EFFECT OF TRAINING SURFACE ON PERFORMANCE OUTCOMES IN FEMALE ATHLETES

Lewis ML†*, Abel MG†, McKeon PO†‡, Yates JW†, Clasey JL†, Mattacola, CG‡: †University of Kentucky (Lexington, KY), *Messiah College (Mechanicsburg, PA), ‡Ithaca College (Ithaca, NY)

Context: Despite increased popularity of sand training, concern remains that it may have detrimental effects on hard surface performance. Objective: Compare anaerobic adaptations as a result of sand training (SG) versus hard court (HG) training. We hypothesized sand training would induce greater improvements.

Design: Randomized controlled trial with longitudinal design. Setting: Training occurred on hardwood or sand surface. Patients or Other Participants: Convenience sample of 17 volunteer female collegiate athletes with mean age (19.53 ± 0.78 yrs), height (168.05 ± 4.45 cm), and mass (66.89 ± 11.79 kg). Interventions: Independent variable was training surface; SG (experimental) vs. HG (standard). Ten training sessions were completed (2 d·wk-1) over 5 weeks. Subjects finished a functional test protocol during familiarization, baseline, and post-test sessions on a hard court. Test order included the vertical jump (VJ), standing long jump (SLJ), t-test (TT), 5 repetition maximum (5RM), back squat (BS), 40-yd dash (DSH), and 300-yd shuttle (SHT). Training included 2, 5-session microcycles and was periodized to increase intensity and volume midway through. Session length was 50 minutes and included agility, muscular power, and anaerobic endurance components. Independent t-tests were used to determine whether any baseline differences existed between the groups. Test-retest reliability of performance outcomes was assessed using intra-class correlation coefficient (ICC).

Main Outcome Measures: Dependent variables were the VJ, SLJ, TT, DSH, 5RM and TT. A 2x2 mixed factor analysis of variance (ANOVA) was used to evaluate effects of surface (SG vs HG) on performance for within and between group comparisons. Power and effect size estimates were calculated. The level of significance was set a priori at p <0.05. Statistical analyses were performed in SPSS Version 20 (IBM Corporation, Armonk, NY).

Results: At baseline, there were no significant differences between groups. There was a significant (p=0.047) group by time interaction effect for the SLJ (SG 0.10 ± 0.11m vs HG 0.01 ± 0.23m). There were significant main effects for time for the SLJ (p=0.015), SHT (p=0.039), and 5RM (p=0.002). Within subjects’ effect for the 5RM (3.68 kg) surpassed the calculated minimum detectable change of 2.92 kg. The calculated effect sizes for all interaction effects were small (<0.02) except for the SLJ, which was moderate to large at 0.24. Large (>0.26) effect sizes were calculated for the main effect for time in the SLJ (0.33), SHT (0.25), and 5RM (0.52).

Conclusions: Our findings suggest sand training may develop new movement strategies leading to improved anaerobic performance on a hard surface. Sand training may be a beneficial supplemental training surface with no negative effects on athletic performance.

Word Count: 423