Sports Medicine Approach to Thoracic Outlet

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Disclosure

1. **Basic Science Support**
   a. Arthrex
   b. Smith-Nephew
2. **Consultant**
   a. Arthrex
3. **Royalties**
   a. Arthrex
   b. Lead Player Publishing
4. **Board Member**
   1. Baseball Health Network
   2. Sports Science Institute of America

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May 1996

ARCHIVES | 1996

BASEBALL;Surgery Set For Cone's Aneurysm

By MALCOLM MORAN MAY 10, 1996

Thoracic Outlet Syndrome

Challenging diagnosis

- Uncommon
- Vague Symptoms
  - Dead arm
- Frustration

Thoracic Outlet Syndrome

Anterior arm

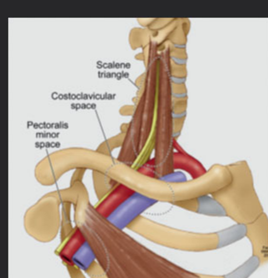
- **Similar to other diagnoses**

- Humeral stress reaction
- Biceps tendinitis
- Cervical radiculopathy
- Median nerve compression
- Musculocutaneous nerve

Thoracic Outlet Syndrome

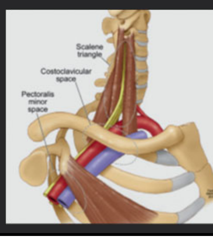
3 types

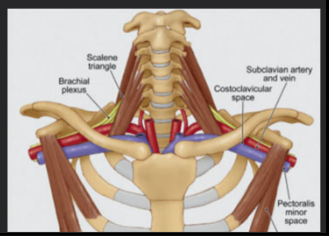
1. **Neurogenic**
2. **Venous**
3. **Arterial**



NEUROGENIC THORACIC OUTLET

- Compression of brachial plexus
- Predisposing anatomy (cervical ribs, ligamentous bands, and scalene muscle abnormalities)





NEUROGENIC THORACIC OUTLET

Symptoms

- Vague heaviness, weakness, pain
- Numbness/paresthesia
- Exacerbated by arm elevation

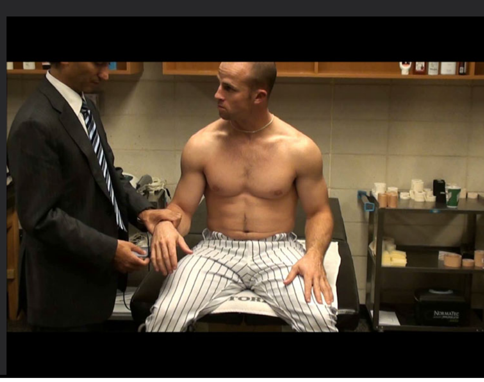
Physical exam

- Tenderness, muscle spasm

Diagnostic imaging

- EMG usually neg – r/o other conditions

Vascular Exam



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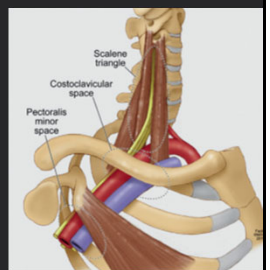
Neurogenic Thoracic Outlet

Treatment

Non-operative

- Rest
- PT to stretch the scalene and pec minor muscles
- Muscle relaxants and NSAIDS



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Neurogenic Thoracic Outlet

Surgical treatment

- Failure of non-operative treatment
- Thoracic outlet decompression
- First rib resection
- Anterior and middle scalene muscles resection
- Pectoralis minor tenotomy

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Neurogenic Thoracic Outlet

Outcome

- 10 pitchers
- Mean age 30 years
- Mean 10.8 months before the return
- No significant performance diff 3 years before and 3 years after surgery (ERA), (WHIP), etc

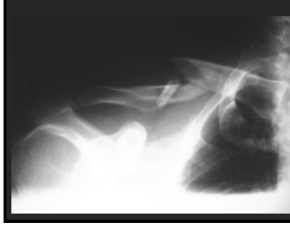
Thompson et al. *Ann Vasc Surg*. 2017

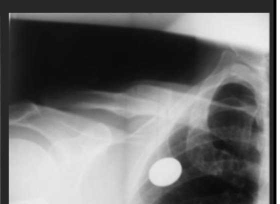
CASE

42 yo male
Works electrician
3 years following injury
Symptoms
- Pain
- Fatigue
- Weakness
- Numbness

CASE History

X-rays
- **Shortening**
- **Vertical fragment**





CASE Imaging

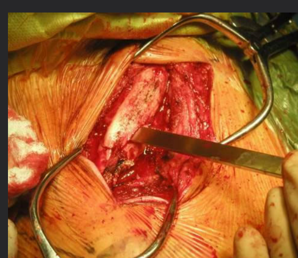
Clavicle 2.1 cm shortening

CASE Surgery

Correct the shortening

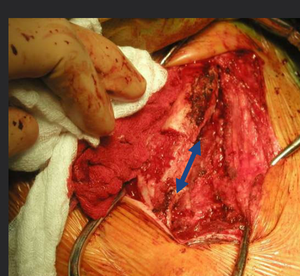
Midshaft Clavicle Fractures
Malunion

Osteotomy

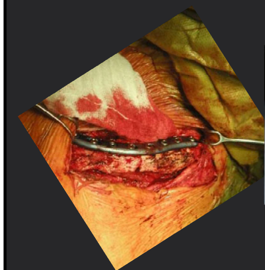


Midshaft Clavicle Fractures
Malunion

Reduction



Midshaft Clavicle Fractures
Malunion



Case

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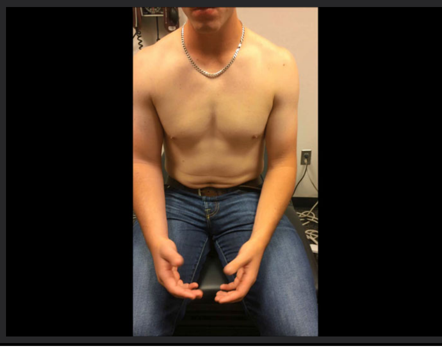
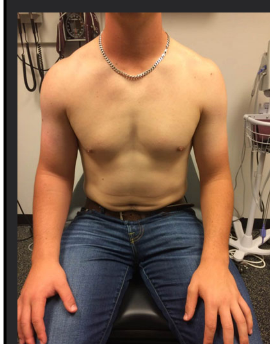
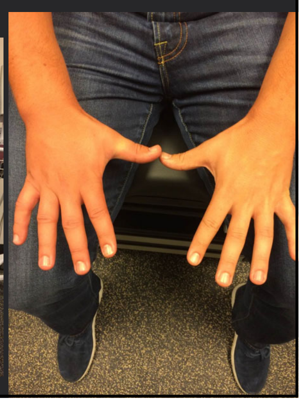
Throwers Scapular Mechanics

CASE







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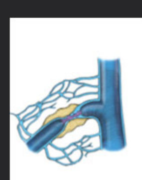
VENOUS THORACIC OUTLET

Axillary-subclavian vein effort thrombosis

- During repetition- subclavian vein compression leads to thrombus formation

Symptoms

- Arm swelling
- Cyanotic discoloration
- Heaviness, and pain or fatigue



VENOUS THORACIC OUTLET

Diagnosis
- Upper extremity (ultrasound)
- Contrast-enhanced CT or MR venography performed with the arm at rest and with the arm raised overhead
- Contrast venography is also required for catheter-based thrombolysis, the preferred initial step in treatment

VENOUS THORACIC OUTLET

Treatment
- Anticoagulation and Thrombolysis
- Balloon angioplasty
- Long-term anticoagulation – difficult in competitive atheltes

VENOUS THORACIC OUTLET

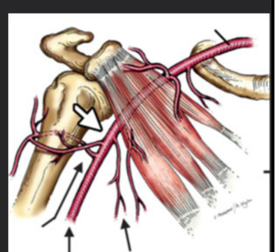
Surgical Management
- Decompress the axillary-subclavian vein and collateral venous pathways
- First rib resection and division or removal of the anterior scalene and subclavius muscles

ARTERIAL THORACIC OUTLET

Subclavian Artery Aneurysms

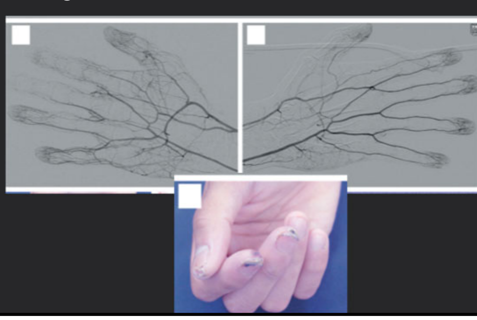
Clinical Recognition

- Finger ischemia, numbness, tingling, cold and painful sensations, cyanotic or pale discoloration



ARTERIAL THORACIC OUTLET

Arteriogram



ARTERIAL THORACIC OUTLET

Treatment

- Anticoagulation
- Thoracic outlet decompression
- Interposition bypass graft reconstruction

ARTERIAL THORACIC OUTLET

Outcomes

- 40 pts with ave age of 40.3 (range, 13-68 years)
- Over 50% ischemia/emboli (n = 21)
- All 40 pts underwent decompression
- 75% had a cervical rib (24 complete, 6 partial)
- Subclavian artery reconstruction performed in 70%
- 92% had patency at 4.5 ± 0.4 years

ARTERIAL THORACIC OUTLET

LESIONS OF THE AXILLARY ARTERY AND ITS BRANCHES

- Exclusively in baseball pitchers and volleyball players
- Arterial compression and stretching by the head of the humerus as it moves forward during extremes of arm elevation and extension, as seen in the overhead pitching motion.

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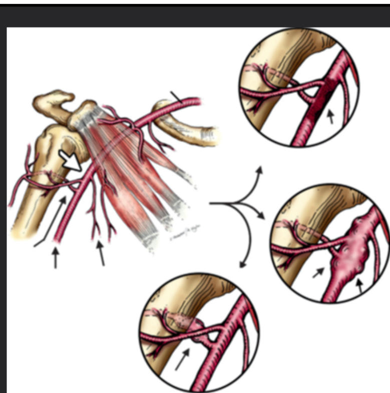
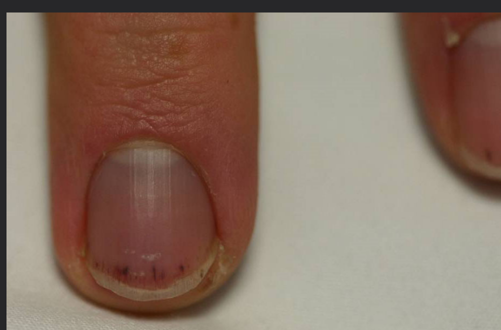
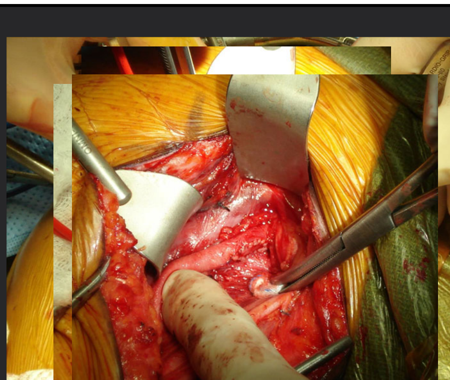
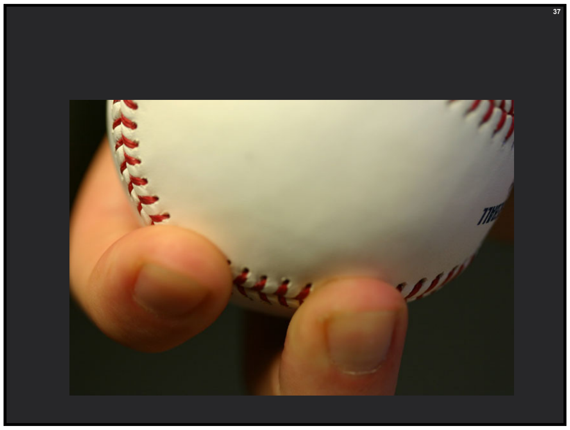


May 1996, May 2009





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