

M1 – M3 Course Summary

Version 8 – May 2013

Scope

- These are extracts from M1-M3 course
- Nb some material was removed May 2013 as it may have infringed Polestar's Intellectual Property. This was material such as the 9 Polestar Movement Categories, The Polestar Principles etc

History

- Born 1880 Germany
- Died at 87 – in 1967
- Emigrated US 1923
- Shared NY address with NY Ballet
- Romana Kryzanowska director
- Ron Fletcher opened a NY studio (is he a 'disciple'? Stop press – yes)
- Certified by Joe = Kathy Grant / Lolita San Miguel
- Disciples = Eve Gentry / Bruce King / Mary Bowen / Robert Fitzgerald

3 Guiding Principles

- Whole Body Health
- Whole Body Commitment
- Breath

Joe Sayings

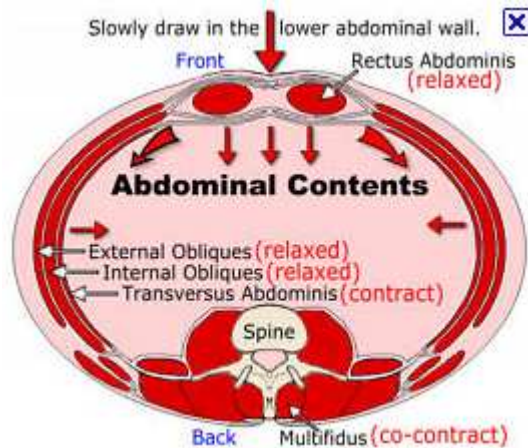
- Believes backs should be like a newborn
- If your spine is inflexibly stiff at 30, you are old; if it is completely flexible at 60, you are young

Polestar Principles

- Section removed

Inner Muscles - Continuum

- RA outer
- Then come both Obliques
- Then innermost = TA



- RA for flexion
- TA for stability

Wrists On A Foam Roller

- Scrubbing floor action
- Arms straight
- If wrists hurt – do you change wrist position (ie flex / rotate wrist) or raise shoulder and take some weight off the wrist? (The latter – DOH!)

Movement Of Thoracic Wall During Breathing – 3 Types (Page 19)

- **Vertical** Diameter Movement
- **Transverse** Diameter Movement (Bucket handle)
- **Anterior Posterior** Diameter Movement (Pump handle)

Panjabi's Stability Model (P36)

- Need three things for stability

- **Inert Structures**
Bone / Ligament / Facia / Disc
- **Contractile Structures**
Muscles
- **Motor Control**
Neuromuscular system / feedback mechanisms

Spine

- C / T / L
- 7 / 12 / 5 (short arse for 5)
- Top 2 C's C1 and C2 = Atlas & Axis
- Facets at 45 / 60 / 90 degrees
- Greatest range mvt all planes / mostly rotation / least rotation, mostly weight bearing

Planes

- **Sagittal** – ie running / cycling
ie Simon is very sagittally oriented
- **Coronal** (as in too many Corona beers – stagger side to side) = **Frontal**
(ie frontal is more an American term)
(when drunk, you get put on a charge and the Sergeant Major yells 'Eyes **FRONT**'
or you would rather have a Bottle (of **Corona!**) in front of me than a **Frontal** Lobotomy)
- **Transverse = Rotational = Horizontal**
- Q: Which plane can the thoracic vertebrae move in?
- A: Transverse / Rotational
- Thoracic spine can pretty much only move in rotation / not really that good at fwds and backwards
- Q: Squatting is an example of movement in which plane?
- Frontal / Sagittal / blah / blah
- A: Sagittal

Important Concepts Flagged

- If one muscle contracts, the direct opposite muscle eccentrically lengthens
– eg kick a football, quads concentrically contract and the hamstrings eccentrically lengthen to compensate and protect it
- **Freyette's Law**: When the slack of a spinal segment is taken up in one direction, there will be less available movement available in rotation. – Try it and see: stand up & tilt to the side &

notice how much less you can rotate the spine! This goes for every joint in the body so when in neutral position, you have maximised your range of motion

Pivot Point Of Hip Joint

- Hip Joint
- Patella
- 2nd Metatarsel (2nd toe)

Movement Integration

- Motor Control: Acquisition of advanced movement skills
- Unconsciously incompetent
- Consciously incompetent
- Consciously competent
- Unconsciously competent
- The above progression could be said to be the Assessment, Practise & Teaching Aims of Pilates

Cueing

- **Verbal**
- **Tactile**
- **Imagery**
(broken down in next section)

Types Of Imagery

- **Direct** – scientific / correct / boring (!) / the body part stays the body part
“upwards rotation of shoulder blades”
- **Indirect** – body part or the way it moves likened to something else / metaphorical
“spine moving like a snake”
- **Space / Location**
 - **Shrinking / Enlarging** : “allow air to float out of the balloon into the rib cage:
 - **Out to In**: “Sunlight warms the muscles of the body”
 - **Outer**: “Move like you are on the moon”
- **Sensory**
 - **Kinesthetic**: “feel the movement of the leg circling before performing the movement”
 - **Proprioceptive**: “Notice the position the body was just in and move back into it”
 - **Tactile**: “remember the feel of a tactile cue you have felt before”
 - **Visual**: “see your head reaching the ceiling”

Odds & Ends

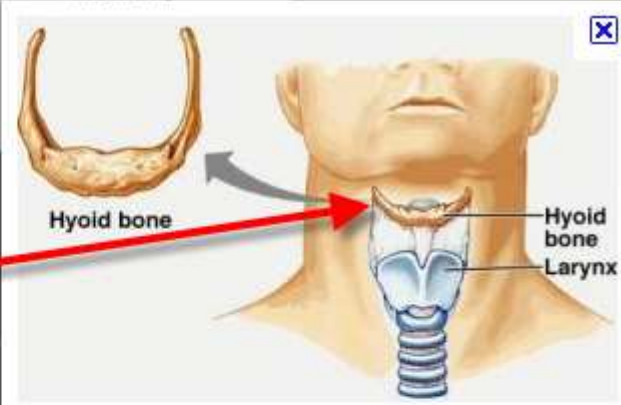
- Know The Difference Between SideLying & SideLift

<p>Sidelift</p> <p>try it also with lower leg straight – nb start on floor - contrast Star where you START in side plank</p>	
<p>Sidelying</p>	

Know These Bones

- Jaw / mandible

- **Hyoid**



hyoid

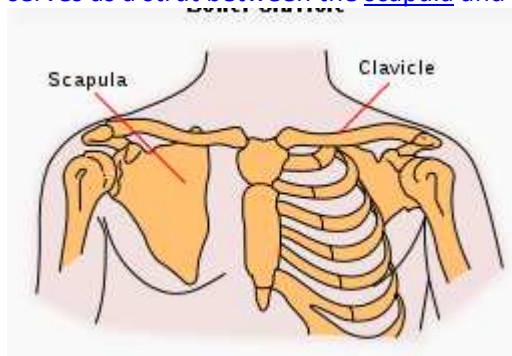
A small, U-shaped bone situated centrally in the upper part of the neck, beneath the mandible but above the larynx near the level of the third cervical vertebra. It can be felt by pressing one's finger into the crease where the chin becomes the neck. The hyoid bone consists of three separate parts – the body, and the left and right greater and lesser cornu (horns) – which fuse in early adulthood.

The function of the hyoid is to provide an anchor point for the muscles of the tongue and for those in the upper part of the front of the neck.

The hyoid is (uniquely in the vertebrate skeleton) not joined to any other bone but is suspended in position by muscles that connect it

- **Clavicle**

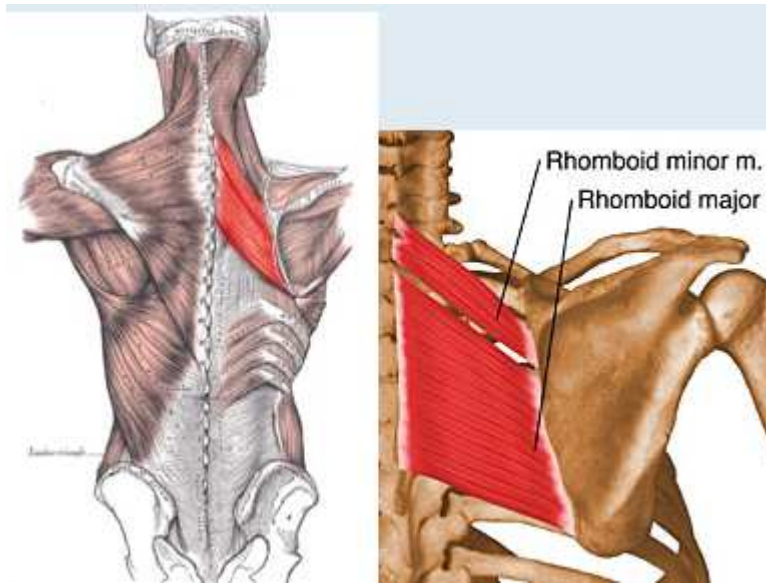
serves as a strut between the scapula and the sternum.



- **Scapula**
- **Humerous**
- **Cervical Spine**
- **Thoracic Spine**

Know These Muscles – Scapulo Thoracic

- **Rhomboid Major & Minor -**
Retract the scapula



- **Traps**
Move scapula and support arm

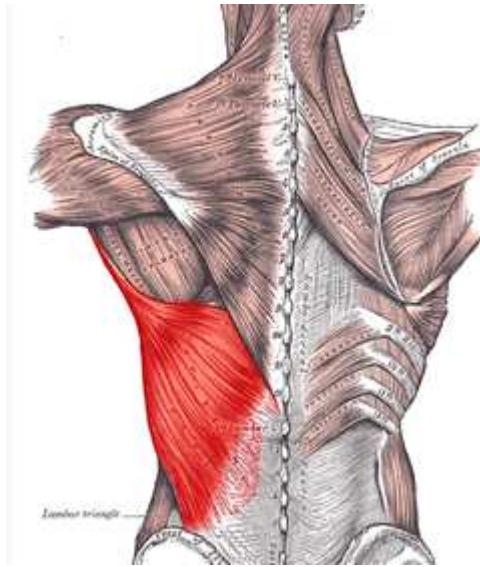


- **Lat Dorsi**

Draws the upper arm downward and backward and rotates it inward, as exemplified in the downstroke in swimming the crawl.

In climbing it joins with the abdominal and pectoral muscles to pull the trunk upward.

The two latissimus dorsi muscles also assist in forced respiration by raising the lower ribs.



- **Pectoralis Minor**

Muscle Knowledge: Pectoralis Minor

Origin: Anterior surface of the sternal ends of ribs 3-5

Insertion: Coracoid process of the scapula

Action: Draws scapula forward and downward, (also elevates ribs if origin are reversed)

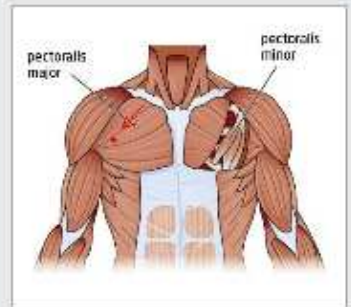


Photo Courtesy of DIAKADI



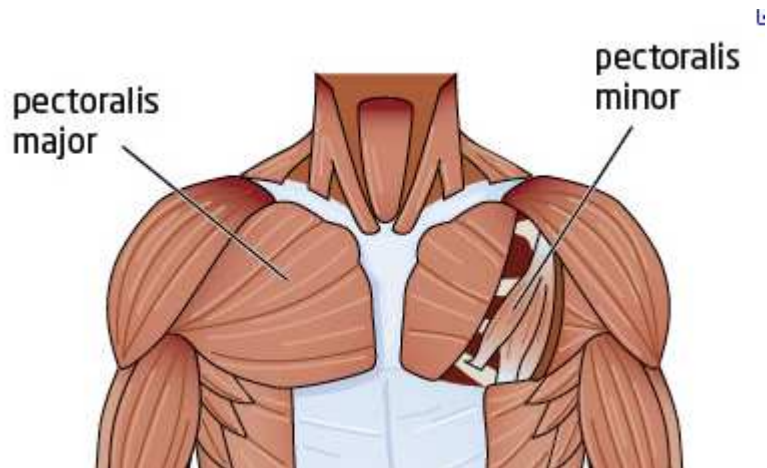
- **Pectoralis Major**

The pectoralis major has four actions which are primarily responsible for movement of the shoulder joint.

The first action is flexion of the humerus, as in throwing a ball side-arm, and in lifting a child. Secondly, it adducts the humerus, as when flapping the arms.

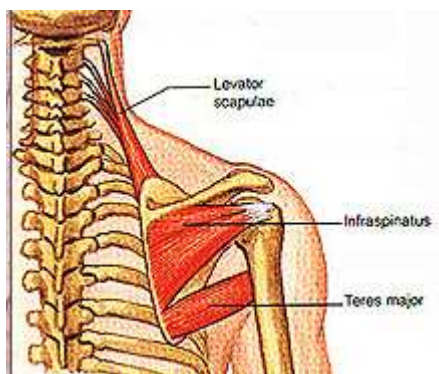
Thirdly, it rotates the humerus medially, as occurs when arm-wrestling.

Finally it aids in deep inspiration, as in taking a deep breath before jumping in a pool. The pectoralis major is also responsible for keeping the arm attached to the trunk of the body



- **Levator Scapulae**

Lifts the scapula (as opposed to retracting it – which is what the Rhomboids do)



- **Serratus Anterior**

Protracts (moves forward) and stabilises scapula / plus upwards rotation

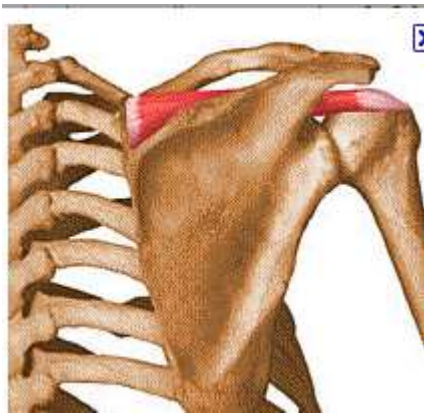
“Big swing muscle” or “Boxer’s muscle” because it is largely responsible for the protraction of the scapula — that is, the pulling of the scapula forward and around the rib cage that occurs when someone throws a punch

Also also plays an important role in the upward rotation of the scapula, such as when lifting a weight overhead



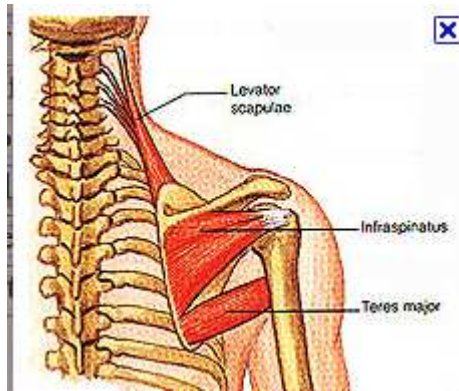
Know These Muscles – Scapulo Humeral

- **Supraspinatus**



abducts the arm at the shoulder

- **Infraspinatus**

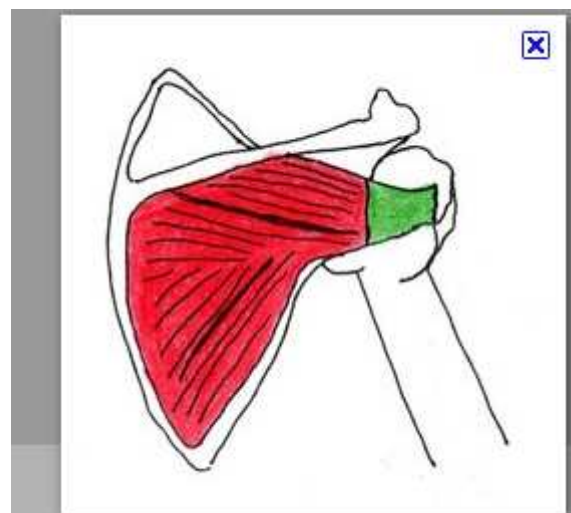
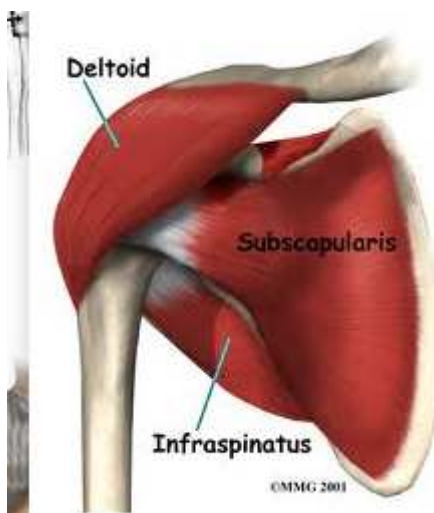


It attaches medially to the infraspinous fossa of the scapula and laterally to the middle facet of the greater tubercle of the humerus.

The primary function of the infraspinatus is extension, horizontal (transverse) extension and lateral rotation of humerus at the shoulder joint. It is the major external rotator of the shoulder. When the arm is fixed, it abducts the inferior angle of the scapula. Its synergists are teres minor, subscapularis, and the deltoid.

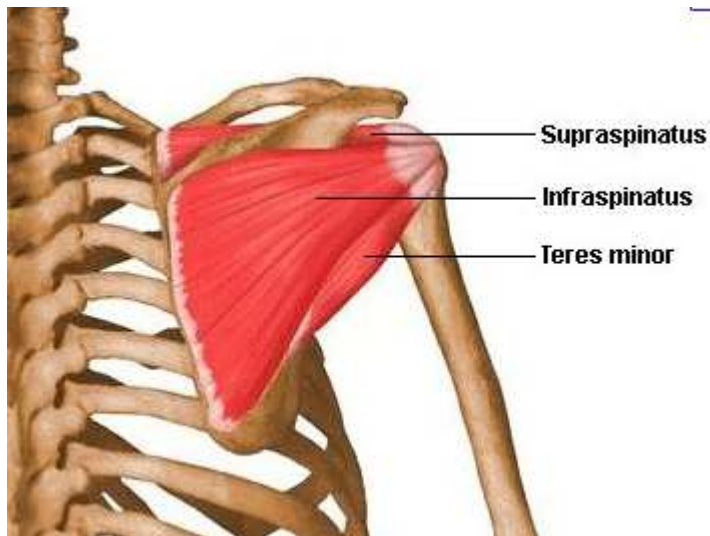
The infraspinatus and teres minor rotate the head of the humerus outward (external, or lateral, rotation); they also assist in carrying the arm backward (extension of the glenohumeral joint)

- **SubScapularis**
internally rotate



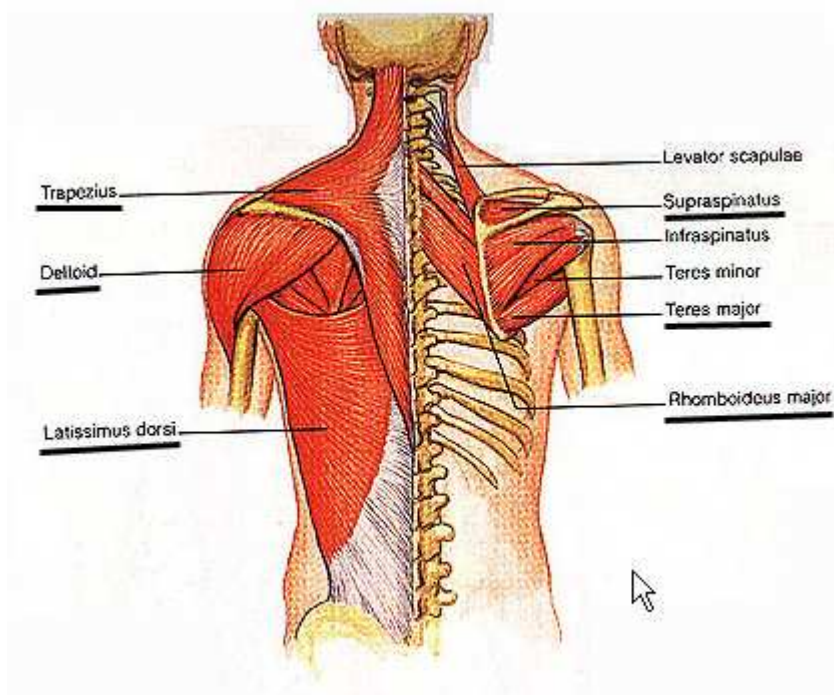
The subscapularis rotates the head of the humerus medially (internal rotation); when the arm is raised, it draws the humerus forward and downward

- **Teres Minor**
externally rotate



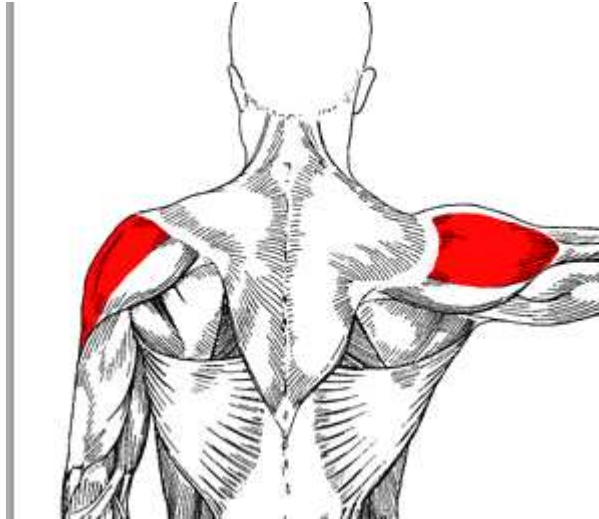
The infraspinatus and teres minor attach to head of the humerus; as part of the rotator cuff they help hold the humeral head in the glenoid cavity of the scapula. They work in tandem with the posterior deltoid to externally (laterally) rotate the humerus, as well as perform transverse abduction, extension and transverse extension.

- **Teres Major**

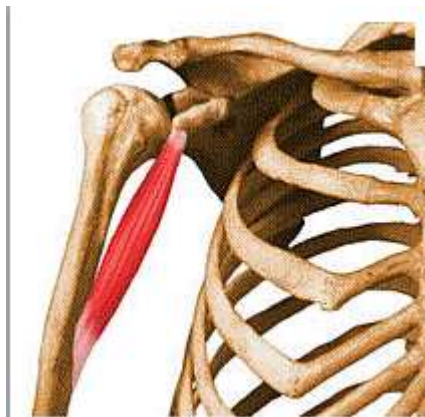


The teres major is a medial rotator and adductor of the humerus and assists the latissimus dorsi in drawing the previously raised humerus downward and backward

- **Deltoid**
Arm abduction along frontal plane



- **Coracobrachialis**
 shoulder (glenohumeral) flexion
 shoulder (glenohumeral) adduction
 shoulder (glenohumeral) horizontal adduction
 huh – Sarah?



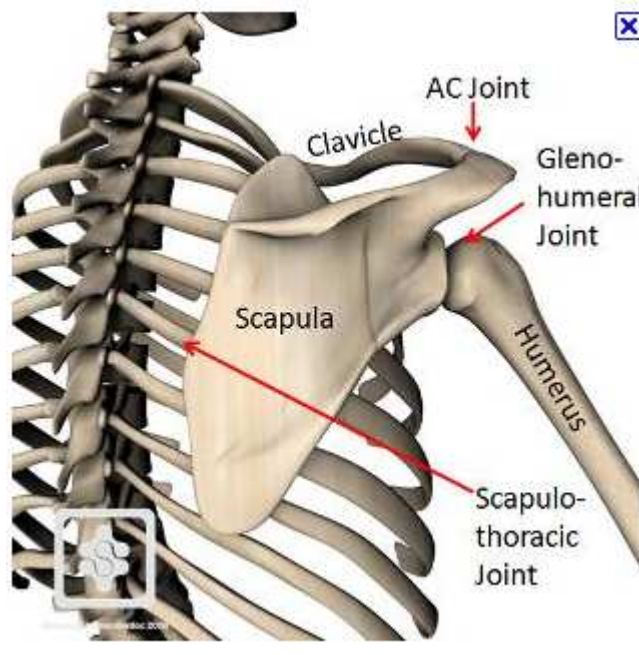
- **Biceps**
- **Triceps**

Shoulder

- **Glenoid Fossa** – bit on the scapula where head of humerus sits
- **Glenohumeral Joint** – where head of humerus inserts into scapula
- **Congruency** : Maintaining optimal surface contact
- **Function of shoulder** to maintain congruency between **head of humerus** and **glenoid fossa**
- Joints of the shoulder:
Glenohumeral: (top of humerus into socket)

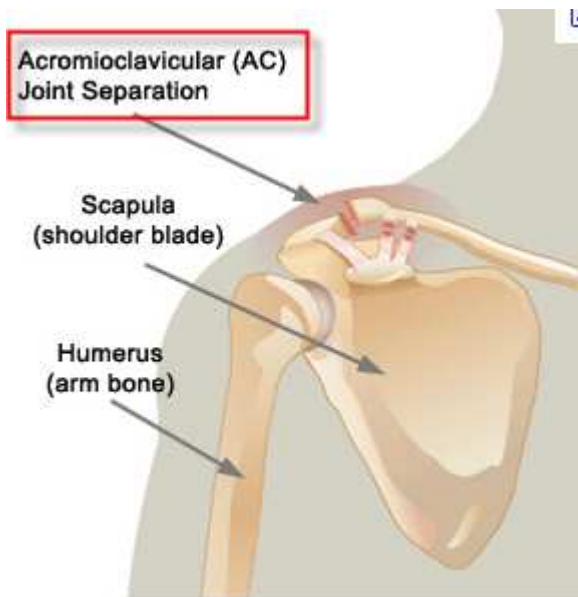


Scapulothoracic :

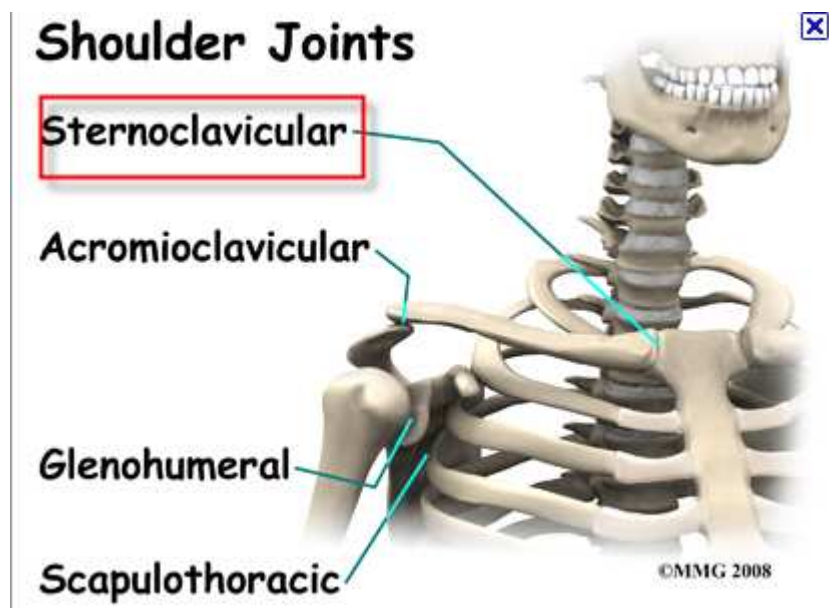


Acromioclavicular :

The **acromioclavicular joint**, or **AC joint**, is a joint at the top of the shoulder. It is the junction between the acromion (part of the scapula that forms the highest point of the shoulder) and the clavicle.



Sternoclavicular



Rotator Cuff

- [SITS](#)
- SupraSpinatus
- InfraSpinatus
- Teres Minor
- SubScapularis

- These muscles arise from the scapula and connect to the head of the humerus forming a cuff at the shoulder joint.
- They hold the head of the humerus in the glenoid fossa of the scapula
- During elevation of the arm, the rotator cuff compresses the glenohumeral joint in order to allow the deltoid to further elevate the arm
- Without the rotator cuff, the humeral head would ride up partially out of the glenoid fossa and the efficiency of the deltoid would be less

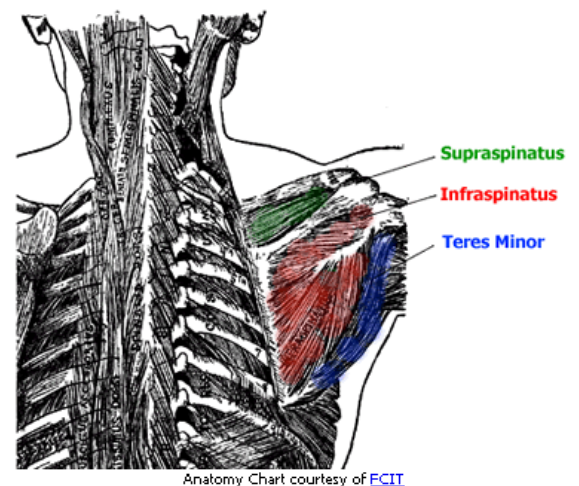
The *Rotator Cuff* is a group of muscles that work in the shoulder joint to keep the humerus from popping out. This makes the *Rotator Cuff* critical for shoulder stability.

There are four muscles in the *Rotator Cuff*: the *Teres Minor*, the *Infraspinatus*, the *Supraspinatus* and the *Subscapularis* (not pictured - it lies on the front aspect of the scapula)

These muscles all work together to keep tension on the humerus, locking it into the shoulder joint.

The *Rotator Cuff* is one of the primary areas of shoulder trauma; when someone has a shoulder injury, chances are very good that is related to injury in the *Rotator Cuff*.

This trauma can be due to sudden injury or can be from overuse in undesirable movement patterns. The upright row exercise is a prime example of this undesirable movement pattern.



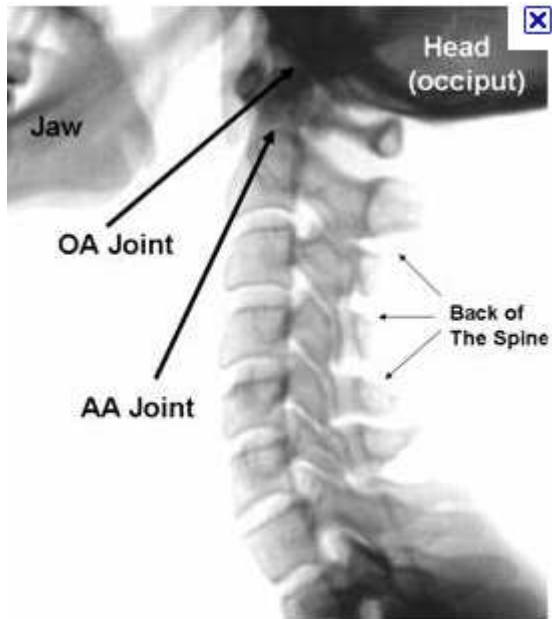
Anatomy Chart courtesy of [FCIT](#)

Functions

The main functions of the *Rotator Cuff* are shoulder joint stabilization and external rotation of the humerus (rotating the arm to the rear).

Joints of the Head & Neck

- **OA Joint** : Flex / Ext & Lateral Flex
- **AA Joint** : Rotation



The AA joints (atlanto-axial joints) and the OA (occipito-atlantal joints) are the uppermost joints in the spine lying just below the head.

Sundry

- Plantar Flexion : Point Toes
- Dorsi Flexion : Draw Back Toes

MultiFifius

Stabalise lower back

Lateral Flexion (if only one side working) (Quadratus Lumborum – see next – also does lateral flexion)

Extension (if both sides working together)

The multifidi are part of the deep stabilization core system. In Latin, "multus" means "many", and "findo" means to cleave". This muscle runs the entire length of the spine, but they are most prominent in the lumbar region.

Because these muscles are so prominent in the lower back, they play a major role in stabilizing the lower back.

Here is a basic over view of the anatomy of this deep lower back muscle.

Origin/ Starting Point:

This muscle starts on the laminae of S4 (sacrum) to C2 (cervical spine/ neck). The lamina is the part of the vertebra between the transverse process and spinous process on the back of the vertebra.

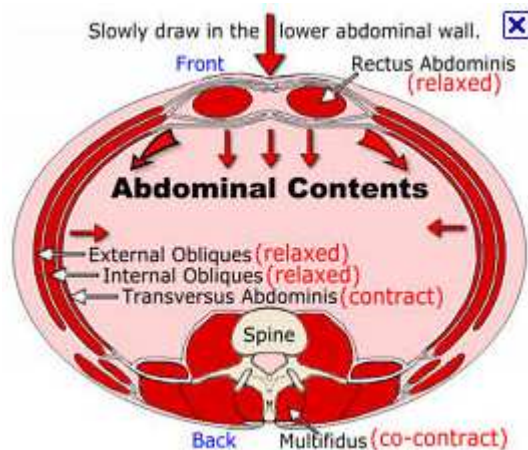


Insertion/ Ending Point:

The fibers of each individual muscle span only 1-3 vertebrae levels and inserts on the spinous processes of the vertebrae 1-3 levels higher.

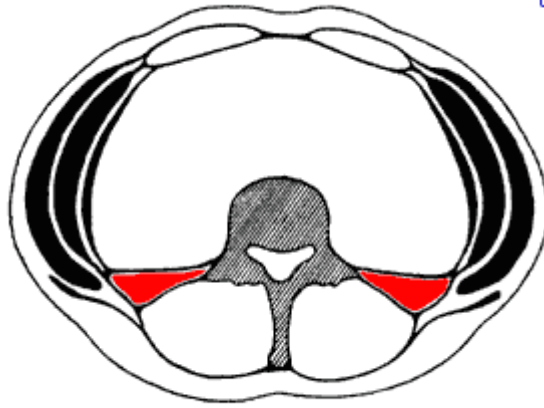
Actions:

When only one side is working at a time, this muscle will help to laterally flex the spine (side bending) or rotate the spine to the opposite side (i.e. the right side will rotate the body to the left). When both side work at the same time, it will also extend the spine (pull it backwards) or stabilize the lower back.

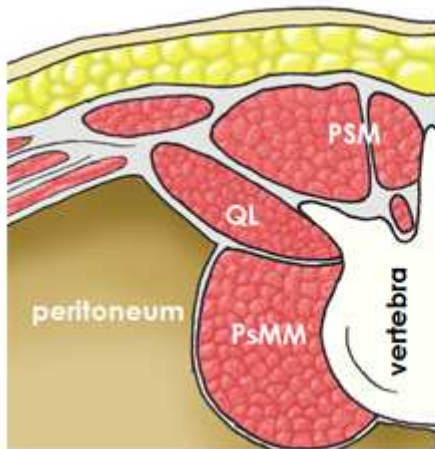


Quadratus Lumborum

[Lateral spinal flexion](#)



© 2007 ExRx.net



PSM = paraspinal muscles
(e.g., multifidus & erector
spinae muscles)

QL = quadratus lumborum
muscle

PsMM = psoas major muscle

