

Knot Security and End Suture Length

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Background

- A significant cause of tendon repair failure is knot failure by unravelling.
- There is little knowledge of the variables causing knot failure of the core suture.

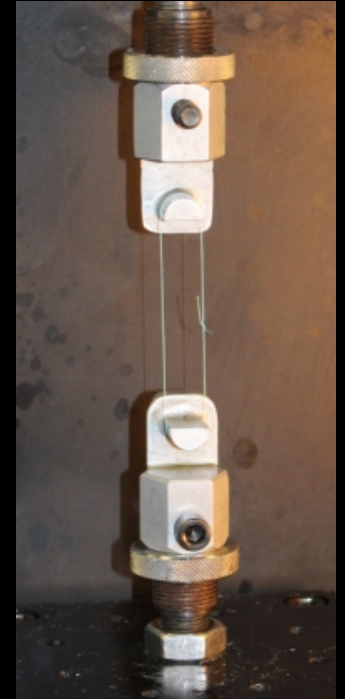
Objective

Improve knot security in core flexor tendon repair by:

- Investigating the strength of different knot configurations.
- Investigating the ideal end suture lengths (ESL).

Method

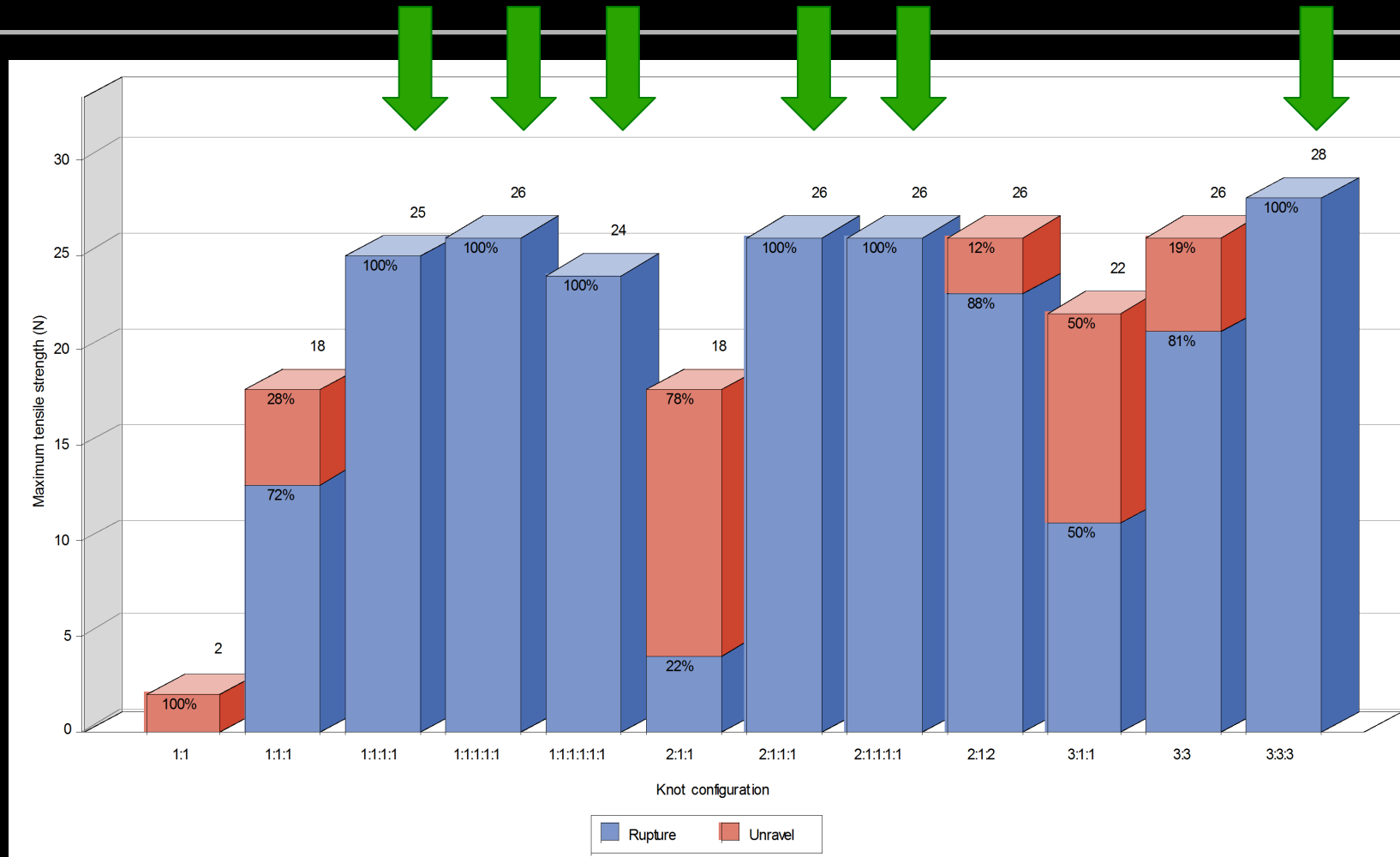
- Knots were tied around a 40mm diameter tube.
- Sutures were soaked in saline.
- The knots were looped around 2 steel rods and subjected to load-to-failure testing.
- Outcome measures
 - Ultimate tensile strength
 - Mode of failure



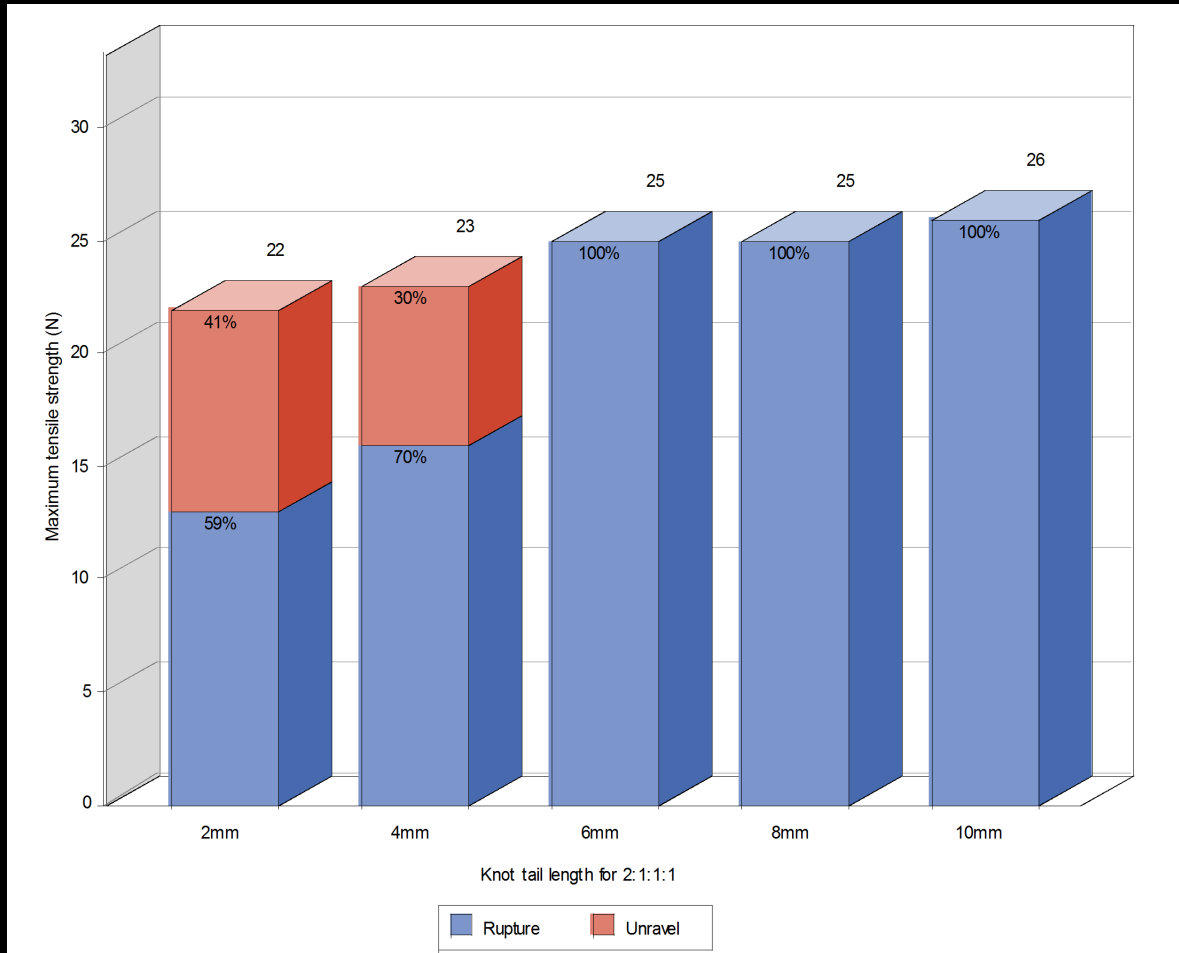
Method

- Part 1
 - 12 different knot configurations were tied using 4-0 Ethibond with an ESL = 10mm
- Part 2
 - Ideal end suture length (ESL) was tested in two optimum knot configurations as determined in part 1 (2:1:1:1 & 1:1:1:1:1)
 - ESL = 2mm, 4mm, 6mm, 8mm, 10mm

Optimum knot configurations

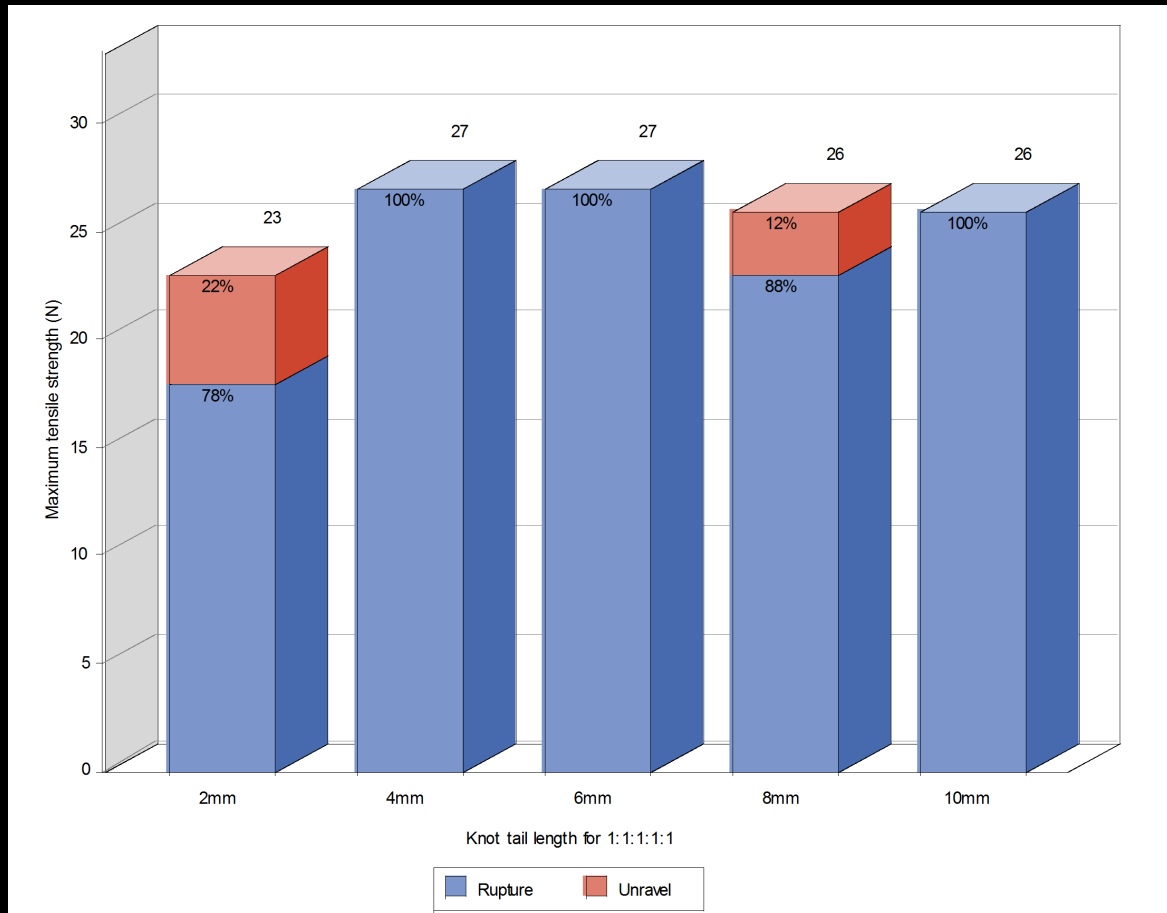


End suture length 2:1:1:1



The ideal end suture length is >4mm for the 2:1:1:1 knot configuration

End suture length 1:1:1:1:1



The ideal end suture length is >2mm for the 1:1:1:1:1 knot configuration

conclusion

- The optimum repair in this study was achieved with:
 - Minimum 5 throws eg. 1:1:1:1:1 and 2:1:1:1
 - Minimum end suture length 6mm