Comparing Interfragmentary Compression Methods In Simulated Equine Condylar Fracture Repairs

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Introduction:
Equine condylar fractures are commonly repaired using lag screws[1]. Inadequate interfragmentary compression can lead to post-operative complications[2]. Our objective was to compare compression achieved by linear (L), triangular (T), sequentially tightened triangular (TD1) and linear + washer (LW) screw configurations, in simulated condylar fracture repairs.

Materials and Methods:
Lateral condylar fractures were simulated in 25 cadaver limbs (10 hind, 15 front). In each limb, pressure-sensitive film (Prescale®, Fuji Photo Film Co.) was placed in the fracture prior to repair with 4.5mm diameter lag screws. Screws were tightened to 4 Nm, after random assignment of configuration. Pressure prints obtained were scanned using dedicated software (Fuji FPD-8010E, Fuji Photo Film Co.). Areas which demonstrated pressure application were compared descriptively and a type 3 ANOVA model was fitted, using software R [3].

Results:
Sixty-three repairs (20*L, 24*T, 11*TD1 and 8*LW) were included in the analyses. Mean area (± s.d.) experiencing pressure >2.5 MPa was 517 mm² ± 152, 573 mm² ± 156, 526 mm² ± 150, 465 mm² ± 64 for L, T, TD1 and LW repairs respectively. No statistical difference was detected.

Conclusions:
Interfragmentary pressure areas created by the T construct were, overall, greater than for the L, LW and TD1 constructs. The absence of a significant difference may indicate that the true difference is small or that the sample size is insufficient.

References:
3. R Core Team, R: A Language and Environment for Statistical Computing (version 4.2.2). R foundation for statistical computing, Vienna, Austria, 2022.