**BACKGROUND AND PURPOSE**

- The core (i.e., lumbo-pelvic-hip complex) and lower extremity are involved in 70% of injuries in women's lacrosse.
- Pre-participation identification of injury risk factors is a key consideration for prevention of strains and sprains.
- Identification of players who possess elevated risk may enhance the effectiveness of preventive interventions.
- Retrospectively determined ROC cut point analysis has been used to assess both pre- and post-training status.

**PARTICIPANTS AND PROCEDURES**

- Prospective analysis: 26 NCAA Division I women's lacrosse players who competed in the 2012-13 season.
- Retrospective analysis: 17 players on 2012 team who also participated in the 2011-12 season.
- Potential predictors of core or LE injury quantified at pre-participation physical examination.
- Asterometric factors: Height, weight, estimated mass moment of inertia, body mass index (BMI).
- Joint function surveys: Foot & Ankle Ability Measure-Sport (FAAM-S), Int. Knee Documentation Comm. (IKDC).
- Measurements obtained before and after 6-week core stability training program.
- Core muscle endurance: Trunk flexion hold (THF), horizontal trunk hold (HTH), wall sit hold (WSH).
- Low back dysfunction screening test: Oswestry Disability Index (ODI).
- Observation periods: 1) 2011-12 pre-season + 16 games; 2) 2012-13 pre-season + 8 games (first half of season).
- Core and LE sprains and strains that resulted in missed practice(s) and/or game(s).
- Games played (GP) tracked throughout observation periods.
- Data analysis: Categorization of high-risk versus low-risk status for maximum predicted performance.
- Receiver operating characteristic (ROC) and logistic regression analyses used to develop prediction models.
- Pre-training status (immediately preceding season) used as criteria for pre-training risk categorization.
- Prospective/retrospectively determined ROC cut-points for prediction model components compared to other methods.
- Overall accuracy of different injury risk assessment methods, and effectiveness of a training program for injury risk reduction among college women's lacrosse players.

**RESULTS**

- Prospective 2012-13 observation period: 14 core/LE injuries sustained by 11 athletes.
- Risk classification based on ROC-derived cut-points for post-training data identified 9 predictors (Table 3).
- Factor prediction model (post-training status) derived from logistic regression analysis (Figure 1).
- More than 2 positive factors: 1) High game exposure, 2) Low BMI, 3) Low TFH, 4) Low HTM, 5) High BMI.
- Nagelkerke R² = 66.5; R² = 64.1 (95% CI: 0.25 - 0.58); OR = 29.3 (95% CI: 1.47 - 175.69).
- Alternative cut-points for the 5 predictors derived from other methods compared to prospective model (Table 4).
- Retrospective 2011-12 injury documentation: 33 core/LE injuries sustained by 14 athletes.
- Pre- to post-training improvements in core muscle endurance were evident (Table 5).
- Magnitude of performance improvement for players with ODI ≥10 versus <10 compared (Figure 2).
- Change in injury risk (defined by prospective model) associated with reduced injury incidence (Table 6).
- Identification of players who possess elevated risk may enhance the effectiveness of preventive interventions.

**CLINICAL RELEVANCE**

- Core stability training appears to be effective in reducing core and LE injury risk in female lacrosse athletes.
- A procedure is needed to select cut-points for pre-season injury risk classification (prior to practice/game exposure).
- Sensitivity of each risk classification method decreased with improvements in performance capabilities.
- Retrospective injury data analysis classified pre-season injury risk status better than use of median values.
- Specifically remained unchanged for injury prediction based on retrospective injury data analysis.
- Specifically improved for injury prediction based on cut-points derived from prospective analyses.
- High-risk players who are likely to derive greatest benefit from risk reduction training need to be identified.
- Although ODI scores were not included in 5-factor model, its association with elevated risk has been established.
- Greatest improvements in core muscle endurance demonstrated by those with pre-training ODI score ≥10.

**REFERENCES**

[2] *A Vanderbilt University Medical Center, Nashville, TN*