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Shortlisted best clinical abstract.

**Novel unilateral analysis of ap lumbar spine bone density in elite cricket fast bowlers.**

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Introduction: Cricket fast bowlers are at a higher risk of serious lumbar injuries compared to players of other positions and it is thought that loading to this region plays a part. Fast bowling exposes the lumbar spine to substantial bending, flexion and rotational forces as well as attenuated force transmission through the lower limb at front foot contact. Profiling lumbar spine bone properties in elite cricket fast bowlers may help us understand skeletal adaptation to this unique and complex loading. The aim of this study was to evaluate lumbar spine bone mass in elite male fast bowlers compared to cricketers of other positions using central dual- energy X-ray absorptiometry (DXA) with novel custom analysis of unilateral regions.

Methods: Twenty-six elite male fast bowlers (age: 22.1 (5.8) yrs, BMI: 24.7 (1.8) kg.m-2) and 19 other elite male cricketers (comprising batsmen (10), spin bowlers (5) and wicket keepers (4); age: 19.2 (4.4) yrs, BMI: 23.2 (2.8) kg.m-2) received an anterior-posterior L1-L4 lumbar spine DXA (GE Lunar iDXA) scan. Bone mineral density (BMD), bone mineral content (BMC), bone width (BW), bone height (BH) and bone area (BA) were derived for each vertebrae. Unilateral analysis was computed for each individual vertebrae (L1-L4) using the custom facility, with region of interest boxes manually placed either side of the spinous process and utilisation of bone edge detection for the outer lumbar body (Lunar enCORE v 15.0).

Results: L1-L4 BMD and BMC were significantly greater in fast bowlers than in other cricketers (1.464 (0.117) vs. 1.327 (0.133) g.cm-2, η2 = 0.238; 99.0 (14.2) vs.87.5 (17.6) g, η2= 0.121; both p<0.001). BW was moderately greater in fast bowlers (4.67 (0.3) vs. 4.49 (0.4), p=0.08, η2= 0.07). There were no differences between groups in BA or BH, and there were no associations with age or BMI (p>0.05). Fast bowlers had significantly greater differences in unilateral L1-L4 BMD (p=0.021 - 0.036, η2 = 0.06 - 0.12). Corresponding with the dominant limb (front foot), differences in unilateral lumbar BMD ranged from 2.6% to 6.3%. Sub-group analyses of the fast bowlers by age found that in senior players (n=11), unilateral BMD differences were almost double those observed in U20's (n=15) at L1 - L3, but not at L4.

Conclusions: Fast bowlers have superior lumbar spine BMD compared to cricketers in other positions. Fast bowlers also have larger differences in unilateral lumbar spine BMD, potentially reflecting the impact of side-specific loading generated during play. Bilateral adaptation of bone in L1-L3 may occur in response to loading over time but longitudinal study is needed. The lack of difference at L4 between seniors and U20's requires further investigation.