METHODS: 77 high-performance athletes from Chile, 17 women and 58 men, were assessed in the IMTP test between 2019 and 2021. The test was performed on two Pasco PS-2142 strength platforms, using a rack designed for the test. Data were obtained using ®ForceDesks (VALD performance) software. The variables analyzed were: PF, Impulse, RFD at 100, 150 and 200 ms (N/s). The statistical analysis of reliability was determined by Coefficient of Variation (CV) < 5% and Technical Error (TE).
RESULTS: The absolute PF of the females was 1837.63±315.35 (N) with a TE of 37.01 (N) and a coefficient of variation (CV) of 2.01%. The average impulse at 100ms was 82.19±16.70 (Ns), TE=2.7 (Ns) and CV= 3.3%; at 150ms was 136.76±33.18 (Ns), TE=6.80 (Ns) and CV=4.98%; and at 200ms was 199.48±46.74 (Ns), TE=7.20 (Ns) and CV=3.6%. Respect to RFD at 100ms the average was 2455±1237.25 (N/s), TE=299.99 (N/s) and CV=12.09%; at 150ms averaged 2958.28±1148.14 (N/s), TE=267.89 (N/s) and CV=9.06%; and at 200 ms the average was 3168.25±974.95 (N/s), TE=204.65 (N/s) and CV=6.45%. Respect to men, the average PF was 2511.86±440.25 (N), TE=56.26 (N) and CV=2.4%. The average impulse at 100 ms was 109.83±22.24 (Ns), TE=5.08 (Ns) and CV=4.63%; at 150ms was 180.60±36.97 (Ns), TE=9.29 (Ns) and CV=4.93%.; and at 200ms was 280.89±52.26 (Ns), TE=13.11 (Ns) and CV=4.67%. Regarding RFD at 100ms the average was 5041.26±2697.56 (N/s), TE=1049.96 (N/s). and CV=20.83%; at 150ms was 5297.80±2025.95 (N/s), TE=793.97 (N/s) and CV=14.99% at 200ms was 5054.66±1496.81 (N/s), TE=626.77 (N/s) and CV=12.40%.
CONCLUSIONS: The results show that the CV less than 5% correspond to the PF and impulse variables in both men and women. The RFD at 100 ms, in both men and women, showed the highest CV. These results are useful since they show reference values in variables widely used in IMTP and their reliability.

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Rate Of Force And Acceleration Improvement In Males Performing Bilateral Three-Dimensional Isotonic Concentric Curls

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Numerous athletic settings involve multidimensional isotonic force output. The rates of improvement in power and acceleration upon initiating a 3D isotonic training program are not well known.
PURPOSE: To assess increases in power and acceleration of the biceps brachii among males performing novel 3D isotonic exercise.
METHODS: We measured 40 males across the lifespan initiating exercise on a Proteus device, which produces 3D concentric loads via electromagnetic resistance. Each subject completed a minimum of 5 exercise sessions on separate days involving bilateral bicep curls. After 8 sessions, 23 subjects were retained. We captured peak power achieved in each repetition, and we exported average peak power across all repetitions (mean power) as well as the highest power achieved in any repetition (peak power). We also exported mean and peak acceleration. Repeated measures ANOVA tested differences in performance metrics across days 1, 5, and 8 (n=23). Paired-samples t-tests measured differences between sessions 1 and 5 (n=40). Linear regressions tested the effect of session number on power and acceleration holding age constant.
RESULTS: Subject age was 35.1 ± 21.3 yr, height was 69.6 ± 3.8 in, and weight was 176.8 ± 35 lb. During the initial session, mean power was 107.8 ± 63.0 W, peak power was 121.8 ± 68.4 W, mean acceleration was 6.7 ± 5.0 m/s^2, and peak acceleration was 8.6 ± 5.8 m/s^2. Comparing sessions 1 to 5, mean power increased to 162.6 ± 122.9 W ($p<0.001$), peak power increased to 184.2 ±145.6 W ($p<0.001$), mean acceleration increased to 10.3 ± 8.7 m/s^2 ($p=0.002$), and peak acceleration increased to 28.5 ± 92.8 m/s^2 ($p=0.089$). Improvements in mean and peak power were both significant between sessions 1 and 5 ($p<0.001$), but not between sessions 5 and 8 ($p>0.250$). Improvements in mean acceleration were significant between sessions 1 and 5 ($p=0.002$), but not between sessions 5 and 8 ($p=1.000$). Holding age constant, linear regression on days 1 through 5 found each additional exercise session to predict an improvement of 11.0 W mean power ($p=0.001$), 12.4 W peak power ($p<0.001$), and 0.9 m/s^2 mean acceleration ($p=0.011$).
CONCLUSION: Men across the lifespan experienced rapid increases in force and acceleration of the biceps brachii upon initiating bilateral 3D concentric exercise. Rapidity of improvement tapered after 5 sessions.

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Power And Velocity Improvements Of The Triceps Brachii Among Males Performing Unilateral Concentric Elbow Extensions

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The triceps brachii (TB) plays an important role in sport and recreational exercise. Neuromuscular adaptations of the TB will vary depending on the exercise stimulus.
PURPOSE: To evaluate increases in power and velocity of the TB in concentric unilateral elbow extension with a 3D isotonic stimulus.
METHODS: We followed 26 males initiating unilateral exercise on the TB. All subjects performed at least 5 exercise sessions on separate days using a Proteus device. During session 1, subjects familiarized themselves with the equipment; performance was not analyzed owing to wide variance. One subject did not record non-dominant sets and was eliminated from analysis. For the remaining 25 subjects, sessions 2 through 10 were evaluated. We retained 15 subjects through session 8, and 7 subjects through session 10. Paired-sample t-tests compared dominant to non-dominant arms in power and velocity at sessions 2, 5, 8, and 10. Increases in power and velocity were also measured from sessions 2 to 5, 5 to 8, and 5 to 10.
RESULTS: Subjects were 31.1 ± 16.4 years of age, 70.8 ± 4.1 inches tall, and weighed 178.1 ± 25.6 lbs. During session 2, dominant power was 84.2 ± 48.1 W and non-dominant power was 89.4 ± 51.1 W. There was no difference between arms at session 2 ($p=0.107$), 5 ($p=0.972$), 8 ($p=0.121$), or 10 ($p=0.362$). Between sessions 2 and 5, power increased 29.0 ± 48.7 W (34.5%) in the dominant arm ($p=0.007$) and 23.7 ± 46.3 W (26.5%) in the non-dominant arm ($p=0.017$). Between sessions 5 and 8, power did not increase in the dominant ($p=0.419$) or non-dominant ($p=0.847$) arms. Between sessions 5 and 10, power did not increase in the dominant ($p=0.598$) or non-dominant ($p=0.464$) arms. During session 2, dominant arm velocity was 4.4 ± 3.3 m/s^2, and non-dominant velocity was 4.6 ± 3.6 m/s^2 ($p=0.419$). Between session 2 and session 5, velocity increased 23.9% in the dominant arm ($p=0.009$) and 17.2% in the non-dominant arm ($p=0.007$). There was no change between sessions 5 and 8 in dominant ($p=0.823$) or non-dominant ($p=0.708$) arms. There was no change between sessions 5 and 10 in dominant ($p=0.232$) or non-dominant ($p=0.665$) arms.
CONCLUSION: Significant improvements in power and velocity of the elbow extensors were observed within 5 unilateral exercise sessions on a Proteus device. Improvements stabilized after 5 sessions, implicating neuromuscular adaptations.

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