Technique for increasing the strength of fixation to the suspensory button in anterior cruciate ligament reconstruction using the quadriceps tendon

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Disclosure

We have nothing to disclose

Introduction

- ✓ Quadriceps tendon (QT) has recently gained great interest as an autograft for ACL reconstruction.
- ✓ QT exhibits better microstructural and mechanical properties than the Hamstring tendon and Bone patellar tendon bone[1)].
- ✓ Primary ACL reconstruction using QT autografts appears to have successful outcomes with a low rate of graft failure[2)].

Fixation strategy of graft

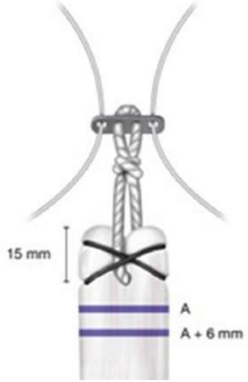
✓ Insufficient strength for graft fixation leads to graft failure[3].

✓ QT cannot be folded and there is no consensus on how to fixation them.

Fixation with hamstring tendon

Fixation with QT

➢ Surgeons appear to use various fixation techniques in clinical settings.



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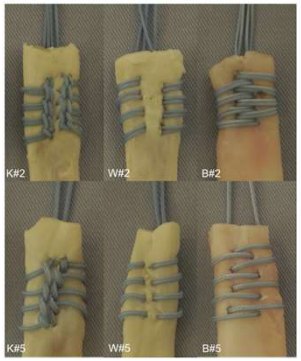
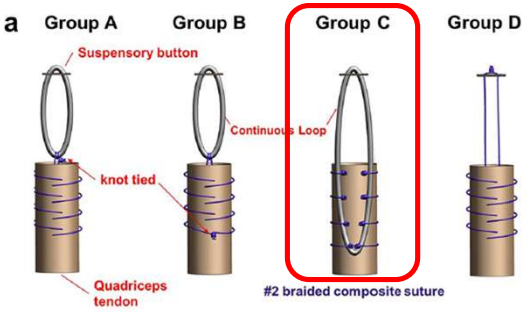
Fixation strategy of graft

- ✓ Evaluated the elongation and load to failure of different stitching methods and suture diameters[6].



- ✓ Direct stitch to the suspensory button device may be better from a biomechanical perspective[7].

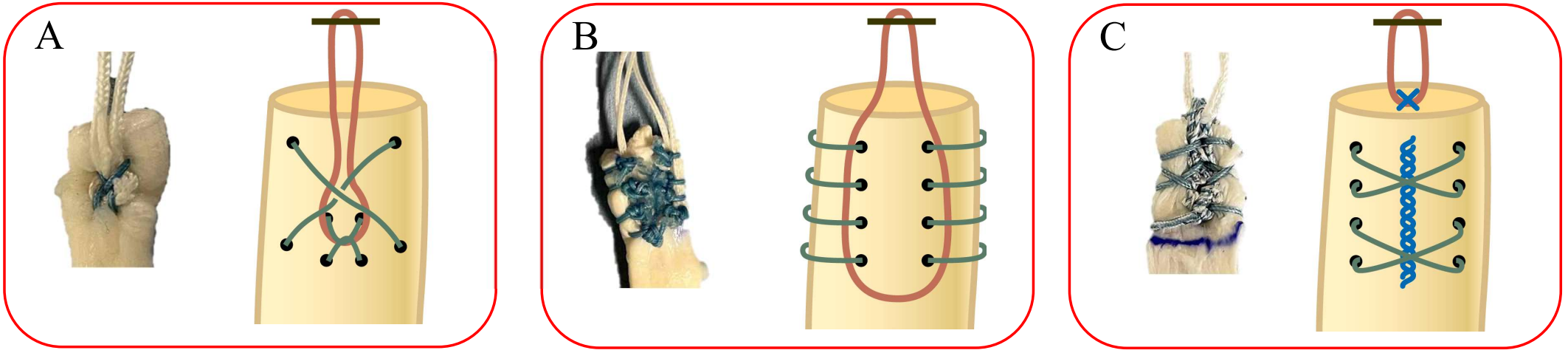


Purpose

To compare the biomechanical strength of various QT fixation using adjustable loops in soft-tissue QT grafts for ACL reconstruction

Material & methods

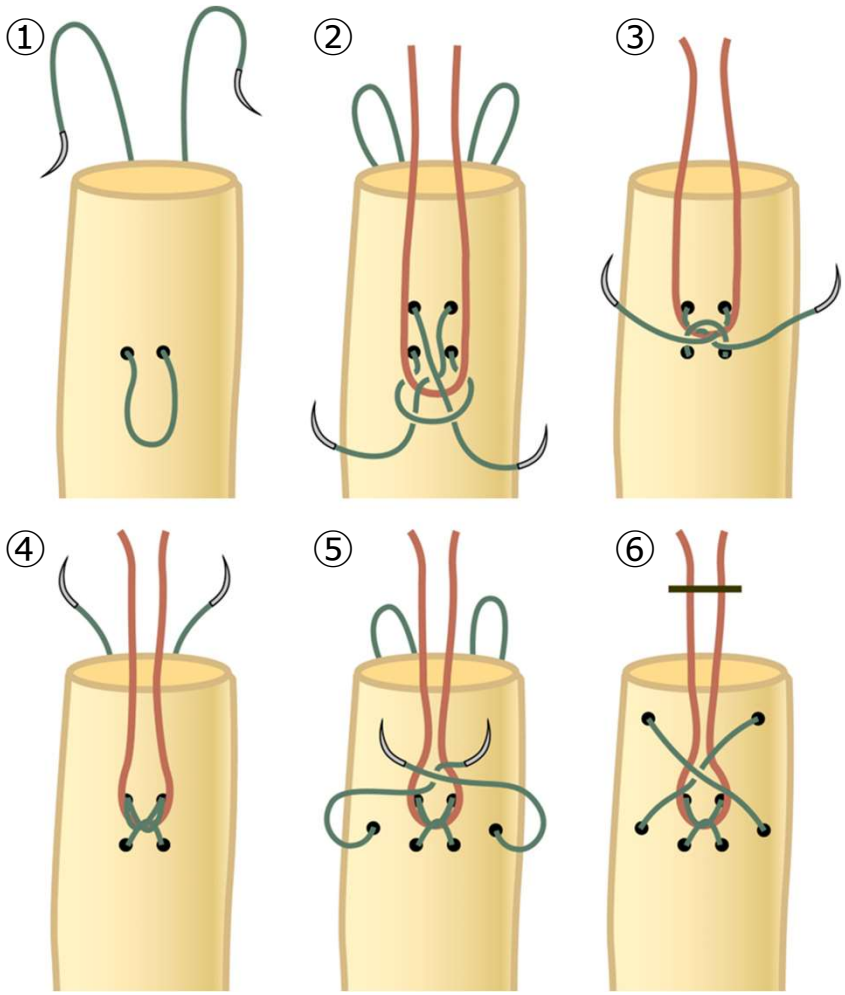
- ✓ Thirty fresh-frozen bovine Achilles tendons (n=10 in each group)
- ✓ Grafts: 10 mm width, 50 mm length, and 4 mm thick
- ✓ ACL TightRope II implant, #2 FiberWire, and FiberTag (Arthrex) were used



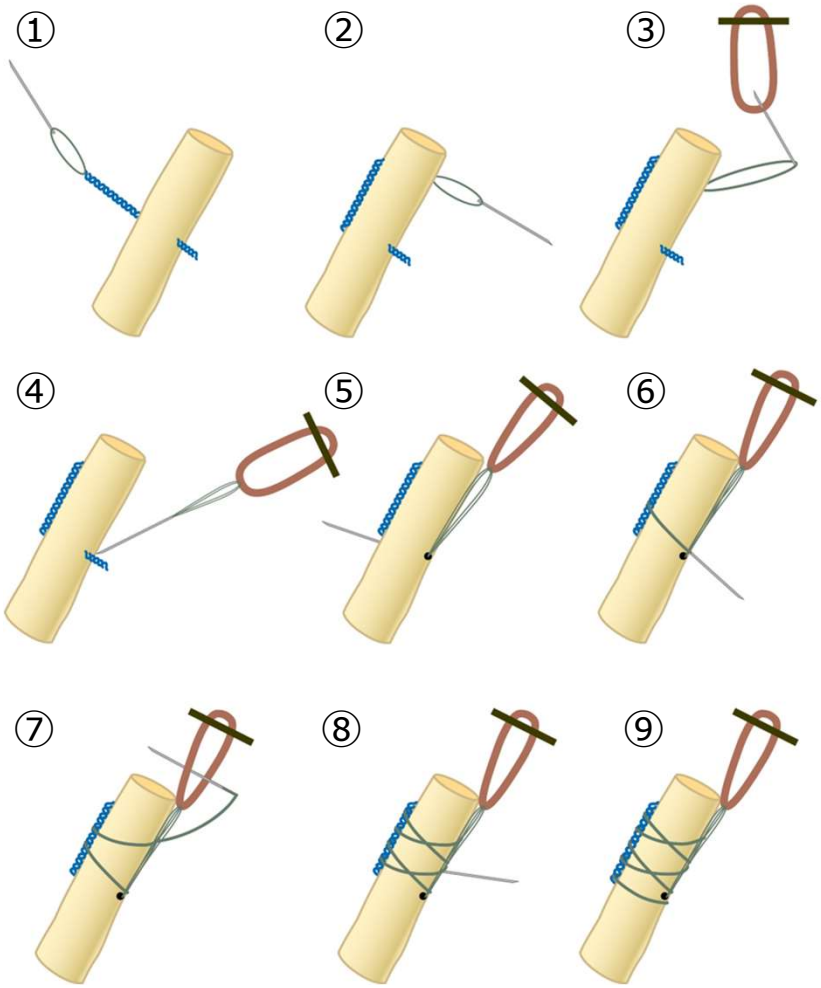
All knots were tied five times and fixed.

Fixation configurations

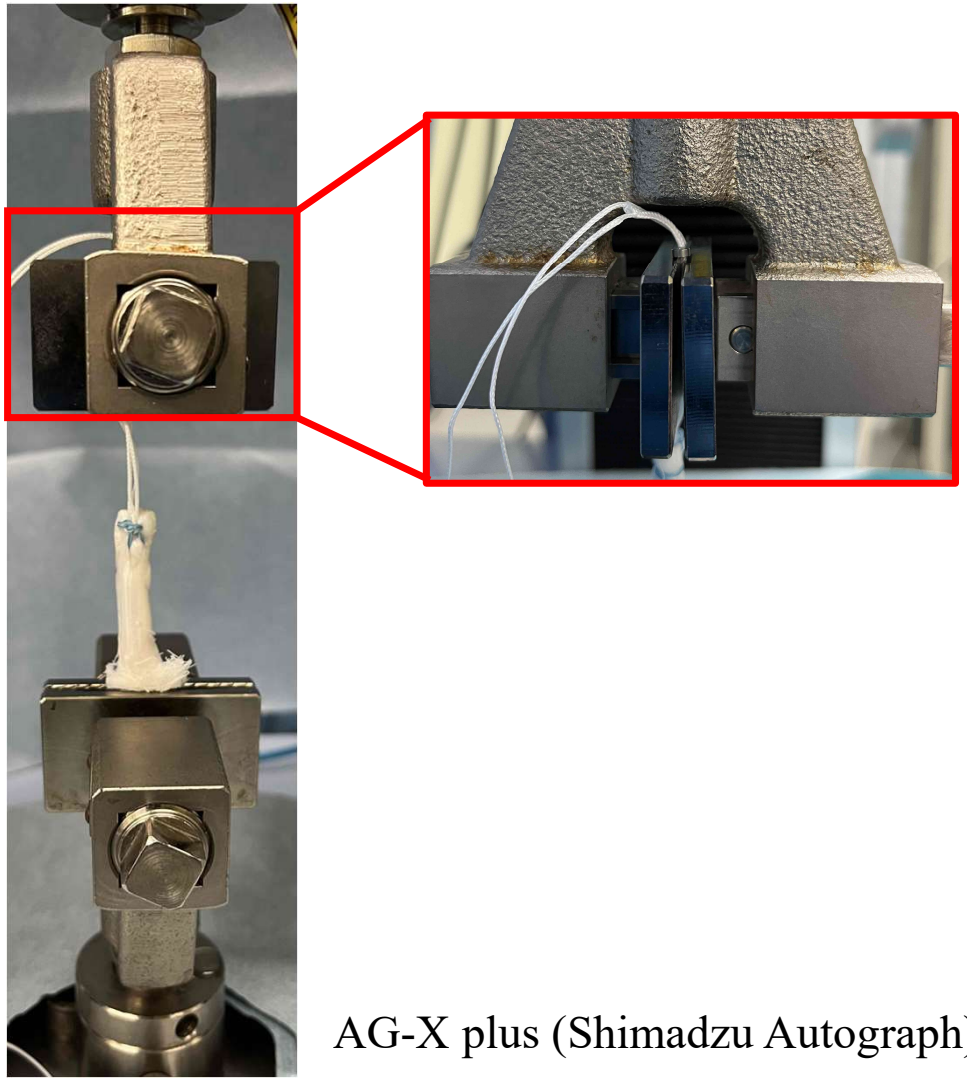
Group A



Group C



Tensile testing



AG-X plus (Shimadzu Autograph)

✓ **Preloading:**

50 N × 5 cycles

statically held at 50 N for 1 min.

➢ The amount of elongation (mm)

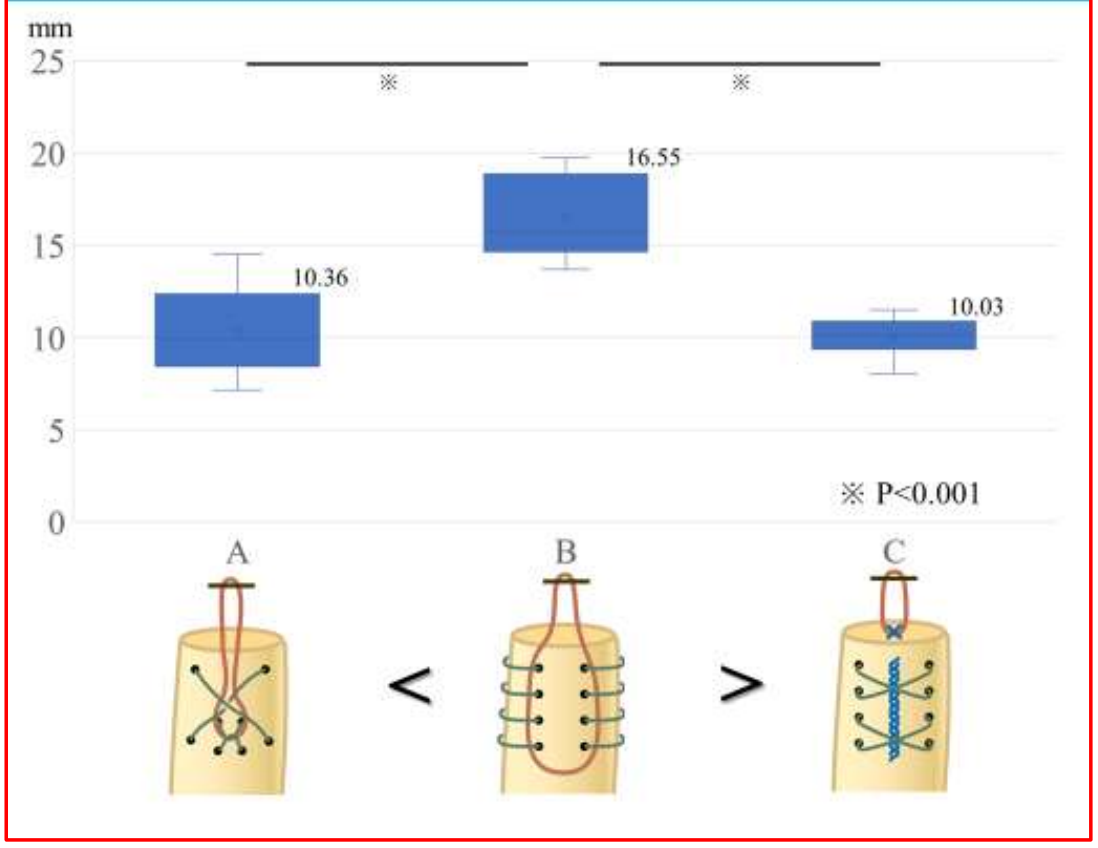
✓ **Load-to-failure testing:**

conducted until rupture at 5mm / min.

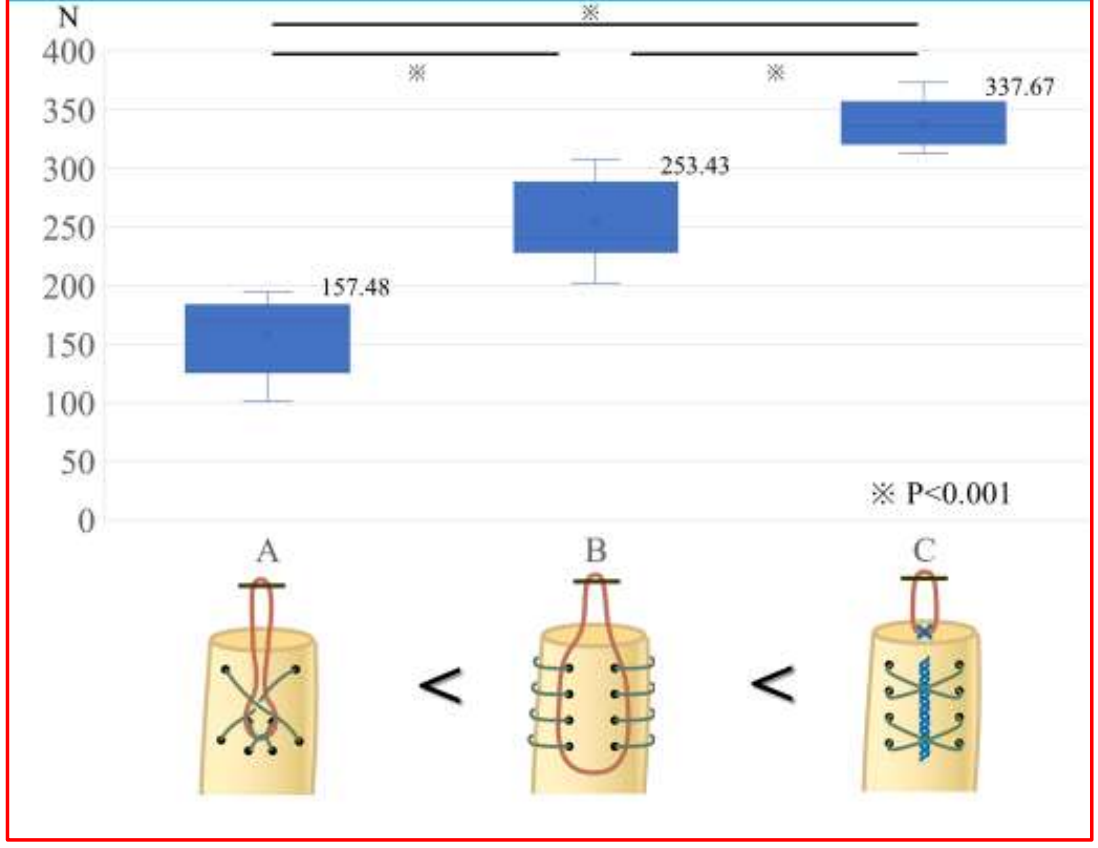
➢ Maximum load to failure (N)

Results

Graft elongation



Maximum load to failure

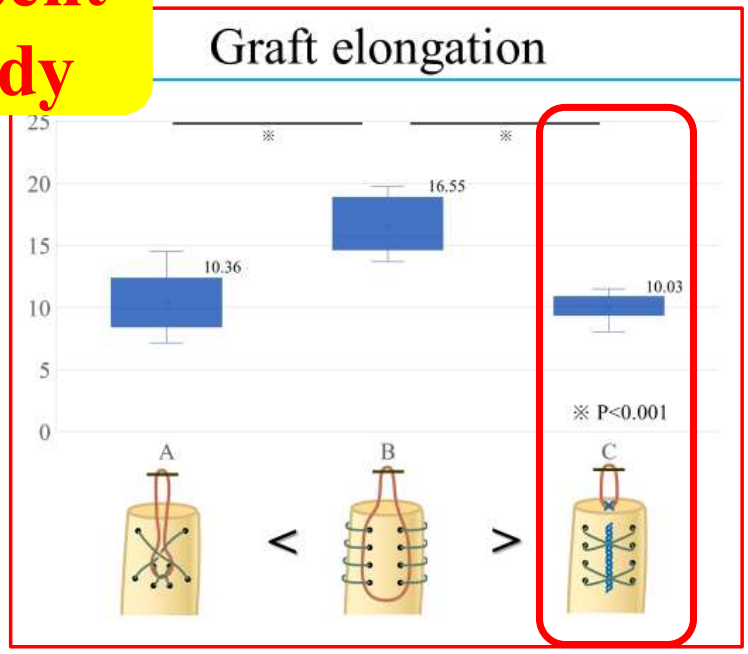


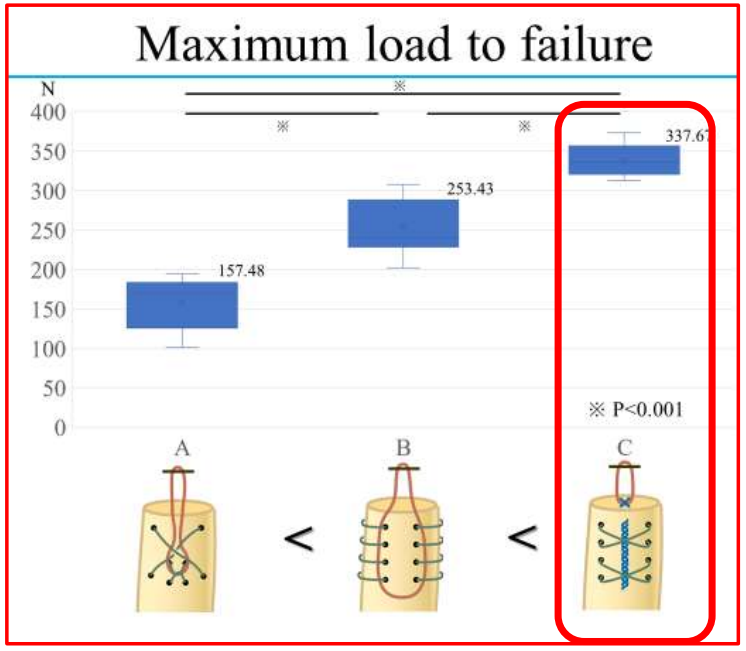
To prevent graft failure

It is particularly important that the tendon

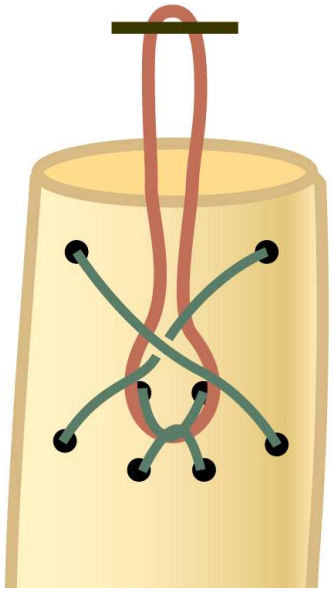
- ✓ Not damaged
- ✓ Does not stretch
- ✓ Has sufficient strength

Present study

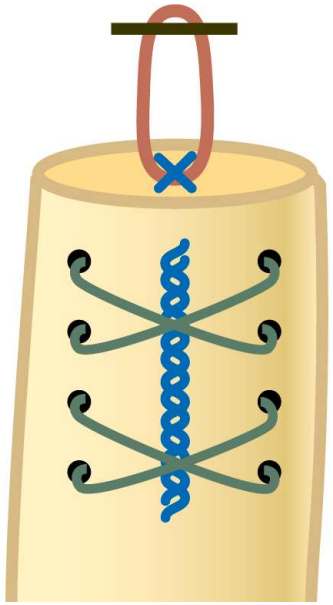




Graft elongation



10.3±2.4mm
Group A



10.0±1.0mm
Group C

Fixation on a surface

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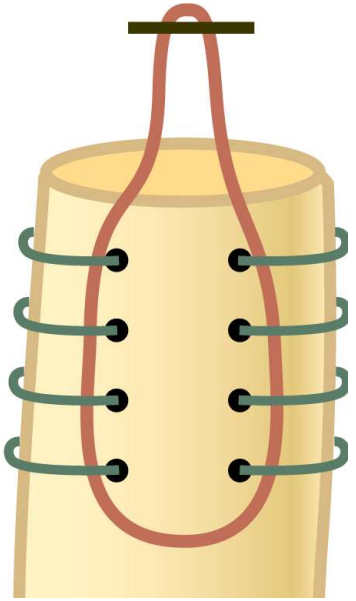
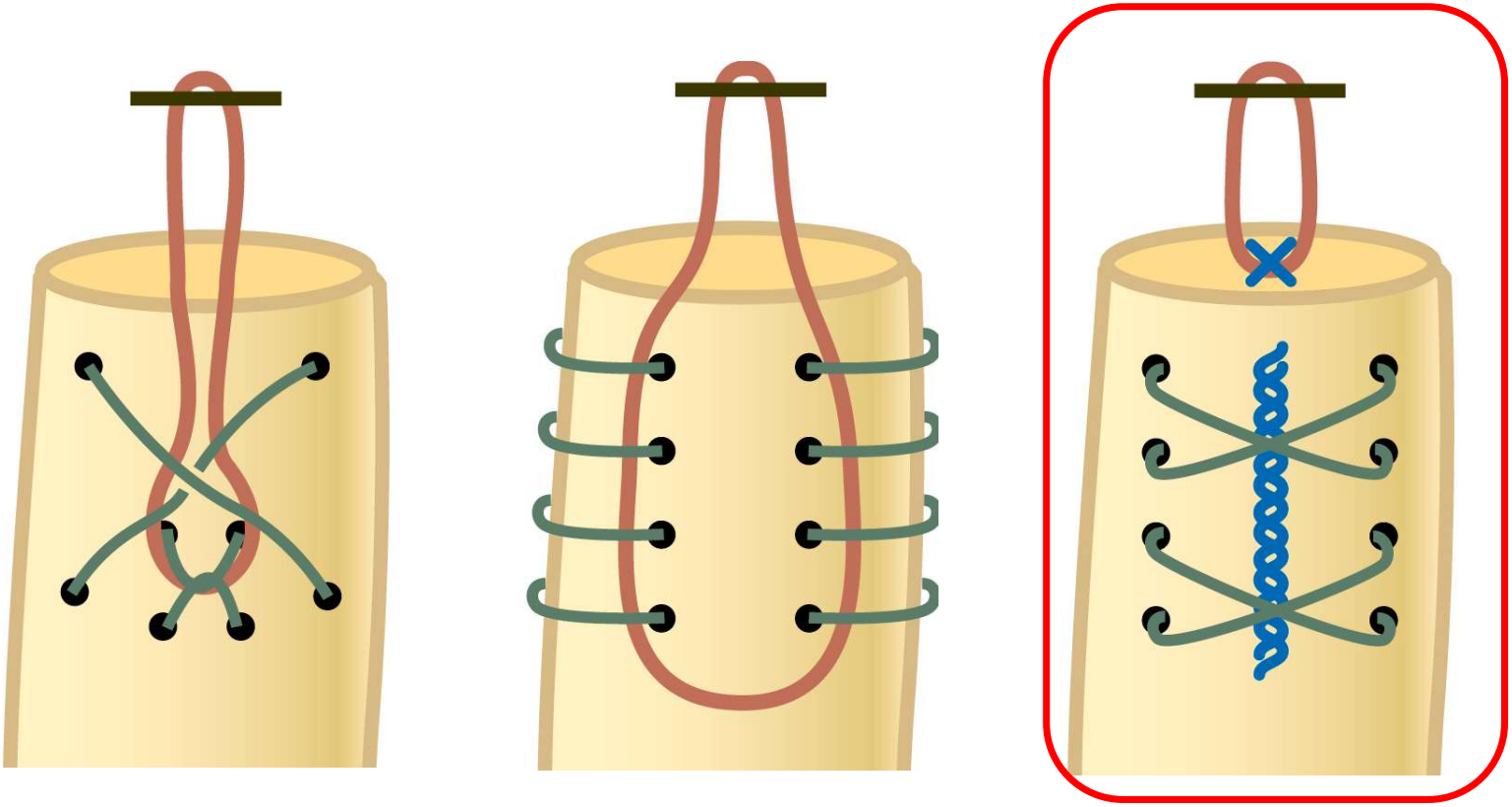


16.6±2.2mm
Group B

Fixation in one direction only

Conclusion



Fixation using Speed Whip Rip Stop technique may be better from a biomechanical perspective at time zero.

Reference

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