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Bioelectrical Impedance Analyzer and Knee Strength: A Comparative Approach Between Men and Women

Topic: Biomechanics

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BACKGROUND

The assessment of muscle strength and body composition is essential for understanding sex differences in physical medicine and rehabilitation. Isokinetic knee performance is influenced by factors such as muscle mass, body composition, and physical activity level. However, few studies have explored the relationship between bioimpedance and knee strength in young and active subjects. This study aimed to compare the isokinetic performance of knee flexors and extensors between men and women and to analyze the influence of body composition on these performances.

METHODS

This was a cross-sectional comparative study conducted in the Department of Physical Medicine and Rehabilitation at CHU Marrakech. Thirty participants (15 men, 15 women) were included based on strict criteria regarding physical activity and body composition. The assessment included:

- Bioimpedance analysis to measure muscle mass and fat mass.
- Isokinetic testing using a dynamometer at three angular velocities: 60°/s, 180°/s, and 240°/s, in both concentric and eccentric modes.
- Calculation of the isokinetic flexor/extensor ratio (H/Q) and fatigue index.
- Statistical analysis was performed using SPSS version, applying Student's t-test and the Mann-Whitney test, with a significance threshold of $p < 0.05$.

RESULTS

Men exhibited significantly greater muscle strength than women in all isokinetic tests ($p < 0.001$).

- Quadriceps: Men generated higher average force than women at all angular velocities, with a significant difference ($p < 0.001$).
- Hamstrings: Knee flexor strength values were also higher in men.
- Bioimpedance: A positive correlation was found between muscle mass and knee strength ($r = 0.795$, $p < 0.001$), whereas fat mass showed a negative correlation with muscle performance ($r = -0.359$, $p = 0.051$).

CONCLUSION

Our results confirm significant differences between men and women in terms of knee strength, linked to body composition. Bioimpedance analysis provides a better understanding of these disparities and could be used to personalize rehabilitation and training protocols.

Statement of Disclosures

None

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