MODE OF FAILURE OF ARTHROSCOPIC KNOTS

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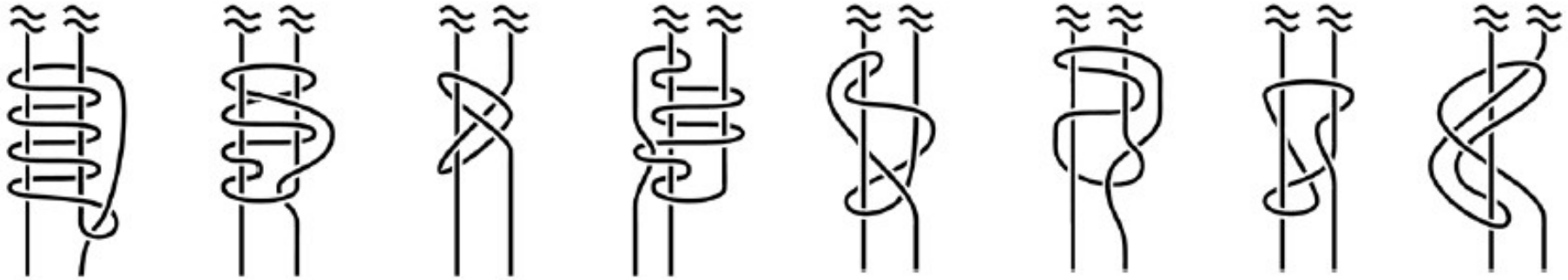

Slip knots: Duncan, Lieurance Modified Roeder, Ten

Flip knots: SMC, Weston, Snyder, and Dines.

Purpose

The purpose of the study was to evaluate the mode of failure and the biomechanical properties of 3 arthroscopic knots.

Materials-Methods

- three arthroscopic knots (square, revo, hangman's)
- 3 types of suture materials (orthocord, fiberwire, ethibond)

Materials-Methods

The knots were created between the crossheads of a materials testing machine and their biomechanical properties in tension were evaluated with a strain rate of 1 mm/min and 50 mm/min.

Materials-Methods

The parameters measured were:

- knot security
- maximum load
- stiffness of the material
- mode of failure

Materials-Methods

The mode of failure was monitored using a special microscope mounted on the materials testing machine.


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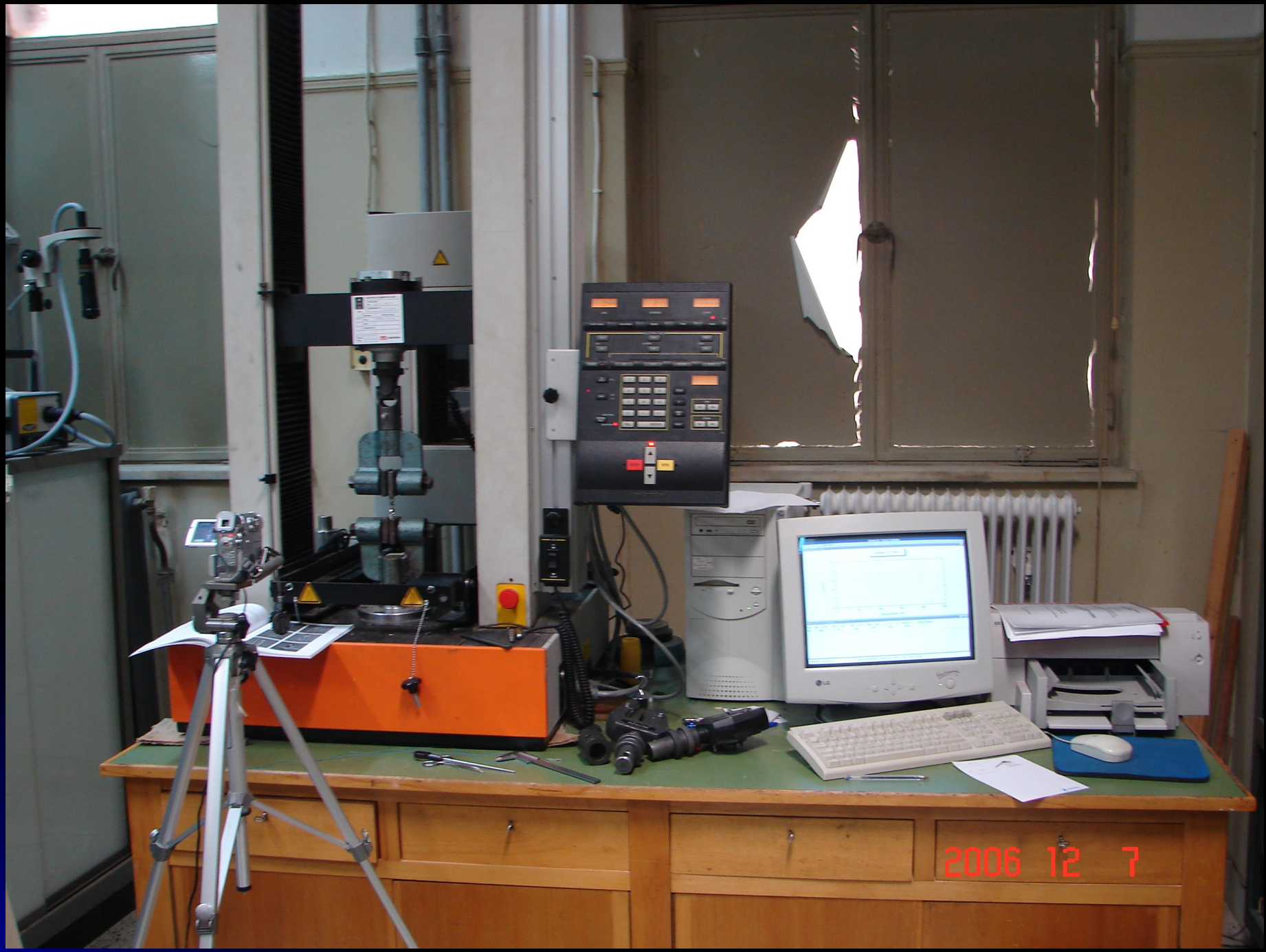
2006 12 7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Instrument
No: 4kN
Calibrated on: 12/10/2004
0019
Parameter
Certificate No(s).
Force
1403/1
Strain
Displacement
Expiry Date 12/10/2005
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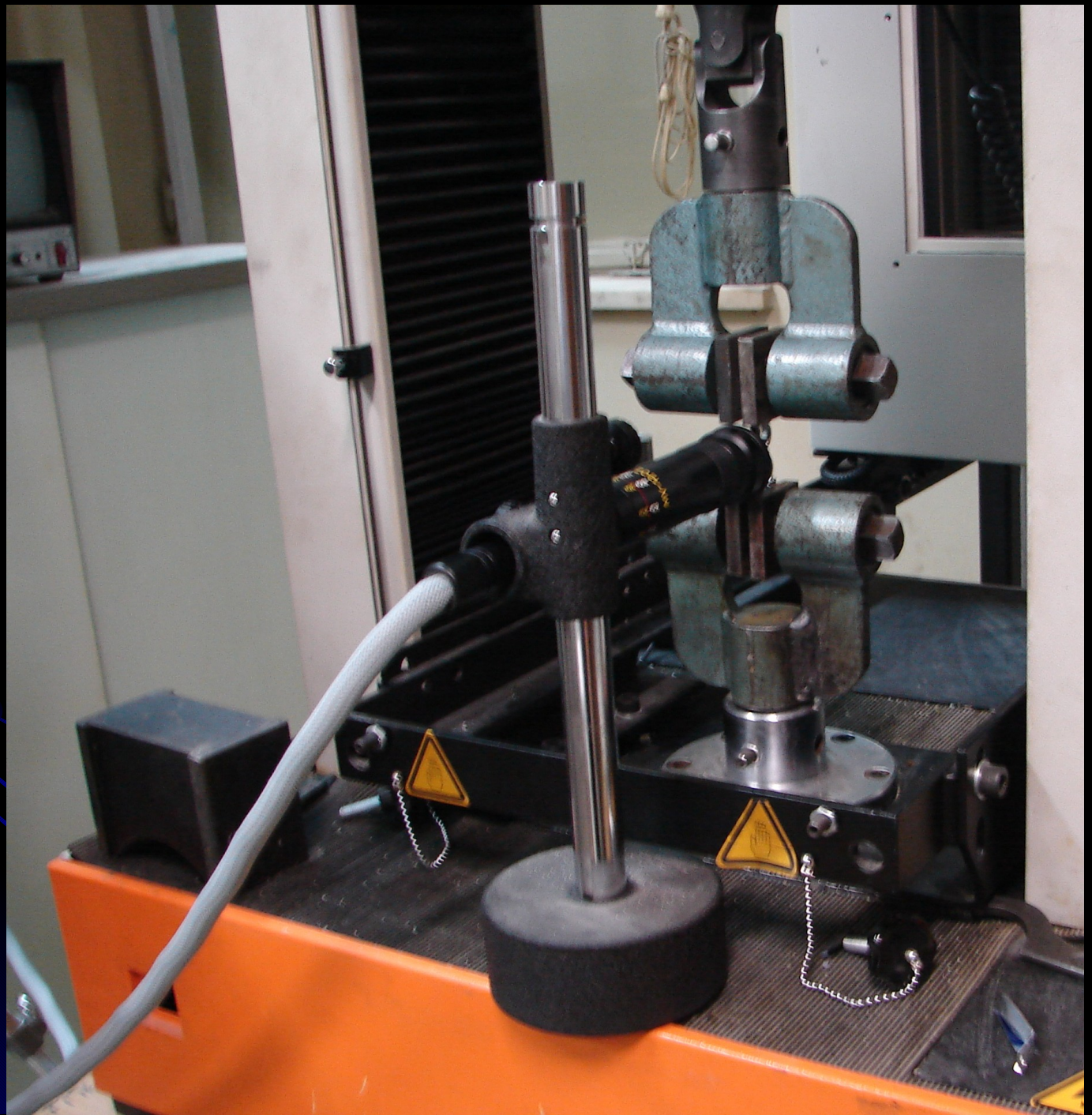
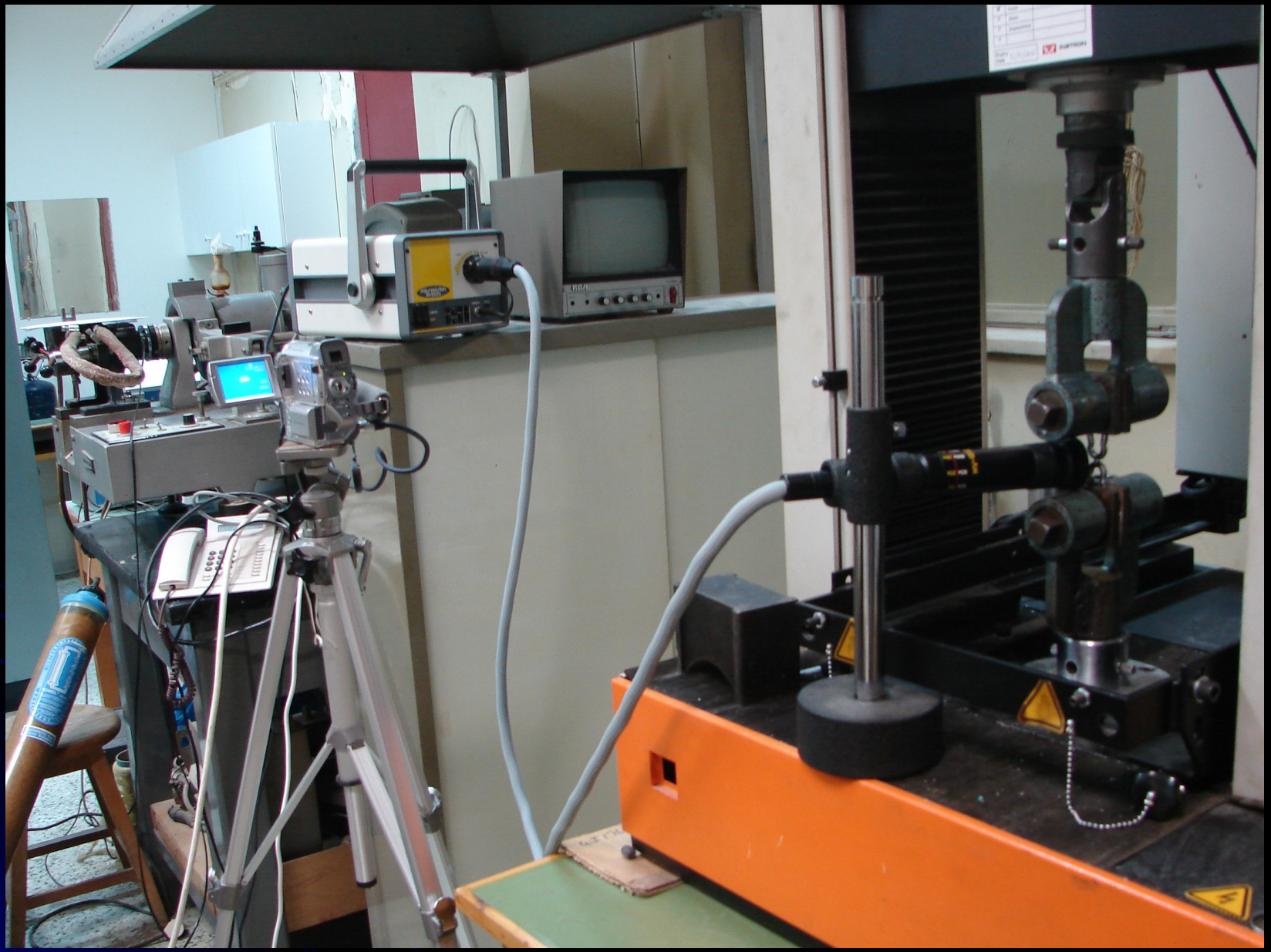
2006 12 7


.032
13.36
- - - -
LOAD
EXTENSION
STRAIN
RESET PEAKS
PEAK BREAK
BREAK
PEAK
TRACK
ELECTRONIC LIMITS
MAX
LOAD
MIN
MAX
EXTENSION
MIN
MAX
STRAIN
MIN



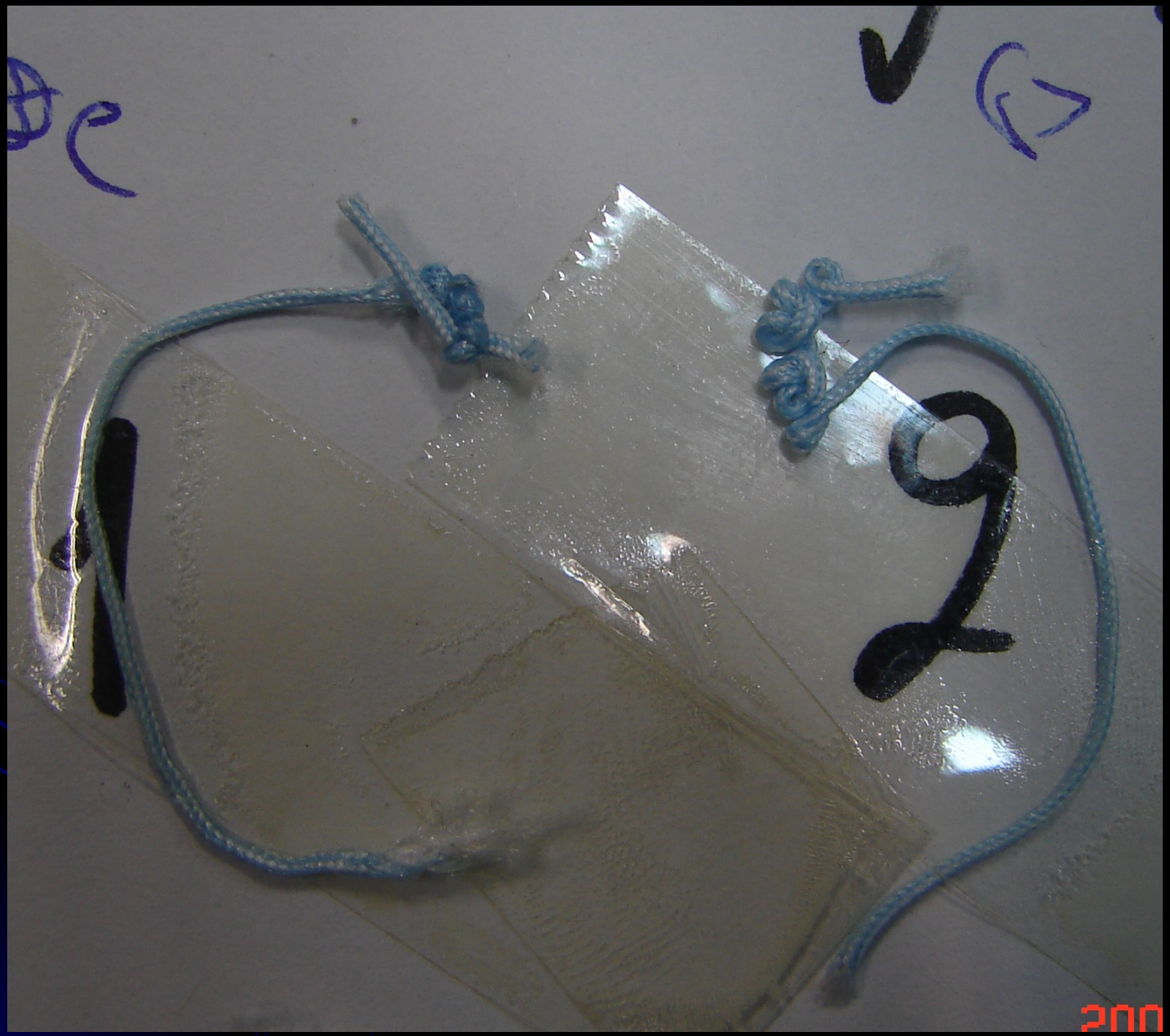

MV-120
65x
20x
100x
30x

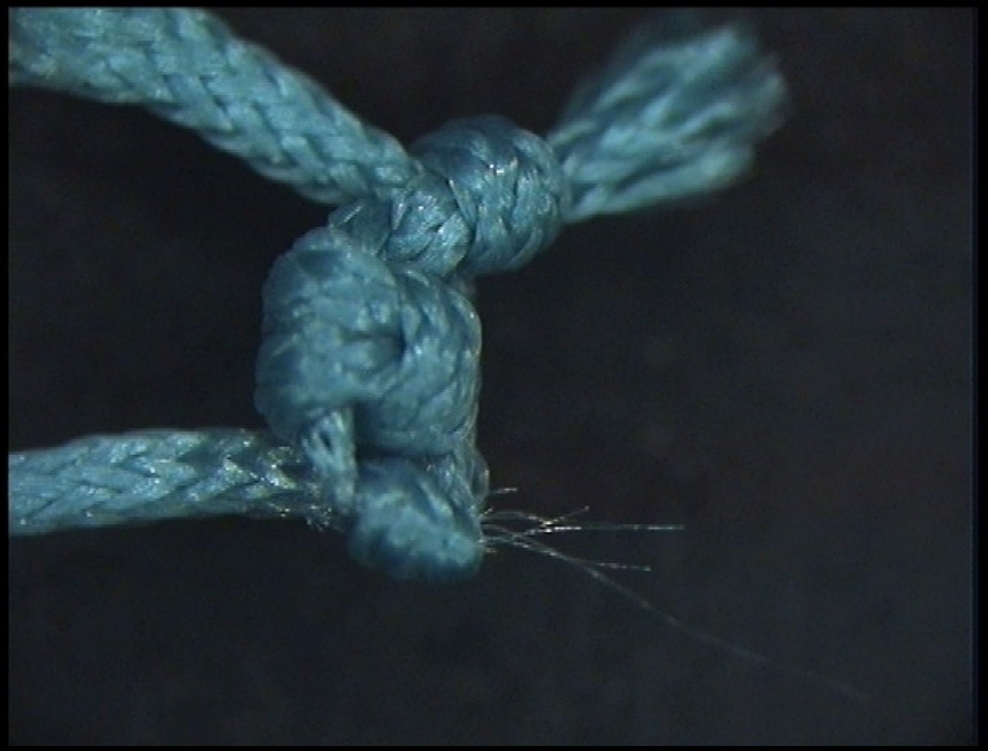


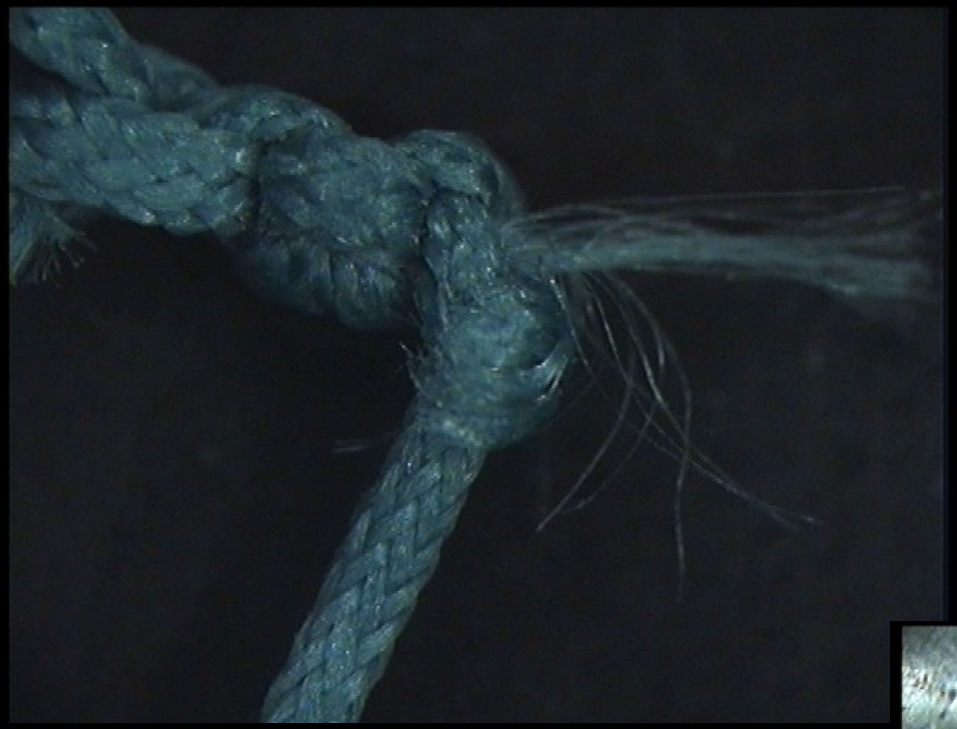
Results

With ethibond suture breakage was the major mode of failure and suture untying was uncommon.

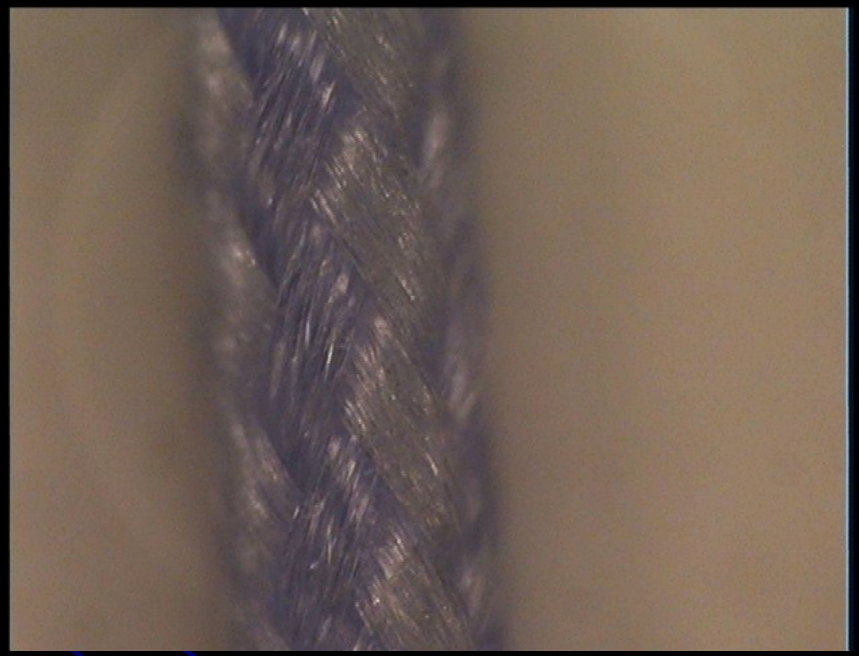
In contrast, with the new generation sutures knot untying was the major mode of failure.



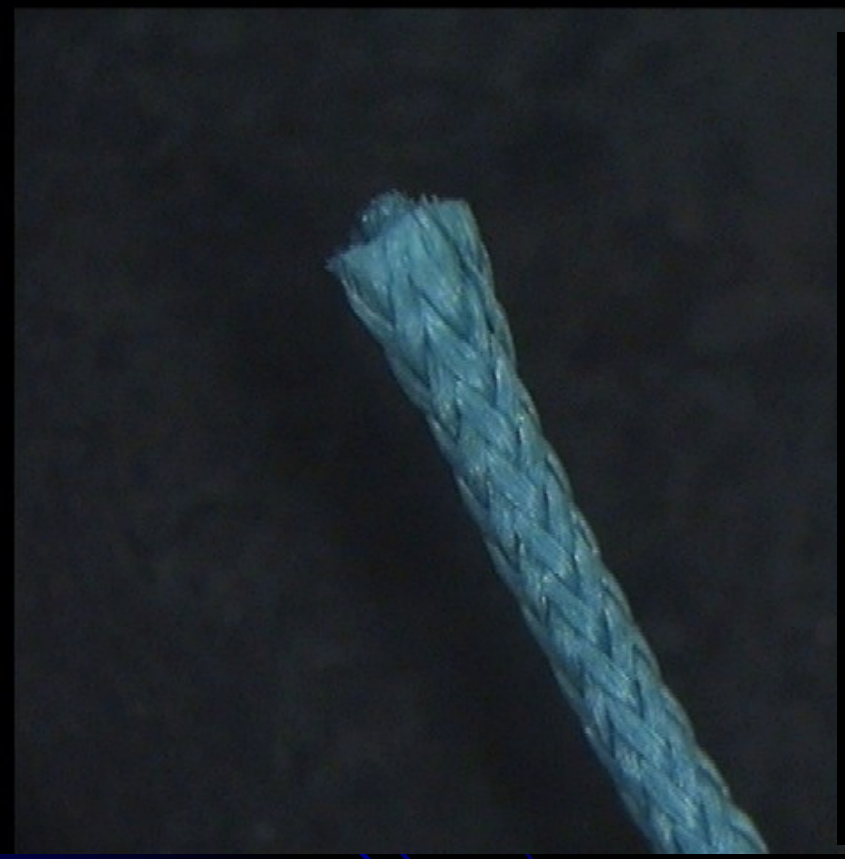


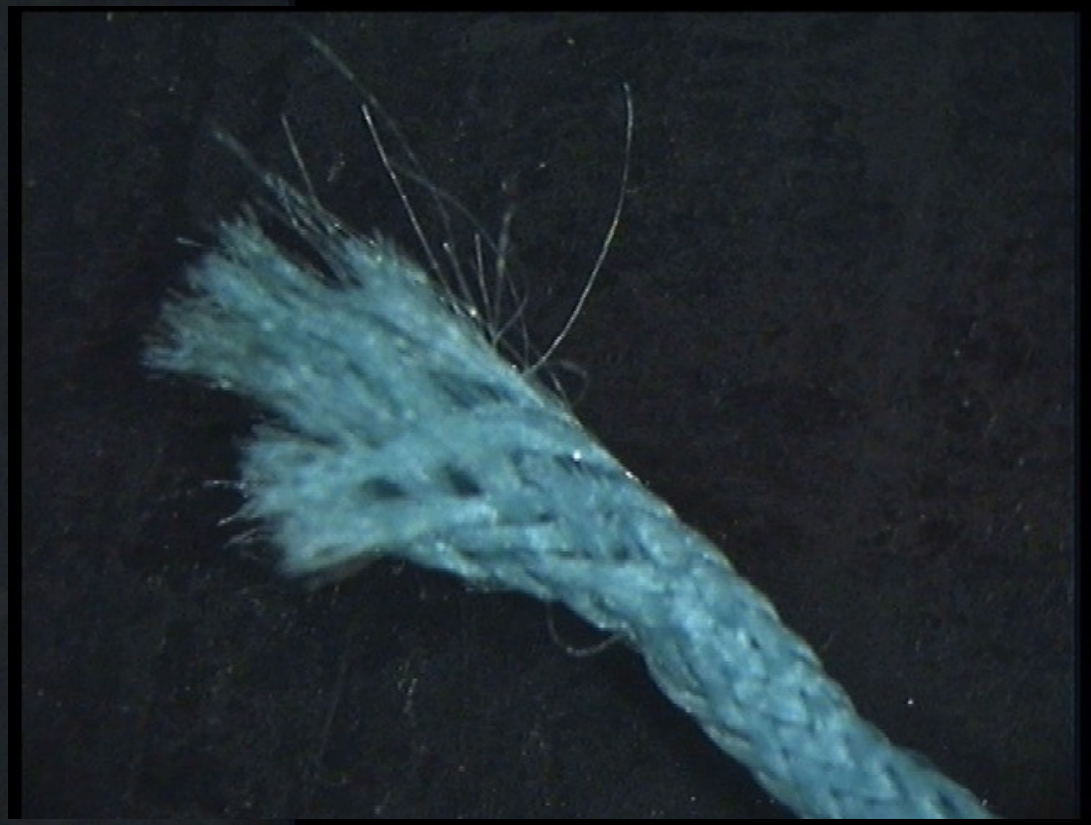


orthocord



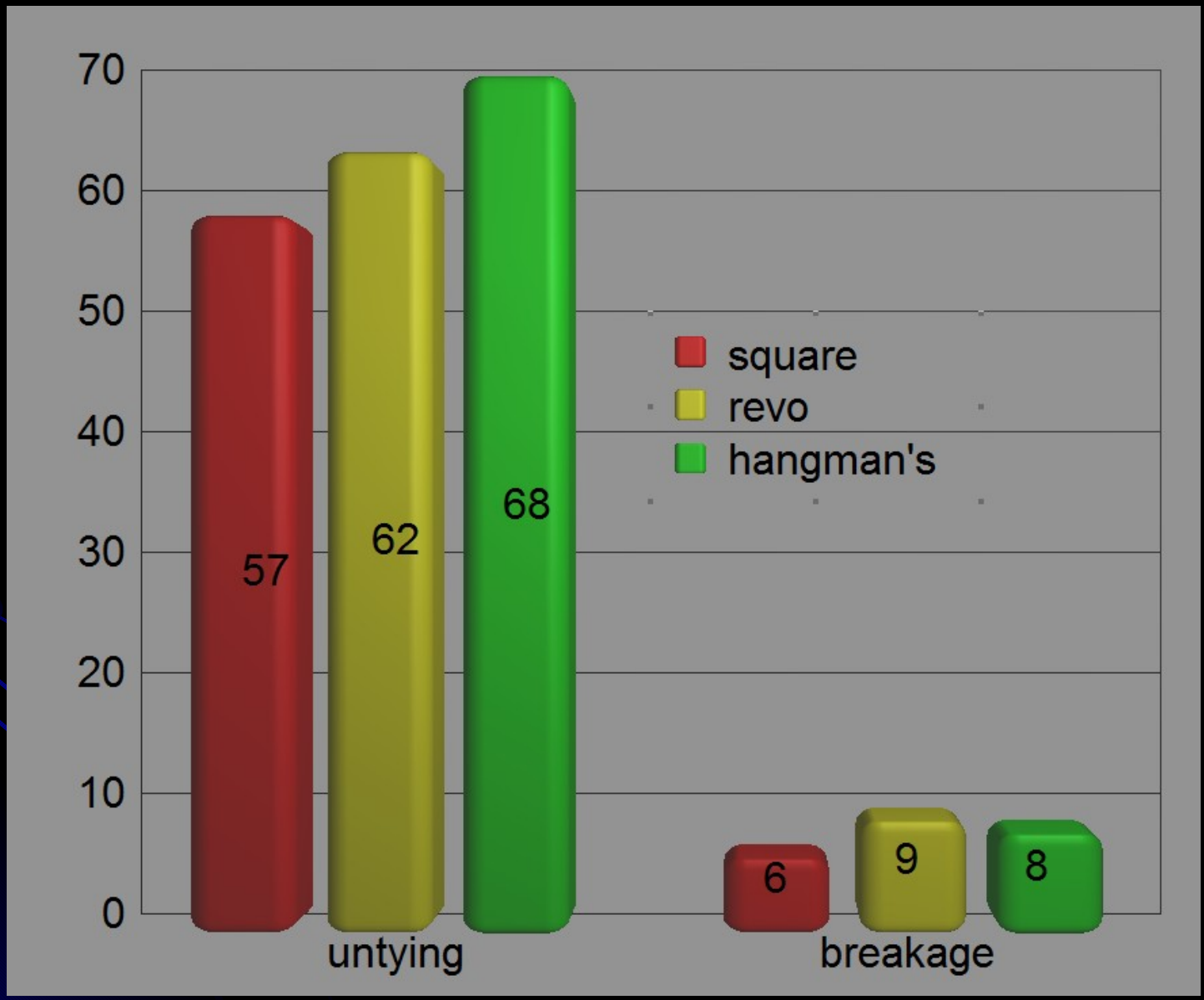
ethibond





fibrewire

Results: Mode of Failure

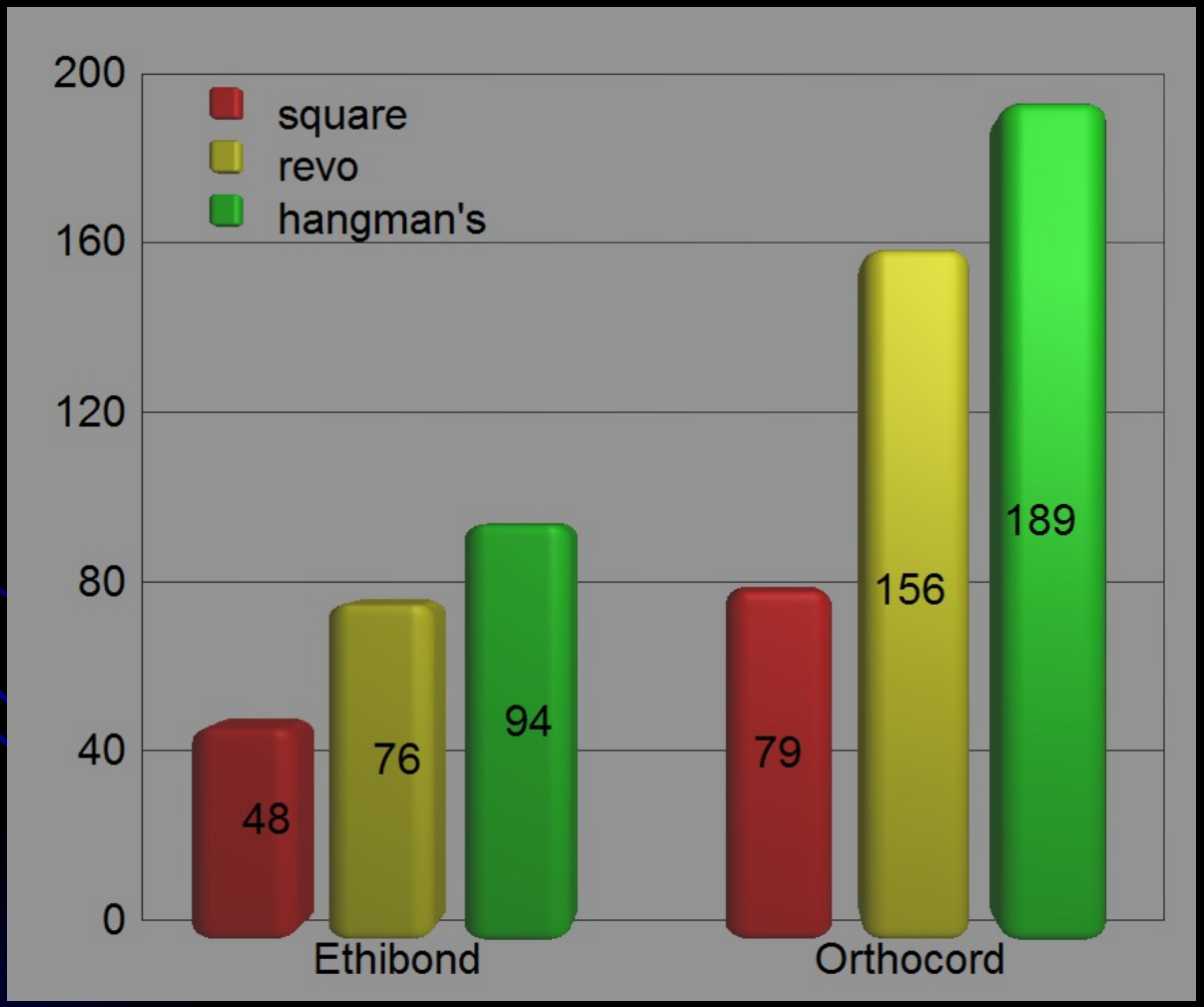


Results: Knot Security

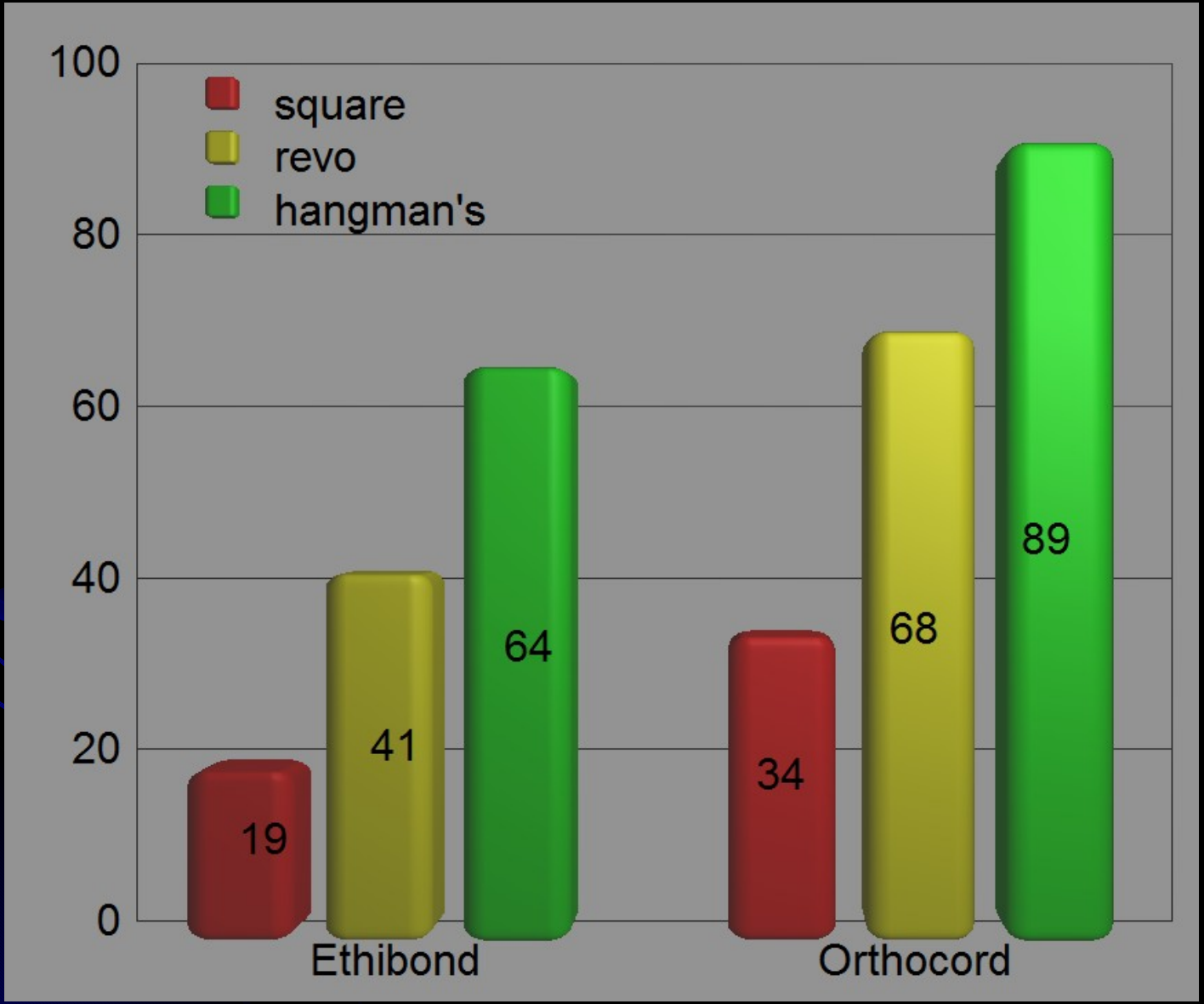
Knot security was least using ethibond compared with the other suture materials.

Results: Strength

The square knot was less stiff and weaker
than the revo or the hangman's knot.



Results: Stiffness



Conclusion

The use of new generation materials increases the strength of the knot but the issue of knot security still remains.