

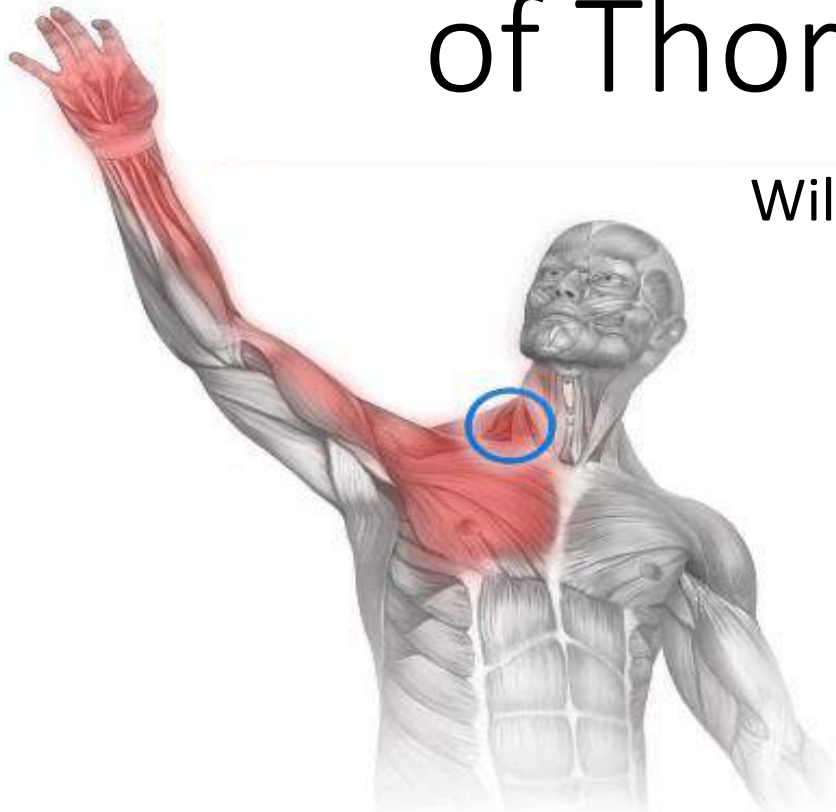
Rehabilitation & Management of Thoracic Outlet Syndrome

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THORACIC-OUTLET SYNDROME: EVALUATION
OF A THERAPEUTIC EXERCISE PROGRAM

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Section of Physical Medicine and Rehabilitation

TOS most commonly dx between
ages of 20-50 (Watson 2009)

Women are 3 to 4 times more likely to
develop neuogenic TOS (Hooper 2010)

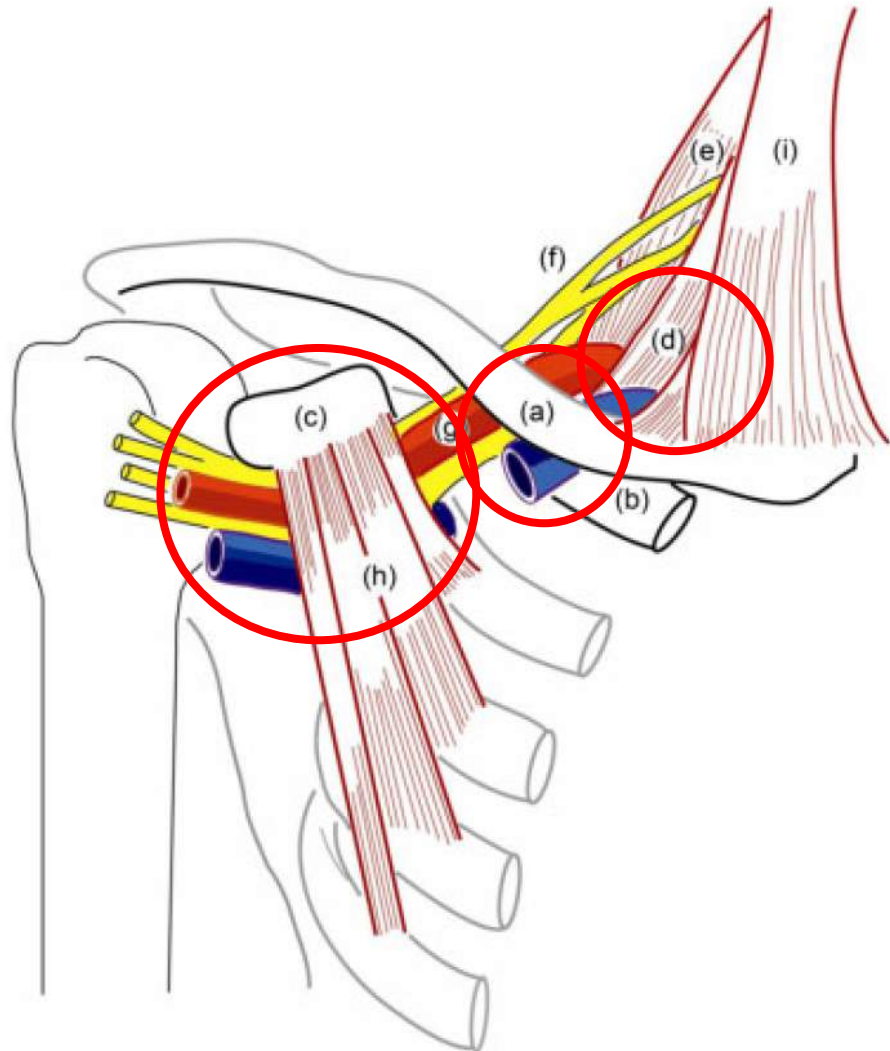
The prevalence is reported to be 8% in the
general population between the ages of 18-60+
years old. (Hooper 2010)



Controversy

- Where, What How
- Diagnosis
- Clinical presentation

Normal Anatomy



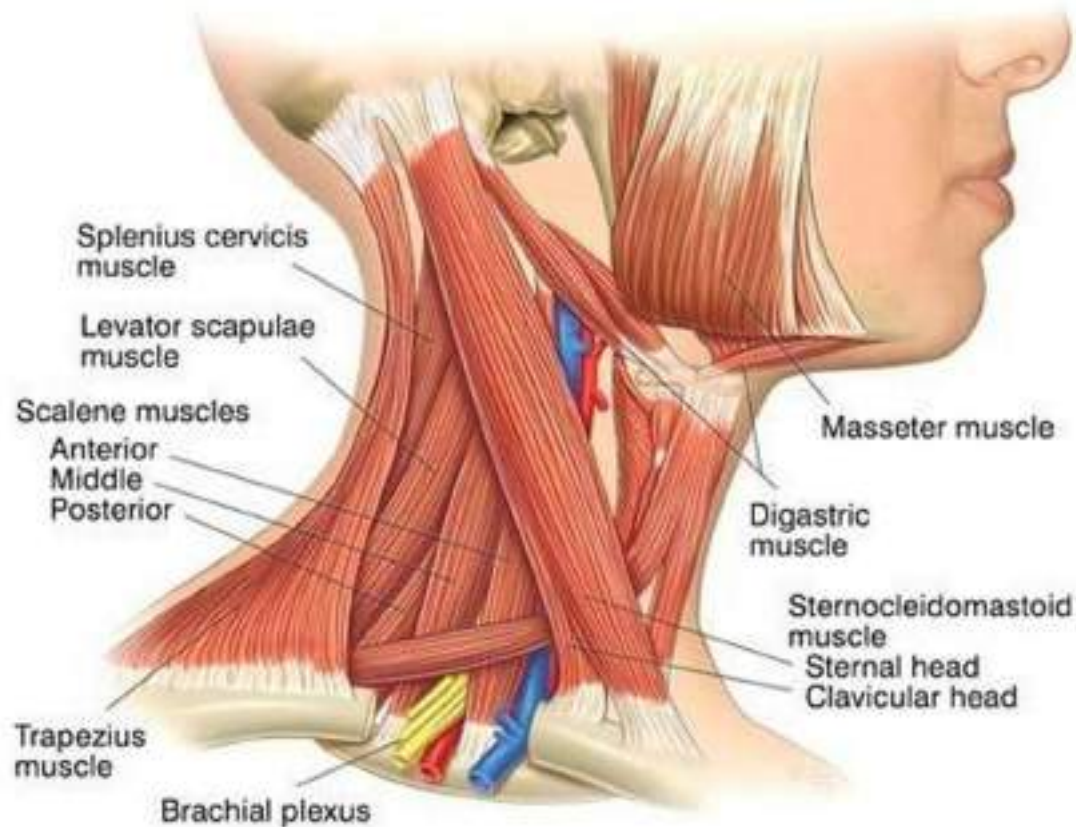
3 Compartments

- Inter-scalene triangle
- Cost-clavicular space
- Thoraco-coraco-pectoral space

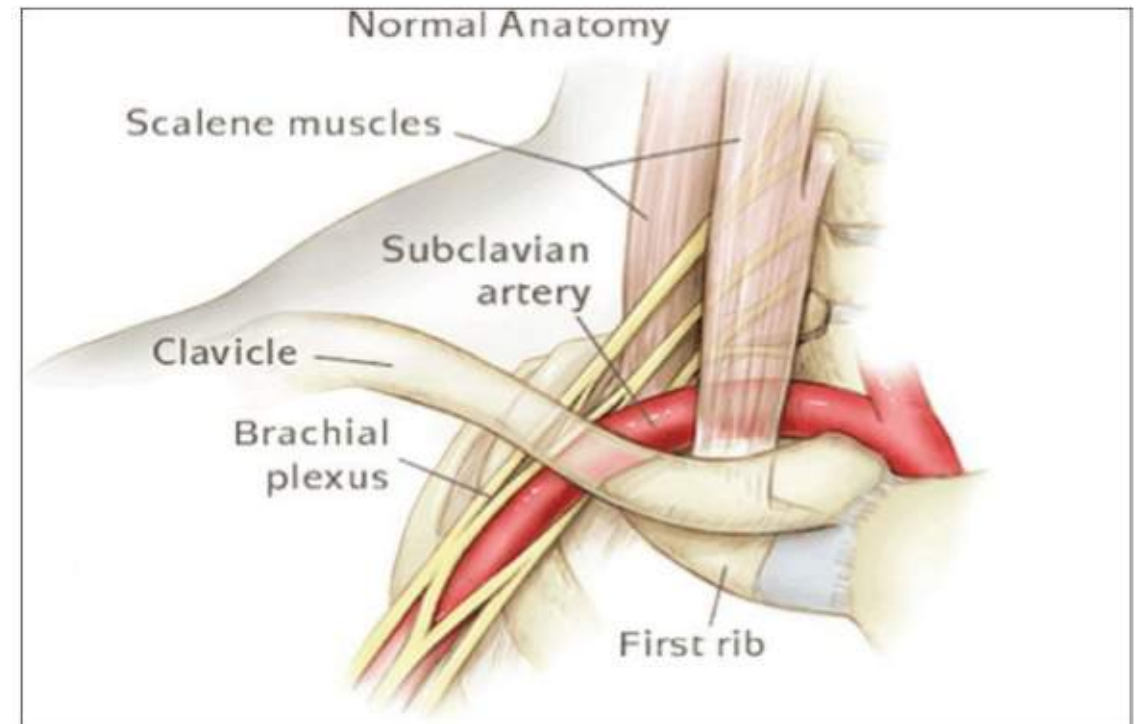
Patho Anatomy: Inter-scalene triangle

~80% of those with TOS symptoms

(Kaczynski 2013)



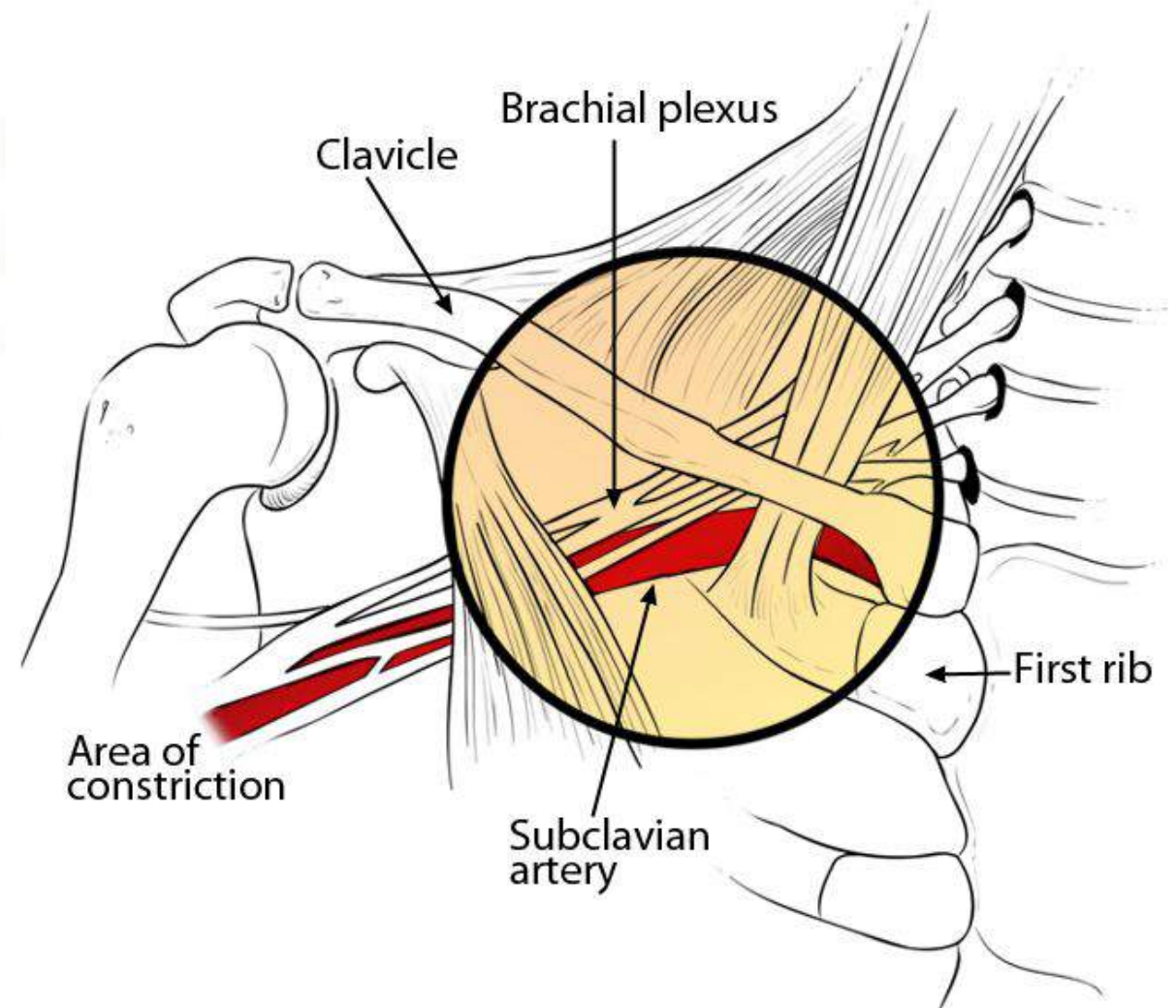
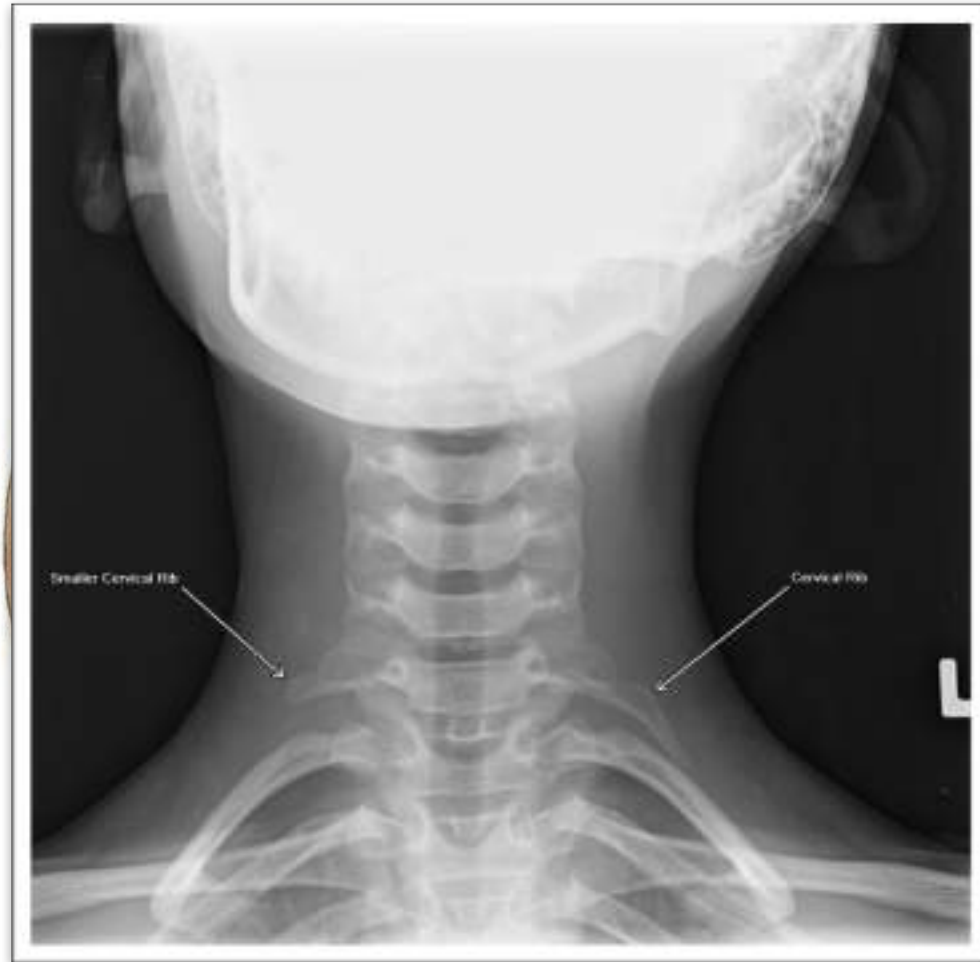
Interscalene triangle



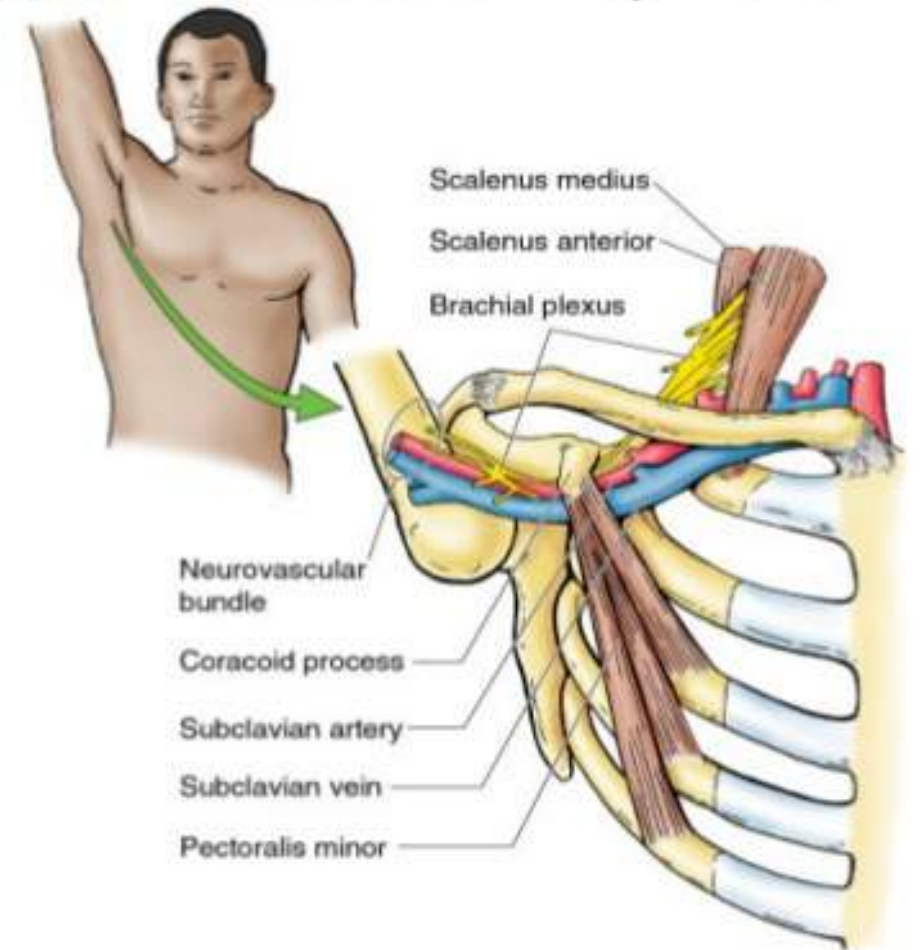
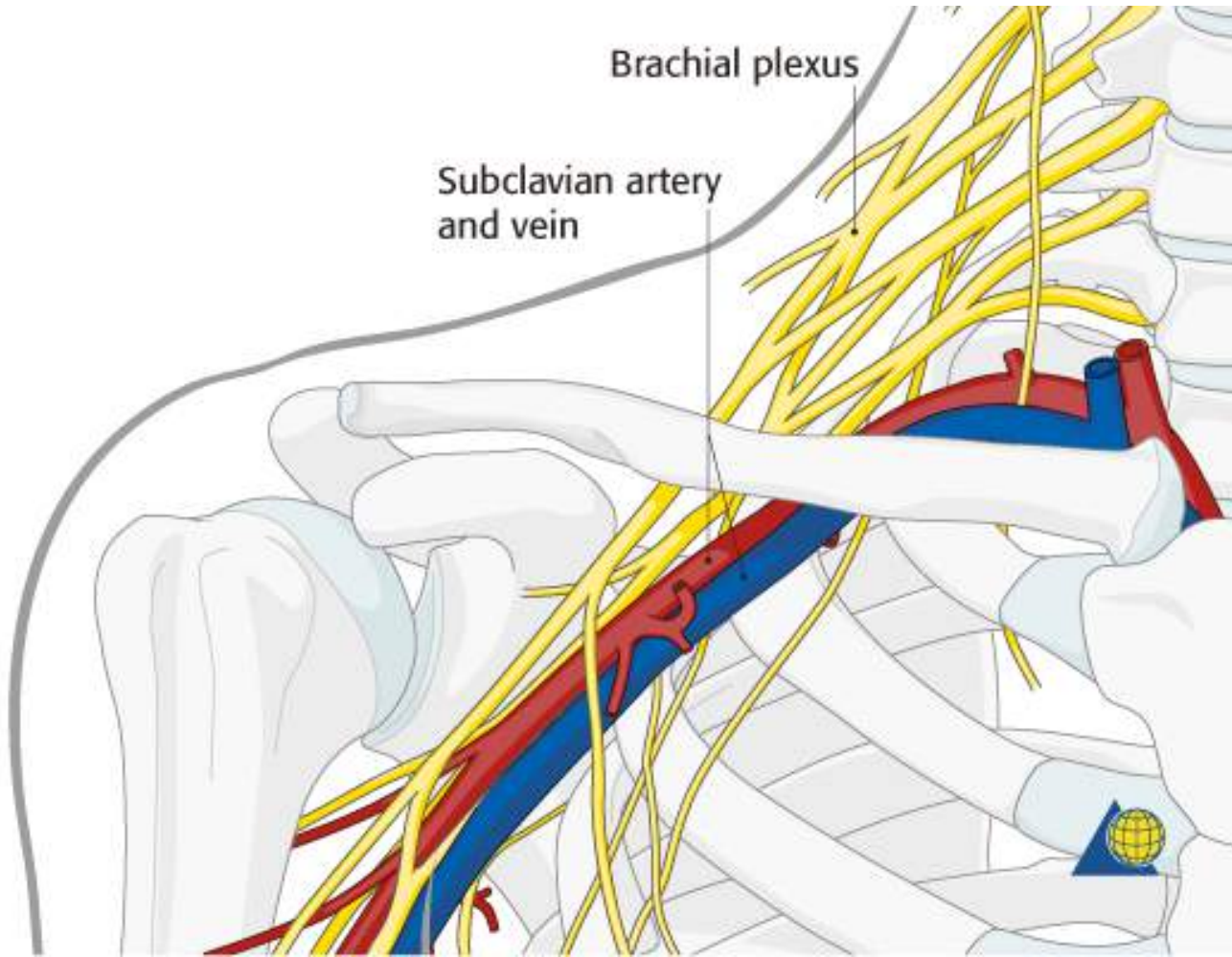
Patho Anatomy: Costo-clavicular space

~3% of those with TOS symptoms

(Kaczynski 2013)



Patho Anatomy: Thoraco-coraco-pectoral space



Thoracic Outlet Syndrome

Vascular TOS

Arterial

Venous

Neurological TOS

True

Symptomatic

90% of TOS cases are of neurogenic origin
less than 1% are arterial
approximately 3-5% are venous. (Sanders 2007)

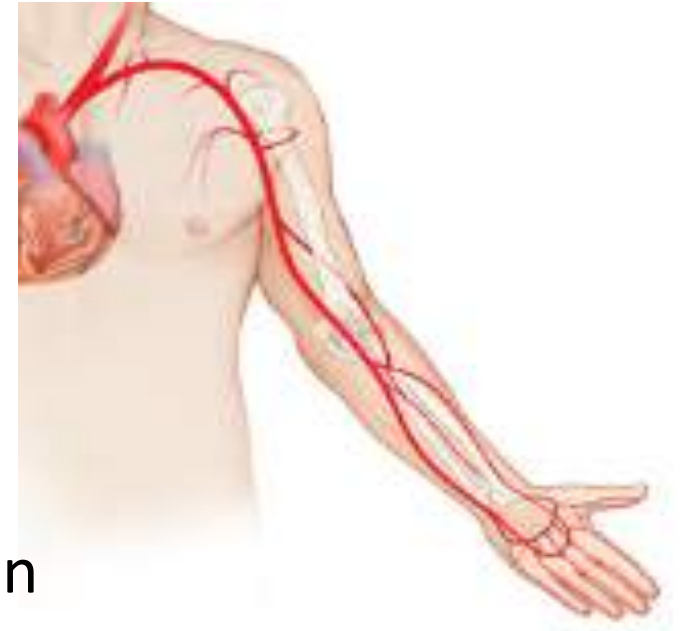
Vascular TOS ~5%

Arterial TOS

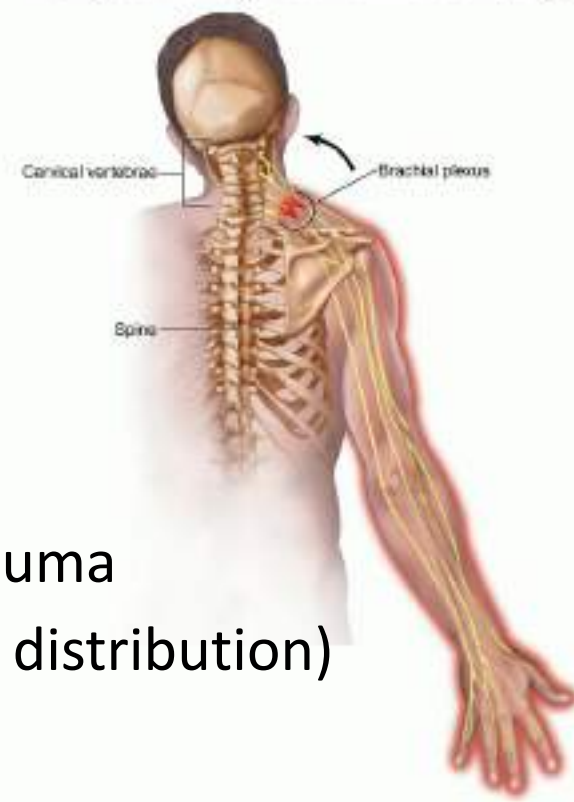
- Often in young adults
- Pain in hand/seldom in shoulder
- Pallor
- Coldness and Cold intolerance
- Paresthesia
- Dx based on above findings
- Confirmed through Doppler & angiography

Venous TOS

- Severe Chest Pain
- Pain often in younger men
- Edema of the arm
- Cyanosis & Feeling of heaviness
- Paresthesia in fingers and hand
- Diagnosis based on above findings
- Confirmed through venous ultrasound or venography



Neurological TOS



True

- Common hx of neck trauma
- Pain paresthesia, numbness (C8, T1 distribution)
- Occipital headaches
- Loss of dexterity
- Cold Intolerance
- Diagnosis base on above info and cluster of provocation tests
- Confirmed through + neurophysiological testing

Symptomatic (~80%)

- Common hx of neck trauma
- Pain paresthesia (C8,T1 distribution)
- Occipital headaches
- Loss of dexterity
- Cold Intolerance
- Diagnosis base on information above and cluster of provocation test
- No confirmation through objective testing

Clinical examination

- Posture
- Cyanosis & Edema
- Atrophy in the hand
- Hand temperature
- Clear Cx spine
- Movements change symptoms



Dx Accuracy of clinical tests for TOS

Test	Sen	Spec	LR+	LR-
Roos Test	52-100	30-100	1.2-5.2	0.4-0.53
Supraclavicular pressure	NT	85-98	NA	NA
Adson's	79	74-100	3.29	0.28
Costoclavicular maneuver	NT	53-100	NA	NA
Wright's	70-90	29-53	1.27-1.49	0.34-0.57
Upper Limb Tension	90	38	1.5	0.3
Cervical Rotation Lateral Flexion	100	NT	NA	NA

NOTE: Sen: Sensitivity; Spec: Specificity; LR+ Positive Likelihood Ratio; LR- Negative Likelihood Ratio

Clinical testing

- High rates of false positives with provocative clinical testing for TOS
(Cook 2008)
- Thoracic Outlet Container Tests
 - Supraclavicular pressure test & Adson's test address compromise to the Scalene Triangle (Winkel 1997)
 - Costoclavicular maneuver evaluates costoclavicular space narrowing (Winkel 1997)
 - Wrights test examines compromise through the thoraco coraco pectoral space (Winkel 1997)
- Neural Tension Tests
 - Upper limb tension test (Mahmud MA 2006)

Non Surgical Treatment Approaches

- Education
 - Posture
 - Sleep
- Directing interventions
 - Inter-scalene triangle
 - Cost-clavicular space
 - Thoraco-coraco-pectoral space





Clavicular Clearing

Scalene Soft Tissue Mobilization



Scalene

Self Stretch



Suboccipitals Self Stretch



Combined Neurodynamic and
Opening Mobilization



Pec Minor
Stretch



putting the pieces together





*Thank
you!*

Gerdy and the
IT Band

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