

## Case Report

# Full-thickness bilateral rotator cuff tears as a result of a bench-pressing accident: case report and literature review of treatment of bilateral rotator cuff tears

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### ABSTRACT

Rotator cuff injuries are frequent pathologies presenting to orthopedic surgeons. These injuries especially occur among older adults due to intrinsic or extrinsic degeneration. They can however present in young athletes, but as result of different etiologies. Overhead athletes may incur rotator cuff injuries due to repetitive trauma. Bilateral simultaneous traumatic shoulder dislocations have been reported in the literature following acute trauma or weight-lifting activity, but bilateral traumatic rotator cuff tears following bench pressing is an unusual presentation in a young individual. To our knowledge, there has been no previous report describing this injury. This article presents a case of a young male athlete who had bilateral rotator cuff tears after a barbell bench press. Both shoulders were treated operatively in a sequential manner, three months apart, and the patient regained excellent functional status 24 months postoperatively.

**Keywords:** Bilateral rotator cuff tears, Bench-press trauma, Shoulder dislocation, Acute rotator cuff tears

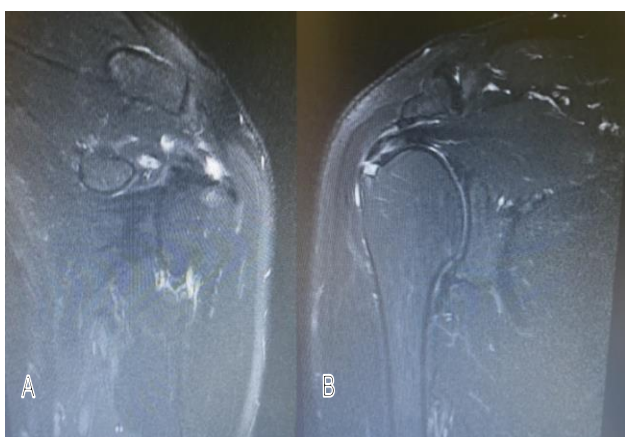
### INTRODUCTION

Rotator cuff injuries can result from direct trauma to the shoulder or simply from wear and tear over time. Their prevalence is notably higher among people aged 50-89 years.<sup>1-6,10</sup> The exact etiology of these injuries is unclear, but multiple risk factors play a role in their development, such as age, overhead activities (e.g., bench press and shoulder press), smoking, diabetes mellitus, and hypertension.<sup>1-9</sup> Overhead athletes are more prone to have rotator cuff tears (RCTs) due to the extra-physiological stress on the shoulder joint. These injuries can present as undersurface partial-thickness cuff tears, intra-tendinous delamination tears, concomitant partial-thickness tears with labral injury, undersurface partial-thickness tears

with capsular injury or insufficiency, partial-thickness bursal-side tears with or without subacromial impingement, or full-thickness RCTs.<sup>11</sup> RCTs can be caused through three mechanisms: tensile overload, primary impingement, and internal impingement. Overhead activities require full abduction and external rotation, and these eccentric movements put extra stress on the rotator cuffs. Over time, the accumulated microtrauma can lead to tears. In addition, this motion subjects the subacromial bursa to inflammation, causing primary impingement.<sup>11</sup> In this case report we present a young healthy male who sustained acute traumatic bilateral rotator cuff tear following bench-pressing injury and reviewed the literature regarding management of bilateral rotator cuff tears.

## CASE REPORT

A healthy 34-year-old man presented to the hospital's outpatient department, reporting severe bilateral shoulder pain following a barbell bench press incident. During this incident, he was trying to resist the weight while descending eccentrically, which caused his shoulders to be forcefully extended while in an abduction position. Upon examination, the patient had significant weakness of the supraspinatus and infraspinatus with intact teres minor and subscapularis function. Stability testing was limited due to considerable pain. A bilateral shoulder magnetic resonance imaging (MRI) was requested, and it revealed full-thickness posterosuperior RCTs as shown in the Figure 1. The decision was made to do diagnostic arthroscopy, repair the torn tendons, and possibly treat any significant intra-articular pathologies of both shoulders sequentially, with 3 months between surgeries. The patient attended follow-up at the clinic over 24 months and has been doing well. He has progressed to excellent clinical and self-rated functional recovery.



**Figure 1 (A and B): Coronal proton density fat suppression MRI of the right shoulder showing full thickness supraspinatus tendon tear with signal intensity across mid-substance of tendon measuring around 10 mm suggestive of tendon delamination. Coronal proton density fat suppression MRI of the left shoulder showing full thickness posterosuperior rotator cuff tendon tear involving infraspinatus with extension to supraspinatus 5 mm medial to the footprint insertion.**

## DISCUSSION

Rotator cuff injuries commonly increase with age due to wear and tear over time.<sup>1-6,10</sup> Abate et al found that increasing age and body mass index and repetitive load on the shoulder joint are particularly associated with bilateral RCTs, with injuries associated with repetitive load being more likely to be found incidentally during ultrasound examination.<sup>3</sup> Rotator cuff muscles have been found to work synergistically to stabilize the shoulder joint anteroposteriorly during bench pressing exercises.<sup>5</sup> Although some evidence suggests that acute RCTs do

better than degenerative tears, outcomes are ultimately similar between the two groups.<sup>6,7</sup> Early surgical treatment of acute tears has yielded promising results.<sup>8</sup>

Young athletes, especially weightlifters who perform bench presses, are more at risk of developing RCT due to excessive stress on the shoulder joint. The injuries can be explained through three potential mechanisms: tensile overload, primary impingement, and internal impingement.<sup>4</sup> Previous reports describe bench press-related injuries such as posterior labral tears and shoulder dislocation.<sup>9,10</sup> Among patients presenting with a soft tissue injury in the shoulder, acute traumatic rotator cuff lesions were found to be more common in the older population.<sup>11</sup>

Posterior glenoid labral detachments are also frequently observed in contact athletes. Mair et al hypothesized that these injuries are likely due to the repeated exposure to posteriorly directed shear forces on the shoulder.<sup>12</sup> They also note that contact athletes routinely perform bench pressing, which can exacerbate the symptoms and the likelihood of developing this kind of injury. RCTs can be treated conservatively or operatively. Table 1 presents a summary of published papers regarding bilateral arthroscopic rotator cuff repair, comparing outcomes for both shoulders.

In addition, an unusual injury associated with bench pressing is anterior shoulder displacement. Cresswell et al reported a case of a 33-year-old man who presented to the emergency department after bench pressing with free weights; his injury was treated using conservative management with close reduction, which was favorable after 6 weeks of follow-up.<sup>19</sup> A similar injury was reported by El Rassi et al.<sup>20</sup> In that case, a 27-year-old man presented to the emergency department with pain and a limited range of motion in both shoulders after sustaining an injury a year earlier while using free weights on the bench press. Attempts at closed reduction failed, but the patient refused surgical treatment as he was satisfied with his shoulder mobility.<sup>20</sup>

Some studies have found that staged treatment of RCTs yield results that are comparable to those from a single-staged treatment.<sup>14-17</sup> Cancienne et al found higher revision and infection rates in cases in which patients underwent a single-staged protocol or a staged protocol with a 3-month interval.<sup>17</sup> However, Chu et al found that single-staged treatment was comparable to a staged protocol and had higher patient satisfaction and a shorter treatment period.<sup>18</sup> Bilateral shoulder dislocations in bench-pressing athletes have been seen in multiple case reports, but we believe that acute bilateral RCTs are rare in young, healthy populations. To the best of our knowledge, this case report is the first description of acute bilateral RCTs due to a bench-pressing accident. The patient underwent a staged arthroscopic repair of his torn rotator cuff tendons, which was successful. The patient returned to his activities after a 24-month follow-up period.

**Table 1: Outcomes of single versus staged rotator cuff repair.**

Reference	Demographics	Dominant hand	Surgery	Follow-up
<b>Morris et al<sup>15</sup></b>	11 patients; ages 51-82 years; 3 men and 8 women	Not reported	Arthroscopic repair (staged)	Favorable outcomes in both shoulders
<b>Pak et al<sup>16</sup></b>	10 patients; ages 50-60 years; 8 men and 2 women	Not reported	Arthroscopic repair (single-staged)	Favorable outcomes in both shoulders
<b>Aleem et al<sup>13</sup></b>	55 patients; ages 44-78 years; 40 men and 15 women	50 right-handed, 5 left-handed	Arthroscopic repair (staged)	Favorable outcomes in both shoulders
<b>Rhee et al<sup>14</sup></b>	64 patients; ages 51-68 years; 27 men and 37 women	62 right handed, 2 left-handed	Arthroscopic repair (staged)	Favorable outcomes in both shoulders
<b>Cancienne et al<sup>17</sup></b>	11 079 patients; ages 65-85 years; 5854 men and 5225 women	Not reported	Arthroscopic repair (10 895 staged; 184 single-staged)	Patients who underwent single-staged bilateral arthroscopic RCR <sup>1</sup> and those with staged RCR at <3 months experienced higher rates of revision RCR and infection than those with staged repair at >6 months
<b>Chu et al<sup>18</sup></b>	93 patients; ages 49-65 years; 40 men and 53 women	Not reported	Arthroscopic repair (42 staged; 51 single-staged)	Single-staged RCR showed similar favorable outcomes compared with staged RCR

<sup>1</sup>RCR, rotator cuff repair.

## CONCLUSION

Acute bilateral simultaneous rotator cuff tears are extremely rare injuries among young population as result of bench-press accidents. From our experience, staged treatment resulted in a desired outcome. From the available literature, we found that treating such injuries can be done in a staged fashion or in a single stage with both expected to result in favorable outcomes.

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## REFERENCES

- Jeong J, Shin DC, Kim TH, Kim K. Prevalence of asymptomatic rotator cuff tear and their related factors in the Korean population. *J Shoulder Elbow Surg.* 2017;26(1):30-5.
- Yamamoto A, Takagishi K, Osawa T, Yanagawa T, Nakajima D, Shitara H et al. Prevalence and risk factors of a rotator cuff tear in the general population. *J Shoulder Elbow Surg.* 2010;19(1):116-20.
- Abate M, Di Carlo L, Salini V, Schiavone C. Risk factors associated to bilateral rotator cuff tears. *Orthop Traumatol Surg Res.* 2017;103(6):841-5.
- Milgrom C, Schaffler M, Gilbert S, Holsbeeck VC. Rotator-cuff changes in asymptomatic adults. The effect of age, hand dominance and gender. *J Bone Joint Surg Br.* 1995;77(2):296-8.
- Ogawa K, Yoshida A, Inokuchi W, Naniwa T. Acromial spur: relationship to aging and morphologic changes in the rotator cuff. *J Shoulder Elbow Surg.* 2005;14(6):591-8.
- Fehring EV, Sun J, VanOeveren LS, Matsen 3<sup>rd</sup> FA. Full-thickness rotator cuff tear prevalence and correlation with function and co-morbidities in patients sixty-five years and older. *J Shoulder Elbow Surg.* 2008;17(6):881-5.
- Longo UG, Franceschi F, Ruzzini L, Spiezia F, Maffulli N, Denaro V. Higher fasting plasma glucose levels within the normoglycaemic range and rotator cuff tears. *Br J Sports Med.* 2009;43(4):284-7.
- Cole A, Gill TK, Shanahan EM, Phillips P, Taylor AW, Hill CL et al. Is diabetes associated with shoulder pain or stiffness? Results from a population based study. *J Rheumatol.* 2009;36(2):371-7.
- Gumina S, Arceri V, Carbone S, Albino P, Passaretti D, Campagna V et al. The association between arterial hypertension and rotator cuff tear: the influence on rotator cuff tear sizes. *J Shoulder Elbow Surg.* 2013;22(2):229-32.
- Sørensen AK, Bak K, Krarup AL, Thune CH, Nygaard M, Jørgensen U et al. Acute rotator cuff tear: do we miss the early diagnosis? A prospective study showing a high incidence of rotator cuff tears after shoulder trauma. *J Shoulder Elbow Surg.* 2007;16(2):174-80.
- Economopoulos KJ, Brockmeier SF. Rotator cuff tears in overhead athletes. *Clin Sports Med.* 2012;31(4):675-92.

12. Mair SD, Zarzour RH, Speer KP. Posterior labral injury in contact athletes. *Am J Sports Med.* 1998;26(6):753-8.
13. Aleem AW, Syed UA, Wascher J, Zoga AC, Close K, Abboud JA et al. Functional outcomes after bilateral arthroscopic rotator cuff repair. *J Shoulder Elbow Surg.* 2016;25(10):1668-73.
14. Rhee SM, Kim DH, Kim SH, Jeong HJ, Oh JH. The clinical outcomes and their associated factors in staged bilateral arthroscopic rotator cuff repair. *Arthroscopy.* 2018;34(10):2799-807.
15. Morris BJ, Haigler RE, O'Connor DP, Elkousy HA, Gartsman GM, Edwards TB et al. Outcomes of staged bilateral reverse shoulder arthroplasties for rotator cuff tear arthropathy. *J Shoulder Elbow Surg.* 2015;24(3):474-81.
16. Pak CH, Moon YL, Sim SW, Elsayed MI. Bilateral arthroscopic rotator cuff repair using a single-stage procedure. *Orthopedics.* 2015;38(5):e423-7.
17. Cancienne JM, Denard PJ, Garrigues GE, Werner BC. The relationship of staged, bilateral arthroscopic primary rotator cuff repair timing and postoperative complications. *Am J Sports Med.* 2021;49(8):2027-34.
18. Chu J, Shieh JS, Wu K, Guan H, Roche S, Held MFG et al. Simultaneous or staged bilateral arthroscopic rotator cuff repair: an observational study of intraoperative and postoperative outcomes. *Orthop J Sports Med.* 2021;9(10):23259671211041994.
19. Cresswell TR, Smith RB. Bilateral anterior shoulder dislocations in bench pressing: an unusual cause. *Br J Sports Med.* 1998; 32(1): 71-2.
20. El Rassi G, Hijjawi A, Matta J, Fahs S, Khair OA. Bilateral locked anterior shoulder dislocation in a bench-pressing athlete: case report. *Arch Orthop Trauma Surg.* 2015;135(6):747-9.

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