

**GENDER AND AGE COMPARISONS IN NEUROMUSCULAR AND
BIOMECHANICAL CHARACTERISTICS OF THE KNEE IN
YOUNG ATHLETES**

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INTRODUCTION: The majority of research examining gender differences related to noncontact ACL injuries has focused on high school and collegiate athletes due to the disparity in injury rates between genders. Yet, current evidence suggests that injury rate differences also occur in younger, school-aged athletes. In addition, the potential contributors to these injury rate differences in school-aged athletes are largely unknown. The purpose of this study was to examine and compare the gender and age group strength, balance, jump height, and landing kinematics characteristics in high school and school-aged athletes.

METHODS: Forty healthy, high school (16.8 ± 0.8 yrs) and 40 school-aged (10.8 ± 0.8 yrs) with an equal distribution of males and females within each group participated in the study. Each subject underwent an isokinetic strength test (knee flexion and extension at $60^\circ/\text{sec}$), single-leg balance assessment (eyes open and eyes closed), vertical jump height test, and a kinematic analysis (knee flexion and valgus angle at initial contact) during a single-leg vertical stop jump task. A two-way ANOVA (age x gender) was utilized to examine age group (within gender) and gender (within age group) differences.

RESULTS: Significant ($p < 0.05$) gender differences were revealed in strength, balance, and jump height performance in the high school group. Specifically, males had greater strength (flexion and extension) and increased jump height whereas females had better balance. No differences were observed in the school-aged group in any of the variables analyzed. Significant age group differences were observed within both genders for strength (flexion and extension) and jump height such that high school athletes had greater strength and jump height performance. School-aged males had better balance than high school males. No significant differences were observed in landing kinematics for any of the comparisons made.

DISCUSSION: Previous studies have demonstrated significant kinematic differences during sports tasks in high school and college-aged athletes. The current study did not reveal kinematic differences but did reveal strength differences which may partially explain the differences in injury rates in these athletes.

CONCLUSIONS: The lack of gender differences within school-aged athletes does not help to explain the gender differences in knee injuries described in the literature. Research should continue to examine the neuromuscular and biomechanical characteristics of young athletes.

ACL RESEARCH RETREAT III- LEXINGTON, KY, APRIL 5-8, 2006