Vertical jump in Women Artistic Gymnasts between 6 and 12 years old

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Résumé

Introduction: Women's Artistic Gymnasts are frequently found among the youngest athletes participating in the Olympics Games (Longo et al., 2016). Elite gymnasts may start training as early as 6 years old with peak performance more than 10 years later. Top-level gymnasts can train twice a day, 5 or 6 days a week, for a total volume sometimes reaching 36 hours a week, up to 12 months a year (Caine & Harringe, 2013). National athletes reportedly perform between 700 to 1 300 elements per day which corresponds to 220 000 to 400 000 elements per year (Sands, 2000). Women artistic gymnastics consist in 4 different apparatus: Vault, Uneven Bars, Balance beam, Floor (Fédération Internationale de Gymnastique (FIG), 2025). Acknowledging that out of these four apparatuses, three are considered leg apparatuses, a vast majority of daily elements start with an impulsion and end with a landing. Among the different physical qualities, lower limb explosivity is therefore paramount in Women's Artistic Gymnastics both for performance and risk prevention. Nevertheless, the current scientific literature mostly focuses on athletes already identified and oriented toward elite structures (Junior or Senior participating in national or international competition).
Method: As part of national technical and physical tests, province organized gathering with standardized evaluation over the course of the past 5 years. As part of the standardized protocol, a Sargent test was performed twice to measure the vertical jump of young athletes. Out of the 2 trials, the best performance was saved for further analysis. A total of 1592 gymnasts were tested between 1 and 5 times resulting in 2011 measurements of vertical jump for gymnasts between 6 and 12 years old.

Results: Vertical jump ranged between 17 and 37cm (Mean ± SD, 26.5 ± 4.2cm) from 6 to 6.99 relative age and between 26 and 52cm (39.8 ± 6.8cm) from 11 to 11.99 years old. The large number of data allowed the computation of quantiles for every 6-month period between the age of 6 and 12 years old. The regression equation of the median splitting the population into a first and a second half is Vertical jump (cm) = 3.1 × Age + 4.6 (RMSE = 0.89).

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Discussions: Despite the potential error inherent to the Sargent test compared to instrumented protocol, the ease and rapidness yield a large number of measurements on the territory, bringing confidence to the outcomes. Moreover, the Sargent test can later be repeated after the gathering to monitor athletes and/or evaluate the training efficiency. The result of this study allows coaches from anywhere to compare gymnasts against national standards for vertical jump while considering the relative age in order to detect outstanding individuals. Additionally, the early detection of potential weakness allows coaches to correct rapidly for a safe and long-lasting sport's participation.

References

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