

A New Arthroscopic Pull-In All-Suture Anchor Meniscus Root Tear Repair Shows Comparable Biomechanical Properties as Conventional Trans-Osseous Pull-Out and Anchor Repair

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- Current suture anchor techniques (SA) for meniscus root repair require a posterior portal with risk of damage to neurovascular structures and transosseus pull-out refixation (TPO) requires extracortical fixation.
- In the new trans-tibial pull-in technique (TPI), an all-suture anchor is arthroscopically pulled-in not requiring a posterior portal nor extracortical fixation nor interference in possible tunnel conflict in multi-ligament reconstruction.

Hypothesis:

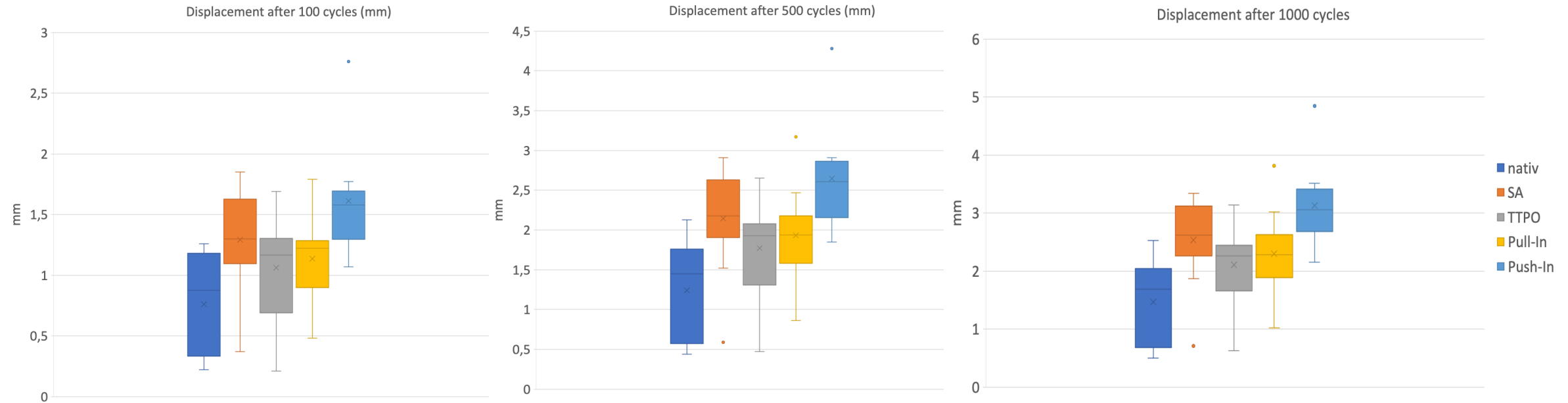
- **Biomechanical properties of meniscal root repair in the new trans-tibial pull-in all-suture anchor technique are comparable to repair with transosseus pull out repair and conventional suture anchor repair.**

5 Groups:

1. intact meniscus
2. TPO with 2 suture loops (#2Hi-Fy, Conmed, USA) and fliptack fixation (Storz, Germany)
3. SA (double loaded) (SuperRevo, Conmed, USA)
4. TPI repair (double loaded) (Y-KnotFlex 1.8 mm, Conmed, USA)
5. Konventional push-in all-suture anchor repair (double loaded) (Y-KnotFlex 1.8 mm, Conmed, USA)

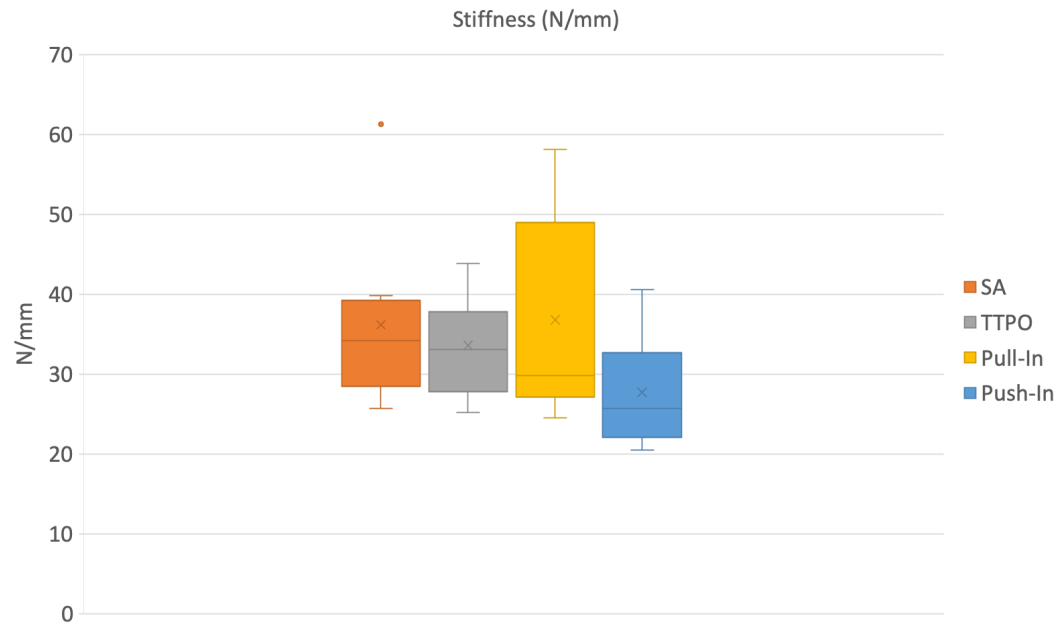
- 10 fresh frozen porcine prox. Tibiae each group, custom setup with potting in PMMA
- refixation of the sectioned medial meniscus root
- Servohydraulic testing device (Zwick, Germany)
- Load to Failure (LTF), Stiffness, Displacement after 100, 500, 1000 cycles
- 5-20 N cyclic loading (1000 Zyklen) à 0.5Hz, LTF with 0,5mm/s
- Statistical analysis with 2-way ANOVA and Kruskal-Wallis testing



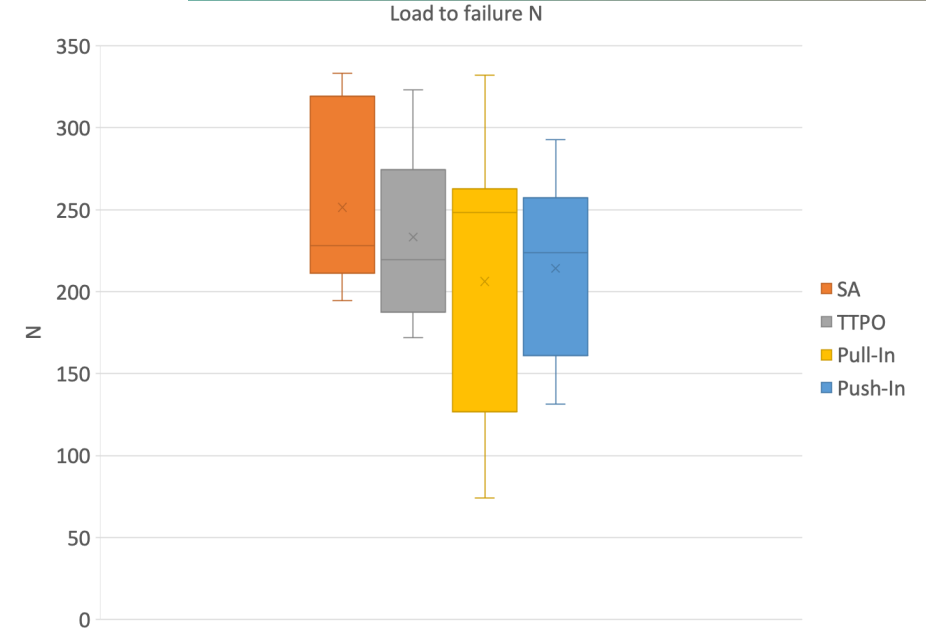


	After 100 cycles (mm)	After 500 cycles (mm)	After 1000 cycles (mm)
native	0,76 ± 0,4	1,24 ± 0,6	1,47 ± 0,8
SA	1,29 ± 0,4	2,15 ± 0,7	2,54 ± 0,8
TPO	1,06 ± 0,4	1,77 ± 0,6	2,10 ± 0,7
Pull-In	1,14 ± 0,3	1,93 ± 0,6	2,30 ± 0,7
Push-In	1,61 ± 0,5	2,65 ± 0,7	3,13 ± 0,7

There was no statistically significant difference regarding stiffness and LTF



	Stiffness (N/mm)
native	156,1 ± 76,3
SA	36,15 ± 10,1
TTPO	33,56 ± 6,2
Pull-In	36,8 ± 12,7
Push-In	27,68 ± 6,6



	Load to failure (N)
native	1064,6 ± 226,0
SA	251,4 ± 52,8
TTPO	233,4 ± 50,0
Pull-In	206,2 ± 86,5
Push-In	214,28 ± 55,2

There was no statistically significant difference regarding stiffness and LTF

The new trans-tibial pull-in technique showed comparable biomechanical properties compared to the transosseous pull out / conventional suture anchor techniques. However, all techniques did not reach the biomechanical properties of the native meniscus.

Thank you!

