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Thoracic Outlet Syndrome Considerations

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Learning Outcomes

After this course, participants will be able to:

1. Discuss the types of thoracic outlet syndrome
2. Identify special tests which would indicate the need to treat for thoracic outlet syndrome
3. List treatments to relieve the symptoms of thoracic outlet syndrome.

3

Thoracic Outlet Syndrome (TOS)

Definition:

1. Compression of the neurovascular structures within the thoracic outlet
2. Diagnosis is made primarily through clinical signs
3. Onset is insidious and not trauma related
   - Posture, body structure, repetitive strain
4. The main complaint is pain and heaviness in the shoulder and neck but can radiate to the ring and little fingers (Crosby & Wehbé, 2004).

4

Anatomy Zones and TOS

There are 3 areas to consider:

- Scalene triangle
- Costoclavicular space
- Subcoracoid space

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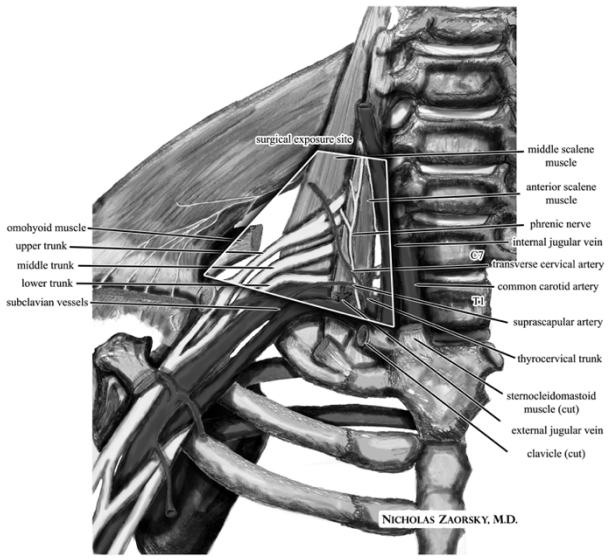
Scalene Triangle



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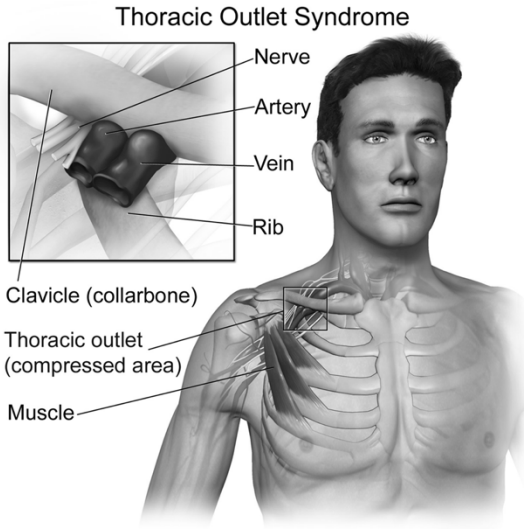
Costoclavicular space

- Trunks of the brachial plexus
- Subclavian artery
- Subclavian vein



Q1 7

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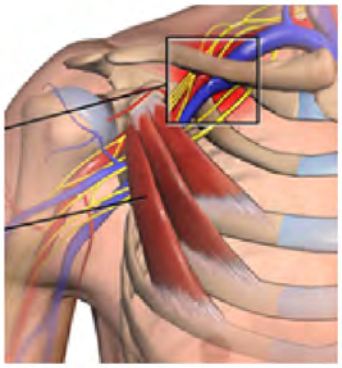
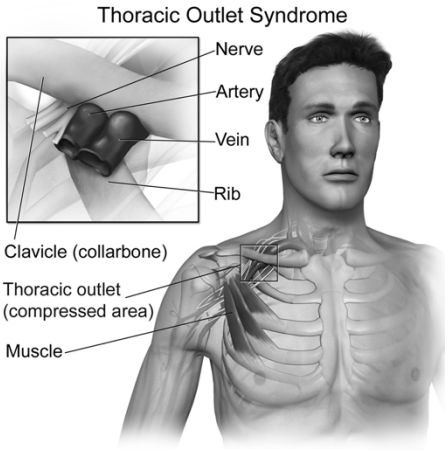
Subcoracoid space





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TOS contents

- Subclavian Vein
- Subclavian Artery
- Brachial Plexus

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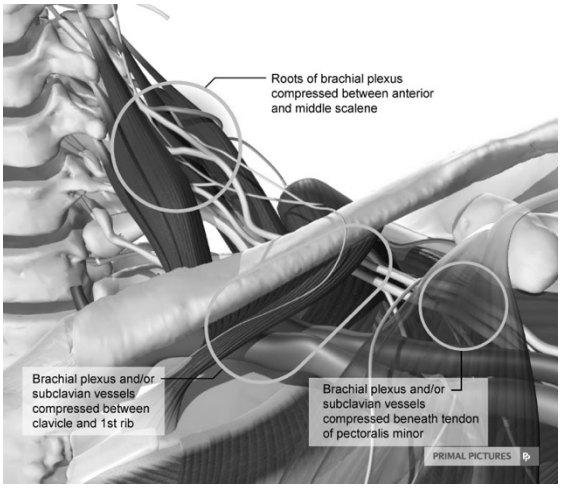
TOS contents



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Scalene Triangle

Borders:

- Anterior scalene
- Middle scalene
- Clavicle inferiorly

Purpose of the scalenes are for head lateral motion and as an accessory to breathing as it attaches to the 1st rib.

11

Costoclavicular space

Borders:

- Clavicle
- Costocoracoid ligament
- Subclavius muscle
- First rib- predisposes a person to TOS

This area is medial and under pressure with "drooping shoulders" or carrying heavy items.

Q2 12

Costoclavicular space

Paget-Schroetter syndrome:

A result of TOS in the costoclavicular space with a thrombosis forming in the subclavian vein.

- This could lead to pulmonary embolism
- Look for UE edema and dusky color change in the arm

Osterman & Wilson (2021)

13

Subcoracoid space

Borders:

- Pectoralis minor
- Coracoid process

The neurovascular bundle is under stress in hyperabduction position of the UE.

Also, NV bundle is stressed in repetitive overhead reaching.

14

Classifications of (TOS)

1. Arterial
2. Venous
3. Neurogenic

Osterman & Wilson (2021)

15

Arterial Symptoms

Compression of the subclavian artery:

- General pain in the UE, neck and shoulder
- Pallor and diminished pulse
- Paresthesias
- Heaviness and fatigue in the UE

**This is the most serious form of TOS in terms of ischemic injury to the UE.

Ozoa, Alves & Fish (2011)

16

Venous Symptoms

Compression of the subclavian or axillary vein in the costoclavicular space:

- Can be intermittent UE edema
- Heaviness and weakness in the UE
- If there is a thrombosis, the edema will be more unchanging and there will be cyanosis.

**A thrombosis is a serious complication. If suspected, the referring physician should be informed immediately.

Ozoa, Alves & Fish (2011)

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Neurogenic Symptoms

True neurogenic:

- Termed “true” neurogenic because there can be electrodiagnosis testing to confirm
- Also called Gilliatt-Sumner Hand; can show motor deficits in the hand in both median and ulnar innervated muscles; sensory deficits are also present

Disputed neurogenic:

- Complaints of weakness, paresthesias, and pain
- Headaches, vision impairments, facial pain

Ozoa, Alves & Fish (2011)

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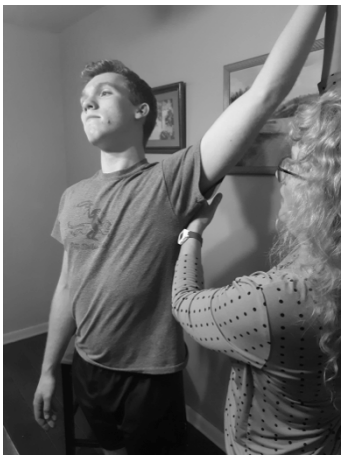
Special tests for TOS

1. Wright's Test
2. Adson's Test
3. Roos Test
4. Military Brace Test

Osterman & Wilson (2021), Walsh (2021), Ozoa et al. (2011)

Q3 19

Wright's test



Ozoa, Alves & Fish (2011)

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Roos Test

Walsh (2021)

21

Military Brace

Ozoa, Alves & Fish (2011)

22

Differential diagnosis

- Cervical disk disease
- Carpal tunnel syndrome
- Peripheral neuropathy
- Shoulder joint related injuries

Osterman & Wilson (2021)

Q4 23

Ergonomic Considerations

- Repetitive heavy lifting in weight training or carrying a bag on the shoulder
- Sleep position
- Head forward position from driving or sitting at a computer
- Repetitive overhead reaching
- Obesity or large breasts which pull down the clavicle

Crosby &Wehbé (2004)

Q5 24

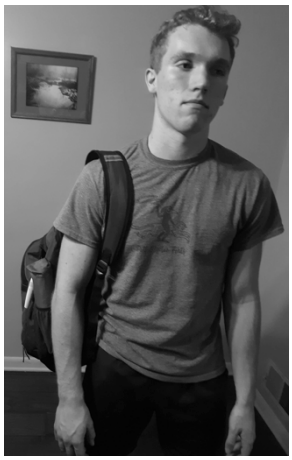
Ergonomic Considerations

- Repetitive heavy lifting in weight training or carrying a bag on the shoulder
  - Depressed clavicular angle from weak or fatigued trapezius
  - Hypertrophy of the scalenes in breath holding and lifting
  - Imbalances chest versus back muscles

Crosby & Wehbé (2004)

Q6 25

Backpack considerations



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Ergonomic Considerations

- Sleep position
  - Supine with both arms supported and hands on abdomen
  - Side lying with the effected arm supported on a pillow and head in a neutral alignment

Walsh (2021)

Q7 27

Sleep Positions

28

Ergonomic Considerations

- Head forward position from driving or sitting at a computer
  - Pelvic position in sitting
  - Monitor height and appropriate eyeglasses
  - Mouse position/angle of shoulder
  - Driver's seat position to steering wheel

Q8 29

Ergonomic Considerations

- Repetitive overhead reaching
  - Bring frequently used items lower
  - Use mechanical lifting

30

Ergonomic Considerations

- Obesity or large breasts which pull down the clavicle
  - Strapless bra
  - Wide padding on the strap
  - Weight loss

Walsh (2021)

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Exercises to Manage TOS

- Gulbahar et al (2005) demonstrate that regular exercise can improve TOS pain and radiographic position.
- Novak et al (1995) show exercise can improve symptoms over the long term for the majority of cases.

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Exercises to Manage TOS

- Education of the patient is key to the success of the program.
  1. Mechanism of injury
  2. Ergonomics
  3. Posture in activity and sleeping
  4. Exercises to support those changes

Walsh (2021)

33

Exercises to Manage TOS

- Diaphragmatic Breathing
  - Supine with arms and head supported
  - Breath “from the belly not the shoulder”
  - This breathing can be done with the shoulder flexed for several reps.

Q9

34

Exercises to Manage TOS

- Corner stretch
  - Stretches the pec minor
  - Can be combined with deep breathing
  - No forward head posture

Q10 35

Corner Stretch Home exercise

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Exercises to Manage TOS

- Shoulder extension with hands joined
  - Stretches anterior shoulder
  - Bilateral stretch for subclavius

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Bil shoulder adduction and extension

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Exercises to Manage TOS

- Supine thoracic extension with shoulder flexion and abduction

39

Thoracic extension

40

Exercises to Manage TOS

- Nerve glides without increased pain

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Exercises to Mange TOS

Sternocleidomastoid stretch

1. Sit on your hand
2. Tilt the head away from the effected side
3. Look up to the ceiling until a stretch is felt

42

Case Study discussion

- First rib compression

Hidlay, Graham & Isaacs (2014)

43

Case Study discussion

- Scalenes compression from hypertrophy

44

Case Study discussion

- Repetitive overhead reaching

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Questions

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