

# **Differences in Strength, Muscle Work, and Hamstring/Quadriceps Ratio in Professional and Junior Elite Basketball Players According to Sex**

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## **Abstract-**

**Background:** Anterior cruciate ligament (ACL) injury is more prevalent in young athletes and women. A deficit of knee flexor strength and a H/Q strength ratio below 0.6 in athletes are risk factors. Therefore, the main objective of this study is to determine if there are differences in the strength of the knee musculature, joint work, and H/Q ratio between professional and junior elite basketball players and sexes, since there are differences in the incidence of ACL injuries between these groups.

**Methods:** Forty-three professional (27 male and 16 female) and 42 junior elite (28 male and 14 female) basketball players were evaluated. Dynamometric knee flexion and extension measurements were performed on both lower limbs at three angular velocities: 30°/s, 120°/s, and 180°/s. Concentric knee flexion and extension strength variables were measured in Newtons, the strength ratio between flexors and extensors in H/Q ratio, and muscle work (product of force times displacement) in Joules. Comparisons of the measured variables were made between categories and sexes.

**Results:** Significant differences ( $p < 0.05$ ) were found between categories (professional and junior) in all measured strength parameters as well as in joint work. No differences were found between categories in the H/Q ratios. Significant differences ( $p < 0.05$ ) were found between sexes in most measured strengths and joint work. However, no differences were found in most of the H/Q ratios. Female basketball players have lower values of strength and muscle work than male players, however, in the H/Q ratio data there are no differences between the two groups. The same occurs between junior and professional athletes.

**Conclusions:** The authors conclude that flexor and extensor strength values should be analyzed in isolation and not in terms of the H/Q ratio.

**Index Terms-** anterior cruciate ligament (ACL) injury; strength ratio; isokinetic strength; hamstrings; quadriceps; basketball players

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