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Paper #88

Age Appropriateness of ACL Injury Prevention Exercises

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Summary:
We evaluated the age appropriateness of ACL injury prevention exercises and discovered that the majority of children ages 8-15 are not able to complete neuromuscular training exercises while maintaining proper alignment without verbal cues.

Abstract:

Background

Much effort has been dedicated to developing neuromuscular training (NMT) programs to reduce the risk of ACL injury. While preventive programs have been successful in decreasing the rate of ACL injury in young populations, the appropriateness of NMT exercises across different age groups has not yet been demonstrated. The purpose of this study is to determine if children ages 8-11 and 12-15 can perform common NMT exercises with equal ability.

Methods

Seven NMT exercises were selected for evaluation from both the Beginner (8-11) and Intermediate (12-15) programs. Male and female subjects ages 8-15 were recruited from schools and youth sports organizations. Informed consent/ assent was obtained from each subject. Participants completed a demographic survey and were assigned a subject ID before testing. Participants completed two trials of each exercise. Performance was assessed after receiving visual/ verbal exercise instruction and again after receiving visual/verbal cues that reinforced correct exercise technique. Three sports medicine practitioners evaluated each exercise using three performance criteria. Exercise technique was deemed correct when at least two evaluators agreed that neutral alignment of the cervical spine, lumbopelvic complex and lower extremities was maintained during each exercise.

Results

301 total participants were evaluated (8-11 years: n = 165, 54.2% female; 12-15 years: n = 136, 39.9% female). With the exception of the side plank exercise (P=0.014) there was not a significant difference between the percentages of males and females who completed the exercises correctly. There was only a significant difference noted in exercise performance between participants aged 8-9 & 10-11 years for figure 8 run narrow and between participants aged 12-13 & 14-15 years for scissor jumps. The addition of cues significantly increased the percentage of participants who correctly completed the exercise across all ages and all sexes (P<0.001). Inter-rater reliability among all criteria for all evaluators for the 8-11 year old exercises was K=0.31 and K=0.42 for the 12-15 year old exercises showing fair agreement.

Conclusion/Significance

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The majority of children ages 8-15 are not able to complete NMT exercises while maintaining proper alignment without verbal cues. The significant increase in proper alignment between trials with and without cues across all age groups demonstrates the importance of providing instructions to encourage proper technique. It is likely that with repeated instructions and practice the percentage of children who are able to complete these exercises with proper alignment will increase further. These results demonstrate the importance for coaches and physical education teachers to be trained in providing cues to improve alignment during ACL injury prevention exercises.