accelerometer (TrignoTM Wireless EMG System Overview, Delsys, USA; ±2*g*), positioned roughly at L5 level, and the variability (standard deviation) calculated in the AP direction. Surface electromyograms (EMG) were collected from the medial gastrocnemius (MG) and tibialis anterior (TA) muscles bilaterally from the Trigno system (1.926Hz). The EMG's RMS amplitude was obtained to evaluate the degree of muscle excitation. Due to the small sample size, the statistical analysis involves data description by means of median (minimum – maximum).
Results: In relation to EO (8.41, 7.56 – 8.98 gx10-3), the standard deviation of ACAP reduced with BFac (median, min-max: 7.82, 4.32 – 11.45 gx10-3) and increased with BFlaser (9.83, 6.50 – 11.01 gx10-3). For the right body side, the RMS of TA increased with the biofeedback (BFac: 6.33, 2.99 – 9.67rms; BFlaser: 6.11, 2.31 – 8.32rms) when compared to EO (5.07, 2.11 – 7.16 rms). For the MG, while RMS was smaller with BFac (5.53, 2.95 – 17.84 rms), the RMS was higher with BFlaser (7.35, 2.93 – 16.95 rms) in relation to EO (6.63, 2.51 – 23.92 rms). For the left side, both ankle muscles showed a smaller RMS with BFac (TA: 4.29, 3,70 – 7.07rms; MG: 6.22, 2.53 – 10.93rms) and with BFlaser (TA: 3.59, 2,32 – 3.59rms; MG: 6.90, 2.38 – 15.44rms) do que EO (TA: 5.18, 4.50 – 6.70rms; MG: 8.31, 2.01 – 23.29rms).
Conclusion: These qualitative considerations indicate BFac seems to reduce the size of postural sway, while BFlaser increases it during standing balance, when compared to EO. Furthermore, an asymmetric postural activation was revealed regardless of biofeedback. TA and MG seem to reduce the level of muscle excitation at left, while they are more active at right.
Implications: Findings suggest that EMGs may provide different estimates of muscle arousal if collected unilaterally during upright posture with biofeedback. Ongoing study with more individuals to advance knowledge about the potential of biofeedback in improving postural control and reducing the risk of falling.
Keywords: Postural Control, Biofeedback, Electromyography

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RELATIONSHIP BETWEEN MAXIMUM MUSCLE STRENGTH AND FREQUENCY SPEED OF KICK TEST FOR BLACK BELT TAEKWONDO ATHLETES

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Background: Taekwondo is a predominantly aerobic combat sport modality (58-66%) in which high-intensity actions are performed with the contribution of the anaerobic alactic system (26-30%) followed by the contribution of the anaerobic lactic metabolism (4-5%). High-intensity actions are performed repeatedly with muscular power and short duration. Thus, seeking to understand the relationship between the variables that represent maximum muscle strength, and the aerobic capacity of taekwondo athletes is relevant for a better understanding of the modality.
Objectives: The aim of this study was to determine whether the 10-second Frequency Speed of Kick Test ($FSKT_{10s}$) correlates with maximal muscle strength in black belt taekwondo athletes.
Methods: Nine male athletes (age: 20.3 ± 5.2 years; height: 177 ± 7.2 cm; body mass: 71.8 ± 15.3 kg and practice time: 9.6 ± 7.2 years) who competed at the state level or more prominently (international: 73%; national: 9%; state: 18%) participated in the study. All were free of any lower limb injury and had no neuromuscular disorder. Maximum muscle strength was achieved in the half-squat exercise, as previously described in the literature. $FSKT_{10s}$ is 10s long, alternating semi-circle kicks between right and left segments on a dummy using a simple torso protector, as often seen in taekwondo matches. Each participant was instructed to read and sign the Informed Consent Form with information about the procedures and risks associated with the study. The Kolmogorov-Smirnov test was used to assess data normality. Pearson's correlation was used to determine the relationship between selected variables. Correlations were classified as follows: 0.0 – 0.1 (trivial), >0.1 – 0.3 (minor), >0.3 – 0.5 (moderate), >0.5 – 0.7 (large), >0.7 – 0.9 (very large), and >0.9 – 1.0 (perfect). For all analyzes an $\alpha = 5\%$ was adopted.
Results: The athletes reached 133±33 kg (95% CI: 108 – 158) during the maximal strength test performed in the half-squat exercise. Values are expressed in relation to the body mass value (1RM/Body mass: 1.9±0.3, 95% CI: 1.6 – 2.1) and allometric scale (1RM/(body mass)0.67 : 7.6±1.4, 95% CI: 6.5 – 8.7). Pearson's correlation showed a statistically significant correlation between the maximum muscle strength test and the $FSKT_{10s}$. The correlation between 1RM/body mass was r = 0.72 (p=0.014). The correlation between 1RM/ $(\text{body mass})^{0.67}$ was r = 0.84 (p=0.004). Both correlations were classified as 'very large'.
Conclusion: There is a strong correlation between maximal muscle strength and $FSKT_{10s}$.
Implications: The strong correlation between the variables studied indicates that athletes with muscular strength developed at optimum levels also improve the frequency of blows applied in a short period of time. Thus, coaches and strength and conditioning coaches will be able to help taekwondo athletes to improve their performance by applying means and training methods aimed at developing maximum muscle strength at optimal levels.
Keywords: Combat sport, Martial art, Sports performance

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AN ANALYSIS OF THE VARIABLES OF TACTICAL AND PHYSICAL PERFORMANCE IN THE U-17 MEN'S WORLD CUP

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Background: The tactical and physical demands of a soccer game are of interest to coaches and trainers for better prescription of the physical training process and understanding of the game's demands. When discussing the demands for games played by base categories, information is scarce. In this study, we will investigate correlations