ISAKOS CONGRESS 2023

Boston
Massachusetts
June 18–June 21

Acute Achilles tendon rupture. Evaluation of practices and outcomes following a large multicenter retrospective and prospective study

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Introduction

- Achilles tendon rupture: one of the most common injury
- No current consensus on treatment and rehabilitation
- Study goals:
  - To assess patients following a recent Achilles tendon rupture at a min 6-month follow-up
  - To compare the results between surgery and orthopaedic treatment
  - To compare the results between surgical techniques
  - To determine the recurrence rate and their risk factors
  - To evaluate the time and level of sports activities

Materials and methods

- Multicentric, retrospective and prospective study

- **Inclusion criteria**:
  - Recent Achilles rupture (less than 3 weeks) between 01/01/2018 and 15/04/2021
  - Adult patients ($\geq 18yo$)
  - Min follow up: 6 months

- **Exclusion criteria**:
  - Open ruptures
  - Non corporeal rupture
  - Predisposing factors (fluoroquinolones, steroid injection…)
  - Metabolical diseases (diabetes, goutte, chondrocalcinosis…)
  - Rhumatismal or neurological disorders
  - Lost patients

- Evaluation criteria:
  - Clinical exam
  - Delay to sports and competition
  - Complications
  - Scores: ATRS, Visa-A, EFAS, SF-12
  - Athletes had a specific follow up

Results

Retrospective study
Initial cohort
n=534

Lost patients
N=127

Exclusion
N=2

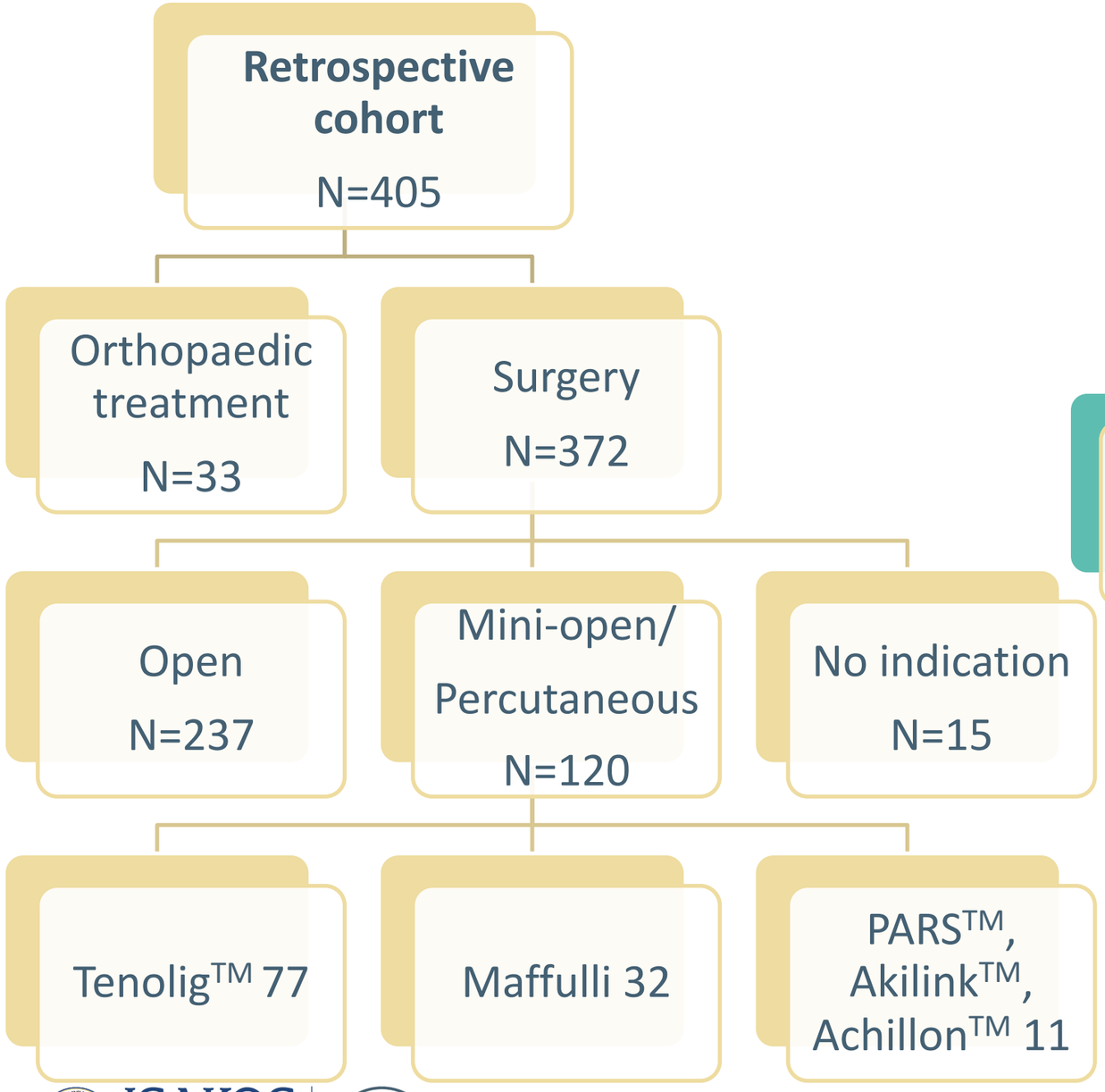
Final cohort
N=405

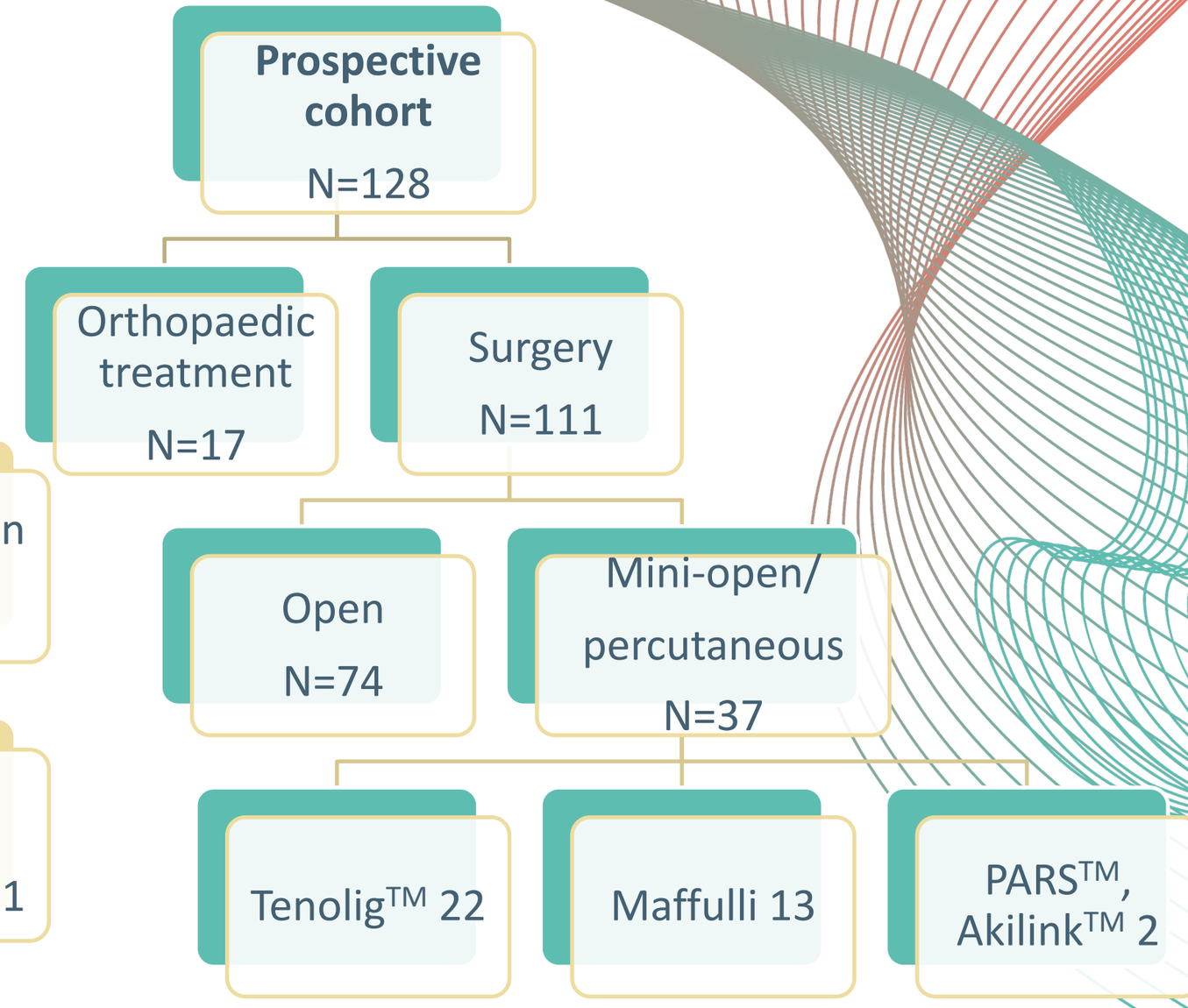
Prospective study
Initial cohort
N=177

Lost patients
N=46

Exclusion
N=3

Final cohort
N=128





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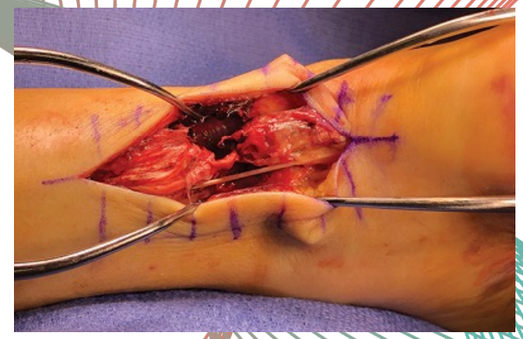
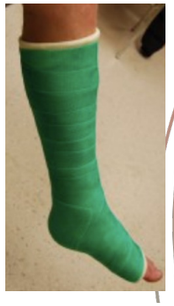
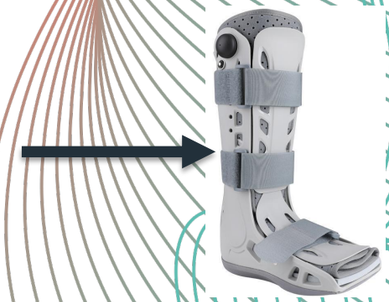
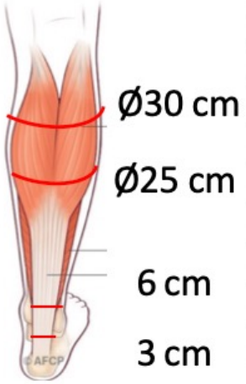
Results

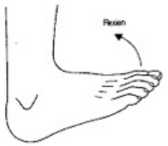
- Similar population in both groups
- Population type: Male, early 40s, active, sport related injury, non-smoker
- Main treatment: open surgery
- Immobilisation: strict, $> 1\text{month}$, equinus then neutral
- Lengthy rehabilitation: 3 to 5 months
- Amyotrophy ($> 1\text{cm}$) and increased tendon thickness: systematic ($p < 0.05$)
- No discrepancy in dorsiflexion











Results

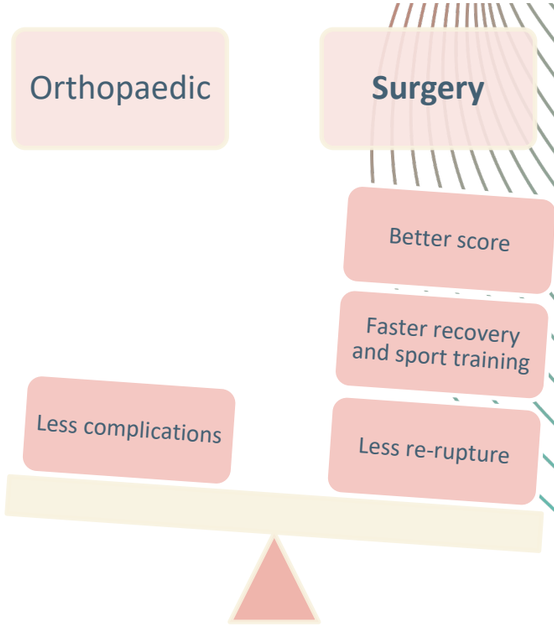
- Tiptoeing on 5 m ($p < 0.05$): > 6 months,
  30% asymmetry
- Unipodal jump ($p < 0.05$): 25% unable at 6 months
- Complication rate : X2 in sedentary patients

	Retrospective		Prospective	
	Surgery	Orthopaedic	Surgery	Orthopaedic
Complication (%) ($p < 0.05$)	25	41	29	27
Re-rupture (%)	4	9	1.7 (except Tenolig™)	9

Score % median [Q1-Q3]	Surgery	Orthopaedic	p
ATRS	84 [66-93]	74 [50.5-86.8]	0.017
EFAS daily	21 [18-23.2]	18 [13-21.5]	0.008
EFAS sport	12 [9-15]	12 [8-14]	0.125
EFAS total	32 [25-37]	27 [21.5-34]	0.013
VISA	87 [70-95]	83 [60-93]	0.344
SF12 physical	53.6 [48.1-55.5]	49.9 [45.4-53.7]	0.01
SF12 mental	52 [43.2-55.9]	50.8 [45.5-55.5]	0.703

- At 12 M: quality of life scores recovered before daily activities and sports
- Training: 76% at 7 M
- Same sport level: 61% at 8.3 M
- Competition: 42% after 8.7 M

Variables	Surgery	Orthopaedic	p
Removal of crutches (M) med [Q1-Q3]	2 [2-3]	3 [2-4]	0.081
Cycling without resistance (M) med [Q1-Q3]	3 [2-4]	4 [2.2-4.8]	0.023
Cycling with resistance (M) med [Q1-Q3]	4 [3-6]	5.5 [3-7]	0.032
Asymetric gait at 12 M n (%)	34%	33%	0.915
Running at 12 M n (%)	243 (78%)	16 (59%)	0.026
Running (M) med [Q1-Q3]	6 [5-8]	7 [6-10]	0.277
Training at 12 M n (%)	214 (78%)	16 (59%)	0.031
Training started (M) med [Q1-Q3]	7 [6-10]	8 [5.8-10.8]	0.701
Competition at 12 M n (%)	95 (43%)	7 (32%)	0.32
Competition started (M) med [Q1-Q3]	9 [8-12]	10.5 [9.2-11.8]	0.218
Previous sport level at 12 M n (%)	166 (62%)	10 (45%)	0.128
Sport at same level (M) med [Q1-Q3]	9 [7-12]	11 [9-12]	0.257



M: Months

Discussion

- Prospective study: fewer patients due to pandemic
- Literature showed few discrepancies between treatments but Tenolig ™ seems to increase the risk of re-rupture
- Open techniques demonstrate less tendon lengthening
- Mini-open seem to generate fewer re-rupture and better scores
- Like in literature:
  - orthopaedic treatments showed worse outcomes: CRPS, re-rupture, lengthening, amyotrophy, longer rehabilitation and inferior scores
  - Life-changing injury : 25 to 40% of athletes stopped competition; 50% practising a jump impulse sport could not resume their activity
  - International athletes had better results than national or regional

Discussion

As in literature, a short period of immobilisation, early weight-bearing, and early rehabilitation did not increase the risk of complications.

Proposition of a rehabilitation protocol:

D0-D21	D22-D45	> **45 D** (Open and Mini – Open) > **60 D** (Ortho and Tenolig®)
• Immobilisation strict or relative • in equinus • NWB	• walking boot • + 10 degrees of DF/week • passive rehabilitation	• rehabilitation increased • removal of orthesis • strengthening starting

D: Day; NWB: Non Weight Bearing; DF: DorsiFlexion

Conclusion

- Largest study on this topic
- Tenolig™ and orthopaedic treatments are not recommended for athletes
- The rehabilitation must start at 3 weeks
- Necessity to gain more understanding on the Achilles tendon biomechanics and its remodelling process
- New mini-open techniques using braided sutures and calcaneal anchorage may show benefits in early recovery

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