Pectoralis major transfer subscapularis irreparable

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Plan

• literature
• Indications contraindications
• Surgical technique
  anatomical aspects nerve ...
• Results complications
Historical perspective


Historical perspective

- Steven J. Klepps, MD, Charles Goldfarb, MD, Evan Flatow, MD, Leesa M. Galatz, MD, and Ken Yamaguchi, MD, St Louis, Mo, and New York, NY
  Anatomic evaluation of the subcoracoid pectoralis major transfer in human cadavers

- Ariane Gerber, MD, Philippe Clavert, MD, Peter J. Millett, MD, MSc, Thomas F. Holovacs, MD, and Jon J. P. Warner, MD
  Split Pectoralis Major and Teres Major Tendon Transfers for Reconstruction of Irreparable Tears of the Subscapularis; Techniques in J Shoulder & Elbow Surgery 5(1):5–12, 2004

- J. Mack Aldridge III, MD, Todd S. Atkinson, MD, and William J. Mallon, MD, Durham, NC
  Combined pectoralis major and latissimus dorsi tendon transfer for massive rotator cuff deficiency
Indications

- Subscapularis tear retracted at the level glenoid atrophic
- Fatty infiltration grade III/IV
- Anterior instability associated
- Subscapularis tear + SS tear
contraindications

• Antero superior instability
Subscapularis and SS tear
loss of Coraco acromial arch
compromise deltoide anterior
• Intraoperative possibility to repair
Combined tendon transfer

- *Pectoralis major + Teres major*
  - complete avulsion of subscapularis
  - PM to sup part / TM to inf part

- *Pectoralis major + Latissimus dorsi*
  - massive rotator cuff deficiency
  - PM to subscap / LD to infraspinatus
  - no pseudoparalysis
  - AH space no arthritis
  - stable shoulder (CA arch)

Difficult to predict successful
Surgical technique

- Beach chair position
- Extended delto-pectoral approach 12 - 15 cm
- Cephalic vein retracted laterally
- Conjoined tendon gently retracted medially
• Exposure of the entire PM tendon

• Arm Abd-IR: release of the subcutaneous adhesions
The upper and lower borders of the PM tendon are identified at the insertion on the humerus.

- The 2 heads of the muscle are identified medially and separated.

- ...Splitting of the tendon!!!
Superposition of the 2 heads of the tendon

...the tendon of the sternal head correspond at the superior part (twist of the tendon) *Posterior lamina*

... the tendon of the clavicular head correspond at the inferior part *Anterior lamina*

- Ant. humeral circumflex vessels are cauterized
Biceps tendon is located at the upper part of PM tendon in the bicipital groove

Tenotomy or tenodesis
The inferior head of PM (Sternal head) is harvested from the humerus.

Laterally +++ With periostum to reinforce tendinous

We don’t detach clavicular head
2 Neuro-vascular pedicule

• Lateral pectoral N  12.5cm from Humeral insertion
• Medial pectoral N  8.5 cm from Humeral insertion

2 cm from the inferior border +++
Bulky muscle
Strong tendon 6 x 2.5 cm
Short excursion
Nerves

Musculo cutaneous nerve                      Axillary nerve

The sternal head of the PM is passed underneath the Conjoined tendon, upper to MC and Axillary nerves
Musculo cutaneous nerve

The distance between the coracoid process and the main trunk of the musculocutaneous nerve as it entered the coracobrachialis averaged 6.1 cm.

The distance between the proximal branch and the coracoid process averaged 4.4 cm.

Branch for coracobrachialis

MC nerve should not only be palpated but also visualized on transfer to verify that adequate space is present for passage superficial to the nerve.
Pectoralis Major Tendon Transfers
Above or Underneath the Conjoint Tendon in Subscapularis-Deficient Shoulders

An in Vitro Biomechanical Analysis

By Gerhard G. Konrad, MD, Norbert P. Sudkamp, MD, Peter C. Krenz, MD, John T. Jolly, MS, Patrick J. McMahon, MD, and Richard E. Debski, PhD

Investigation performed at the University of Pittsburgh, Pittsburgh, Pennsylvania

with a pectoralis major tendon transfer underneath the conjoint tendon, the line of action of the transferred tendon is closer to that of the subscapularis muscle.
PM tendon transfer can cover antero-superior cuff tears

Upper part is sutured to the Supra Spinatus, arm in neutral rotation

The tendon is not fixed to the lesser tuberosity

- Place the tendon under adequate tension
- Possible repair of the native tendon
Split PM (SS + sup part Subscap) + TM (inf part Subscap)
Which results?

- **Resch and Col 2000**
  12 patients  26.9 to 67.1% Cst score
  No anterior instability
  Belly press test negative 50%

- **Josht and Col 2003**
  30 patients  47 to 70% Cst score
  loss ER 66 to 50°  AAE 119 to 132°
  Strength 1.8 to 3.6

NO INFLUENCE ABOVE / BEHIND conjoined Tendon
Which results?

• **Galatz and Col 2000**
  14 patients
  Indications: *AS lesion No CA Arch AS instability*
  AAE 28.4 to 60°
  Loss ER 11 P satisfied/ 3 P unsatisfied

• **Aldridge M and Col 2004**
  11 patients
  Indications: massive cuff deficiency (Subscap/ SS IS)
  *LDorsi posteriorly PMajor anteriorly*
  AAE 42 to 86°
  ER 0 to 13°
Lift off test -

Belly press test -

Lift off test -
Latissimus dorsi Post (GT)  
And  
Teres major Ant (LT)  

RCT  
SS + IS  
Subscapularis
Pectoralis major for scapula winging in serratus anterior palsy

Sternal Head Of PM

Fascia lata graft
Or semitendinosus or gracilis tendon
Serratus anterior palsy literature
