

Early Versus Delayed Rehabilitation After Arthroscopic Rotator Cuff Repair

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INTRODUCTION

- In the United States, it is estimated that over 270,000 rotator cuff (RC) repair surgeries are performed each year.
- However, rate of postoperative defect and insufficient healing still remains at 20-90% of all repair cases. Some of the factors that affect the surgical outcomes include:
 - Patient's age, comorbidities and preoperative status
 - Repair technique
 - Rehabilitation protocols
- Currently, there is no standard rehabilitation protocol established for RC repairs – it still remains as gray area for orthopedic surgeons whether or not to start the patient on rehabilitation immediately following the surgery, or on a delayed schedule after period of immobilization.
- Therefore, our study is a systematic literature review of 3 randomized trials that compares clinical outcomes on early vs. delayed rehabilitation protocol in patients s/p arthroscopic RC repair.
- Outcomes were assessed with: visual analog pain scale (VAS) score, American Shoulder and Elbow Surgeons (ASES) score, constant score, Simple Shoulder Test (SST), Range of Motion (ROM) of the shoulder, RC strength, imaging studies.

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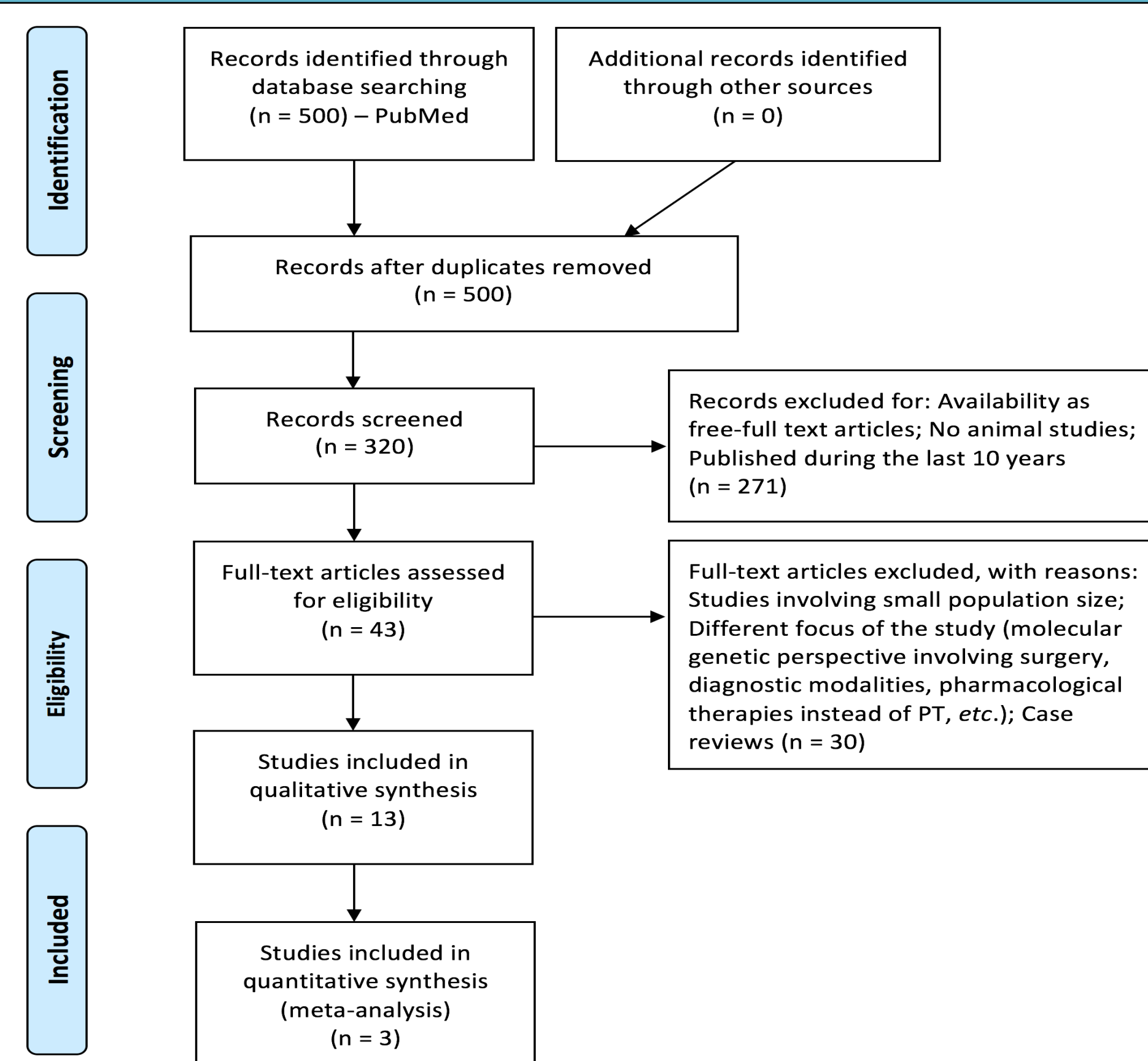
Population	Patients s/p arthroscopic RC repair for a full-thickness tear
Intervention	Early rehabilitation protocol immediately following surgery
Comparison/Control	Delayed rehabilitation protocol initiated at 4-6 weeks post-operatively following a strict immobilization
Outcome	Return of RC function and tendon healing as assessed with ROM of the shoulder, SST, constant, VAS and ASES scores, and imaging study

PATIENT SCENARIO & CLINICAL QUESTION

JC is a 21 year old male collegiate swimmer who recently underwent an arthroscopic rotator cuff repair for a full thickness tear of the right supraspinatus muscle. His primary concern is to be able to participate in the U.S. Olympic Team Trials that are being held next summer. He wants to know which rehabilitation protocol (early versus delayed) will give him the best clinical results, tendon healing rate and return of normal rotator cuff function.

In patients s/p arthroscopic rotator cuff repair, does early rehabilitation protocol immediately following surgery produce better tendon healing and regain of function in comparison to delayed rehabilitation protocol?

METHODS



RESULTS

	Study 1 Keener et al.	Study 2 Cuff et al.	Study 3 Kim et al.
Study Design	Prospective randomized trial	Randomized controlled trial	Randomized controlled trial
Year Published	2014	2012	2012
Journal Published In	Journal of Bone and Joint Surgery	Journal of Shoulder and Elbow Surgery	The American Journal of Sports Medicine
Sample Size	124	68	105
Level of Evidence	1	1	1

Study 1: "Rehabilitation Following Arthroscopic Rotator Cuff Repair"

Objective: To compare clinical results and tendon healing rates following arthroscopic rotator cuff repair utilizing two distinct rehabilitation protocols (early versus delayed).

Results: All measured outcomes, except active external rotation, were significantly improved compared to baseline in both rehabilitation groups. The traditional (early) rehabilitation group had significantly better active elevation and external rotation at three months postoperatively. There were no significant differences in functional scores, active motion, and shoulder strength between rehabilitation groups at later time points.

Study Critique: Subject attrition was an issue. Study was underpowered. At-home exercises were unsupervised. Patient satisfaction was not evaluated.

Study 2: "Prospective Randomized Study of Arthroscopic Rotator Cuff Repair Using an Early Versus Delayed Physical Therapy Protocol"

Objective: To evaluate patient outcomes and RC healing after arthroscopic repair using a postoperative physical therapy protocol with early passive motion compared with a delayed protocol that limited early passive motion.

Results: Both rehabilitation groups showed similar improvements in preoperative to postoperative ASES and SST scores. At 6 months, the early range of motion (ROM) group demonstrated a greater average forward elevation compared to the delayed ROM group. At 1-year postoperative assessment, no statistically significant differences were found in rotator cuff healing, range of motion, or patient satisfaction between the two rehabilitation groups.

Study Critique: Lacked statistical power. At-home exercises were unsupervised. Movement restrictions were not documented.

Study 3: "Is Early Passive Motion Exercise Necessary After Arthroscopic Rotator Cuff Repair?"

Objective: To elucidate whether early passive motion exercise affects functional outcome and tendon healing after arthroscopic rotator cuff repair.

Results: All 105 patients completed minimum of 1-year follow-up evaluations. For all the evaluation criteria including 3 ROM and 3 functional tests, data collected from 6-month and 1-year follow-up were used to make comparisons. It was found that there were no significant differences between the two groups for all the evaluation criteria. Imaging studies done at a minimum of 1 year following surgery revealed that healing of the repaired RC was seen in 88% of patients in the early motion group and 82% of patients in the delayed motion group.

Study Critique: Patients were recruited from 2 different sites that employed 2 different surgeons and researchers from each location. This raises a concern for interobserver discrepancies.

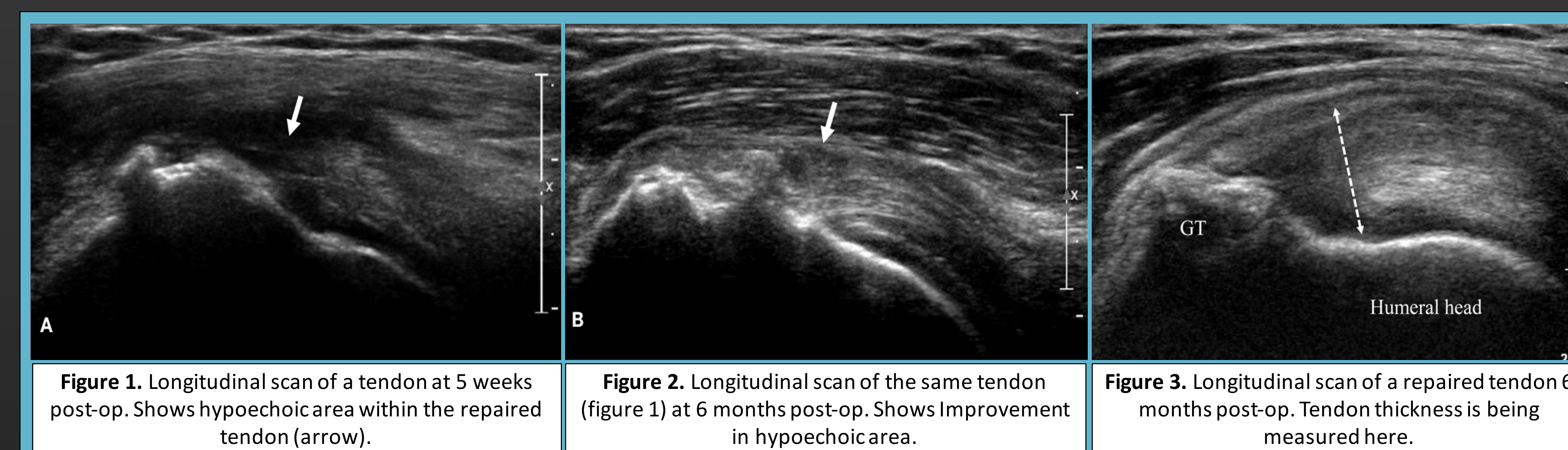


Figure 1. Longitudinal scan of a tendon at 5 weeks post-op. Shows hypoechoic area within the repaired tendon (arrow).

Figure 2. Longitudinal scan of the same tendon (figure 1) at 6 months post-op. Shows improvement in hypoechoic area.

Figure 3. Longitudinal scan of a repaired tendon 6 months post-op. Tendon thickness is being measured here.

CONCLUSION

Our analysis of early vs. delayed rehabilitation after arthroscopic rotator cuff repair revealed:

- No significant difference in subjective functional scores
 - ASES
 - SST
 - VAS
 - Relative constant score
- No significant difference in shoulder range of motion
 - Elevation
 - External rotation
 - External rotation and abduction
- No significant difference in rotator cuff strength
 - Abduction
 - External rotation
- No significant difference in ultrasound findings between groups

Important to note:

Although no statistical difference was found between the two rehabilitation groups, it should not be assumed that immobilization does not lead to shoulder stiffness or that early motion does not impair tendon healing. Further studies are needed to draw these conclusions.

Recommendations for future studies:

Larger sample size is needed. Close monitoring of at home exercises and movement restrictions may help prevent non-compliance and enforce strict adherence to the assigned rehabilitation protocol.

CLINICAL RECOMMENDATIONS

JC is a young college athlete s/p arthroscopic rotator cuff repair who needs to be able to swim at his full capacity next year. Based on our analysis, either rehabilitation protocol, early passive range of motion or a period of early immobilization, is equally safe and effective after surgical rotator cuff repair. It is important that JC is aware of the risks and benefits of each protocol. Ultimately, the decision will be left up to JC and what works best with his lifestyle and schedule.

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