ISAKOS CONGRESS 2023

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OUTCOME COMPARISON BETWEEN ARHTROSCOPIC REPAIR OF FULL-THICKNESS ROTATOR CUFF TEAR AND PARTIAL-THICKNESS ROTATOR CUFF TEAR

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Introduction

- The purpose of this study was to compare the functional outcome and retear rate of arthroscopic repair of partial-thickness rotator cuff tear (**PTRCT**) compared with full-thickness rotator cuff tear (**FTRCT**) performing the same suture-bridge repair technique.

Methods

- From 2012 to 2020
- 304 Patients were included with FTRCT and PTRCT diagnosis
  - 242 FTRCT
  - 62 PTRCT
- Details were retrieved from the Socrates Orthopaedic Outcomes Software database (Ortholink Pty Ltd, Pyrmont, NSW, Australia).
- <u>Inclusion criteria</u>
  - *Primary surgery*
  - *Same Surgeon (MH) – Same technique (suture bridge technique)*
  - *USS assessment: at Week 6,12 and 24 performed by only one experienced sonographer*
  - *The time point for examination of cuff integrity was six months[1]*
  - *Constant score, Western Ontario Rotator Cuff Index (WORC) and Oxford score were assessed at week 24*

Methods

- Same Surgeon (MH)
- All patients were prepared in the lateral decubitus position
- The joint was routinely examined
- Acromioplasty were never performed. Bursectomy in all patients
- All patients had undergone a suture bridge repair technique
- A standardized postoperative rehabilitation protocol for both groups:
  - 6 weeks of sling immobilization
  - Gentle passive and active assisted movements were initiated for the next 6 weeks
  - Gradual strengthening exercises were commenced only after 12 weeks postoperatively

Results

- Statistically significant difference was observed between the mean age of patients
  - 63 years ± 8.29 for FTRCT group
  - 57 years ± 10.01 for PTRCT (p=.001)
- No differences in the grade of tendinopathy were observed between both groups

Age at Surgery

Full Tear - Age at surgery	-	**Partial Tear - Age at surgery**	**0.001**

Descriptive Statistics

	Full Tear Age at surgery	Partial Tear Age at surgery
Mean	**63**	**57**
Std. Deviation	8.29	10.01
Minimum	35	33
Maximum	83	75

Paired Samples T-Test
Full vs Partial

			p-value
Full Group		Partial Group	(statistical difference between groups)
Age at surgery	-	**Age at surgery**	**0.001**
Tendinopathy	-	**Tendinopathy**	**0.583**

Note. Student's t-test.

Results

- Clinical outcomes were significantly improved following arthroscopic repair in both groups individually, preoperatively scores vs scores at week 12 and at week 26 of all three scores (p=<.001)

Intraoperative Tear Extent Full

Paired Samples T-Test
Oxford Preop, Oxford 12w and Oxford 26w

			p-value
Group 1		Group 2	(statistical difference between groups)
Oxford Score Preop	-	Oxford Score 12w	< .001
Oxford Score 12w	-	Oxford Score 26w	< .001
Oxford Score Preop	-	Oxford Score 26w	< .001

Note. Student's t-test.

Intraoperative Tear Extent Full

Paired Samples T-Test
Constant Preop and Constant 26w

			p-value
Group 1		Group 2	(statistical difference between groups)
Constant Score Preop	-	Constant Score 26w	< .001
Constant Pain Preop	-	Constant Pain 26w	< .001
Constant Subjective Preop	-	Constant Subjective 26w	< .001
Constant Objective Preop	-	Constant Objective 26w	< .001

Note. Student's t-test.

Intraoperative Tear Extent Full

Paired Samples T-Test
WORC Preop, WORC 12w and WORC 26w

			p-value
Group 1		Group 2	(statistical difference between groups)
WORC Score Preop	-	WORC Score 12w	< .001
WORC Score 12w	-	WORC Score 26w	< .001
WORC Score Preop	-	WORC Score 26w	< .001

Note. Student's t-test.

Intraoperative Tear Extent Partial

Paired Samples T-Test
Oxford Preop, Oxford 12w and Oxford 26w

			p-value
Group 1		Group 2	(statistical difference between groups)
Oxford Score Preop	-	Oxford Score 12w	< .001
Oxford Score 12w	-	Oxford Score 26w	< .001
Oxford Score Preop	-	Oxford Score 26w	< .001

Note. Student's t-test.

Intraoperative Tear Extent Partial

Paired Samples T-Test
Constant Preop and Constant 26w

			p-value
Group 1		Group 2	(statistical difference between groups)
Constant Score Preop	-	Constant Score 26w	< .001
Constant Pain Preop	-	Constant Pain 26w	< .001
Constant Subjective Preop	-	Constant Subjective 26w	< .001
Constant Objective Preop	-	Constant Objective 26w	0.117

Note. Student's t-test.

Intraoperative Tear Extent Partial

Paired Samples T-Test
WORC Preop, WORC 12w and WORC 26w

			p-value
Group 1		Group 2	(statistical difference between groups)
WORC Score Preop	-	WORC Score 12w	0.180
WORC Score 12w	-	WORC Score 26w	< .001
WORC Score Preop	-	WORC Score 26w	< .001

Note. Student's t-test.

Results

- No differences between preoperatively Total Oxford Score between both groups. Although Oxford usual pain was statistically significant higher in the PTRCT group (2.82 ±0.8 vs 2.64 ± 0.9 p=<0.05).
- No differences between total Oxford Score at week 26 between both groups. However, Oxford worst pain at week 26 was statistically significant higher in the PTRCT group (1.38 ±0.79 vs 1.05 ± 0.82 p=<0.05)
- The Constant score at week 26 reflected statistically higher score for FTRCT group.
- No differences in WORC scores preoperatively and at week 26 between both groups.
- Preoperatively WORC score vs WORC score at week 12 improved in the FTRCT group and there were no significant differences in the PTRC group (P=<0.05)

Oxford - Preop

FTRCT		PTRCT	
Oxford Worst Pain-preop	-	Oxford Worst Pain-preop	0.165
Oxford Usual Pain-preop	-	Oxford Usual Pain-preop	0.034
Oxford Score-preop	-	Oxford Score-preop	0.707

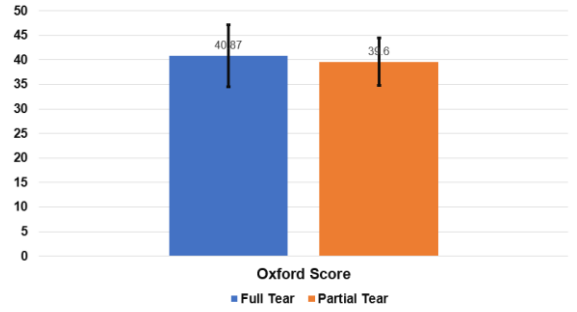
Descriptive Statistics

	Full Tear Oxford Worst Pain-preop	Full Tear Oxford Usual Pain-preop	Full Tear Oxford Score-preop	Partial Tear Oxford Worst Pain-preop	Partial Tear Oxford Usual Pain-preop	Partial Tear Oxford Score-preop
Mean	2.463	2.645	28.71	2.629	2.823	29.58
Std. Deviation	0.7841	0.9586	9.09	0.6831	0.8401	6.681
Minimum	0.000	0.000	2.000	1.000	1.000	13.000
Maximum	4.000	4.000	47.00	4.000	4.000	42.00

Scores	FTRCT	PTRCT	P-value
Oxford Score 26w	40.87	39.60	0.227
Constant score 26w	66.58	64.45	0.037
WORC 26w	529.0	609.2	0.065

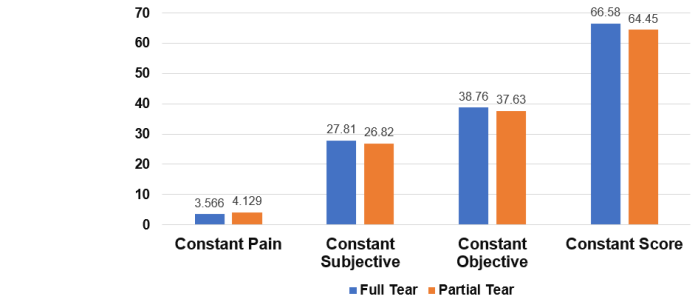
Oxford – 26w

Oxford Worst Pain-26w	-	Oxford Worst Pain-26w	0.022
Oxford Usual Pain-26w	-	Oxford Usual Pain-26w	0.066
Oxford Score-26w	-	Oxford Score-26w	0.227



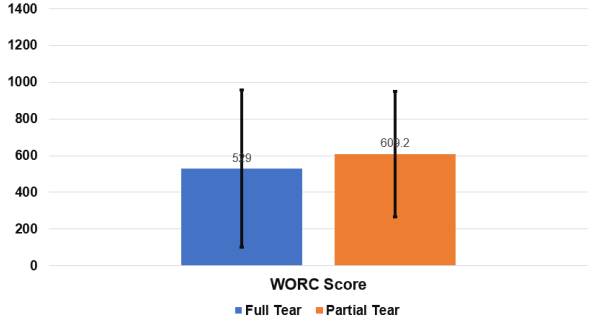
Constant - 26w

Constant Pain-26w	-	Constant Pain-26w	0.206
Constant Objective-26w	-	Constant Objective-26w	0.079
Constant Subjective-26w	-	Constant Subjective-26w	0.040
Constant Score-26w	-	Constant Score-26w	0.037



WORC – 26w

WORC Physical Score-26w	-	WORC Physical Score-26w	0.093
WORC Emotions Score-26w	-	WORC Emotions Score-preop	0.187
WORC Total Score-26w	-	WORC Total Score-26w	0.065



Results

- Retear rates at weeks 12 and 26 were statistically significantly higher in FTRCT group than in PTRCT group.
  - 17.77% FTRCT
  - 3.23% PTRCT
  - p=<0.05 at final follow-up

Patient Grouping Analysed
Intraoperative Tear Extent Full versus Partial

Paired Samples T-Test
Full vs Partial

			p-value
FTRCT		PTRCT	(statistical difference between groups)
Re-tear 6w	vs	**Re-tear 6w**	**0.057**
Re-tear 12w	vs	**Re-tear 12w**	**< 0.001**
Re-tear 26w	vs	**Re-tear 26w**	**0.004**
Compliance 6w	vs	**Compliance 6w**	**0.709**
Compliance 12w	vs	**Compliance 12w**	**No variance**
Compliance 26w	vs	**Compliance 26w**	**No variance**
Footprint 6w	vs	**Footprint 6w**	**0.023**
Footprint 12w	vs	**Footprint 12w**	**0.013**
Footprint 26w		**Footprint 26w**	**0.006**

Note. Student's t-test.

	FTRCT 6w	FTRCT 12w	FTRCT 26w	PTRCT 6w	PTRCT 12w	PTRCT 26w
Segmental	18	22	25	2	1	0
Complete	5	13	18	0	0	2
Total Patients	242	242	242	62	62	62

All patients have a re-tear status recorded at 6w, 12w and 26w

Total_Percentages

	Full Tear 6w	Full Tear 12w	Full Tear 26w	Partial Tear 6w	Partial Tear 12w	Partial Tear 26w
Segmental	7.44	9.09	10.33	3.23	1.61	0
Complete	2.07	5.37	7.44	0	0	3.23

All patients have a re-tear status recorded at 6w, 12w and 26w

Discussion

- Arthroscopic rotator cuff repair provides statistically significant improvements in functional outcome, pain and PROM. However, retear rates still remain an area of concern for rehabilitation purposes.
- A systematic review assessing 2048 repairs by Hein et al. found significantly lower re-tear rates in double row and suture bridge techniques compared with single row techniques for most tear sizes, including tears between 1 and 3 cm, less than 3 cm, greater than 3 cm and greater than 5 cm. [1,2]
- Standard bursal side PTRCT surgical treatment remains controversial. Some of the literature supports full-thickness conversion repair. Other studies have found that for PTRCTs, intact articular side rotator cuff–fiber preservation can be done. There were five studes that mentioned repair integrity and clinical outcomes. From the five studies, the retear rate of RCTs with the Bursa takedown procedure was better than that of the remanent preservation technique. We postulated whether the tissue retained in the surgical procedures was pathological tissue of the remaining rotator cuff, which may have caused recurrent pain. [3]
- Franceschi et al performed a randomized clinical trial comparing conversion vs. in situ repair and specifically looked at retear rates, demonstrating no difference between the two techniques. [4]
- In several studies, the authors compared the clinical results of bursal- and articular-side PTRCTs. Kim et al. did not determine any differences in re-tear rates between these two injuries but found superior clinical results at 2 years of follow-up for high-grade bursal-side tears compared with articular tears, which were treated after conversion to full thickness tears.[3,5,6]

Discussion

- Ultrasound has a 91% sensitivity, 86% specificity and 89% accuracy compared with the intra-operative arthroscopic assessment but is operator dependent. Detection of re-tear or failed rotator cuff repair using MRI ranges from 70 to 90% and may be improved with arthrography techniques. [7,8]
- The question of timing of shoulder range of motion postoperatively has been a source of great discussion, with proponents of early range of motion suggesting the potential for increased shoulder range of motion and decreased postoperative stiffness, muscle atrophy, and fatty infiltration. Advocates of delayed range of motion submit that it more adequately protects the repair by minimizing micromotion and allows tendon-to-bone healing, which could reduce retear rates. There has been discordance in the results of recent meta-analyses that have compared early-motion with delayed-motion rehabilitation, and an exact understanding of which postoperative protocol is best is yet to be determined.[9]
- The findings of the systematic review of Saltzman, B. M. et al suggested that patients with low risk for improper healing but high risk for shoulder stiffness postoperatively and those with decreased motion preoperatively may be best suited for early-motion rehabilitation protocols.[9]

Conclusion

- Patients with PTRCT are usually younger than patients with FTRCT.
- FTRCT and PTRCT have similar preoperatively functional scores but paradoxically, our study showed that PTRCT tends to be more painful than FTRCT.
- Arthroscopic repair of PTRCT and FTRCT followed by a suture bridge repair technique has provided similar outcomes in Oxford and WORC scores at final follow-up.
- However, these two different entities should be rehabilitated differently as the PTRCT has shown a higher grade of stiffness at week 12 and lower re-tear rates than FTRCT at final follow-up.
- Therefore, with less risk of re-tear rate, starting at 4-week following surgery might be a reasonable time-point to begin with an early physiotherapy protocol for PTRCT.

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