Partial Thickness Rotator Cuff Tears: Retear Rate and Functional Outcome Following an Arthroscopic Tear Completion and Suture-Bridge Technique Suggests a Specific Rehabilitation Plan

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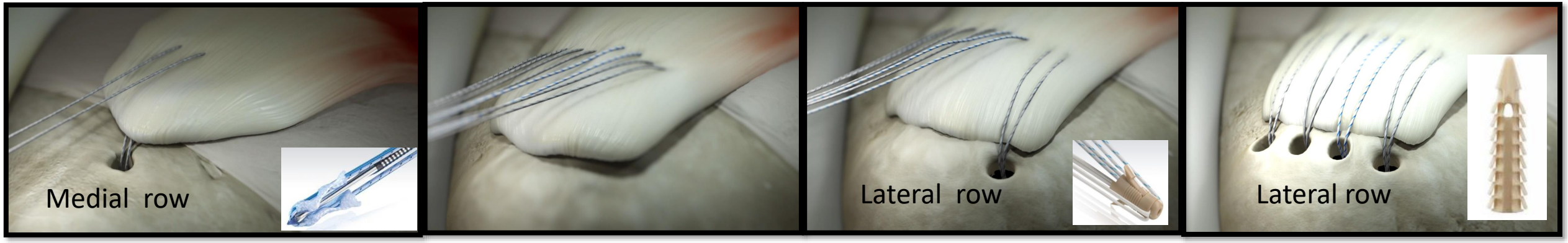
Introduction

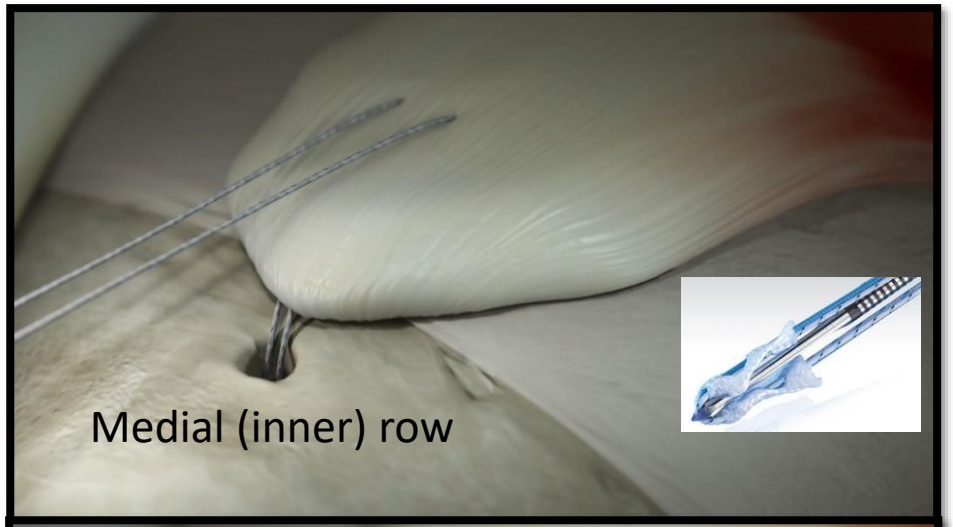
- Partial-thickness rotator cuff tears (PTRCTs) are known to have a more significant role than previously recognized in the cause of long-term shoulder pain.
- The technique of the repair of a PTRCT, which was always debatable, has became more controversial with new repair techniques in recent years.
- The suture-bridge technique has sparked the controversy over the potential impact of this trend on the retear rate and healing process following an arthroscopic rotator cuff repair.
- The purpose of this study was to evaluate the functional outcome and retear rate of an arthroscopic conversion of PTRCT to full-thickness rotator cuff tear (FTRCT) and a suture-bridge repair.
- The hypothesis was that retear rates in this population would be lower than full-thickness tears and single row techniques.
- Based on a very low re-tear rate, with post-operative stiffness being the much more significant problem especially with PTRCTs our unit has implemented a change in the rehabilitation addressing these issues.

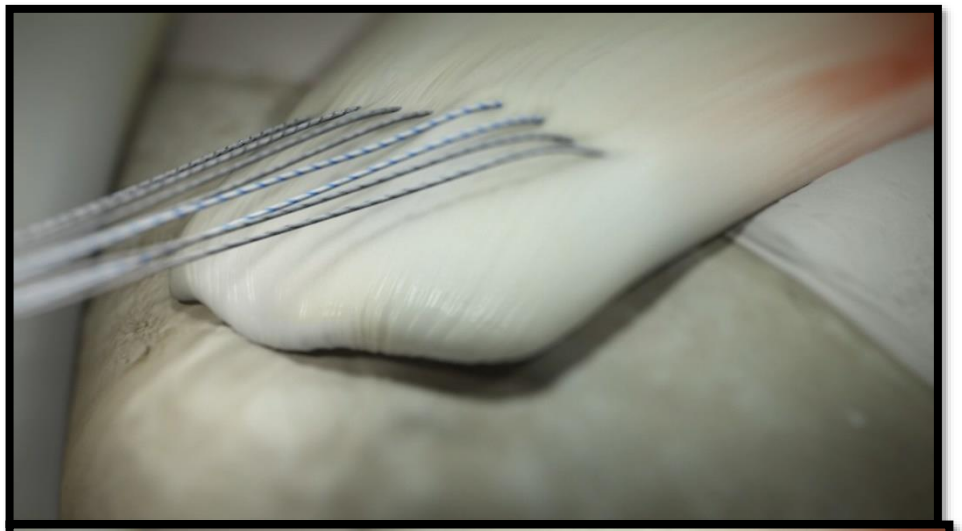
Methods

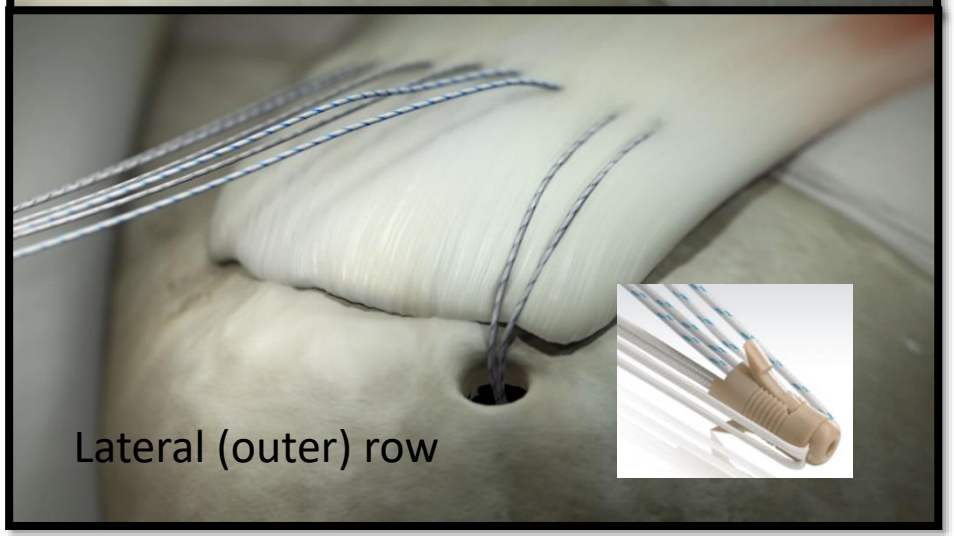
- Sixty-two patients with confirmed PTRCT that required an arthroscopic rotator cuff repair during the period between 2012 and 2020 with completed serial ultrasound examinations at weeks 6, 12 and 26 postoperatively were included. The time point for examination of cuff integrity was six months, chosen on the basis of in vivo animal studies of rotator cuff repair healing process. Functional clinical scores were assessed by Constant score, Western Ontario Rotator Cuff Index (WORC) and Oxford score.
- Intraoperative findings were noted and evaluated. Details were retrieved from the Socrates Orthopaedic Outcomes Software database. Surgical procedures were performed by the same experienced senior surgeon (MH). All procedures were performed in the lateral decubitus position.
- The joint was routinely examined to detect any articular lesions and assess the supraspinatus tendon to confirm the PTRCT. Acromioplasty was not performed. A thorough debridement of degenerative tendon was perform.



All patients had undergone a suture bridge repair technique. A triple-loaded suture anchor was placed at the medial aspect of the supraspinatus footprint, at the middle of the anteroposterior length of the footprint and the sutures were passed through the medial portion of the tendon. Then without tying the sutures, they were fixed to lateral anchors as the standard configuration of our repair. 1 – 2 free-sutures passed through the tendon in a horizontal mattress suture configuration and then attached to the lateral row .







Methods

3 Protocols are employed in this practice following rotator cuff repairs

Minimal Tension Repair

- Phase 1: Passive Motion weeks -4
- Phase 2: Protection and Active Motion (weeks 4-10)
- 4 weeks introduce active assisted movement

LOW TENSION REPAIR

- Phase 1: Passive Motion weeks -6
- Phase 2: Protection and Active Motion (weeks 6-12)
- 6 weeks introduce active assisted movement

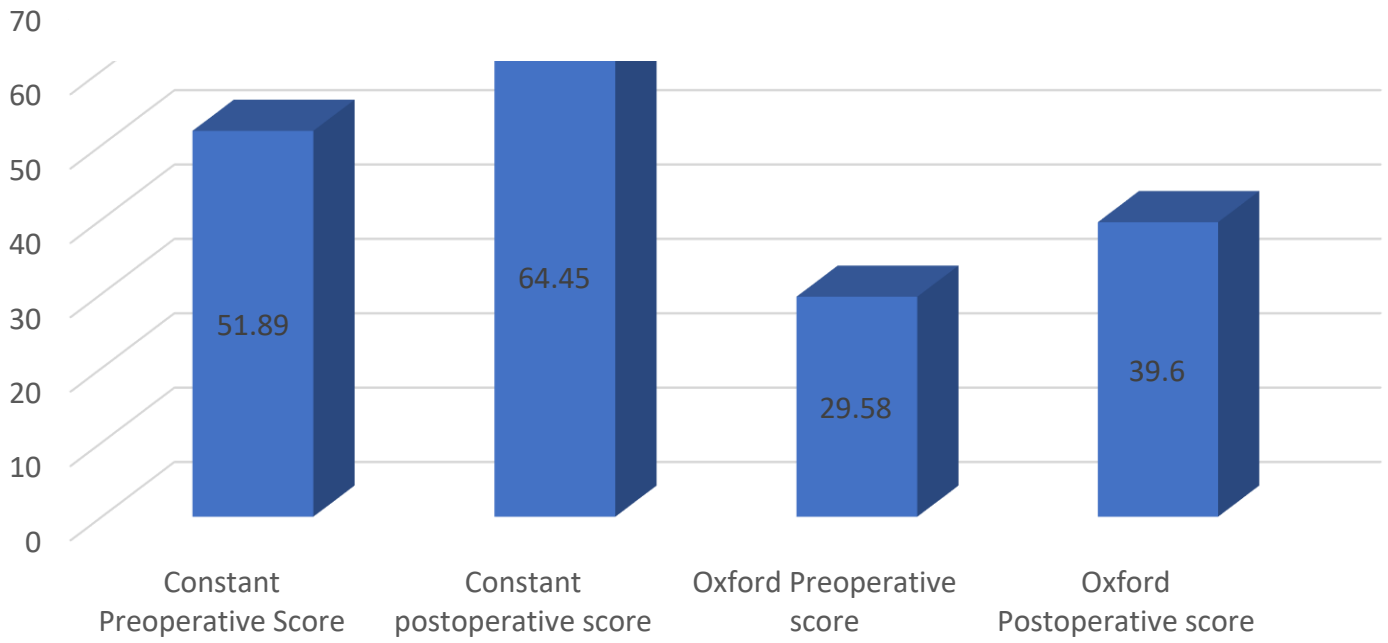
HIGH TENSION REPAIR

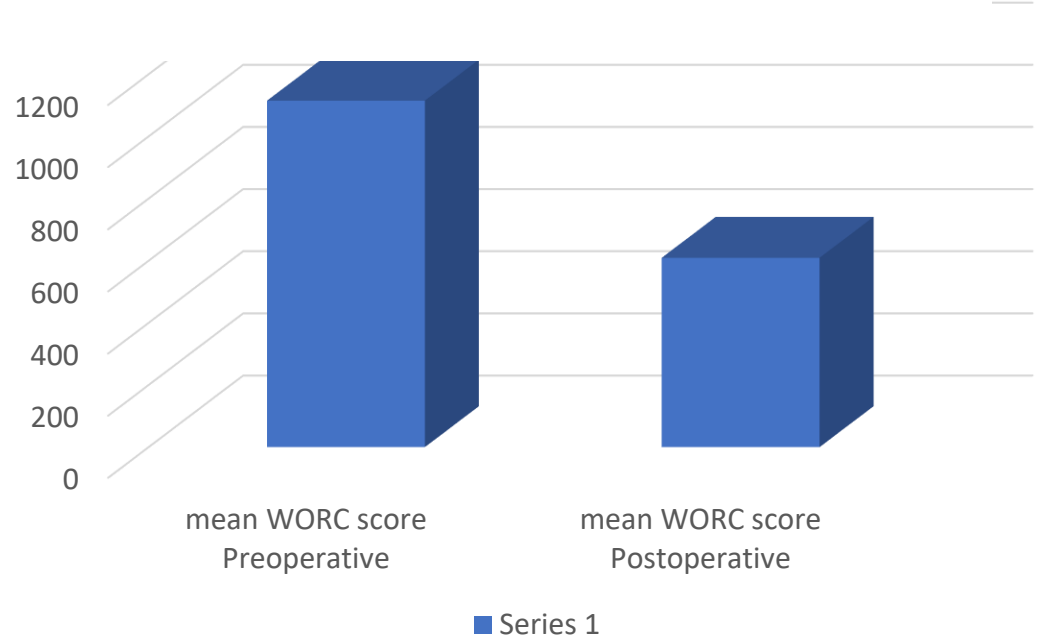
- Phase 1: Passive Motion weeks -8
- Phase 2: Protection and Active Motion (weeks 8-12)
- 8 weeks introduce active assisted movement

As PTRCTs, due to their nature, are repaired with minimal tension, all patients in this series underwent the **Minimal Tension Repair protocol.**

Results

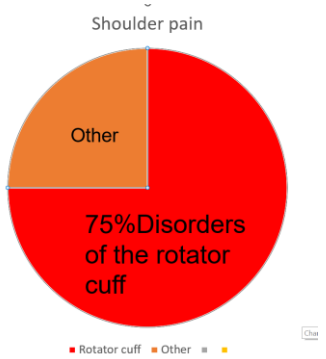
- 60 patients were included in this study. The mean age was 57 years old
- The mean Constant score significantly improved from 51.89 preoperatively to 64.45 at week 26 postoperatively.
- The mean Oxford score significantly increased from 29.58 preoperatively to 39.60 at week 26 postoperatively.
- The mean WORC score significantly improved from 1115 preoperatively to 609.2 at week 26 postoperatively.
- 60 patients (96.77%) had an intact repair on ultrasound at week 6 and 26. Two patients (3.23%) had a PTRCT at week 6 and two patients (3.23%) had a FTRCT at week 26. The overall rate of retear was therefore 3.23%





Discussion

- Although studies have demonstrated approximately 75% of people with shoulder pain are due to RCTs, Making a precise diagnosis is one of the hardest aspects of management of PTRCTs.
  - The accuracy of ultrasonography vs MRI remains is controversial
  - One study concluding both methods underestimated rotator cuff tear size by about 33%.
  - *“No method was able to determine the size of partial-thickness rotator cuff tears “*
- Many studies have demonstrated PTRCTs are often missed.



- PTRCTs are known to have a more significant role than previously recognized in the cause of long-term shoulder pain. (Thangarajah). The identification of even small tears has become increasingly important .
- MRI’s are not accurate at assessing the size of PTRCT’s. Ultrasound has been shown to be superior for these patients.
- Paradoxically , PTRCTs tend to be more painful and disabling than full-thickness tears (FTRCTs).

Discussion

- PTRCTs are more common in younger patients who are more likely to have symptoms than the older generation from RC tears and the prevalence in males was significantly greater in the 50s and 60s than females, and prevalence of tear in heavy labour, was greater than that of unemployed people (Minagawa et al).
- Therefore PTRCTs cause a substantial economic costs due to
  - increased demands on health care,
  - impaired work performance,
  - substantial sickness absence
  - early retirement or job loss
- Therefore the rehabilitation of PTRCT repairs needs to optimize to provide a safe but early return to employment.

Discussion

- In a study looking at the timing of repairing PTRCTs, they also noted was a very low incidence of retear. However, they did note superior functional outcomes in the delayed repair group compared with the immediate repair group . This compromise in functional outcomes is not due to structural integrity but due to the postoperative pain and stiffness.

- From a surgical technique point of view, arthroscopic thorough debridemnt of the degenerative tendon and conversion of PTRCT to FTRCT followed by a double row suture bridge repair technique has provided functional significantly improvements in all three functional scores (Constant, Oxford and WORC) and low rates of retear.
- The short-term clinical and functional outcomes of this study are similar with other studies on repair of PTRC.
- However our retear rate is lower compared to most other studies, which reported a mean retear rate of 10.9%.
- The primary objective of the study was to assess retear of the surgical repair following a conversion to FTRCT. These results suggest that this technique is a highly effective treatment option to be considered when a surgical repair of a PTRCT is required

Conclusion

- Partial thickness rotator cuff tears (PTRCTs) cause a substantial economic costs to individuals and society and therefore a repair needs to optimize a safe but early return to employment.
- With the overall rate of retear of only 3.23% despite early rehabilitation, the issues with repair of PTRCTs is more the problems with pain and stiffness following the surgery than retear.

This suggests it is safe to commence early range of movements exercises, immediately after the surgery and these people can return to suitable work duties earlier than our average 60 plus year old full thickness repair patients.

Conclusion

Further research is underway to assess the safety of accelerated rehabilitation protocols with strengthening exercises around 10 weeks after surgery in what we describe as :

Minimal Tension Repair

- Phase 1: Passive Motion only weeks 0-4
- Phase 2: Protection and Active Motion (weeks 4-10)
- Phase 3: Early strengthening (weeks 10 – 24)
- At phase 3 workers can commence careful returning to manual labour

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