TACSM Abstract

The Effect of Lower Extremity Bilateral Asymmetries on Performance in Division I Soccer Players

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ABSTRACT

BACKGROUND: Most soccer players have a preferred leg with which they kick the ball. Depending on the volume of exposure to repeated unilateral movements in training, practice, and games, this could lead to lower extremity bilateral asymmetry (Maloney, 2019). Asymmetries could jeopardize performance (Bell, 2014; Yanci, 2016). **PURPOSE**: This study examines the relationship between lower muscle mass asymmetries, in collegiate soccer players, and unilateral and bilateral jump performance. **METHODS**: Participants were 23 NCAA Division 1 female soccer players (19.2 ± 1.1 years, 166.2 ± 6.7 cm, 65.4 ± 8.0 kg). Participants underwent whole body dual exergy X-ray absorptiometry (DEXA, Hologic W) and then performed a single bilateral vertical jump followed by a single unilateral vertical jump on each leg while being recorded by 8 video cameras using the DARI Motion Capture system (DARI ® Motion, Kansas City, KS). Main variables examined included lean mass and bone mineral density (BMD) of each leg, and jump height and ground reaction forces (GRF) during the vertical jumps. Participants self reported the preferred leg used to kick a ball; this was defined as their dominant leg (DOM). The plant leg was defined as non-dominant (NDOM). Differences between legs were analyzed using paired t-test. Pearson r correlation was used to analyzed relationship between asymmetries and bilateral vertical jump performance. **RESULTS**: DEXA revealed a significant difference between leg lean mass (DOM: 8236 ± 1148 g, NDOM: 7873 ± 1141 g, $p < 0.001$), but not between leg BMD ($p > 0.05$). Jump height of the unilateral jumps was greater on the DOM side (0.329 ± 0.067 vs 0.313 ± 0.057% of lower body, $p = 0.041$). Maximal GRF during bilateral vertical jump was greater in DOM (DOM: 1280 ± 209N, NDOM: 1259 ± 200N, $p < 0.001$). There was no correlation between leg lean mass difference and vertical jump performance ($p > 0.05$). **CONCLUSIONS**: The D1 soccer players had a significant 5% lower leg muscle mass asymmetry, and this difference translated to a 5% difference in unilateral vertical jump performance. However, the asymmetry was not associated with bilateral vertical jump performance.