Latissimus Dorsi Injuries in Throwing Athletes
Baseball Sports Medicine

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Disclosures

- Arthrex: Consultant
- DJO: Education
- Smith Nephew: Education
- American Journal of Sports Medicine
- Journal of Bone and Joint Surgery
- Journal of Shoulder and Elbow Surgery
- Orthopaedic Journal of Sports Medicine
- The Physician and Sports Medicine
- Cleveland Clinic Journal of Medicine

Latissimus Dorsi Anatomy

- Fan-shaped muscle
- Broad origin thoraco-lumbar spine and iliac crests
- Inserts as a flat tendon on proximal humerus
- Rotates on itself
  - Superior thoracic fibers attach distally
  - Inferior fibers become proximal tendon
Teres Major Anatomy

- Teres major tendon nearly confluent with latissimus
- Approximately 1 cm posterior to latissimus on humerus
- Difficult to isolate from each other clinically
- Nearly identical function to latissimus

Latissimus Dorsi: Function/Mechanics

- Humeral adduction, extension, internal rotation
- Adducts elevated arm against resistance ("pull down")
- Compresses inferior scapula when arm elevated

- Low activity during wind-up, early cocking
- Activity increases during late cocking to 100-150% MMT
  - Eccentric firing
  - Forms "anterior wall" along with subscapularis and pectoralis major
  - Provides anterior support to shoulder

DiGiovine, et. al. 1992

DiGiovine, et. al. 1992
Latissimus Dorsi/Subscapularis Function

- Latissimus and subscapularis activity much greater in professional vs. amateur athlete (Gowan, et al, 1987)

Latissimus Dorsi/Subscapularis Function

- Latissimus and subscapularis activity has been shown to be lower in unstable vs. stable shoulders during acceleration (Glousman, et al, 1988)

  • Cause or effect?

Latissimus Dorsi Injury Clinical Presentation

- Acute pain in upper arm/posterior axilla, most intense at ball release and follow through
- Most do not have prodromal symptoms
- Physical findings:
  - Tenderness along lat. in axilla
  - Pain with resisted pull-down
  - Asymmetry in axillary fold with rupture
  - Ecchymosis
MR Imaging

• Standard shoulder protocol does not include latissimus
• Initial “shoulder” MRI can be non-diagnostic
• If injury suspected, must broaden image field

Schickendantz, et al, AJSM 2009

Case Study #1

• 26 y.o. Major League RHP
• 2 years s/p TACS, labrum and cuff debridement
• Sudden, sharp axillary pain throwing a bullpen
• PE showed tenderness along latissimus; pain with pull down; no noticeable defect
• MRI: complete rupture of latissimus @ musculo-tendinous junction

Case # 2
Case # 2

Combined Subscapularis & Latissimus Injury

Edema & hemorrhage in proximal latissimus (blue arrow), also subscapularis (pink)

Treatment

- No throwing for 6 weeks
- Physical therapy/rehabilitation; NSAIDS prn
- Maintain rotator cuff, scapular rotators, trunk and general conditioning
- Begin interval throwing program (ITP) when symptom free and "normal" exam
- Typically 10-12 weeks before return to play
Case #1

- Follow-up:
- Returned to throwing approx. 12 weeks after injury
- Performed well as a reliever
- No further injuries
- Traded to NL team; no further problems

Case #2: RB

32 y.o. left handed MLB pro relief pitcher

Sharp pain along posterior medial upper arm after throwing one pitch; no axillary pain; was removed from the game

On exam painful with end range elevation /ER
Pain and guarding with ADD > IR

MRI the next day
Developed ecchymosis in axillary region
ICE-ICE-ICE x5 days
Started pool day 5
Started PRE Day 7
Plyometrics Day 12
ITP Day 14
Mound Day 21
Rehab Start Day 28
Major league ready 35 days

Published Literature
• Latissimus dorsi and teres major tears in professional baseball pitchers: a case series.
  • *Semin Arthrosc.* 2010;16(5):205-207.
  • 10 professional pitchers
  • 5 latissimus dorsi; 4 teres major; 1 combined injury
  • Non-operative treatment
  • 100% return to play (9/10 same level); 9/10 within 3 months
  • 1 recurrence 6 months after return to play
• Long term effects unknown
Published Literature

  - Management and outcomes of latissimus dorsi and teres major injuries in professional baseball pitchers.
  - Nagda SH, Cohen SB, Noonan TJ, Raasch WG, Ciccotti MG, Yocum LA.
  - 16 pitchers
  - Non-operative treatment
  - 94% return to play; mean time to pitching 62 days
  - 2 recurrences

Operative Management

- Traumatic Rupture of the Latissimus Dorsi Levine J, Savoie F.
  Orthopedics 2008; 31(8): 799-801
  - Case study of a 42-year-old man recreational athlete who injured his shoulder while water skiing
  - Immobilizer x2 weeks then sling
  - PROM started at 2 weeks, AROM and light stretching at 5 weeks
  - Eight weeks postoperatively, he resumed recreational weightlifting.
  - Eleven weeks postoperatively, motion, strength, and function were normal and equal to the opposite extremity.
  - The patient had resumed all activities (heavy weightlifting, tennis, water skiing, and nonprofessional triathlon participation)

Operative Management

  - 2 cases reported, 35 year old water skier and 24 year old baseball player. Time to surgery was 7-8 weeks each
  - Both were able to return to prior level of activity
  - Sling x6 weeks
  - Started PROM in FF/A&D to 90 at 2 weeks, AAROM at 4 weeks, AROM including into ER at 6 weeks
  - Started light strengthening at 6 weeks except adduction/R delayed until 8-10 weeks
  - Baseball player initiated throwing at 12 weeks
Operative Management

Open Repair of an Acute Latissimus Tendon Avulsion in a Major League Baseball Pitcher


- 29 year old Major League pitcher
- Open repair 8 days after injury
- Sling only x2 weeks
- Started PROM at 2 weeks to 6 weeks. Progressed to AROM/isometrics then light stretching from week 6 to 12
- Initiated light throwing at 12 weeks post op
- Normal spring training activity at 30 weeks
- At 2 years his performance was consistent with prior years

Conclusions

- Latissimus dorsi injury should be considered in the differential diagnosis of shoulder pain in the throwing athlete
- Standard field of view shoulder imaging protocols are unlikely to be adequate; a wide field of view is necessary
- The majority of athletes with incomplete tendon injuries and intra-muscular injuries can return to competitive throwing by 3 months after injury
- The role for surgery is becoming clarified; Complete tendon avulsion with retraction should be considered for repair