

# Minimum 2-year patient reported outcomes following fixation of displaced greater tuberosity fractures: A Matched Cohort Analysis

Vail Health IRB #2020-29

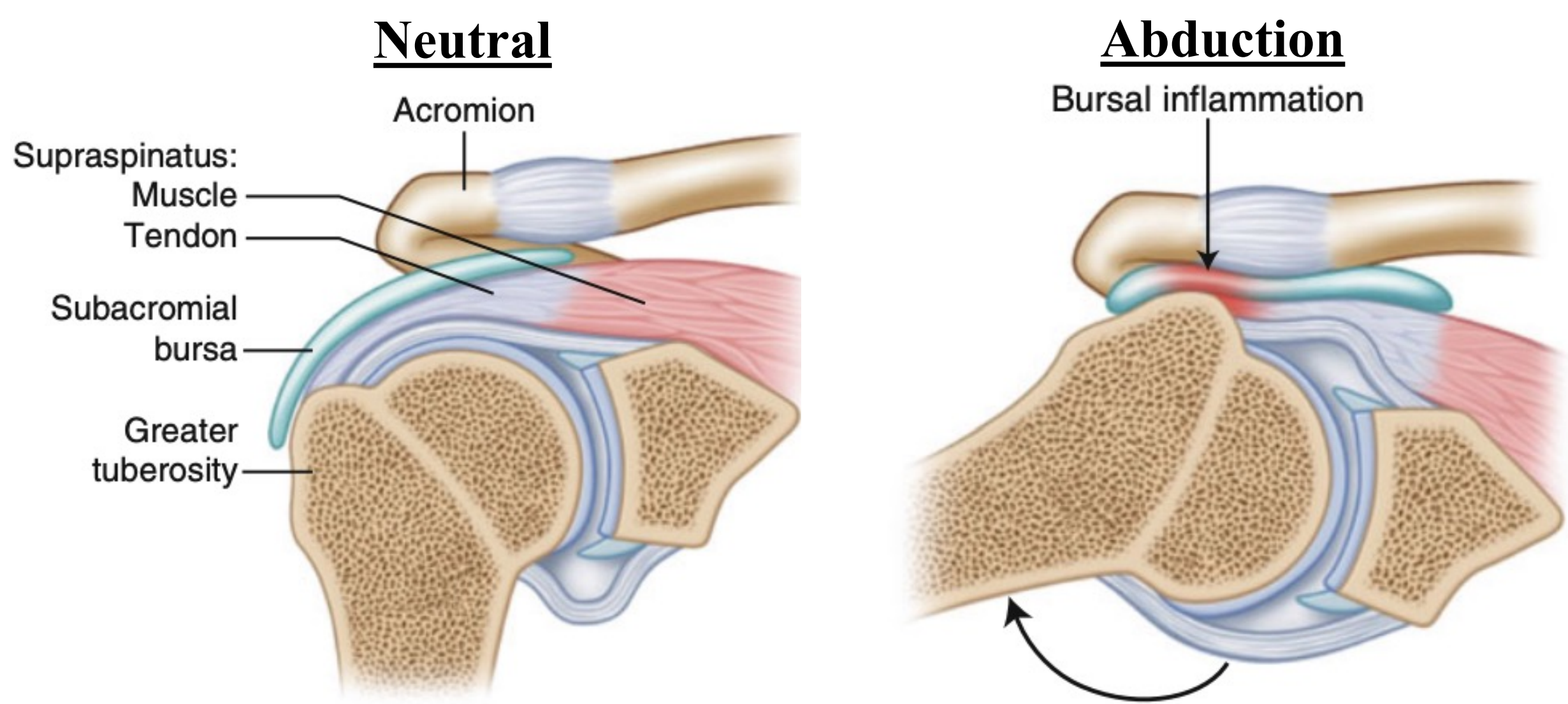
Rakowski DR, Ruzbarsky JJ, Woolson TE, Horan MP, Nolte PC, Millett PJ

Center for Outcomes-based Orthopaedic Research at the Steadman Philippon Research Institute & The Steadman Clinic, Vail, CO, USA

Funding and Conflict of Interest Statement: Financial research support not directly related to this study was received by the Institute from the following: Siemens, Smith & Nephew, Arthrex and Ossur

## INTRODUCTION

- The greater tuberosity is one of the key attachment sites for the rotator cuff tendons
- Isolated greater tuberosity (GT) fractures account for approximately one fifth of all proximal humerus fractures<sup>1,2</sup>
- These fractures are often seen in middle-aged patients after a glenohumeral dislocation or trauma to the lateral shoulder<sup>3-6</sup>
- Surgery is generally indicated for displacement greater than 5 mm or 3 mm in athletes and overhead workers<sup>7,8</sup>
- Operative management aims to restore normal anatomy, prevent subacromial impingement, pain, and shoulder dysfunction<sup>9</sup>
- Outcomes after GT fracture fixation remains relatively unknown



Warth RJ, Millett PJ. Springer 2015.

## PURPOSE

The purpose of this study was to evaluate and compare patient-reported outcomes (PROs) following isolated GT fracture fixation to acute rotator cuff repair (RCR) at a minimum of 2 years

## HYPOTHESIS

We hypothesize that patients who undergo fixation of GT fractures with a double-row technique will have equivalent PROs to those treated for an acute rotator cuff tear

## METHODS

- Retrospective chart review of prospectively collected data
- Included patients aged 18-80 years old who had surgery for a GT fracture or an acute rotator cuff tear from 2006-2018
- Matched 1:3 based on time to surgery
- Minimum 2-year follow-up
- Patient reported outcomes (PROs): SF-12 PCS, ASES, SANE, QuickDASH, and patient satisfaction
- Utilized MCID, SSB, PASS for the ASES score
- Demographic/clinical variables:
  - Days from injury to surgery
  - Sex
  - Age
- Failure defined as:
  - Fracture nonunion
  - Revision surgery



## RESULTS

### GT fracture fixation group

- 12/14 (85.7%) pts with min 2-year f/u (avg: 6.3 y; range: 2-11 y)
- 16.1 days to surgery (range 1-39)
- Pre- to post-op ASES (p=.018) and SF-12 PCS (p=.110)

### Acute rotator cuff repair group

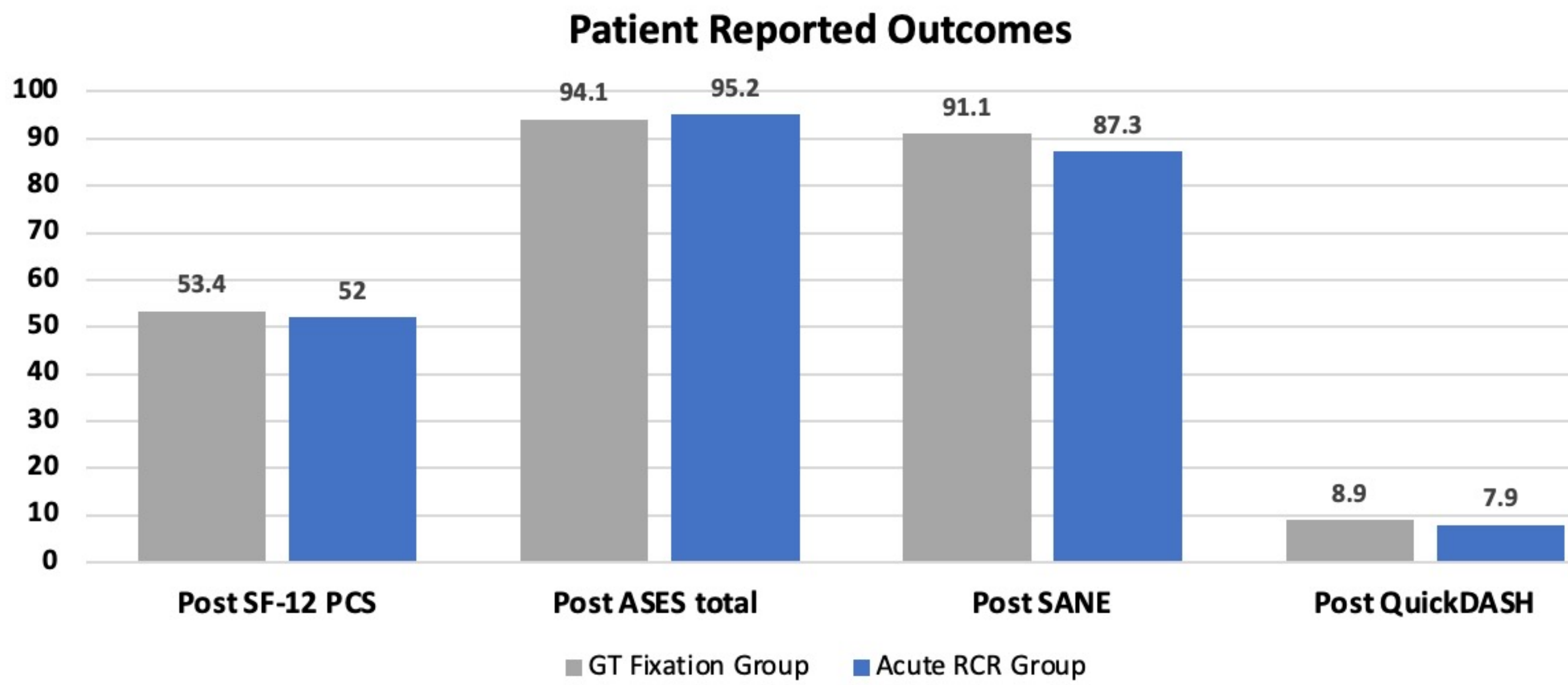
- 39/43 (90.6%) pts with min 2-year f/u (avg: 7.0 y; range: 2-13 y)
- 20.4 days to surgery (range 1-45)
- Pre- and post-op ASES (p<.001) and SF-12 PCS (p<.001)

### ASES Score

	MCID	SCB	PASS
GT Fx Fixation	100% (6/6)	100% (6/6)	91% (10/11)
Acute RCR	100% (25/25)	96% (24/25)	94% (34/36)

## RESULTS

No sig. difference in post-op PROs (All p>.172)



- There was no difference in postoperative PROs between both groups when double-row repairs were performed (All p>.404)
- Two patients (14.3%) in the GT fracture fixation group reported stiffness postoperatively
- One patient (2.3%) in the acute RCR group had recurrent shoulder pain and subsequently underwent revision surgery.

## LIMITATIONS

- Population: the GT group is relatively small and heterogeneous in terms of interventions
- Outcomes: SANE and QuickDASH were not collected until 2010, thus pre- to post-op improvement could not be reported
- Generalizability: This is a sports medicine referral center, thus our patients are generally healthy with low comorbidities

## CONCLUSIONS

- Min 2-yr PROs show high outcome scores whether treated by open reduction and internal fixation or arthroscopic fixation
- Treatment selection should be based on fracture morphology, post-operative goals, lifestyle, and shared-decision making
- The improvements in PROs are similar to those achieved with acute rotator cuff tears that were fixed arthroscopically with RCR

## REFERENCES

- Kim E, Shin HK, Kim CH. Characteristics of an isolated greater tuberosity fracture of the humerus. J Orthop Sci. 2005;10(5):441-4. Epub 2005/09/30. doi: 10.1007/s00776-005-0924-6. PubMed PMID: 16193353.
- Court-Brown CM, Garg A, McQueen MM. The epidemiology of proximal humeral fractures. Acta Orthop Scand. 2001;72(4):365-71. Epub 2001/10/03. doi: 10.1080/000164701753542023. PubMed PMID: 11580125.
- Gruson KI, Ruchelsman DE, Tejwani NC. Isolated tuberosity fractures of the proximal humerus: Current concepts. Injury. 2008;39(3):284-98. doi: <https://doi.org/10.1016/j.injury.2007.09.022>.
- Fakler JK, Hogan C, Heyde CE, John T. Current concepts in the treatment of proximal humeral fractures. Orthopedics. 2008;31(1):42-51. Epub 2008/02/14. doi: 10.3928/01477447-20080101-13. PubMed PMID: 18269167.
- Kim S-H, Ha K-I. Arthroscopic treatment of symptomatic shoulders with minimally displaced greater tuberosity fracture. Arthroscopy: The Journal of Arthroscopic & Related Surgery. 2000;16(7):695-700. doi: <https://doi.org/10.1053/jars.2000.9237>.
- Rouleau DM, Mutch J, Laflamme GY. Surgical Treatment of Displaced Greater Tuberosity Fractures of the Humerus. J Am Acad Orthop Surg. 2016;24(1):46-56. Epub 2015/12/25. doi: 10.5435/jaas-d-14-00289. PubMed PMID: 26700632.
- McLaughlin HL. Dislocation of the Shoulder with Tuberosity Fracture. Surgical Clinics of North America. 1963;43(6):1615-20. doi: [https://doi.org/10.1016/S0039-6109\(16\)37150-X](https://doi.org/10.1016/S0039-6109(16)37150-X).
- Park TS, Choi IY, Kim YH, Park MR, Shon JH, Kim SI. A new suggestion for the treatment of minimally displaced fractures of the greater tuberosity of the proximal humerus. Bull Hosp Jt Dis. 1997;56(3):171-6. Epub 1997/01/01. PubMed PMID: 9361919.
- Platzer P, Kutscha-Lissberg F, Lehr S, Vecsei V, Gaebler C. The influence of displacement on shoulder function in patients with minimally displaced fractures of the greater tuberosity. Injury. 2005;36(10):1185-9. doi: <https://doi.org/10.1016/j.injury.2005.02.018>.