IN PECTORALIS MAJOR RUPTURES, DOES SURGICAL OR NON-SURGICAL INTERVENTION PRODUCE BETTER STRENGTH OUTCOMES: A SYSTEMATIC REVIEW

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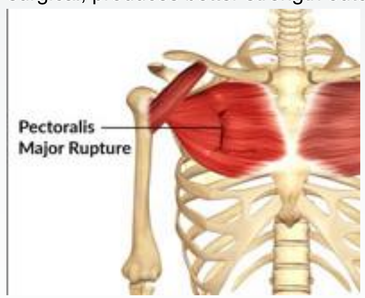
Introduction

In today's American culture, physical fitness and appearance is greatly valued. Weightlifting has been popularized as well as other high level sporting and fitness activities. More uncommon injuries are being noted to include pectoralis major muscle ruptures. Unlike typical musculoskeletal injuries, a well defined standard of care has not been established for pectoralis major rupture. Nonsurgical treatment has been studied with incomplete ruptures and within the geriatric population. Surgical treatment has been researched with an emphasis on which technique provides the best outcomes. For each individual patient there are varying important outcomes such as, return to function, cosmesis, and strength. Strength as an outcome measure is valuable because it is a universal tool that can be used for both prospective and retrospective studies.[4] Strength also seems to be dramatically affected in a negative way causing a significant loss which would lead to reason it is a valuable outcome measure. The basic information presented here regarding pectoralis major rupture leads to reflect on which is the better option, surgical treatment or nonsurgical treatment. An obvious research question emerges: In patients with pectoralis major muscle rupture, which intervention, surgical or non-surgical, produces better strength outcomes?

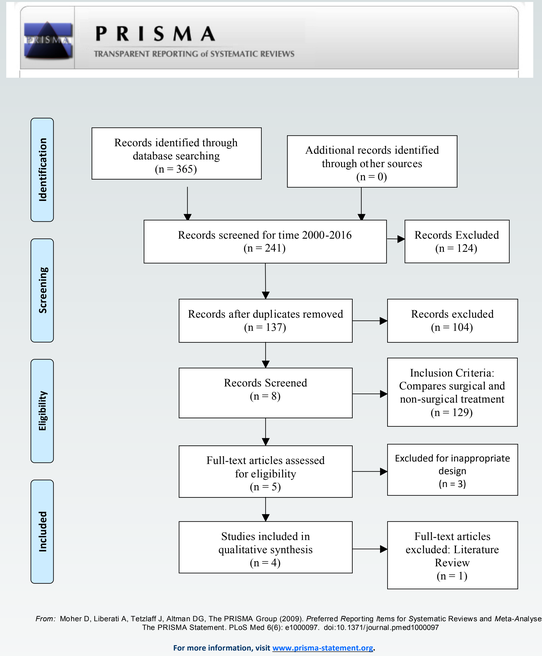


Methods

In February 2016 databases CINAHL, Cochrane, Medline, and SPORTDiscus were searched using the terms, "pectoralis major rupture OR pectoralis major tear AND treatment". Limiting time to 2000-2016 resulted in 241 studies. Removal of duplicates reduced studies to 137. Title and abstract screening reduced the number to 8 studies. These were reviewed full text leading to exclusion of 4 studies.

Methods cont'd

The final 4 studies were assessed for their level of research design and strength of quality using a question tool from the AACPDM. Additionally, studies were assessed for strength outcome measures.



Results

All 4 studies were identified as level IV research according to the Coding Levels of Evidence table found in the AACPDM. Three studies were case series and one was a cohort series. All 4 studies received a quality of study score of 5/7. This score results in studies showing moderate strength of evidence. From the 4 studies reviewed, 48 pectoralis majors had surgical intervention and 44 had nonsurgical intervention. One study reported 6 nonsurgical subjects went on to have surgery after completion of the study. All 4 studies utilized strength testing as an outcome measure. Strength outcomes revealed surgical intervention lead to peak torque of 74-110% of the uninvolved side while non-surgical intervention lead to only 56-75% of the uninvolved side.

Study	Level/Quality	1	2	3	4	5	6	7
2000, Schepsis	IV- case series (5/7)	yes	no	yes	no	yes	yes	yes
2001, Hanna	IV- case series (5/7)	yes	no	yes	no	yes	yes	yes
2010, Pochini	IV- case series (5/7)	yes	no	yes	no	yes	yes	yes
2011, Fleury	IV- case series (5/7)	yes	no	yes	no	yes	yes	yes

Clinical Relevance

The clinical bottom line is that surgical intervention is superior for strength outcomes in complete pectoralis major ruptures. From this systematic review, it was determined that research should not be looking further at surgical versus nonsurgical treatments for complete ruptures. With this so obvious result, any future research should focus on the gap in knowledge and evidence of how varying degrees of partial tear will best respond to surgical versus nonsurgical intervention. A distinction between partial and complete ruptures needs to be determined in order to identify a severity of the rupture. This would lead to the question of what evidence might a physical therapist use to accurately identify patients who should definitively go on for surgery versus those who would best respond to a non-surgical approach to rehabilitation?

Conclusion

The evidence is clear that surgical treatment should be the standard of care for complete pectoralis major muscle ruptures. Especially when regarding the outcome measure of strength. Strength outcome alone shows an 18-35% greater improvement in surgical intervention. Additional subjective outcome measures studied also demonstrated greater outcomes which include cosmesis, pain, and overall satisfaction.

References

1. Schepsis A, Grafe M, Jones H, Lemos M. Rupture of the pectoralis major muscle: outcome after repair of acute and chronic injuries. *Am J Sports Med.* January 2000;28(1):9-15.
2. Hanna C, Glenny A, Stanley S, Caughey M. Pectoralis major tears: comparison of surgical and conservative treatment. *Br J Sports Med.* June 2001;35(3):202-206.
3. de Castro Pochini A, Ejnisman B, Albertoni W, et al. Pectoralis major muscle rupture in athletes: a prospective study. *Am J* Sports *Med.* January 2010;38(1):92-98.
4. Fleury AM, da Silva AC, de Castro Ponchini A, Ejnisman B, Barbosa de Lira CA, dos Dantos Andrade M. Isokinetic muscle assessment after treatment of pectoralis major muscle rupture using surgical or non-surgical procedures. *Clinics* 2011;66(2):312–320
5. Kircher J, Ziskoven C, Patzer T, Zaps D, Bittersohl B, Krauspe R. Surgical and nonsurgical treatment of total rupture of the pectoralis major muscle in athletes: update and critical appraisal. *Open Access J Sports Med* 2010;1:201–205.
6. Bak K, Cameron E, Henderson I. Rupture of the pectoralis major: a meta-analysis of 112 cases. *Knee Surg Sports Traumatol Arthrosc.* March 2000;8(2):113-119.
7. Manske R, Prohaska D. Pectoralis major tendon repair post surgical rehabilitation. *N Am J Sports Phys Ther.* February 2007;2(1):22-33.
8. El-Essawy M, Al-Jassir F, Al-Nakshabandi N. Magnetic resonance imaging assessment of the pectoralis major muscle rupture. *Saudi Med J.* August 2010;31(8):937-938.