

Determination and development of specific motor abilities in young Austrian elite soccer players

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Introduction

Talent identification in Austrian soccer very often relied on subjective expert judgment by the national coaches. Several studies can show, that the physical demands in soccer increased significantly (Ekblom 1994). Nevertheless scientific research (Kollath et al. 2005, Meyer et al. 2005) has shown that the physical development stagnates or even stoppes at the age around 16 and 17. As a consequence the Austrian Football Federation (ÖFB) initiated a project called "The Austrian Way". Besides structural adaptations this projects contains a longitudinal term study with the aim of testing soccer specific motor abilities twice a year for the young Austrian elite soccer players. This test battery mainly includes tests for sprinting, coordination, jumping and endurance abilities. The present longitudinal study is aiming at dimension analyses of the tested motor abilities at the various age groups of young Austrian elite soccer players and at the analysis of their motor performance development.

Methods

Individual profiles are measured and normalized age-dependent evaluations of individual parameters are generated twice a year. The items tested are added up to the following skill-factors: Speed; Agility; Strength; Flexibility; Specific endurance; Muscle-Function; Body-Composition. The data of 2937 subjects, at the age of 13 to 19, which have been tested over the last 4 years, were analysed by factor analysis (rotated varimax) and one-way Anova followed by a Bonferroni test.

Results

Factor analysis of tested items (14) showed a 5-fold dimension of motor skills for the players aged 13 to 17. The factors grouped in: speed/strength (20m sprint, CMJ), coordination (pendulum-sprint, hurdles-boomerang, tapping, agility), reactive-strength (DJ) and specific endurance (shuttle run). The 5th factor loaded ball throw and seems to reflect strength of the torso and the arms. At the 18 years old players the dimensions are reduced to speed/strength/coordination, acyclic fastness/reactive-strength, specific endurance and strength of the torso. Age-dependent differences were calculated with one-way Anova.

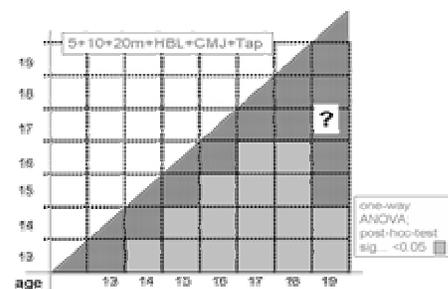


Figure 1: Results of Anova for 5/10/20m, hb, CMJ and tapping

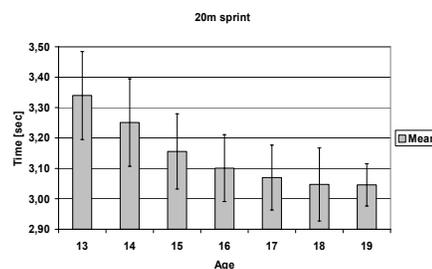


Figure 2: Means and St.Dev. for 20m

It revealed significant differences (see Figure 1) for sprinting, hurdles boomerang, CMJ and tapping till the age of 17 ($p=0.005$). In pendulum sprint, DJ and shuttle run this break in development already occurred at

the age of 16. No significant differences for the shuttle run were found between the ages 13 and 14.

Discussion

Databases as presented are necessary to evaluate a holistic approach in soccer education as well as to select players from 12-19 years for national teams. The tested items ensure to cover the motor dimensions of modern soccer. Our results go along with the findings of Kollath et al. (2005) and Meyer et al. (2005). For evaluating the reason of the break in the physical development at the age of 17 more issues about specific training regimes (speed, coordination, strength) for youth players have to be reconceived. The results suggest that specific physical conditioning in these areas should start at the age of 16.

Reference

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Kollath E, Mehrheim G, Kleinöder H, Braunleder A (2005). *Fußballtraining*. 54-59.

Meyer T, Coen B, Urhausen A, Wilking P, Honorio S, Kindermann W (2005). *Deutsche Zeitschrift für Sportmedizin*. 20-25.