

Intra- and Inter-Limb Isokinetic Strength Asymmetry in Competitive Judokas: Differences in Magnitude Across Competition Levels and Sex

Joachim D'Hondt, Laurent Chapelle, Brecht Pletinckx, Marie Sadouni, Liese Bosman, Tijl Lindekens, Peter Clarys

Vrije Universiteit Brussel, Brussels, Belgium

Purpose: Inter-limb asymmetry is generally perceived by practitioners to increase injury risk and reduce sport performance. However, it remains unclear whether the magnitude of these asymmetries differs between judokas of varying competitive levels and sexes, potentially increasing the risk of injury or performance decline in certain groups. Therefore, this cross-sectional study aimed to examine differences in the magnitude of lower intra- and inter-limb asymmetry across competitive levels (i.e. regional, national, and international) and between sexes in competitive judokas.

Methods: The magnitude of lower intra-limb (i.e. hamstring/quadriceps ratio [H/Q]) and inter-limb (i.e. quadriceps/quadriceps ratio [Q/Q], hamstring/hamstring ratio [H/H], hamstring/quadriceps:hamstring/quadriceps ratio [H/Q:H/Q], and percentage difference method [PDM] for knee extension and flexion) isokinetic strength asymmetry was assessed in 30 male and 24 female judokas aged 14–58 years. Range of motion was individually set, spanning from maximal knee flexion to maximal knee extension. The angular velocity was set at 90°/sec. To assess differences in descriptive characteristics, as well as intra- and inter-limb asymmetry across competitive levels and sex, a two-way ANOVA was conducted. If significant main effects or interactions were found, post hoc pairwise comparisons were performed using Tukey's test. In cases where normality assumptions were violated, non-parametric alternatives were used: the Kruskal–Wallis H test for competitive-level comparisons for males and females separately, and the Mann–Whitney U test for post hoc analysis of the Kruskal–Wallis H test or sex-based differences.

Results: No significant differences in the H/Q ratio, H/H ratio, Q/Q ratio, H/Q:H/Q ratio, or PDM for knee extension and flexion were found across competitive levels ($p = 0.403$ – 0.979). However, male judokas showed a significant Q/Q difference ($p = 0.035$), with international athletes (97.00 ± 3.34) having lower values than regional (92.59 ± 4.64 , $p = 0.032$) and national (90.86 ± 7.18 , $p = 0.026$) judokas. No significant sex-based differences in asymmetry were observed ($p = 0.467$ – 0.774).

Conclusion: Since most asymmetry indices did not significantly vary by competitive level or sex, and overall asymmetry magnitudes were relatively low, reducing lower limb asymmetry with regard to injury prevention and sport performance may not be a priority for male and female judokas at any level.

