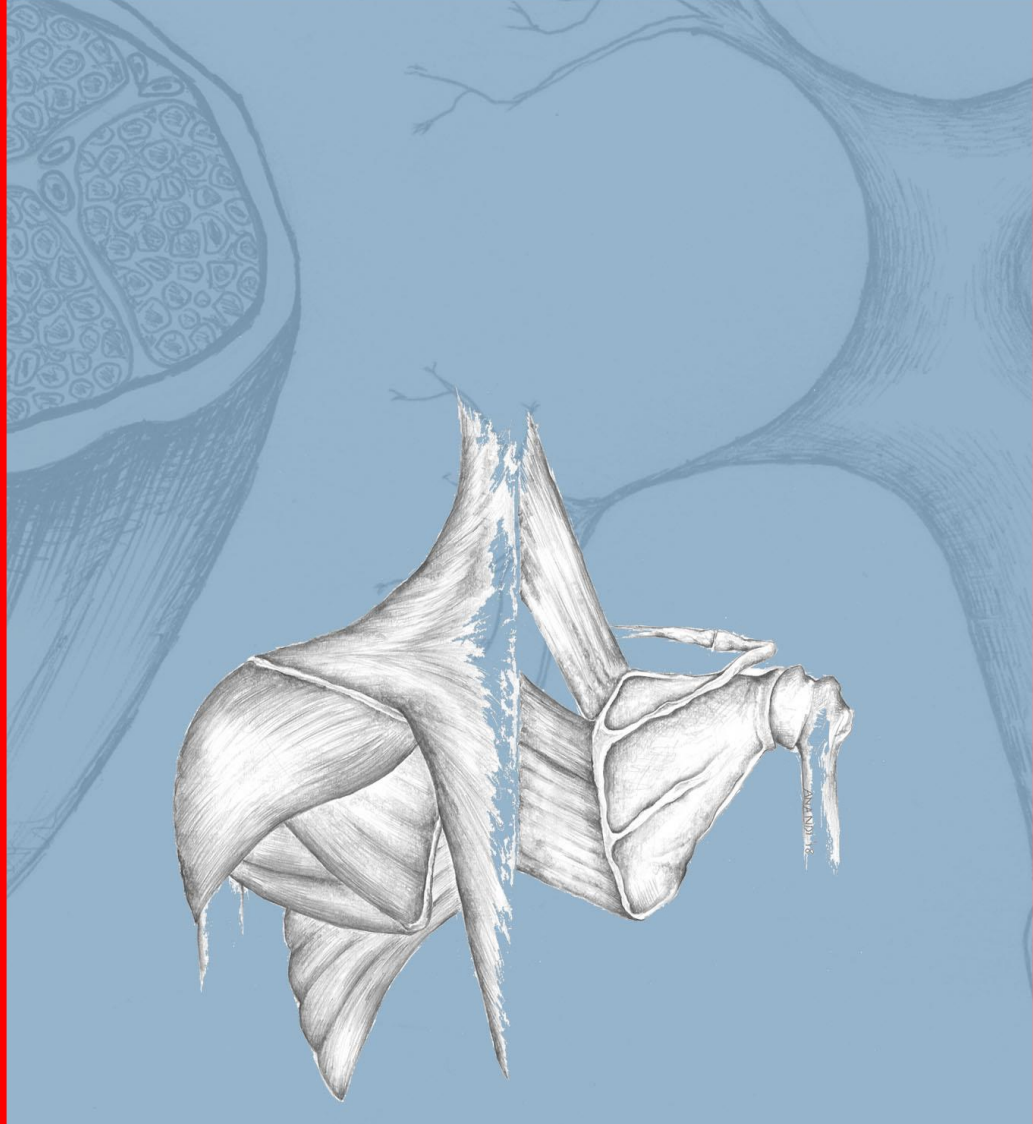


Shoulders

Pre - Study Guide



Shoulder stabilization & precision in rehabilitation

Contents

Anatomy.....	3
Functional joint range.....	3
Anatomical terminology	5
Positional terminology.....	5
Directional terminology.....	5
Shoulder blade and movements.....	6
Bones and Muscles	Error! Bookmark not defined.
Quick Quiz.....	12
References	13



This pre-study guide is there to ensure that you are able to absorb the information in the course to YOUR Maximum capacity. We hope that you are as excited as we were when we set up of-course online. Our passion is post education and our objective is to leave you feeling inspired and motivated.

Let's get started!

Anatomy

Concentric contraction:

Shortening of the muscle against high or low load which will decrease the joint angle

Eccentric work:

Controlling a joint as the muscle lengthens against high resistance.

Eccentric control:

Controlling a joint as the muscle lengthens against low resistance.

When looking at the anatomy of the shoulder, remember that a muscle works and controls both eccentrically and works under high or low load concentrically. Therefore a muscle could be weaker concentrically but stronger eccentrically depending on the activities and load that you expect it to endure on a daily basis. This is usually the case for the external rotators of the shoulder joint due to our everyday activities being predominantly in humeral medial rotation and flexion. However this does not mean that the muscle is strong, it just means that there is more effort exerted from the muscle in an eccentric or concentric position on a daily basis.

What is muscle strength?

A group of muscles may have a great ability to contract but the amount of load and repetitions that the group can handle will indicate the amount of strength that the group has. Therefore, in order to obtain strength, we need to add resistance and additional repetitions.

Hence, through postural assessment we cannot conclude that muscles are strong or weak until we physically test them.

Functional joint range

The shoulder joint has a large amount of mobility with little stability due to shallow insertion of the humeral head into the glenoid cavity. Additional to this the general population is unaware of how their shoulders should work and therefore they end up compensating in most of the movements that they perform.

A natural shoulder joint range is **180 degrees** flexion, **45 - 60 degrees** extension, **80 - 90 degrees** external rotation and **70 - 90 degrees** medial rotation. However joint range also depends on the flexibility of the muscles, ligaments and capsule surrounding the joint.

Shoulder disassociation:

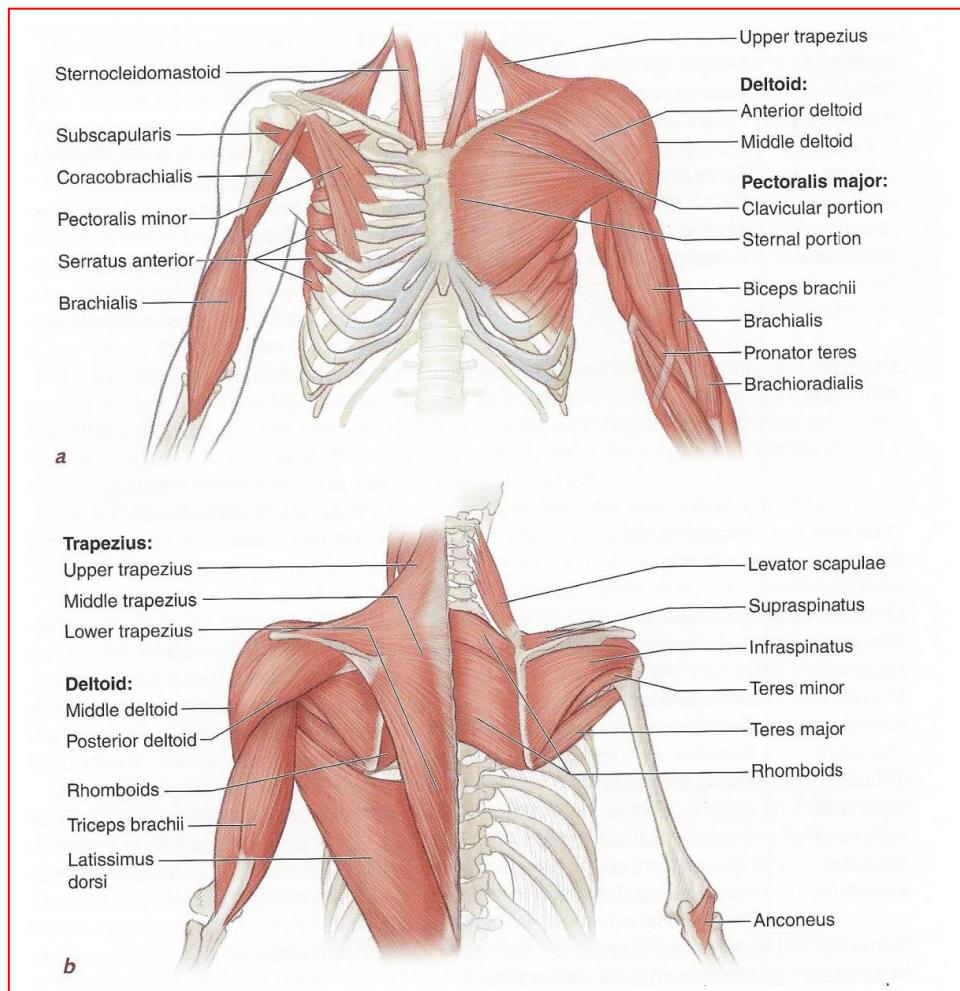
Movement in the shoulder joint should be free. There should be a mind connection to the blade of the shoulder and less connection to what the arm is doing.

Shoulder depression should never be forced; it should be a feeling of relaxing the shoulder blades down to your hips. If we forcefully press them down, then we will engage latissimus dorsi as this muscle is innovated easily against force and load due to its global positioning.

Why less latissimus dorsi?

The 'lats' are attached to the upper humeral head and the forceful activation of the 'lats' to depress the shoulders will cause the humeral head to be pulled away from the glenoid cavity (socket)

This will de-stabilize and weaken the shoulder long term.





Anatomical terminology





Positional terminology



Anatomical position	Standing, feet and palms facing towards the front
Supine	Lying on the back
Prone	Lying on your abdomen





Notes:



Directional terminology

Anterior  In front of/ to the front e.g. *Arm moves to the front / Muscle in the front*
Posterior  To the back of/ behind e.g. *Arm moves to the back / Muscle to the back*

Lateral   Move toward the outside e.g. *Turn your arm out*
Medial   Move toward the centre e.g. *Turn your arm in*

Inferior  Below / towards the feet e.g. *Inferior angle of the shoulder blade*
Superior  Above / towards the head e.g. *Superior border of the shoulder blade*

Proximal   Closer to the centre e.g. *Rhomboids are proximally situated*
Distal   Further from the centre e.g. *Serratus anterior is distally situated*

Abduct  Movement away from the midline e.g. *Move the arm away from the body*
Adduct  Movement towards the midline e.g. *Move the arm towards the body*

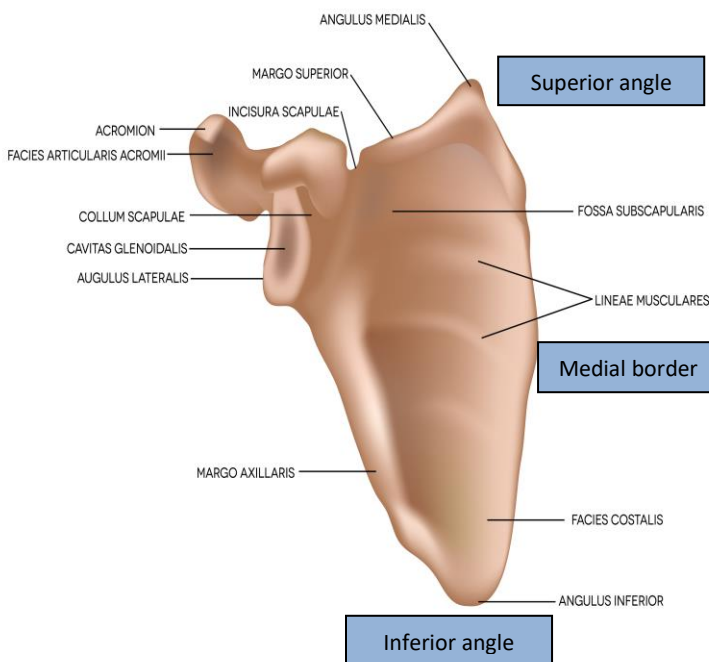
Notes:

Muscles are named by:

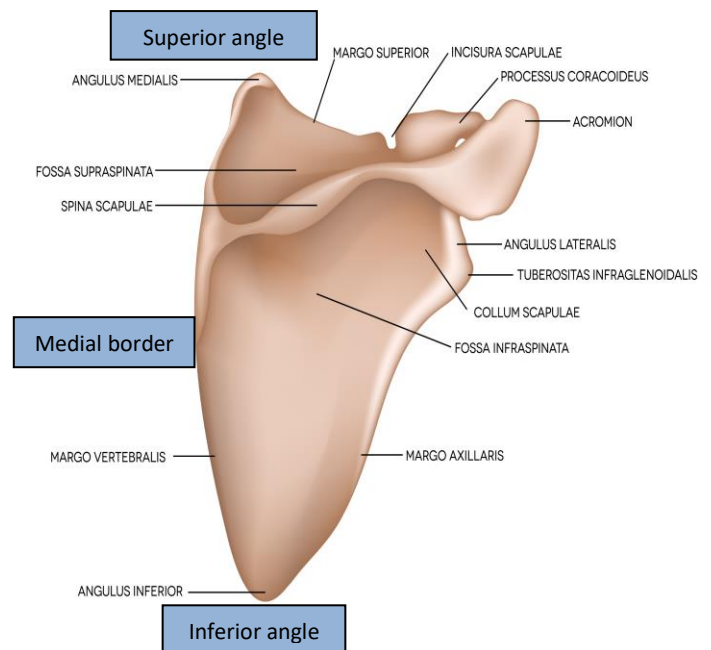
- How many / grouping e.g. triceps and biceps.
- Action e.g. adductor magnus
- Fibre organisation e.g. VMO (vastus medialis oblique)
- Location or relative position e.g. rectus femoris or serratus anterior
- Structure, size & shape e.g. gluteus maximus

Shoulder blade and movements

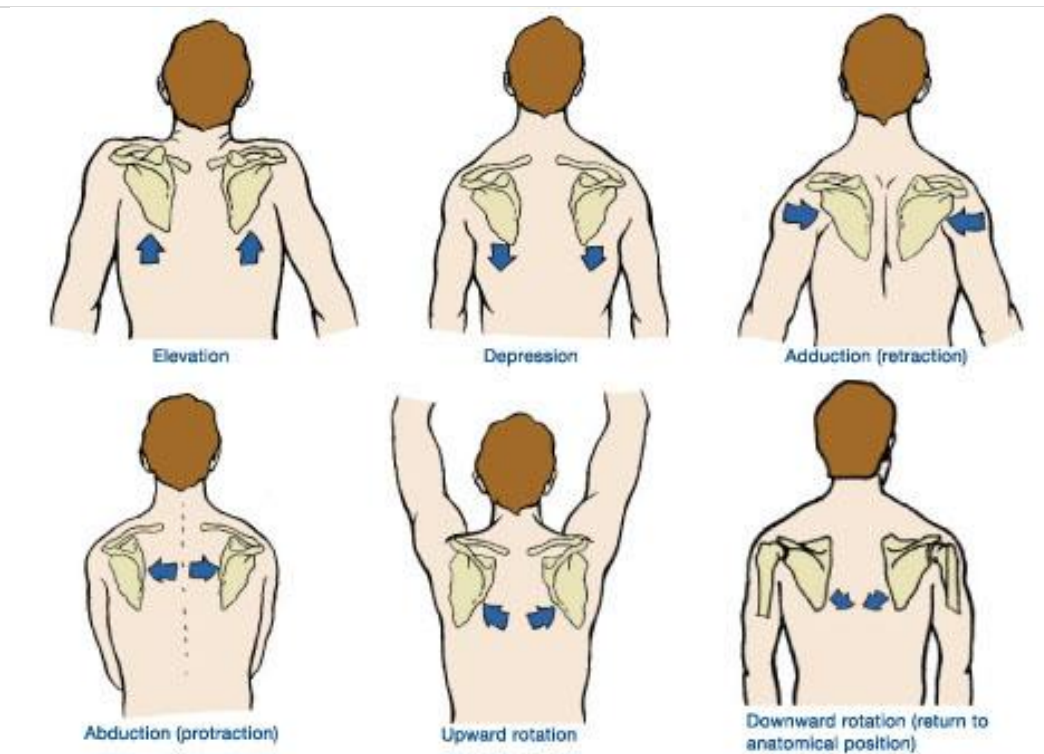
RIGHT SHOULDER BLADE (SCAPULA)



FROM IN FRONT

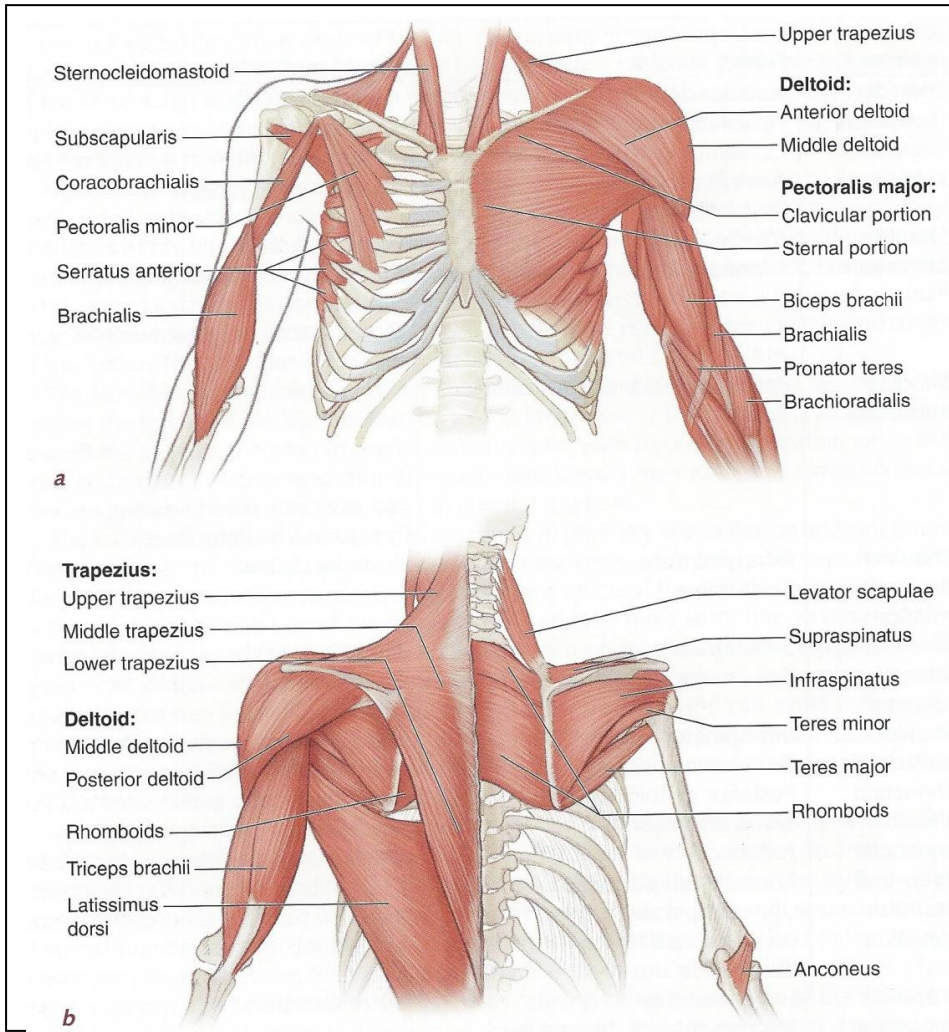


FROM BEHIND



Musculoskeletal system

Bones	Description
Scapula	The scapula has an inferior and superior angle as well as a medial and superior border. It is a gliding joint and glides across the rib cage. It has the ability to elevate, depress, adduct (retract), abduct (protract)
Clavicle	This is the collarbone which ends in the acromion (collarbone attaches to shoulder blade)
Gleno - Humeral joint	Where the head of the humerus fits into the cup shaped glenoid cavity. A ball and socket joint which is shallow and forms part of the scapula, allowing for the largest range of motion but the least stability. The gleno-humeral joint works together with the scapula for shoulder stabilisation
Humerus	This is the upper arm bone. The head of the humerus fits into the Glenoid cavity (part of the shoulder blade) to form the ball and socket shoulder joint
Ulna, radius	Parallel bones in forearm
Olecranon	This is the anatomical word for the elbow and comes from the ulna. It can also be called the decranon.
Carpals	2 rows of 4 bones in wrist which are followed by the Metacarpals and then the Phalanges



Remember:

Functional joint range

The shoulder joint has a large amount of mobility with little stability in the sense that generally the population is not aware of how their shoulders should work and therefore they end up compensating in most movements that they do.

A natural shoulder joint range is **180 degrees** flexion, **45 - 60 degrees** extension, **90 degrees** external rotation and **70 – 90 degrees** medial rotation.

However joint range also depends on the flexibility of the muscles surrounding the joint.

Lateral shoulder rotators

Muscle	Movement	Antagonist	Position
Infraspinatus	External rotation of the humerus	Teres major, latissimus dorsi, pectoralis major	Lies on posterior scapula and attaches to posterior upper humerus
Teres minor	External rotation of the humerus	Teres major, latissimus dorsi, pectoralis major	Lies on posterior scapula, beneath the infraspinatus and attaches to posterior upper humerus
Supraspinatus	Abduction of humerus and assists in lateral humeral rotation	Latissimus dorsi, subscapularis (abduction) teres major and subscapularis, latissimus dorsi, pectoralis major (lateral rotation)	Lies above the spine of scapula (fossa supraspinata) and attaches to the head of the humerus

Medial shoulder rotators

Muscle	Movement	Antagonist	Position
Teres major	Internal rotation of the humerus	Teres minor, infraspinatus, supraspinatus	Runs from posterior scapula and attaches to the anterior upper humerus
Subscapularis	Internal rotation of the humerus and adduction of humerus	Teres minor, infraspinatus (internal rotation) deltoid, supraspinatus (adduction)	Lies anterior to the scapula and attaches to the head of the humerus
Latissimus dorsi	Medial rotation, extension and adduction of the humerus	Infraspinatus, teres minor (medial rotation) anterior deltoid, biceps (extension) supraspinatus and medial deltoid (adduction)	Runs from humerus to below the scapula and attaches at the thoracic and lumbar fascia
Pectoralis major	Humeral adduction in horizontal plane & medial shoulder rotation	Teres minor, infraspinatus (medial rotation) and posterior deltoid (adduction)	Runs from the clavicle and the ribs to the humerus

Shoulder abductors

Muscle	Movement	Antagonist	Position
Supraspinatus	Abduction of the humerus and assists in lateral shoulder rotation	Latissimus dorsi, subscapularis (abduction) teres major and subscapularis, latissimus dorsi, pectoralis major (lateral rotation)	Lies above the spine of scapula (fossa supraspinata) and attaches to the head of the humerus
Deltoid anterior, medius, posterior	Flexion, abduction and extension of the humerus	Latissimus dorsi, long head of tricep, posterior deltoid (flexion) Teres major, subscapularis, latissimus dorsi (abduction) anterior deltoid, bicep and pectoralis major (extension)	Runs from the clavicle and the acromion to the humerus

Shoulder adductors

Muscle	Movement	Antagonist	Position
Pectoralis major	Shoulder adduction in horizontal plane & medial shoulder rotation	Teres minor, infraspinatus (medial rotation) and posterior deltoid (adduction)	Runs from the clavicle and the ribs to the humerus
Latissimus dorsi	Medial rotation, extension and adduction of the shoulder	Infraspinatus, teres minor (medial rotation) anterior deltoid, biceps (extension) supraspinatus and medial deltoid (adduction)	Runs from humerus to below the scapula and attaches at the thoracic and lumbar fascia
Subscapularis	Internal rotation of shoulder and adduction of humerus	Teres minor, infraspinatus (internal rotation) deltoid, supraspinatus (adduction)	Lies anterior to the scapula and attaches to the anterior area of the head of the humerus

Shoulder flexors

Muscle	Movement	Antagonist	Position
Pectoralis major	Shoulder adduction in horizontal plane & medial shoulder rotation, upper fibres do flexion	Teres minor, infraspinatus (medial rotation) and posterior deltoid (adduction)	Runs from the clavicle and the ribs to the humerus
Deltoid anterior	Flexion, abduction	Latissimus dorsi, long head of tricep, posterior deltoid (flexion)	Runs from the clavicle and the acromion to the humerus
Coracobrachialis	Shoulder flexion and adduction	Triceps brachii (long head), latissimus dorsi, posterior deltoid	Coracoid process to the humerus
Biceps Brachii (short head)	Flexes shoulder and forearm (synergist to brachialis)	Triceps brachii, latissimus dorsi, posterior deltoid	Runs from shoulder joint to the radius

Shoulder extensors

Muscle	Movement	Antagonist	Position
Latissimus dorsi	Medial rotation, extension and adduction of the shoulder	Infraspinatus, teres minor (medial rotation) anterior deltoid, biceps (extension) supraspinatus and medial deltoid (adduction)	Runs from humerus to below the scapula and attaches at the thoracic and lumbar fascia
Deltoid posterior	Abduction and extension of shoulder joint	Latissimus dorsi, subscapularis (abduction) anterior deltoid, biceps and pectoralis major (extension)	Runs from the clavicle and the acromion to the humerus
Triceps brachii	Extend forearm, long head - extends the shoulder	Biceps brachii and brachialis, in arm extension - anterior deltoid, pec major	Longhead: runs from the scapula and attaches over the elbow Lateral and medial head: runs from the top of the humerus and attaches over the elbow

Scapula abductors (protractors)

Muscle	Movement	Antagonist	Position
Serratus anterior	Abduction of shoulder blades, last 60° of shoulder flexion	Rhomboids, middle traps, latissimus dorsi, anterior deltoid, pectoralis major (in flexion), coracobrachialis	Runs from anterior part of scapula to the ribs
Pectoralis major (through pulling the humeral head anteriorly)	Shoulder adduction in horizontal plane & medial shoulder rotation, upper fibres do flexion	Teres minor, infraspinatus (medial rotation) and posterior deltoid (adduction)	Runs from the clavicle and the ribs to the humerus

Scapula adductors (retractors)

Muscle	Movement	Antagonist	Position
Middle Trapezius	Adducts the scapulae	Serratus anterior, pectoralis major	Medial border of scapula to spine
Rhomboids major and minor	Adducts the scapulae (major), elevates and adducts the scapula (minor)	Serratus anterior, pectoralis major (adduction) Lower trapezius (elevation)	Runs from the medial border of scapula to the thoracic and lower cervical vertebrae

Scapula elevation

Muscle	Movement	Antagonist	Position
Levator scapula	Elevates shoulder blade	Lower trapezius, pectoralis minor, latissimus dorsi	Superior scapula and cervical vertebrae
Upper trapezius	Elevates shoulder blade	Lower trapezius, pectoralis minor, latissimus dorsi	Occipital bone, superior scapula and thoracic vertebrae
Rhomboids minor	Elevates and adducts the scapula (minor)	Serratus anterior, pectoralis major (adduction) Lower trapezius (elevation)	Runs from the medial border of scapula to the thoracic and lower cervical vertebrae

Scapula depression

Muscle	Movement	Antagonist	Position
Lower Trapezius	Depresses shoulder blade	Upper trapezius, rhomboid minor and levator scapula	Inferior border of the scapula to the lower thoracic spine
Pectoralis Minor	Depresses shoulder blade and anteriorly tilts scapula	Upper trapezius, rhomboid minor and levator scapula	Coracoid process to ribs
Latissimus Dorsi	Depresses humerus and then directly the scapula (not recommended), shoulder extension, adduction and medial rotation.	Upper trapezius, rhomboid minor & levator scapula (depressions) Deltoid anterior, coracobrachialis, pec major, short head of the bicep (extension), teres minor, infraspinatus, supraspinatus	Runs from humerus to below the scapula and attaches at the thoracic and lumbar fascia

Pectoralis minor will also play a role in elevation if the shoulder blade is **not** in a neutral position. It will then anteriorly tilt the shoulder blade and depress it anteriorly cause the scapula to poke (inferior angle protrudes out).

NB: the position of the thoracic spine will affect the ability to stabilize the shoulder successfully.



Quick Quiz

1. Name the scapula abductors. (2)
2. What are the antagonists of the teres minor? (5)
3. What is the anatomical term for the shoulder joint? (1)
4. Name the shoulder lateral rotators. (3)
5. Name the scapula elevators. (3)
6. What muscles are attached from the scapula to the cervical spine? (3)
7. Which muscle depresses the scapula from the anterior aspect of the body? (1)
8. What are the antagonists for the anterior deltoid? (3)

WELL DONE!!

IF YOU FEEL CONFIDENT WITH THIS MANUAL THEN **LET'S GET STARTED** WITH THE COURSE!

IT'S TIME TO SHAKE THINGS UP AND START STABILIZING SHOULDERS

References

1. **Reference 1:** Kendall, F. P. , McCreary, E. K. , Provance, P. G. , McIntyre Rodgers, M, Romani, W. A. (2005). Muscles testing and functions with posture and pain. Lippincott Williams & Wilkins.
2. **Reference 2:** Leon Chaitow. (2001). Muscle Energy Techniques
3. **Reference 3:** Website: <http://en.wikipedia.org/wiki/spinal> ; Last visited, March 2012, Wikimedia foundation incorporated.
4. **Reference 4:** National strength & conditioning Association. (2012) NSCA's Essentials of Personal Training. Coburn, J.W., Malek, M.H.
5. Website: <http://www.getbodysmart.com/> ; Updated 03-07-2011
6. Thompson, T. (2007) Pilates Unlimited Post educational course Agur, A. M. R (1999) Grants Atlas of Anatomy. Lippincott Williams & Wilkins. Pg 92 – 93, 262 – 263, 270 – 271, 276 – 279, 318 -319, 322 – 323, 334 – 335, 374 – 375, 446 – 447
7. Comerford, M. J, Mottram, S L, (2007) Post educational course – Performance stability. Pg 15, 25
8. Comerford, M. J, Mottram, S L, (2007) Post educational course – Performance stability. Pg 6, 16
9. Website:www.dollarphotoclub.com; updates 2014 - 2015
10. Website: https://www.acefitness.org/images/webcontent/certifiednews/April_2012/ShoulderMvmnt.jpg