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Inter-Segmental Coordination Strategies and Kinematics Utilized During a Single Leg 180° Jump

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Recent literature indicates multi-planar analysis provides a more robust assessment for functional instabilities that could indicate injury. The single-leg 180° jump requires multi-planar movement, dynamic effort and allows for bilateral assessment. **PURPOSE:** To determine inter-segmental thorax and pelvis coordination and knee kinematic strategies utilized when performing a single-leg 180° jump. **METHODS:** 14 male elite rugby players performed five single leg 180° jumps on each leg, with 3D kinematic data collected using a 12 camera motion capture system. Independent t-tests were used to determine any significant differences in abduction (ABD)/adduction (ADD) between the dominant limb (DL) and non-dominant limb (NDL) during the loading (LOP) and landing (LAP) phases following a 180° single leg jump. Continuous relative phase (CRP) was calculated as a representative of inter-segmental coordination between the segmental rotations of the thorax and the pelvis about the vertical (z) axis. **RESULTS:** At LOP, NDL greater peak ABD ($p = .01$). At LAP, DL greater peak ADD ($p = .05$). At LAP, NDL, greater peak ABD ($p = .01$). CRP plots denoted differences in pelvis/thorax segmental coordination for both the DL and NDL (see figure 1). **CONCLUSIONS:** Differential inter-segmental movement CRP plots indicate participants can utilize a thorax led; pelvis led or synchronized rotational method. Variability is more pronounced during the LAP, indicated by significant differences in bilateral LAP peak ADD/ABD, which is of greater interest for injury risk prediction because of the dynamic loading of the tissues. Future research should assess CRP to identify compensatory strategies and injury risk.

Figure 1: Thorax/Pelvis Coordination: DL (Left) vs NDL (Right)

