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Surgical Therapy of Pectoralis major Rupture

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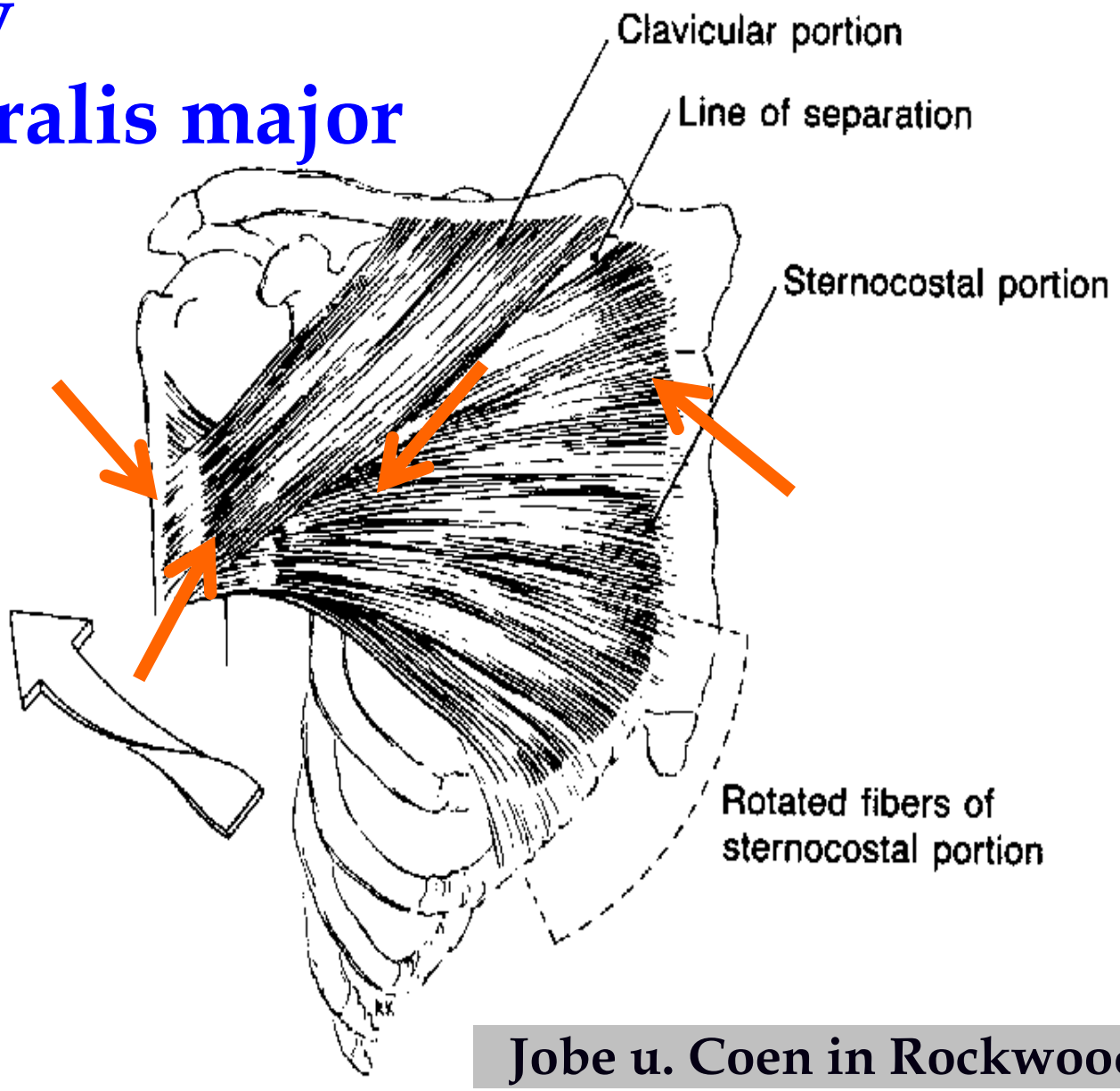
Purpose

- Pectoralis major rupture is n ot very common, only 300 cases are documented in the literature.
- surgical therapy ist judged differently
- which results are achieved by surgical therapy compared with conservative treatment? Which factors are influencing the results?

Objectives

- mechanism of injury
- location of rupture
- size of rupture
- conservative vs operative treatment
- time of operation
- acute/chronic rupture
- demand of the athlete

Anatomy
M. Pectoralis major



Jobe u. Coen in Rockwood et al. 2004

Methods: Patient selection

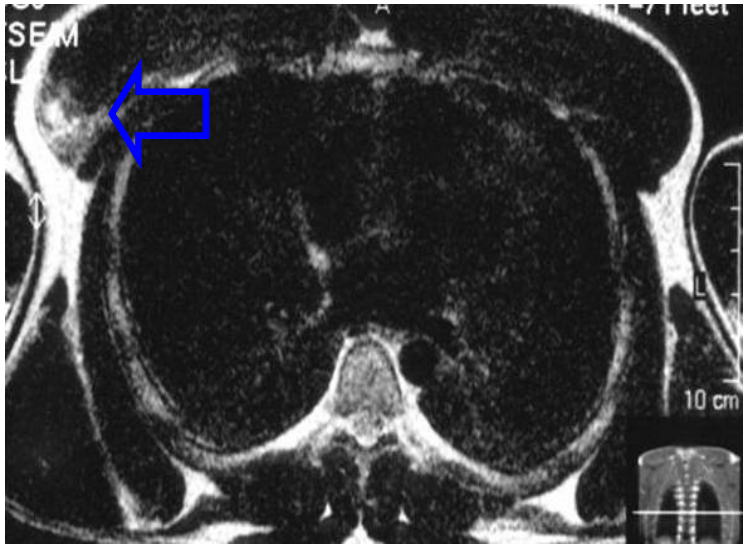
- 105 Pectoralis major Ruptures in 92 patients
- 1997-2008, Follow up > 1 Jahr
- all male, 52 right side
- 101 Power athletes (96 Bodybuilding, 5 Powerlifting)
- 7 ruptures on both sides at different time
- 6 Reruptures

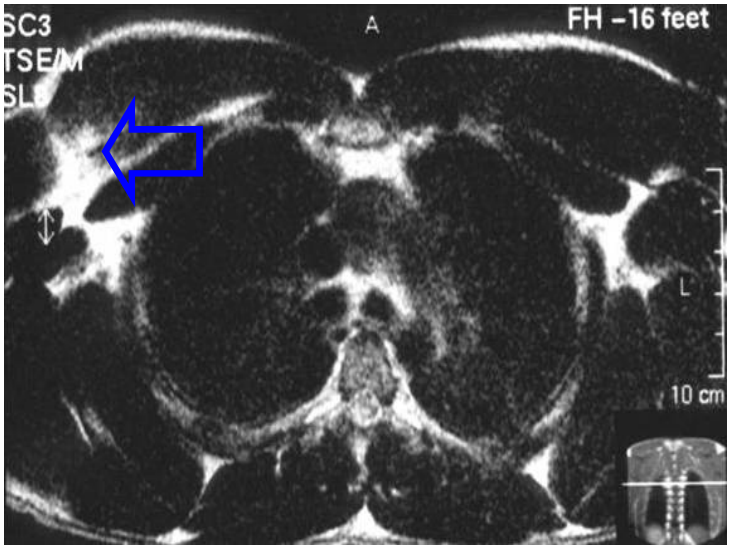
Methods: Demographics

- age ∅ 34,3 years (16-53)
- height ∅ 180 cm (167-205)
- weigth ∅ 105 Kg (74-148)
- period of training 14,1 years (3-29)
- 4,1 times / week (3-6)

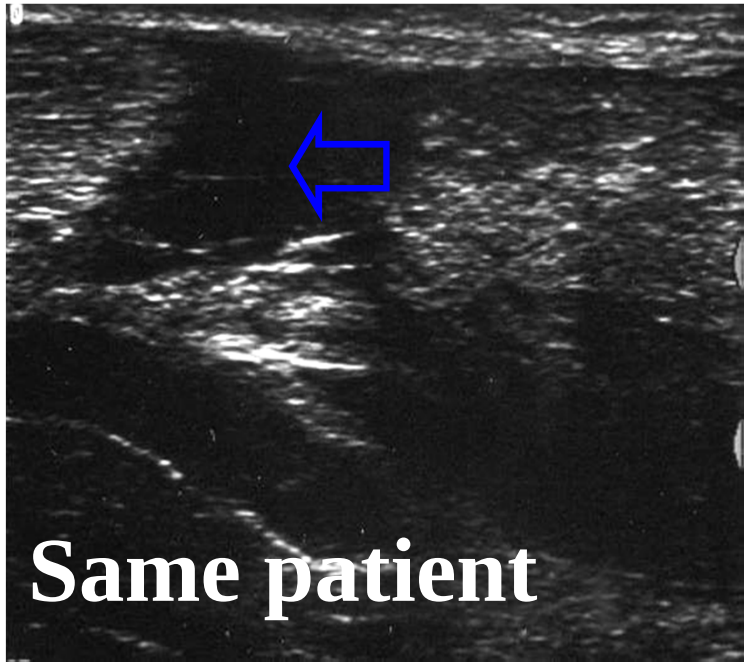
Methods: Diagnostics

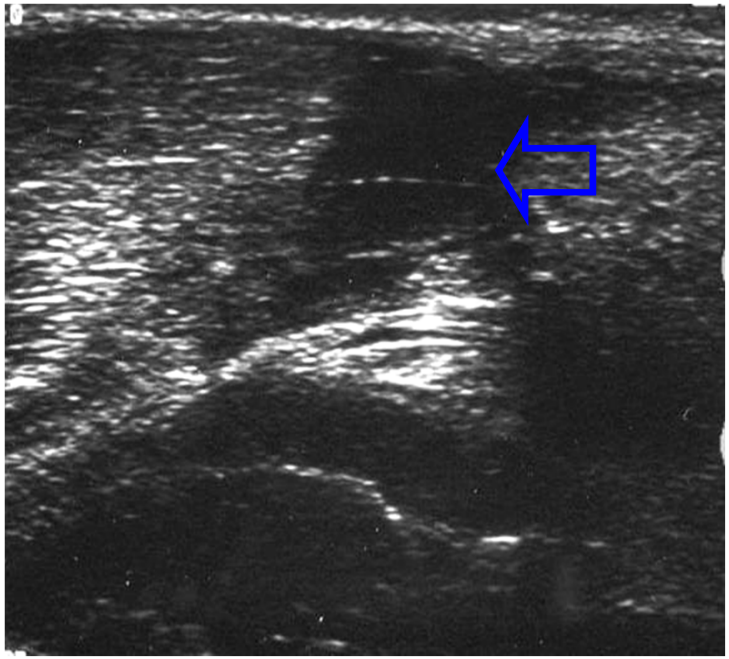
- clinical aspect
- „shape sign“
- Ultrasound
- MRI





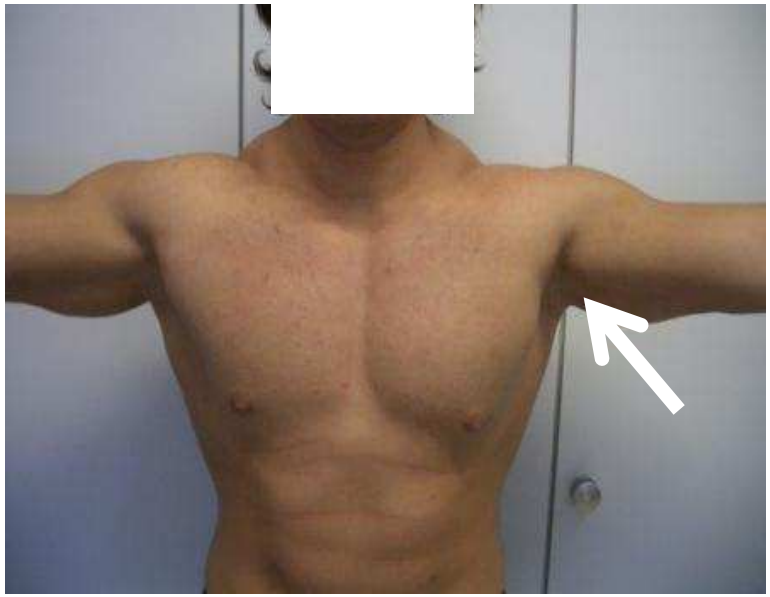
MRI

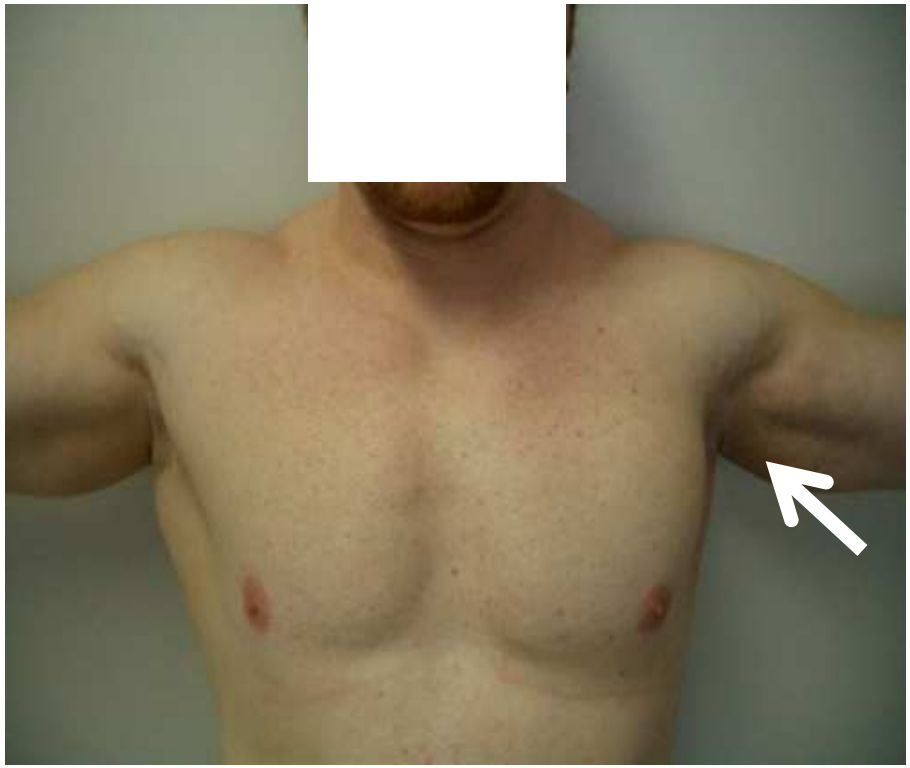




Ultra-sound

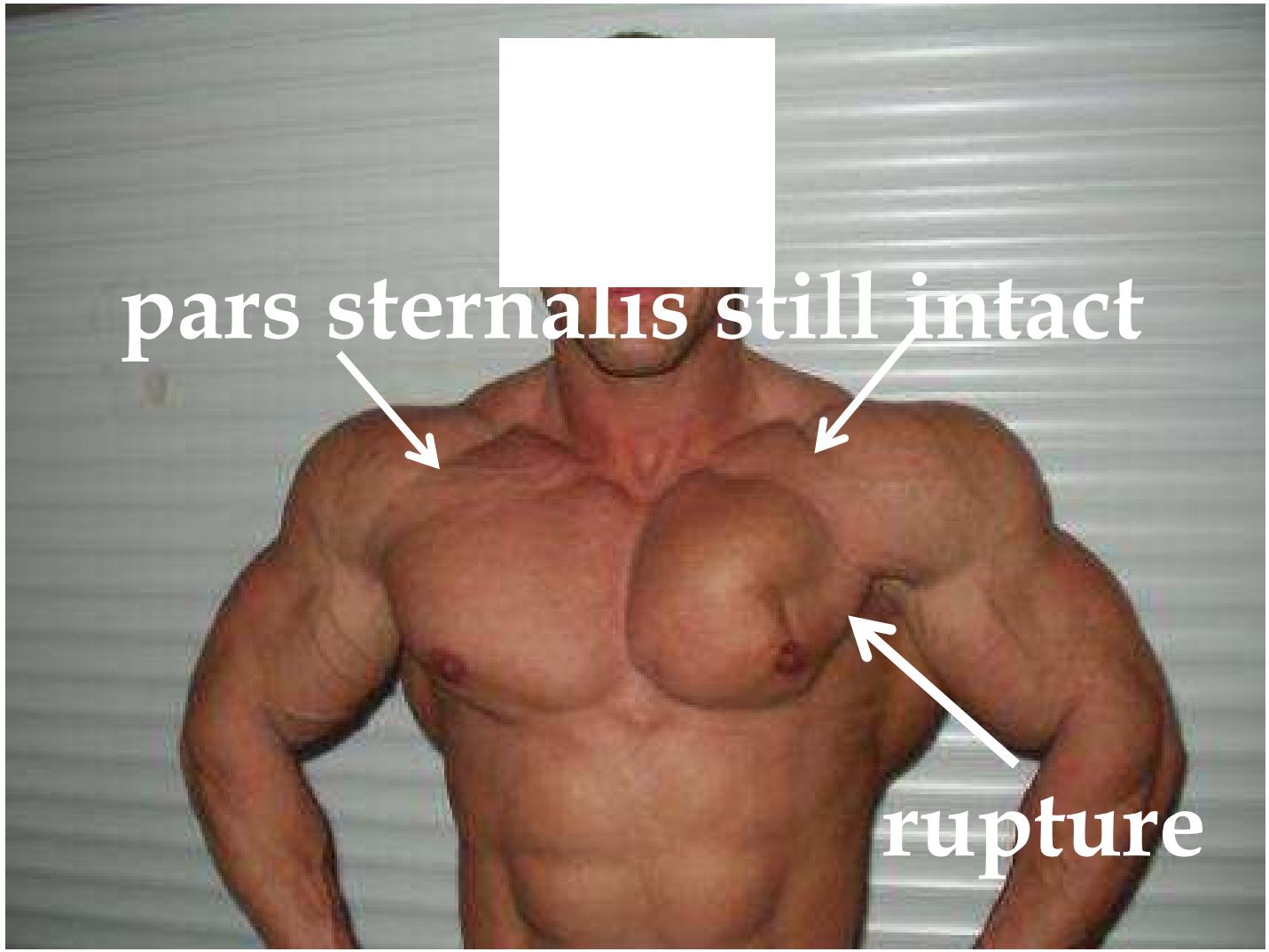
clinical aspect



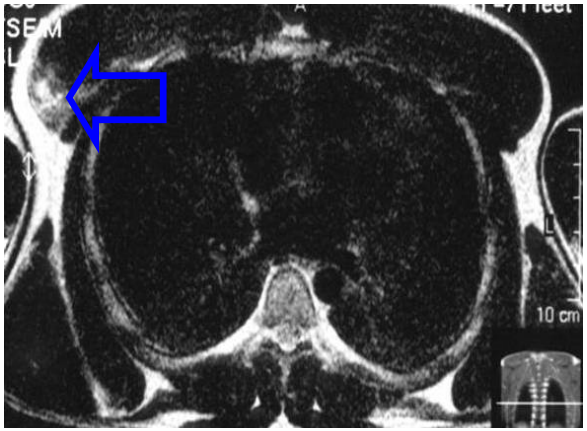


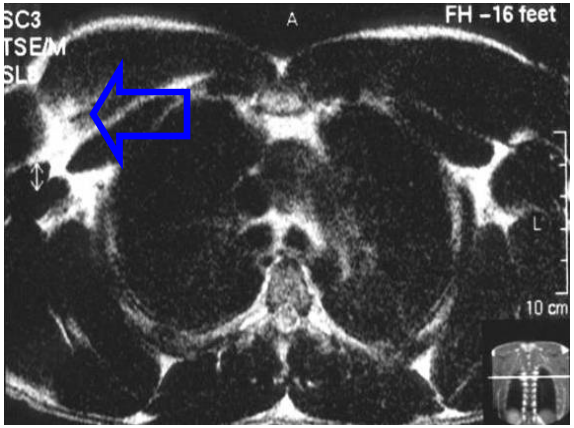
„*Shape sign*“ loss of the shape of lateral aspect of the pectoralis in the 90° ABD arm in case of rupture

Clinical aspect: Location of the rupture

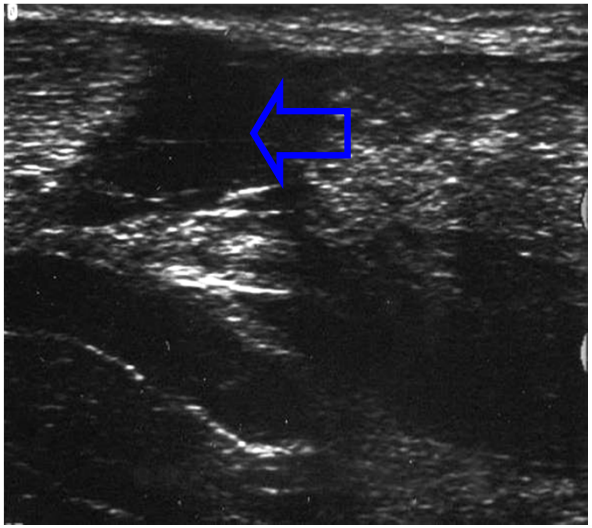


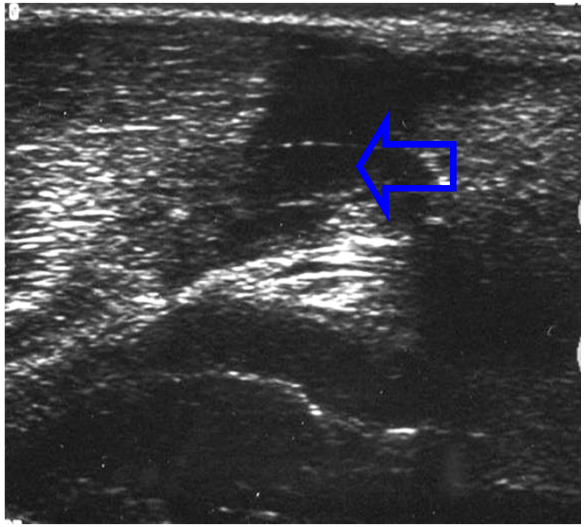
MRI and Ultrasoud of the same patient in an acute ruptur. The advantage of the ultrasound is the functional investigation in a abducted position. This shows reliable the size of the rupture. In the MRI the position of the shoulder is always adducted. The size of the rupture is so more difficult to see.





MRI





Ultrasound

Methods: Demographics

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- height ∅ 180 cm (167-205)
- weigth ∅ 105 Kg (74-148)
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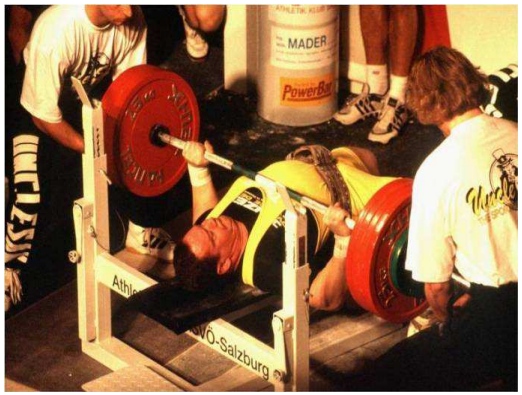
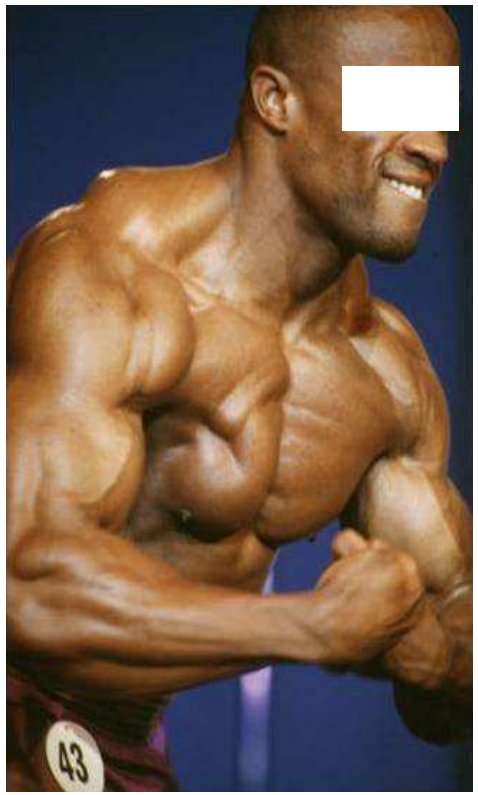
Methods: Mechanism of injury

- 82/105 bench pressing
- 5 ruptures in other Weight training exercises:
  Flys, Dips, power clean
- 4 in other sports:
  Gymnastics, Jiu-Jitzu, Boxing, Ringen, Wrestling
- 8 fall on the abducted arm:
  mototorcycle, bicycle, Skiing, Football, tree, ladder
- 3 forcible IRO: arm wrestling
- 3 without definitive trauma



Methods: Location



- 77 myotendinous junction, 17 tendon, 11 muscle
- 3 complete, 102 incomplete
- Pars sternocostalis most time
- 24 alone, 67 x together with the pars abdominalis, 5 x with pars clavicul.
- 6 pars abdominalis alone

Methods: Time of Operation

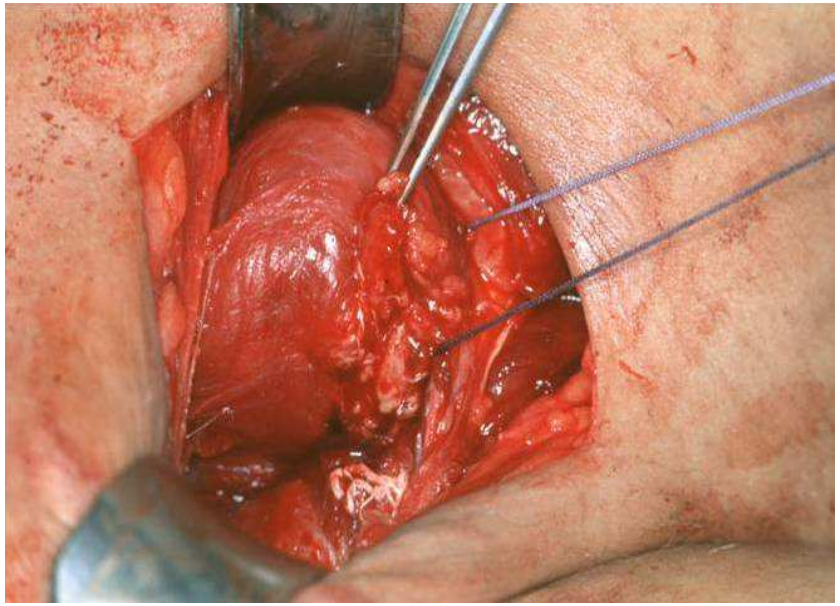
- 64/105 OP
- 27 primary – within 2 weeks after trauma
- 10 postprimary – 2-6 weeks
- 27 chronic – more than 6 weeks
- 7 of the 27 chronic had prior operation

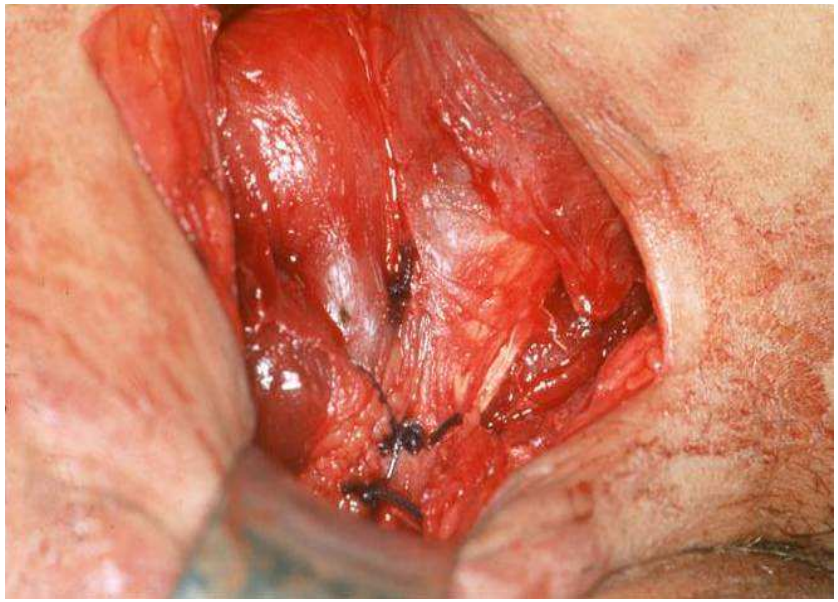
Methods: Operation - Technique

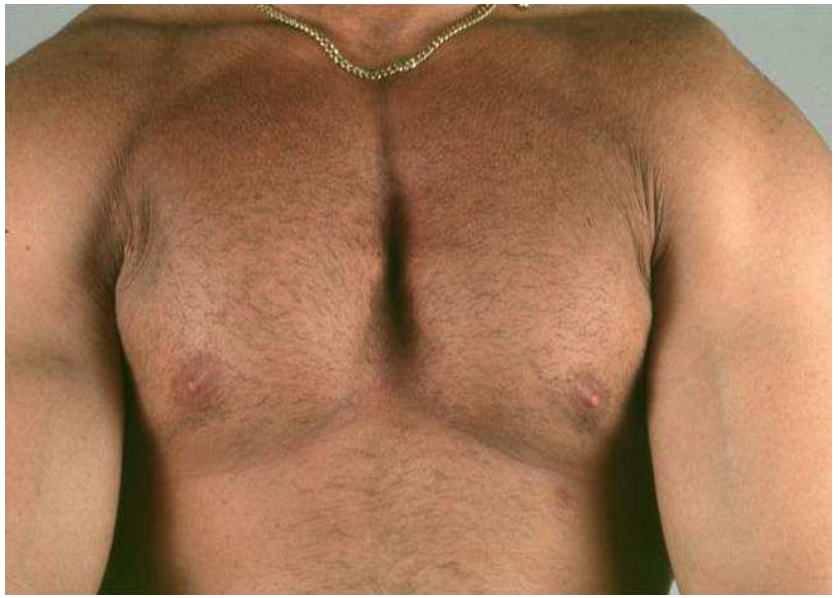
- scin incision a little medial to the sulcus deltoideopectoralis in the cleavage lines!
- clearing up the hematoma
- mobilizing the tendon and the muscle
- matress sutures with Orthocord and Vicryl from the tendon stump to the muscle
- suture anchors if necessary (only in 8 cases)
- tie down the sutures in shoulder ADD
- Redon drainge, suture of the fascia

Methods: Operation - Aftercare

- 6 weeks immobilisation in a sling
- 6 weeks no shoulder mobilisation
- from the 7th week starting mobilisation with increase full range of motion exept ARO in ABD and for 6 weeks without any weigth bearing
- from the 13th week increase weight bearing and starting specific training

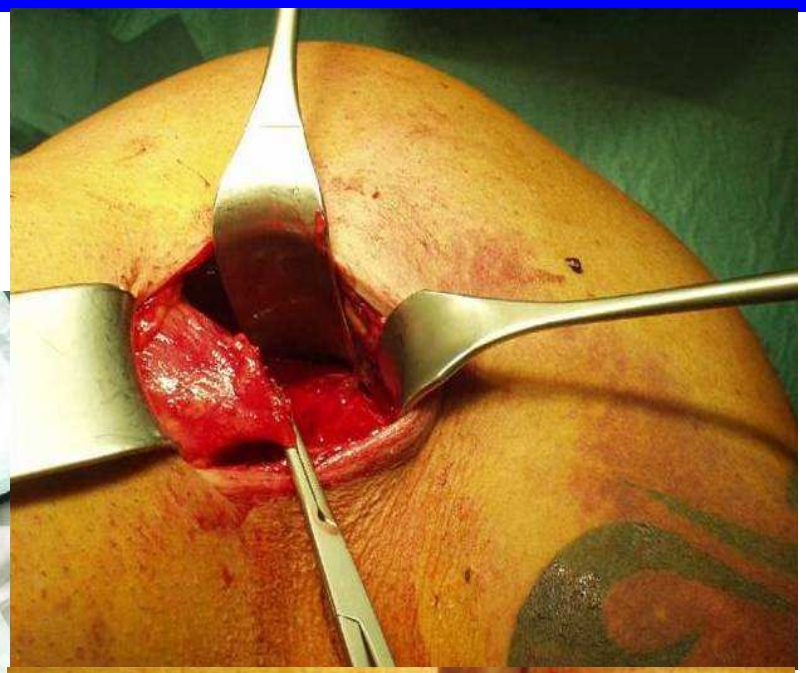


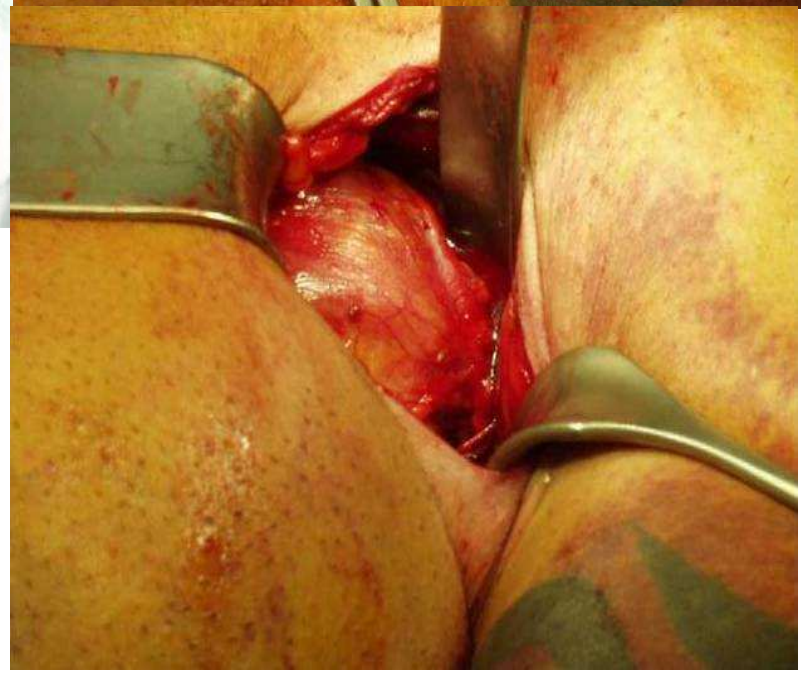




Results

- 37 primary, postprimary
  - 37 good and very good
  - 32 prior level of strength
- 27 chronic (incl 5 Reruptures)
  - 10 good, 10 satified, 7 poor
  - 12 prior level of strength
- all have free range of motion, no pain, free function, no reduction in ADL, no cramps, all results are stable in the follow up



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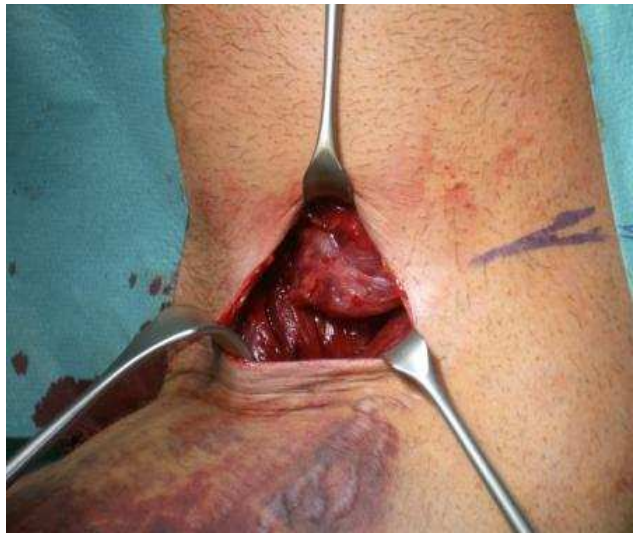

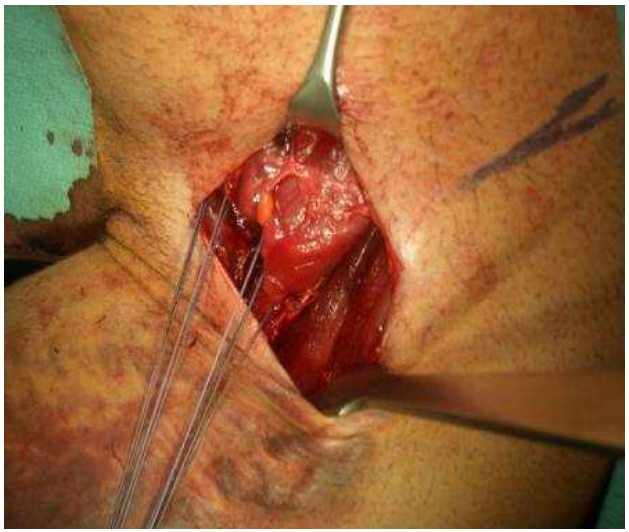

Results - Complications

- operative 5/64
- 2 small wound disorders
- 2 postoperative Hematoma with Revision
- 1 MRSE Infect with several Revisions and VAC
- 5 Reruptures: 2 new trauma, all renew OP

Discussion

- n=17, 10 weight lifting/8 Bench pressing
- 13 Operation(6 acute, 7 chronic > 2 weeks)
- subjektive Satisfaction 96% acut, 93% chronic, 51% in the non-operative group
- Isokinetic - Adduction strength - acut 102%, chronic 94%, non-operative 71%

Schepsis et al. 2000

- n= 33 OP comparison with Metaanalysis
- both series – best outcome in early operative therapy
- delayed operation better outcome than conservative treatment

Ääriema et. 2004

Discussion

- Location – only 17/105 were tendon injuries, the most common location was at the myotendinous junction
- the complete rupture is in contrast to the literature rare, only in 3 of 105 cases complete
- there is no established score to measure the outcome
- Isokinetic is very helpful to determinate the strengh postoperative, but the most of the injured athlets do bench pressing. In these cases the maximum weigth shows perfect the strengh outcome postoperative in contrast to preop.

Pectoralis major Rupture - conclusion

- the early correct Diagnosis is very important
- the function and the ADL are although without operation good, but there is a strengh deficite
- in concord with the literature the early acute operation leeds always to good and excellent results
- in the chronic cases the results are not so good like the acute cases, but there is an improvement in most of the cases.
- The location and the size of the pectoralis major rupture doesn`t influence the postop. results

Pectoralis major Rupture - conclusion

- in clinical diagnostics the „shape sign“ is very helpful
- MRI and Ultrasoud shows both the size and location of the rupture. The advantage of the ultrasound is the functional investigation in a abducted position. This shows reliable the size of the rupture. In the MRI the position of the shoulder is alwys adducted. The size of the rupture is so more difficult to determinate.

Pectoralis major Rupture

„The acute operation had an significant betteroutcome as conservative treatment or delayed operation. Age and location doesn`t influence the results.“

(Bak et al. 2000)

Pectoralis major Rupture

The early accurate diagnostics and following anatomical reconstruction of the pectoralis major improve the results in every aspect. There is always a indication for reconstruction of the pectoralis major in an acute injury in every weight training athlet. The most negative influence on the results is an delay in time.


thanks