The impact of moderate and high intensity total body fatigue on passing accuracy of experienced and novice basketball players

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Introduction

According to Hoffman et al (1995) high-intensity, moderate duration exercise among other factors may be detrimental to basketball performance. It has been shown in previous research that fatigue is frequently accompanied by a decline in skills and performance (Al-Nakeeb et al 2003, Mohr 2003, Davey et al 2002). Despite the acknowledged importance of fatigue on performance however, ecologically sound research, investigating fatigue and its effects on sport-specific skills is very limited. To our knowledge, no study has previously examined the effect of fatigue on basketball-passing skills. Consequently, the aims of this study were (1) to investigate the effects of moderate and high intensity total body fatigue on the performance of a basketball-passing test of experienced and novice basketball players (2) to ascertain if the effects of fatigue on performance are the same regardless of skill level.

Methods

Ten physically active physical education students (23.30 ± 1.05 yrs) and ten National Division 1 and 2 basketball players (22.50 ± 0.41 yrs) volunteered to participate in this study. Participants performed the modified AAHPERD (1984) Basketball Passing Test under three different testing conditions: rest, moderate and high intensity total body fatigue. Fatigue intensity was established using a percentage of the maximal number of squat thrusts performed by the participant in one minute. It was felt by the investigators that this method of inducing fatigue was more appropriate as it takes into consideration the fitness level of each individual participant. Following on from the process of establishing the maximal fatigue level, the participants performed the passing task under three conditions. These conditions were: rest, 70% and 90% of their maximal squat thrust repetitions. Testing on the three conditions was counterbalanced throughout this study.

Results

ANOVA with repeated measures revealed a significant (F 2,36 = 5.252, p < .05) level of fatigue by level of performance interaction. Two separate ANOVA’s with repeated measures revealed that in the novice players, there was a significant difference (p < .05) between performance at rest and performance following both moderate and high intensity total body fatigue. In the experienced players however, the only significant difference occurred between performance at rest and performance following high intensity total body fatigue. On examination of Figure 1 it is clear that in the experienced group there is a detriment in performance following moderate and high intensity total body fatigue but the detriment is not as steep as the detriment in the novice players performance. In summary, the results indicate that high intensity total body fatigue has a detrimental effect on performance of a basketball-passing test irrespective of skill level but at moderate fatigue there is no deterioration in performance among the experienced players.

Discussion

Due to the fact that many sports skills are performed in a fatigued state, there is a need to assess skill acquisition and performance in this condition. The game of basketball entails intermittent exercise bouts of short, intense activity punctuating longer periods of moderate intensity exercise. The results of this study demonstrated a potential decrement in basketball accuracy following a short bout of intense exercise at a high intensity regardless of skill level. The results however, suggest that the detriment is much greater in novice players than experienced players. Consequently, experienced players seem to perform better given the level and type of fatigue than the novice players and are better able to cope physically with the demands of the test in terms of speed and/or accuracy of passing. The results of this study reinforce the claim that fatigue is frequently accompanied by a decline in skill and potentially this decline may be relative to the skill level of the participant. Certainly, future ecologically sound studies are needed examining the effects of basketball-specific fatigue on performance of ecologically valid basketball tests. Research examining the effect of sport-specific fatigue on aspects of performance such as concentration, biomechanical aspects of performance or anticipation and examining whether differences in level of performance are linked to one or more of these factors would also be noteworthy to coaches, trainers and sport scientists alike.

References