CONCLUSIONS: Impaired isometric hip abductor strength predisposes competitive male soccer players to lateral non-contact ankle sprains. Screening procedures should consider evaluating isometric hip abductor strength (specifically for high-level male athletes participating in soccer) as a pre-season hip abductor predictor future lateral non-contact ankle sprains.

134 June 1, 10:30 AM - 10:45 AM
Effect of Sports Specialization on Lower Extremity Strength between Female Figure Skaters and Soccer Players

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Sport specialization can be defined as intensive, year round training in a single sport at the exclusion of other sports. Recent evidence indicated sport specialization as a risk factor for overuse injuries in young athletes. However, the effect of sport specialization on neuromuscular parameters such as hamstring and quadricep strength, and strength ratios between the two have not been reported.

PURPOSE: To examine the effect of specialization in sports on the strength of hamstrings and quadriceps, with hamstrings:quadriceps strength ratio (H:Q ratio) in young female figure skating and soccer athletes.

METHODS: A cross-sectional study design was employed. Isometric hamstring and quadricep strength and H:Q ratio were measured in young female figure skaters (N=73, age=13.8±3.3) and soccer players (N=115, age=13.8±1.9). Normalized strength of the hamstrings and quadriceps, and H:Q ratio were compared between figure skaters and soccer players by an independent t-test. Subsequently, H:Q ratio was compared by age groups; < 12 years old, 13-16 years old, and >17 years old to evaluate strength development over time between the two cohorts. This was analyzed by a two-way analysis of variance (ANOVA).

RESULTS: Hamstring strength was significantly greater in figure skaters compared to soccer players (p=0.001). Also, H:Q ratio was statistically greater in figure skaters compared to soccer players (p=0.004). There were no significant differences in quadriceps strength or the H:Q ratio < 12 years old. However, the two-way ANOVA indicated significantly increased H:Q ratio of figure skaters compared to soccer players in 13-16 years old category (p=0.023 in right limb and p=0.036 in left limb) and left limb of > 17 years old (p=0.044).

CONCLUSIONS: Musculoskeletal development depends on specific demands of movement patterns of particular sports in young female athletes, which may potentially assist understanding increased overuse injury incidences in pediatric and young athletes. Character Count: 1999/2000

135 June 1, 10:45 AM - 11:00 AM
Comparison of Dominant and Non-Dominant Limb Biomechanics in Female Soccer Players

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The high incidence of anterior cruciate ligament (ACL) rupture in sports, particularly noncontact injuries, warrants determination of risk factors associated with these injuries. The role that leg dominance plays in injury risk during soccer has not been elucidated. One group has suggested injuries differ between the sexes, with women more likely to injure their non-dominant, support leg, but men more likely to injure their dominant, kicking leg (1). Others have reported that leg dominance is not a risk factor (2-3).

PURPOSE: To examine the accuracy of Self-Reported versus Waterloo Footedness Questionnaire (SR) vs. Waterloo Footedness Questionnaire (WFQ) in defining footedness and 2) determine if there are differences in isometric and dynamic measures between dominant and non-dominant limbs.

METHODS: Thirty-two women from two NCAA Division I soccer teams (20.1 ± 1.2 yrs; 1.7 ± 1 m; 64.3 ± 6.1 kg) underwent biomechanical analyses of two tasks; a) a single leg squat (SQ). Knee joint angles and external moments (normalized to mass X height) in the sagittal and frontal planes were assessed at peak knee flexion. Peak knee extension power during the TH landing was also assessed. Paired t-tests were performed to detect differences between biomechanical variables from the self-reported dominant (D) and non-dominant limbs (ND).

RESULTS: No between limb differences were observed for the knee angles during the TH (sagittal plane D= 66 ± 9 and ND= 67 ± 10 deg, p=.767; frontal plane D= 7 ± 5 and ND= 6 ± 6 deg, p=.360) or the SQ (sagittal plane D= 71 ± 12 and ND= 73 ± 13 deg, p=.333; frontal D= 8 ± 4 and ND= 10 ± 6 deg, p=.175). Additionally, no between limb differences in knee flexion moments for either the TH (D= 1.1±.3 and ND= 1.1±.3 Nm/kgm, p=.137) or the SQ (D=1.1±.2 and ND= 1.1±.3 Nm/kgm, p=.997) were observed. However, knee adduction moments were smaller in the dominant limb compared to the non-dominant limb between the TH (D= .35±.2 Nm/kgm; ND= .46±.22 Nm/kgm; p=.011) and the SQ (D=.24±.15 and ND= .35±.17 Nm/kgm, p=.030). No between limb differences were present for the TH landing power (p=.767).

CONCLUSIONS: The greater knee adduction moments observed on the non-dominant stance limb for both the TH and SQ would deter the knee from a deleterious risk knee abduction position, commonly associated with noncontact ACL injury. It is therefore plausible that the between limb differences contribute to women soccer players being more likely to sustain injury to their dominant preferred kicking limb.

Character Count: 1999/2000

136 June 1, 11:00 AM - 11:15 AM
Footedness, Lateral Dominance and Symmetry in Collegiate Male Soccer Players

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Functional and structural asymmetries from lateral dominance previously verified in volleyball, tennis and baseball players but equivocal in soccer players.

PURPOSE: To: 1) assess the accuracy of Self-Reported (SR) versus Waterloo Footedness Questionnaire - Revised (WFO-R) in defining footedness and 2) determine if footedness is accompanied by corresponding asymmetries in strength, flexibility and body composition in collegiate male soccer players.

METHODS: SR vs. WFO-R classifications of footedness compared with assessments of ball velocity (right minus left foot;R-L) obtained from maximal full-instep kicks (Simi Aktisys 2D). Lower limb muscle strength measured using a handheld dynamometer; flexibility via goniometer; and body composition via dual energy x-ray absorptiometry.

RESULTS: 17 male collegiate soccer players participated (age 19±1.5years; BMI 23.9±1.4kg/m2). SR identified 2 left-footed players (lefties) and 15 right-footed (righties), while WFO-R identified 7 righties plus 10 mixed-footed players (no lefties identified). Ball velocity (R-L) correctly matched 16/17(94%) right- vs. left-footed players via SR. Remarkable overall symmetry documented. Only differences categorized via SR: lefties had greater maximum (-0.06±0.4vs.4.7±3.5kg;p<0.04) supination strength (R-L difference); greater left ankle plantarflexion (58.0±8.5vs.47.9±5.4p<0.03); and greater right heel arm mass (5.2±3.6vs.4.5±3.9kg; p<0.03) when compared with righties. Via WFO-R, mixed players demonstrated: greater maximum (-1.8±7.1vs.5.7±6.3kg;p<0.04) left foot plantarflexion strength (R-L difference); left (51.7±5.2vs.45.4±6.5°;p<0.04) and right (50.4±5.4vs.46.5±9°;p<0.002) ankle joint plantarflexion; and increased pelvic bone mineral content (461.7±33.6vs.419.1±36.1gp<0.02) compared with righties.

CONCLUSIONS: 1) SR footedness closely approximated maximal ball velocity results (lefties kick harder with left foot and vice versa); 2) Collegiate male soccer players largely demonstrated symmetry despite lateral dominance, with minimal asymmetries noted (mostly in the foot and ankle). We speculate the prevalence of running versus kicking in soccer or functional compensation up the kinetic chain may dismiss expected dominance-induced asymmetries.