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AN ANALYSIS OF ARTHROSCOPIC KNOT TECHNIQUES – LOOKING FOR THE PERFECT KNOT

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Abstract

Introduction and Aims: The aim was to assess the efficacy of current arthroscopic knotting techniques with commonly used suture materials.

Method: A Hounsfield tensiometer with 1000N load cell, strain rate 25mm/min, bar separation of 7.5mm under standard temperature and pressure was used. Suture materials used, 2 Ethibond, 1 PDS and 1 Panacryl. The knotting techniques compared were the Tennessee slider, Tautline hitch, Duncan Loop, SMC knot and Surgeon’s knot. Two surgeons tied each 10 times using a suture passer and standardised knot technique. Each knot was tested to failure on 10 sequential experiments. Suture material strength was tested in isolation, tested to failure using the different knots then repeated after suture immersion in normal (0.9%) saline.

Results: Ultimate strength of the suture material and the knotting techniques were assessed. The mode of failure, slip or suture material fracture was also investigated. The 2 Ethibond had higher ultimate strength than either 1 PDS or 1 Panacryl. The Tautline hitch and Surgeon’s knot had significantly lower slip rates, with superior internal security than the other knotting techniques (P less than 0.002). The Tennessee slider, Duncan Loop and SMC knots had low security and slipped in more than 50 percent of experiments. There was no difference after saline soaking. The number of additional half hitches required for maximum knot holding capacity was consistently three, confirming previous findings.

Conclusion: The Tautline hitch is recommended due to internal security, tying characteristics and overall knot strength. Whichever knot is selected, three additional alternating half hitches to obtain consistent security is strongly supported.

Footnotes

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