

An Engineer Patient's Perspective of Pectoralis Major Muscle Injuries

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Abstract

Pectoralis muscle injuries are fairly rare resulting in relatively limited information being available that often contains conflicting data. The target audience for this paper is for patients that have been diagnosed by a doctor confirming a pec tear and are in the process of determining the best course of treatment. The goal is to provide additional insights to patients dealing with this injury from the author's research that is not provided in the current medical literature. A review of patient feedback logged on an active online forum seems to indicate the percentage of people that benefit from surgery is less than reported in the medical literature. In reporting surgical success rates the medical literature does not take into account a significant percentage of conservative treated patients achieve similar results which in effect lowers the reported surgical success rates. A key element that is never discussed in the medical literature is the substantial psychological impact patients dealing with this injury experience which can often overshadow the actual physical impacts.

Introduction and Background

The author is a 54 year old retired research engineer that sustained a pectoralis muscle tear at the musculotendinous junction March 2011. This paper is a summary of findings the author discovered through research and conversations with surgeons and other patients. The intent is not to duplicate information that is currently available but to provide addition insights not readily available in one place. In particular, the symptoms and diagnosis for determining if one has a pectoralis muscle rupture/tear is not addressed. The target audience for this paper is for patients that have been diagnosed by a doctor confirming a pec tear and are in the process of determining the best course of treatment. It is strongly encouraged readers also read the following two papers which provide a compressive overview of the common causes of this injury, symptoms, diagnosis and treatment options: Petilon et al¹ and Provencher et al². Both of these papers can be bought online for around \$35 each.

Online Forum

An excellent resource for patients is the ongoing online forum on pec tears³. This forum was started in 2006 and contains over 1,800 posts from close to 100 pectoralis muscle rupture patients. It is a very informative resource chronicling symptoms and recovery from a patient's perspective which also allows patients to post questions/concerns that are answered by other patients. Here are a few high level stats on forum postings from its beginning in 2006 through June 2011:

- Posts from 97 pec tear patients
- Of these 97, there were 57 patients that provided enough information to allow grouping into the following:

- 15 people (26%) did not have surgery
- 21 had a successful surgery
- 21 had an unsuccessful surgery

So for the 42 people that had surgery there was a 50% success rate. This is most likely somewhat skewed as people with bad results are more likely to post results than those with successful results that quickly move on with their lives. It was not possible to determine why so many surgeries failed but two issues did emerge:

- Inappropriate, lack of adherence to or over aggressive rehab by patient and/or physical therapist resulting in re-tear early in recovery
- Lack of experience and/or skill of surgeon, 50% of failed surgery patients reported their injury being exactly the same after surgery

This highlights the importance of finding a good surgeon with experience with this injury and strictly following an appropriate rehab protocol.

The satisfaction levels reported on this forum appear to be quite different than those reported in the medical literature. According to the literature surgery produces good to excellent results for 90% of patients and conservative treatment for 26%-53% of patients. There are many factors at play but the key one is the definition/criteria of success, i.e. what constitutes an “excellent” result. The four main criteria most researchers use are ROM, pain, strength and appearance. As some papers have pointed out and was also apparent on this forum ROM is a non issue as full ROM returns regardless if surgery is performed or not, so not a good criteria for judging the success of surgery. Near full strength returns for a large percentage of people who chose conservative or had delayed surgeries. So in most cases this leaves us with just two criteria to judge the success of a surgery: pain and appearance which of course are both very subjective. Many patients claimed their surgery was not successful due to appearance, i.e. they still have balling of and/or a divot/indentation in their pec. This is an important consideration, only a small percentage of surgical patients regain pre-injury appearance and symmetry of their pecs. Appearance and symmetry are often improved and for some greatly improved with surgery but cosmetic defects are rarely completely eliminated.

Here is another consideration, as document in the medical literature and also confirmed on the forum somewhere around 30%-40% of people will have good to excellent results without surgery. Many people have surgery within the first few weeks after their injury not really knowing how they would have progressed without surgery. So for 30%-40% of the people that had surgery it is likely they would have had similar results without surgery which is not taken into account in the medical literature.

And then there is the placebo effect or what the author calls surgery rationalization. Someone that goes through the ordeal of surgery and the brutal recovery will have a strong motivation for believing it was beneficial even when the benefit return of the surgery may have been minimal or nonexistent

Other key observations compiled from posts on this forum:

- Both surgical and conservative patients regain full range of motion (ROM). This was also documented in several medical papers. For those that have surgery it typically takes 12 weeks after surgery to regain full ROM and for those that do not have surgery around 6 weeks after injury. People with long chronic injuries (2+ years) and/or required a graft take longer after surgery to regain full ROM and may lose a small percentage of ROM (less than 5%).
- Approximately 20% of patients experience elbow stiffness and pain after surgery which eventually goes away.
- 85% of patients experience shoulder issues (frozen shoulder, shoulder locking up/clicking) while recovering from surgery which is the focus of most rehab protocols. For most patients this goes away 3-6 months after surgery but for a few patients (~10%) it lingered for over a year and possibly indefinitely but this could not be determined due to lack of follow up posts. This was more prevalent with chronic repairs.
- A large percentage of conservative patients (and surgical patients before surgery) feel a momentary strain/pain/ache/twinge in pec and tendon with certain movements, especially quick motions. This is often more prevalent in the first few months after the injury and subsides for most over time but only a few claimed it completely went away. This was cited by several long term chronic patients as one of the main reasons they decided to have surgery years after their injuries. A small percentage of surgical patients also reported having this symptom.
- A small percentage of people have felt a pulling on their bicep tendon when doing certain movements and exercises, in particular flies. This has occurred in patients before surgery and after surgery. The author experienced this about a month after his injury and then it completely subsided about a month later.
- 2 surgical patients were worse off after surgery, one with reduced ROM/pain and the other with constant pain, highlighting that though rare (1%-2%) surgeries can result in a worsened condition.

- Many patients have difficulty coping with this injury psychologically making comments like ‘it was constantly on their minds’, “not feeling complete” and “feeling they were not fully together”. Quite a few of the long term chronic patients claimed these thoughts and feelings were their main reason for deciding to have the surgery even though they were function well, had regained most of their strength and had no pain.

Key Findings

Here is a list of the key findings assembled from all sources (medical literature, online forum, conversations with doctors and other patients) the author believes would be of most interest to pec tear patients:

- MRIs are useful in helping to determine the location and extend of the tear but only provide a limit amount of information that can often be misinterpreted. Surgery is the only way to be 100% sure of the location and extend of a tear.
- 65% of tears are tendon avulsions (tendon pulled off the bone), 27% occur at the musculotendinous (MT) junction and the last 8% is spread across various other types of ruptures that are fairly rare.
- MT junction tears are much more difficult to repair than tendon avulsions and the medical community is divided on if they can effectively be repaired. Most surgeons feel MT tears should be treated conservatively while a few have successfully performed surgical repairs.
- Tendons regenerate/reattach at a rate of about 15% per month. This is why it is so critical to limit movement/activity for the first month after surgery as the only thing holding things in place for the first month are the sutures. This regeneration rate can be used to help determine the rate of safely returning to weight bearing exercises. For instance, at 3 months it would be advised to limit yourself to less than 45% ($3\text{ mo} \times 15\% \text{ per month}$) of your pre-injury lifting capabilities. This is why most doctors advise not to return to full activities until 6 months after surgery at which time your tendon would be approximately 90% healed.
- As we age, tendons become more brittle, less vascular and degenerate. The tendons of a 50+ year old are much less likely to respond well to surgery than a 25 year old. Most surgeons consider 55 being the upper limit for surgery being advisable/useful due to poorer tendon quality resulting in reduced ability to heal/recover and a higher risk of re-rupture.
- Acute repairs (within 6 weeks of injury) are easier to perform and typically have better results than chronic repairs (those performed more than 6 weeks after injury). This produces somewhat of a dilemma since many patients (30%-40%) can have excellent recoveries without surgery but they will not know if that is going to be the case 3-6 months after their injury.

- Several repairs on injuries that were 1-5 years old and one that was over 10 years old have been performed resulting in improved appearance and some strength gain for 50% of the patients. A few patients reported achieving 70%-80% of their pre-injury strength after a chronic repair but it was not clear if this was an improvement or how much of an improvement this was over their post-injury strength before surgery. Only a few surgeons will attempt such late repairs.

Conclusions

Due to the low occurrence of pectoralis muscle ruptures they are still not very well understood. There have only been about 200 cases reported in the medical literature with most studies only containing 10-20 patients and many with less than 10. Due to the small number of cases reported, often anecdotally, and the lack of control of the large number of variables involved, including:

- Location and extend of tear
- Amount of muscle retraction
- Amount of scarring
- Variations in each patient's anatomy and physiology
- Experience and skill of surgeon
- Rehab protocol and patient's adherence to it
- Experience and skill of physical therapist

an analysis producing definitive conclusions concerning the benefits of surgery is just not possible. The vast majority of the medical literature claims surgery produces good to excellent results for 90% of patients but a review of an on-going forum of close to 100 patients indicates only 50%. Several patients on the on-line forum mentioned their surgeons indicated surgery was a 50/50 proposition. The author also heard this from 3 different surgeons. The medical papers are likely somewhat biased and the authors of these papers could have cherry picked the best cases for surgery. The truth is most likely somewhere in the middle at 70%, this being an average, assuming a skilled/experienced surgeon and the patient diligently follows an appropriate rehab protocol. Younger patients (less than 35) with partial tendon avulsions would probably approach the 90% where older patients (35+) with MT junction tears would be closer to 50%. The medical literature indicated conservative treatment produces good to excellent results for 30%-40% of patients. This was also indicated on the online forum. Many surgeries are performed within weeks of injury before it can be determined how the patient would have recovered with conservative treatment. This needs to be taken into account when determining the percentage of patients benefiting from surgery, which would result in a lower percentage. Often conservative treated patients receive little or no guidance concerning rehab. This was the case for the author. Given many may have partial tears and the slow rate of tendon regeneration it would seem it would be beneficial for them to follow the same rehab protocol as surgical patients, in particular keeping their arm stationary for the first month and then slowly increasing weight bearing exercises to match tendon regeneration rates (15% per month). One medical

study⁴ that provided the same rehab protocol for both conservative and surgical patients resulted in virtually no strength difference between the two treatment approaches indicating it may be possible to achieve even higher success rates with conservative treatment by following a controlled rehab protocol similar to surgical patients.

References

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