C) and CHO condition. Experimental CHO group intake of carbo hydrates was increased by 3 gram/kg. of body weight over the C condition. This was achieved of the supplementation of 16.5% glucose polymer solution. Performance time before the experiment were not different for both groups. After 22.5 hours of recovery cycle the C group reduced their performance time by 16.10 minutes whereas the CHO group maintain the same performance. In conclusion that a high CHO diet restores endurance karate capacity within 22.5 hours whereas isocaloric diet without supplemental CHO does not. The rate of perceived exertion was significantly lower with CHO. In conclusion, ingestion of CHO improves karate sport performance most probably by elevating blood glucose leading to an increase supply of CHO and subsequently oxidation in muscles.

228

RECREATION AND REHABILITATION OF ENDOCRINE PATIENTS

Djordjević D., Mileusnić M., Djurić M., Djordjević Z., Jevtović R.

This study comprises contemporary views on medical rehabilitation and recreation of endocrine patients. General principles of rehabilitation and recreation based on physiological activities of the human organism are given in this study. Influencing the activity of some segments of the body, we are able to change the function of organs and systems. The functional unity of the organism is provided thanks to the central and especially the neuro-vegetative and the endocrine systems, which provides the needed stability and balance.

The study describes the changes which occur in the cardiovascular system during physical strain thereby reviewing the short and long duration of muscular activities as well as the activity of the heart and circulation of the blood of corpulent and elderly people.

In the group of endocrine patients, special attention is paid to the diabetics, and then to the fat and asthenic ones as well as to patients suffering from thyroidopathy.

It is a fact that one of the causes of arteriosclerosis is the lack of physical strain. Therefore it is necessary to introduce regular recreation activities and outings with abundant sports activities, which also present the best prevention from illnesses of the metabolism or coronary diseases. The work emphasizes that chronic psychological stress influences stronger secretion of catecholamine and accelerates the development of arteriosclerosis; therefore it also recommends active and passive rest and physical exercises.

It is important for the diabetics to choose their profession carefully - namely, it has to be connected with physical labour.

Attention is also drawn to the importance of the spa as a place for medical treatment for diabetics during their rehabilitation and recreation.