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3410 Board #98 June 1 8:00 AM - 9:30 AM  
**A Novel Assessment of Baseball Throwing Mechanics**  
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To remain competitive, collegiate athletes constantly seek novel methods of performance enhancement. As technological advancements permit more sophisticated assessments, it is important to appraise their utility.

**PURPOSE:** To establish a mechanical profile of baseball throwing and to test which kinematic domains associate with on-field performance.

**METHODS:** 18 collegiate baseball players (11 fielders, 7 pitchers) were tested using Proteus (Boston Biomotion, USA), which analyzes isotonic force production concurrently in all 3 planes. Players performed 5 consecutive throw motions against 3lb of magnetic resistance. Proteus software calculated power, velocity, explosiveness (rate of force development), endurance (maintenance of force characteristics), consistency (repeatability of movement), and range of motion (ROM). Across the total sample, these values were used to generate throwing profiles; among the subsample of pitchers, the values were used in linear regressions to predict in-season performance.

**RESULTS:** Across all players, power was  $118.4 \pm 80.0$ , explosiveness was  $82.9 \pm 29.4$ , velocity was  $6.0 \pm 1.2$ , endurance was  $97.2 \pm 5.9$ , consistency was  $86.5 \pm 9.1$ , and ROM was  $4.0 \pm 0.6$ . Consistency was inversely related to power ( $R = -0.639$ ;  $p = 0.004$ ). Explosiveness was inversely related to endurance ( $R = -0.879$ ;  $p < 0.001$ ). Pitchers exhibited patterns for higher power, velocity, and explosiveness, but none reached significance ( $p > 0.10$ ). ROM differed between groups: the pitchers' ball path traveled 20.6% farther in 3D space ( $p = 0.007$ ). Controlling for height, it remained 18.5% farther ( $p = 0.012$ ). Among pitchers, in-season earned run average (ERA) increased with power ( $R = 0.933$ ;  $p = 0.002$ ) and velocity ( $R = 0.931$ ;  $p = 0.002$ ) and decreased with consistency ( $R = -0.956$ ;  $p = 0.001$ ). Each additional point of power predicted an increase of 0.2 strikeouts per nine innings ( $p = 0.025$ ) and a 0.2-point increase in ERA ( $p = 0.002$ ). Each additional point of consistency, predicted 0.2 fewer strikeouts per nine innings ( $p = 0.047$ ) and a 0.2-point decrease in ERA ( $p = 0.001$ ).

**CONCLUSIONS:** Novel instruments to assess pitching mechanics enable the generation of new normative data. Preliminary analyses suggest power and explosiveness are inverse to consistency and endurance, and they predict different performances on the field.

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3411 Board #99 June 1 8:00 AM - 9:30 AM  
**Acute Effects of Neuromuscular Electrical Stimulation on Vertical Jump**  
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Multiple studies have indicated improvements in muscular strength, power, and performance can be made over time using neuromuscular electrical stimulation (NMES). Yet no previous studies have conducted research into the effects of NMES on vertical jump immediately after isometric stimulation to the quadriceps group.

**PURPOSE:** To determine the acute effects of NMES on vertical jump.

**METHODS:** A group of 24 participants were randomly divided into an experimental and a control group. All participants were pretested in the countermovement jump (CMJ) to determine maximum jumping height. Participants in the treatment group were treated with NMES to the quadriceps. Participants in the control group received sham treatment in identical testing conditions. All participants then engaged in a post treatment CMJ test. The difference between pretest and posttest jump scores was computed to determine the effects of treatment.

**RESULTS:** A paired samples *t*-test showed a statistically significant increase in experimental CMJ scores from pre-test ( $M = 28.69$ ,  $SD = 6.87$ ) to posttest ( $M = 30.14$ ,  $SD = 7.42$ ),  $t(11) = 1.796$ ,  $p < .05$ . (Figure 1). A statistically significant decrease in control CMJ scores occurred from pre-test ( $M = 30.72$ ,  $SD = 6.51$ ) to posttest ( $M = 29.18$ ,  $SD = 6.24$ ),  $t(11) = 1.796$ ,  $p < .05$ . The mean increase in experimental CMJ scores was 1.45 with a 95% confidence interval ranging from 26.61 to 33.67. The mean decrease in control CMJ scores was 1.54 with a 95% confidence interval ranging from 26.21 to 32.15. Cohen's *d* (.24) indicated a small effect size.

**CONCLUSION:** The acute application of NMES to the quadriceps group lead to significant improvements in vertical performance.

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3412 Board #100 June 1 8:00 AM - 9:30 AM  
**Correlation Analysis Of The Skulpt<sup>®</sup> And Bodpod<sup>®</sup>**  
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The BodPod<sup>®</sup> (BP) is a standard, reliable tool for measuring body composition. A new body composition measurement tool called the Shulpt<sup>®</sup> (SK) was created recently. The SK is a form of bioelectrical impedance analysis that measures at three different sites, tricep, abdomen, and thigh, but little to no research exists examining the validity of this form of measurement. For this reason, this study sought to determine the accuracy of the SK compared to the BP. If the SK is determined to be accurate, the low cost and convenience of the SK would make measuring body composition more accessible and available to the general population.

**PURPOSE:** The purpose of this study was to test the accuracy of the SK against the BP when measuring body composition.

**METHODS:** This was accomplished by measuring body fat percentage using the BP first and then the SK on 91 participants. Subjects for this study included: female (50) and male (41) subjects. Demographic data of each subject was taken before the assessment as well as height (cm) and weight (kg). The body fat percentage results were analyzed using SPSS software.

**RESULTS:** A Spearman's R correlation coefficient was calculated for the relationship between the body fat % measured from the SK and BP. A strong positive correlation was found  $R = 0.904$  ( $p < 0.000$ ), indicating a significant direct relationship between the two variables. This suggests that a subject measuring a high % body fat on the BP also measures high on the SK<sup>®</sup>. A paired-samples *t* test was calculated to compare the mean body fat % from the SK<sup>®</sup> to the mean body fat % of the BP. The results conclude there was a statistical significant difference between the BP and SK of  $p < 0.000$ . An average of 5.55% difference was found between the results of the two measurement tools. The mean body fat % on the BP<sup>®</sup> was 21.824 ( $sd = 10.05$ ). The mean body fat % on the SK was 27.371 ( $sd = 8.67$ ).

**CONCLUSION:** Since there was significant difference found between BP and SK, the SK is not a recommended body fat measurement tool in research settings, but is acceptable to use in general population settings. However, the positive correlation shows the SK can differentiate between individuals with high versus low body fat. These findings suggest an individual could use the SK to track changes in body composition, an important factor in a person's overall health and wellness.

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3413 Board #101 June 1 8:00 AM - 9:30 AM  
**Positional Difference in Linear Momentum During Vertical Jump in Division II College Football Players**  
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