



QUESTION | I AM HAVING DIFFICULTIES WITH THE MANAGEMENT OF A PATIENT PRESENTING WITH STIFFNESS AFTER AN ARTHROSCOPIC ROTATOR CUFF REPAIR. IT HAS BEEN TEN WEEKS SINCE THE REPAIR AND HE HAS LIMITED PASSIVE EXTERNAL ROTATION AND FORWARD ELEVATION. I AM NOT SURE HOW HARD TO PUSH HIS RANGE OF MOTION, AND HE HAS CONCERNS ABOUT NOT IMPROVING. ANY ADVICE WOULD BE APPRECIATED.

ANSWER | When rotator cuff repairs were performed with open surgery, post-operative stiffness was a significant problem. Due to the high incidence of stiffness after open surgery, a general principle of early motion was adopted. A well-respected shoulder surgeon reflected this philosophy in a statement in 1985: “The use of physiotherapy is no longer controversial. Early passive range of motion exercises of the shoulder both prevent adhesions and protect the repair”.¹

The introduction of arthroscopic rotator cuff surgery, along with basic science research, has changed both the way stiffness is viewed and how it is managed. Recent research suggests that the inflammatory response is higher after *open* rotator cuff repair than after *arthroscopic* rotator cuff repair. Shinoda et al² performed a randomized trial of arthroscopic vs. open repairs and found a 3-fold increase in interleukin-6 levels post-operatively in the open repair group. In addition, passive range of motion may actually increase post-operative adhesions. In a rat model of rotator cuff repair, Peltz et al³ showed that immediate passive range of motion actually led to increased stiffness compared with continued immobilisation. Sonnabend et al⁴ evaluated rotator cuff healing in a primate model. Maturation of tendon-bone healing did not occur until 12-15 weeks, suggesting that the repair should be protected for this amount of time. In order to maximize healing and avoid stiffness, basic science research supports an arthroscopic repair, followed by an initial period of immobilisation, and protecting the repair for at least 12-15 weeks.

Stiffness after rotator cuff repair is usually a transient problem and resolves with time. In a review by Denard et al.⁵, they found the incidence of transient stiffness to be 10%. In their study, stiffness was defined as “resistant” if it did not improve and required capsular release. The incidence of resistant stiffness was 3.3%. An arthroscopic capsular release resulted in resolution of range of motion in all cases.

Stiffness may even be a positive factor in healing of the rotator cuff after repair. Parsons et al.⁶ evaluated the incidence of stiffness after a rehabilitation protocol of 6 weeks immobilisation after arthroscopic rotator cuff repair. 23% of their patients had a transient stiffness (forward elevation less than 100 degrees and ER less than 30 degrees). Of these patients, 70% had an intact repair on MRI compared to only 36% intact in the non-stiff group. Patients with transient stiffness had a similar range of motion to the non-stiff group at one year. In a study by Huberty et al⁷, 24 patients or 4% developed resistant stiffness after arthroscopic rotator cuff repair and required capsular release. At surgery, 23 of the 24 had complete healing of their rotator cuff. Following capsular release, all 24 patients were satisfied with the overall result of their treatment.

My rehabilitation protocol after arthroscopic rotator cuff repair involves a period of six weeks sling immobilisation. I allow passive external rotation only and no forward flexion in the first six weeks. At six weeks, the sling is removed and full passive motion is initiated. Gentle active range of motion is allowed in front of the body and only to shoulder level. Strengthening with therabands begins no earlier than twelve weeks. I explain to all patients that stiffness may develop initially but is usually transient and will resolve at one year. I only offer an arthroscopic capsular release after one year if patients are not satisfied with their range of motion.

In your particular patient, he is stiff at ten weeks. I would continue a gentle range of motion program, being careful not to forcefully stress the shoulder, trying to avoid causing inflammation. I would reassure the patient that stiffness will likely resolve with time and should be normal at one year.

The main goal after arthroscopic rotator cuff repair should be healing of the tendon to bone. Studies have shown improved functional outcomes with rotator cuff healing. Because stiffness is manageable, and may even be beneficial for rotator cuff healing, emphasis should be placed on facilitating healing of the rotator cuff over avoiding stiffness.

Dr Todd Gothelf
Foot, Ankle, Shoulder Surgeon

References

1. Cofield RH. Rotator cuff disease of the shoulder. *J Bone Joint Surg Am* 1985;67:974-979.
2. Shinoda T, Shibata Y, Izaki T, Shitama T, Naito M. A comparative study of surgical invasion in arthroscopic and open rotator cuff repair. *J Shoulder Elbow Surg* 2009;18:596-599.
3. Peltz CD, Dourte LM, Kuntz AF, et al. The effect of postoperative passive motion on rotator cuff healing in a rat model. *J Bone Joint Surg Am* 2009;91:2421-2429.
4. Sonnabend DH, Howlett CR, Young AA. Histological evaluation of repair of the rotator cuff in a primate model. *J Bone Joint Surg Br* 2010;92:586-594.
5. Denard PJ, Ladermann, A, Burkhart SS. Prevention and Management of Stiffness After Arthroscopic Rotator Cuff Repair: Systematic Review and Implications for Rotator Cuff Healing. *Arthroscopy* 2011; 27: 842-848.
6. Parsons BO, Gruson KI, Chen DD, Harrison AK, Gladstone J, Flatow EL. Does slower rehabilitation after arthroscopic rotator cuff repair lead to long-term stiffness? *J Shoulder Elbow Surg* 2010;19:1034-1039.
7. Huberty DP, Schoolfield JD, Brady PC, Vadala AP, Arrigoni P, Burkhart SS. Incidence and treatment of postoperative stiffness following arthroscopic rotator cuff repair. *Arthroscopy* 2009;25:880-890.