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A comparison of two styles of the football instep kick and their relationship to lumbopelvic stability

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Objectives: To investigate the differences between the follow through (FT) and non follow through (NFT) kicking techniques, their relationships with lumbopelvic stability, and to draw inferences for injury potential.

Design: A VICON system measured the three-dimensional (3D) positions of 6 reflective markers on participants' trunk to gain angular displacement of the spine during the different kicking techniques. A pressure biofeedback unit was used to measure participants' lumbopelvic stability.

Setting: The data collection area in the Department of Exercise and Sports Science, Manchester Metropolitan University, Cheshire was used for 3D motion-capture. Lumbopelvic stability testing was performed at the Bolton Wanderers FC training facility.

Participants: Twelve male professional footballers with mean (\pm SD), age 19 (\pm 5) yrs, height 181.6 (\pm 18) cms and mass 78.6 (\pm 25) kg were used in the study.

Main Outcome Measures: 1) Differences in motion of the lower spine between the FT and NFT kicks were analysed using paired t-tests. 2) Differences in spinal rotation and lumbopelvic stability between left and right sides were also analysed using paired t-tests. 3) Relationships between lumbopelvic stability and lower spine motion were analysed for both FT and NFT kicks using Spearman's rank order correlation.

Results: Significantly greater end ranges of spinal motion were discovered for NFT kicks compared to FT kicks ($P < 0.001$). Significantly greater left lower spine rotation was found compared to right rotation for both kicks. Significantly lower left rotation stability scores were found compared to right ($P < 0.002$). A significant inverse relationship was found between lower spine extension and extension stability for both kicks ($P < 0.001$).

Conclusion: NFT kicks are thought to have increased risk of injury to the lumbopelvic region compared to FT kicks due to greater end ranges of spinal motion. Reduced left rotational stability is linked to increased left lower spine rotation from frequently performed right footed kicks. Poor extension stability is thought to increase the risk of lumbopelvic extension injury when kicking.