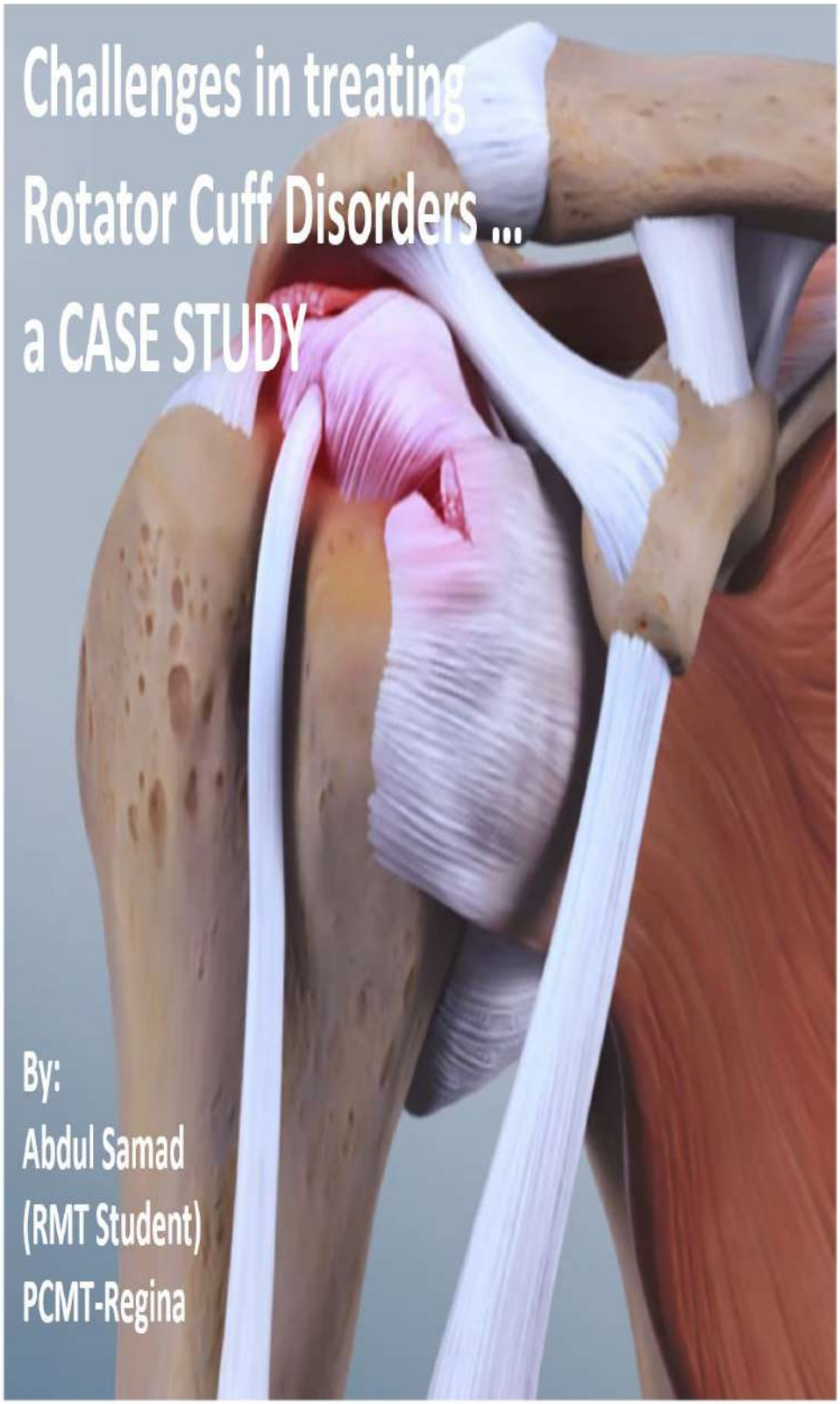
Challenges in treating
Rotator Cuff Disorders ...
a CASE STUDY
By:
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CONTENTS

CASE STUDY TITLE: "Challenges in Treating Rotator Cuff Syndrome"

By

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This Case Study submitted on Dec 3rd, 2022 in partial fulfilment of the requirements for the Diploma in Registered Massage Therapy at Prairie College of Massage Therapy-Regina Campus SK- Canada

(Batch: Apr,2022-Mar,2023)

CASE STUDY TITLE: CHALLENGES IN TREATING ROTATOR CUFF DISORDERS

Background:

Rotator cuff syndrome (RCS) is a blanket term used for several musculoskeletal conditions. Rotator cuff is made up of muscle bellies and tendons of the infraspinatus, supraspinatus, teres minor and subscapularis muscles. RCS describes any injury or degenerative condition affecting the rotator cuff. This includes subacromial impingement syndrome and bursitis, rotator cuff tendinitis, tendinosis and partial or full thickness rotator cuff tears. There is abundance of literature (Mathew J et al) showed manual therapy is found to be effective while treating chronic shoulder condition like rotator cuff disorder

This case study is based on my client (X) who is forty-five years old female suffering from consistent bilateral shoulder pain (right side), inability to perform daily routine activities like chopping vegetables, dough making and overhead activities such as combing hair, lifting glass of water. She has a history of sedentary lifestyle, never had any physical exercise or sports etc. (X) has a history of sedentary life style, underwent many radiological investigations starting from X-Rays to MRI, overly diagnosed by several ortho physicians. Cervical spondylosis, shoulder impingement syndrome, rotator cuff tendinitis and carpal tunnel syndrome are some of the diagnoses for which she had several sessions of physiotherapy but no benefit.

Introduction

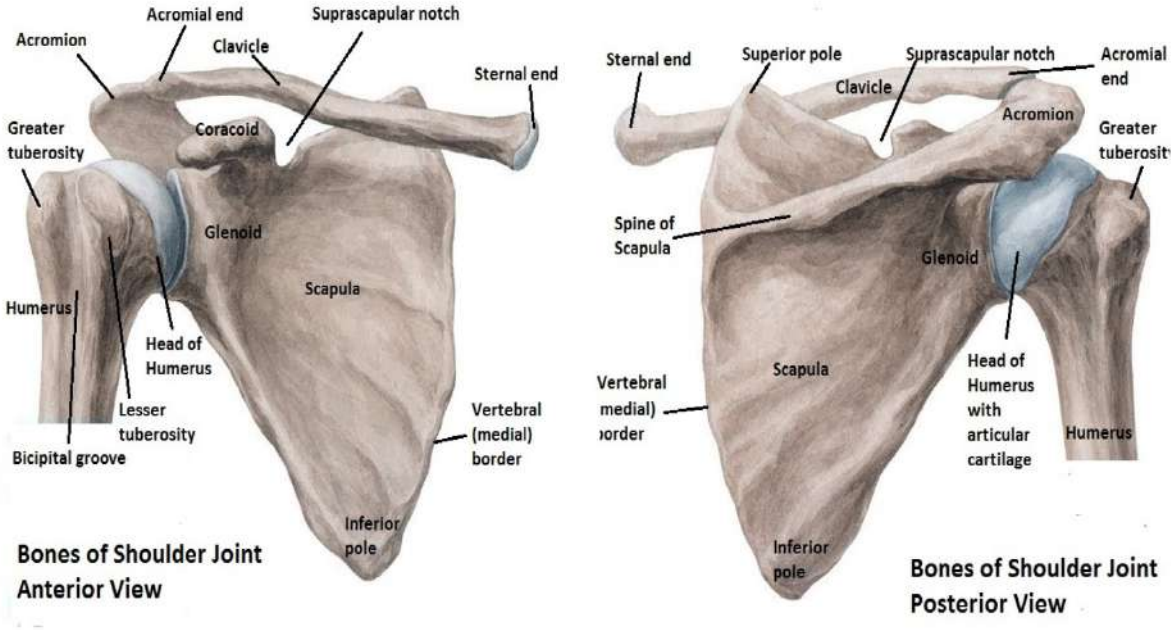
RC syndrome is a most common complaint in therapeutic massage therapy. In this condition soft tissues become painfully entrapped in the area of shoulder joint. The entrapment varies per person, resulting pain on elevation of the arm or lying on the affected side. Patients affected with this condition faces mild to severe restricted range of motion (ROM) and they are unable to perform overhead activities.

The shoulder joint is structurally and functionally complex as it is one of the most freely movable area in the human body due to the articulation at the glenohumeral joint. The glenoid cavity articulates humeral head which is almost three times bigger than glenoid fossa. The superioinferior (SI) diameter and the anteroposterior diameter of the humeral head and radius of curvature of the humeral head are 3 times larger than glenoid width, glenoid length and radius of curvature of the glenoid cavity.

The second complexity of the glenohumeral joint is glenoid cavity itself which is fixed and perpendicular to the humeral head and articulate only 25% of humeral head from the side hence the labrum and soft tissues (rotator cuff muscles) have to be very strong and flexible to keep the shoulder joint healthy and functional against the gravitational force.

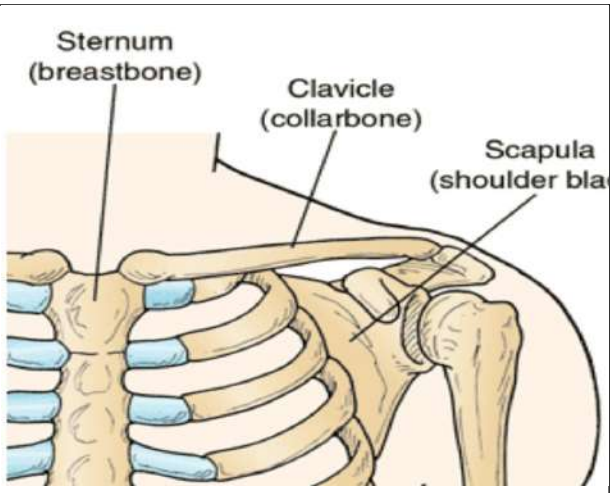
To understand the complexity of the shoulder joint, we need to study anatomy, physiology and pathology and pathophysiology in detail.

Anatomy of Shoulder Girdle



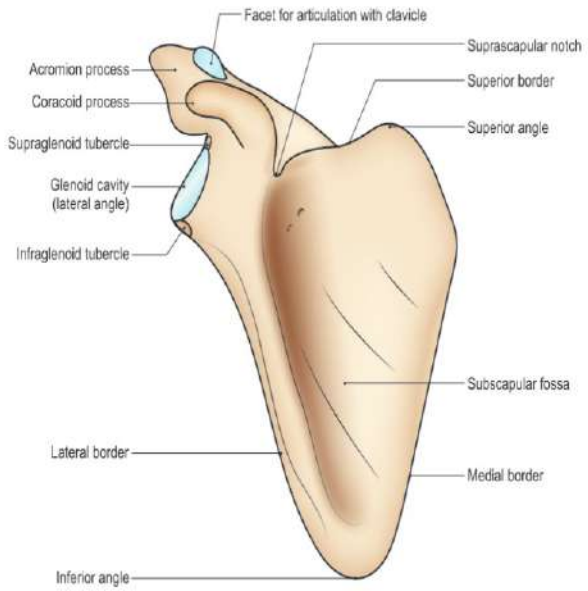
The shoulder joint is made up of four bones named Sternum (breastbone), Clavicle (Collarbone), Scapula (Shoulder blade) and humerus (upper arm bone). It has two joints, the acromioclavicular joint where the highest point of the scapula (acromion) meets the clavicle and the glenohumeral joint.

The Sternum (Breastbone):

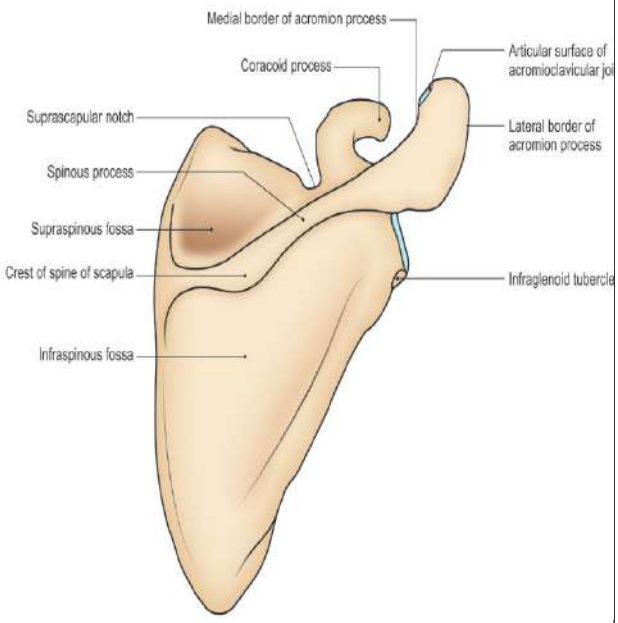
Sternoclavicular (SC)joint is a saddle shaped synovial joint that serve as a primary skeletal connection between the axial skeleton and the upper limb. It articulates the medial end of the clavicle with clavicular notch of the manubrium of sternum and the superior surface of the first costal cartilage. The articular surface of the clavicle is covered with fibrous cartilage. The capsular ligament is attached laterally to the margins of articular areas of the sternum and on the first costal cartilage.	

The Scapula (Shoulder blade):

Bony Landmark of Scapula (Costal view)



Dorsal view



The scapula is a triangular flat irregular bone located in the upper thorax region on the dorsal surface of the rib cage. It connects with the humerus (upper arm bone) at glenohumeral joint as well as the clavicle at the acromioclavicular joint to form the shoulder joint. Irregular surface of scapula articulates to many soft tissues. The Scapula has two surfaces (*costal & dorsal*), three borders (*superior, medial & lateral*), three angles (*superior, inferior & lateral or glenoid angle*) and three processes (*spinous, acromion and coracoid process*).

Surfaces

The costal surface or subscapular fossa is concave and is directed medially and forwards. It is marked by three longitudinal ridges. Another thick ridge adjoins the lateral border. This part of the bone is almost rod-like. It acts as a lever for the action of the serratus anterior in overhead abduction of the arm.

The dorsal surface gives attachment to the spine of the scapula which divides the surface into a smaller supraspinous fossa and a larger infraspinous fossa.

Borders:

The *superior border* is shortest. Near the root of the coracoid process, it presents the suprascapular notch.

The *lateral border* is thick. At the upper end, it presents the infra-glenoid tubercle.

The *medial border* is thin. It extends from the superior angle to the inferior angle.

Angles

The *superior angle* is covered by the trapezius.

The *inferior angle* is covered by the latissimus dorsi. It moves forwards round the chest when the arm is abducted.

The *lateral or glenoid angle* is broad and bears the glenoid cavity or fossa, which is directed forwards, laterally and slightly upwards (Fig. 2.7). A supra- glenoid tubercle is present above the glenoid cavity.

Processes

The spine or spinous process is a triangular plate of bone with three borders and two surfaces. It divides

the dorsal surface of the scapula into the supraspinous and infraspinous fossae. Its posterior border is called the crest of the spine. The crest has upper and lower lips.

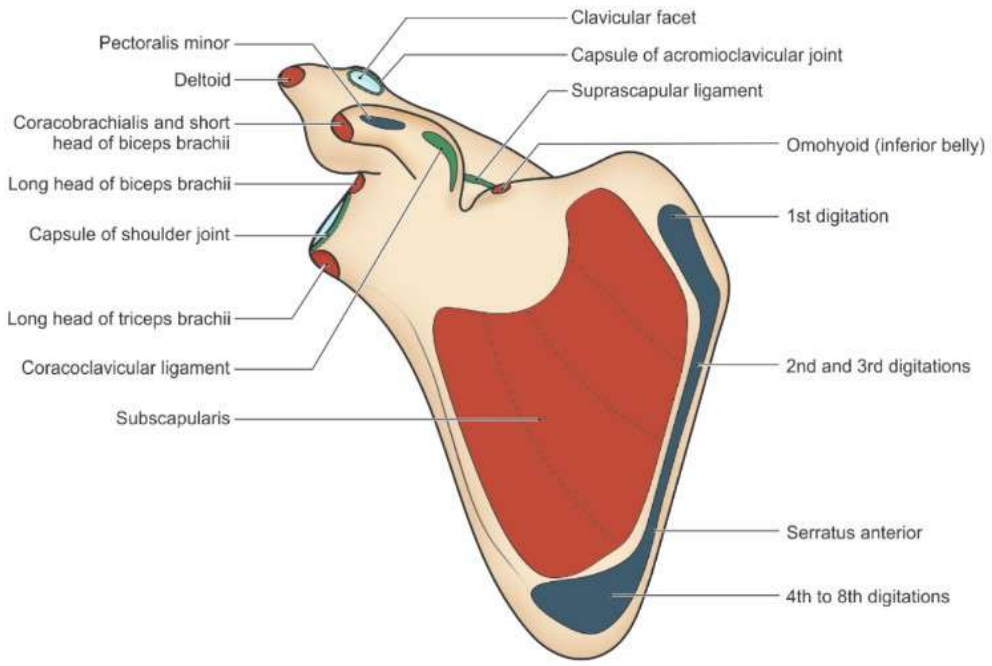
The acromion process has two borders, medial and lateral; two surfaces, superior and inferior; and a facet for the clavicle

The coracoid (Greek like a crow's beak) *process* is directed forwards and slightly laterally. It is bent and finger-like. It is an atavistic type of epiphysis

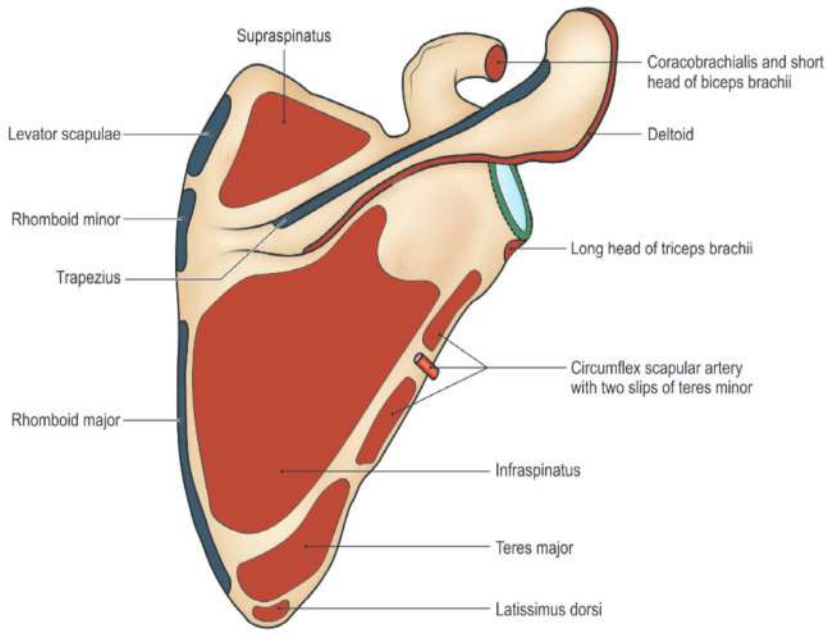
Attachments of the Scapula:

In total 17 different muscles attached to Scapula which make it difficult to fracture.

Attachments of Right Scapula (Costal aspect)



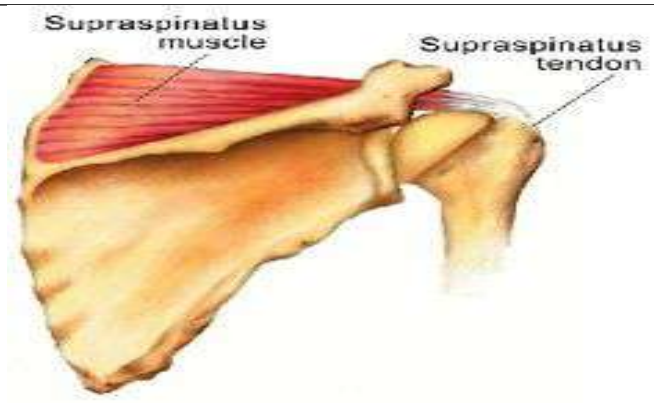
Attachment of the Scapula (Dorsal aspect)



Attachments of right scapula: Dorsal aspect

Attachments of the Scapula with Origin Insertion and Innervation

Supraspinatus:

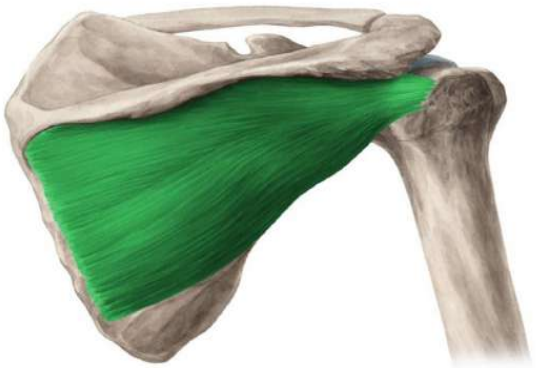


Origin:
Supraspinous fossa of the scapula

Insertion:
Greater tubercle of humerus

Nerve:
Suprascapular

Infraspinatus:



Origin:

Infraspinous fossa of the scapula

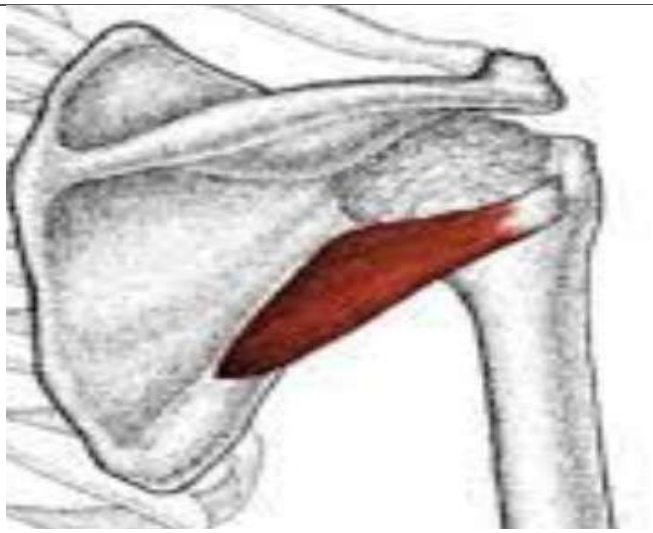
Insertion:

Greater tubercle of humerus

Action: Nerve:

Subscapular

Teres Minor:



Origin:

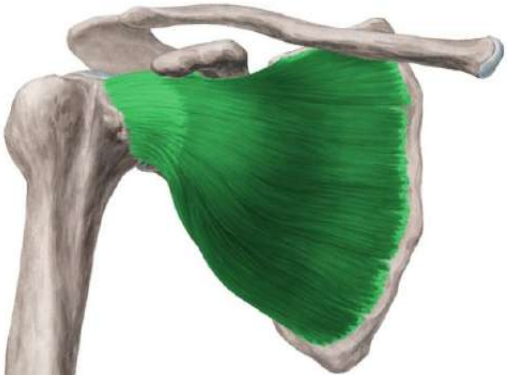
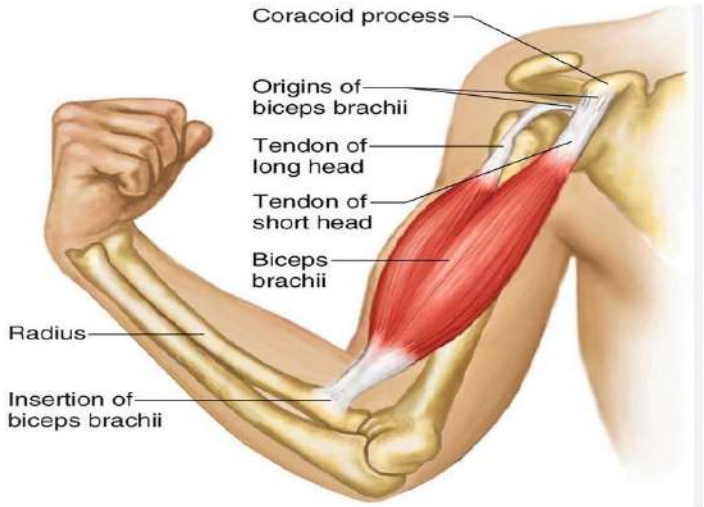
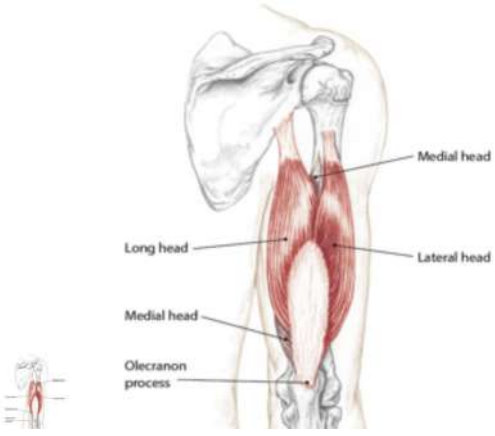
Upper two-third of lateral border of scapula

Insertion:

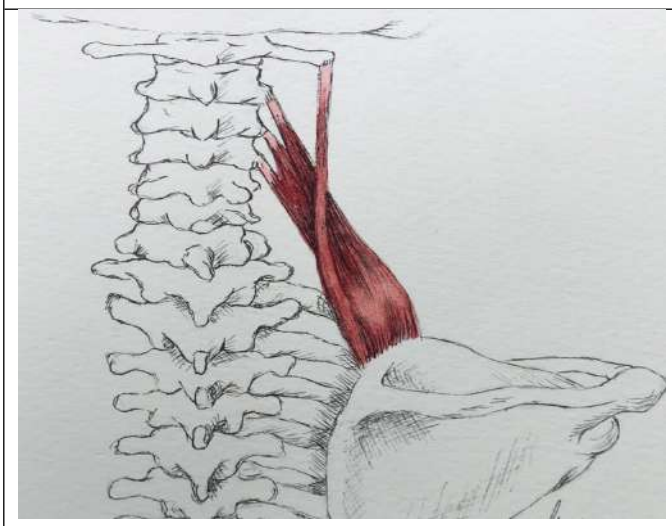
Greater tubercle of humerus

Action:

Nerve: Axillary

Subscapularis:	
	**Origin:** Subscapular fossa of the scapula **Insertion:** Lesser tubercle of humerus **Nerve:** Upper & lower subscapular
Biceps Brachii:	
	**Origin:** Long Head: Supraglenoid tubercle of scapula Short Head: Coracoid process of scapula **Insertion:** Tuberosity of the radius and aponeurosis of the biceps brachii **Nerve:** Musculocutaneous
Triceps Brachii:	
	**Origin:** Long head: Infra-glenoid tubercle of the scapula Lateral head: Posterior surface of proximal half of humerus Medial head: Posterior surface of distal half of the humerus **Insertion:** Olecranon process of the ulna **Nerve:** Radial

Levator Scapula:



Origin:

Transverse processes of first through fourth cervical vertebrae

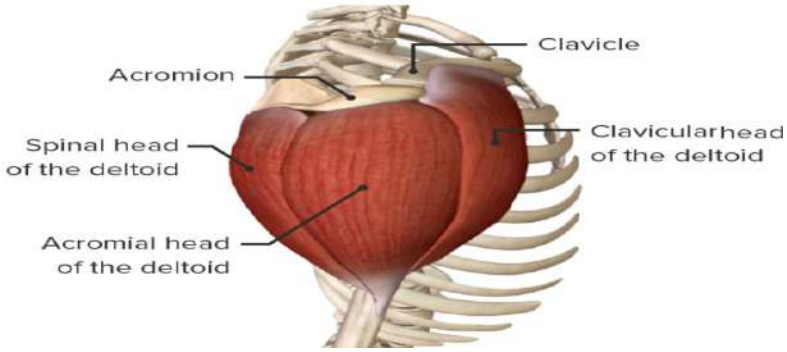
Insertion:

Medial border of scapula between superior angle and superior portion of the spine

Nerve:

Cervical & Dorsal Scapular

Deltoid:



Origin:

Lateral one-third of clavicle acromion and spine of scapula

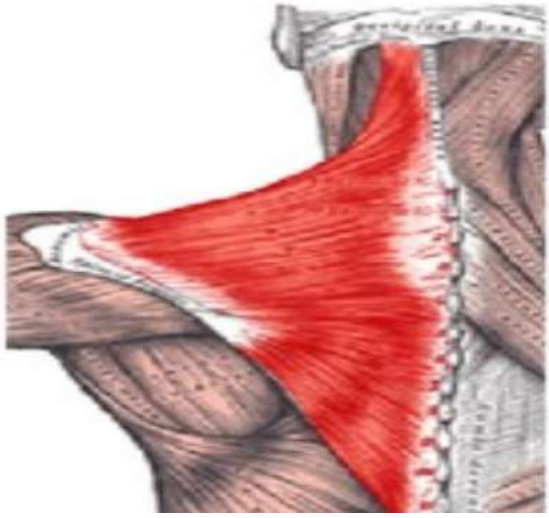
Insertion:

Deltoid tuberosity

Nerve:

Axillary

Trapezius:



Origin:

External occipital protuberance, medial portion of superior nuchal line of the occiput, ligamentum nuchae and spinous processes of C-7 through T-12

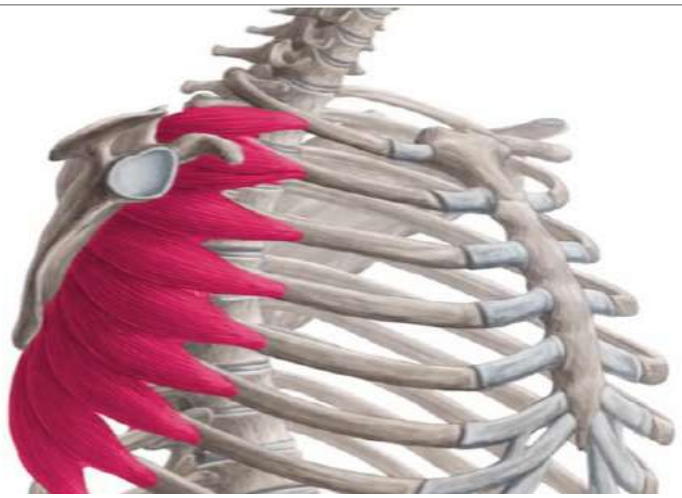
Insertion:

Lateral one-third of clavicle, acromion and spine of the scapula

Nerve:

Spinal portion of cranial

Serratus Anterior:



Origin:

External surfaces of upper 9 ribs

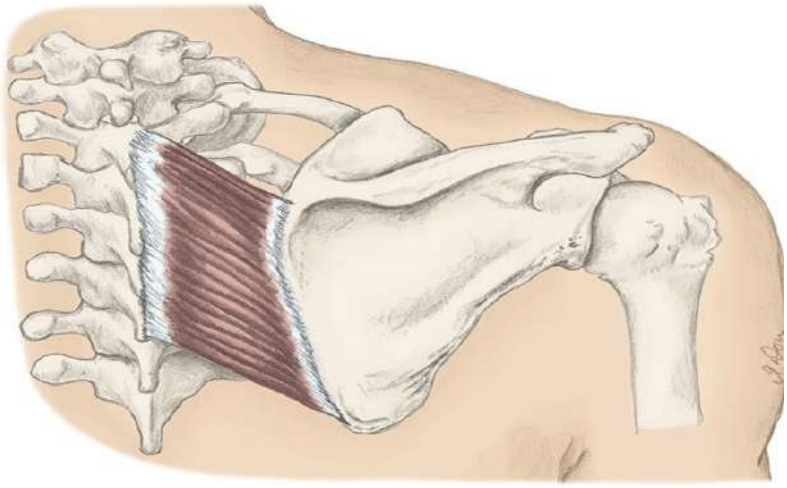
Insertion:

Anterior surface of medial border of the scapula

Nerve:

Long thoracic

Rhomboid Major:



Origin:

Spinous processes of T2-T5

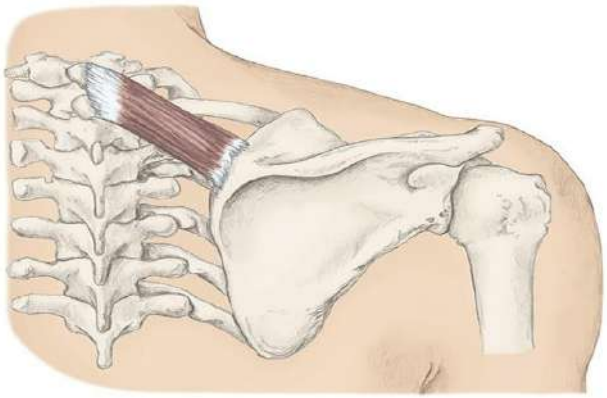
Insertion:

Medial border of scapula between the spine of the scapula and acromion process

Nerve:

Dorsal Scapular

Rhomboid Minor:



Origin:

Spinous processes of C7-T1

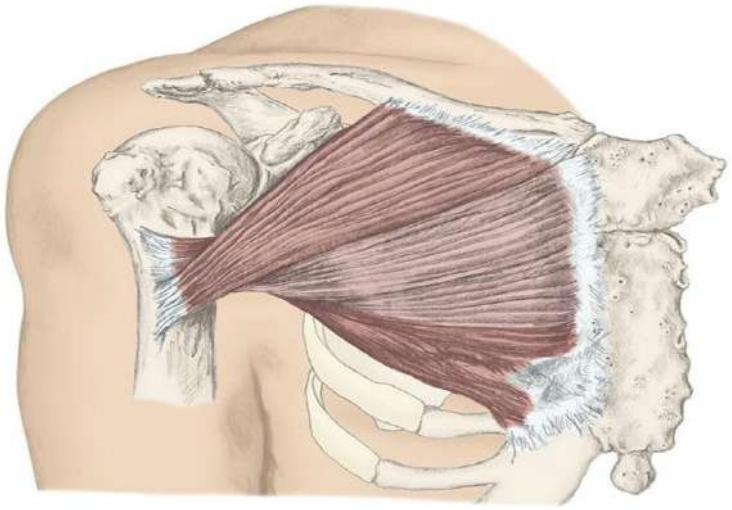
Insertion:

Upper portion of medial border of the across from spine of the scapula

Nerve:

Dorsal Scapular

Pectoralis Major:



Origin:

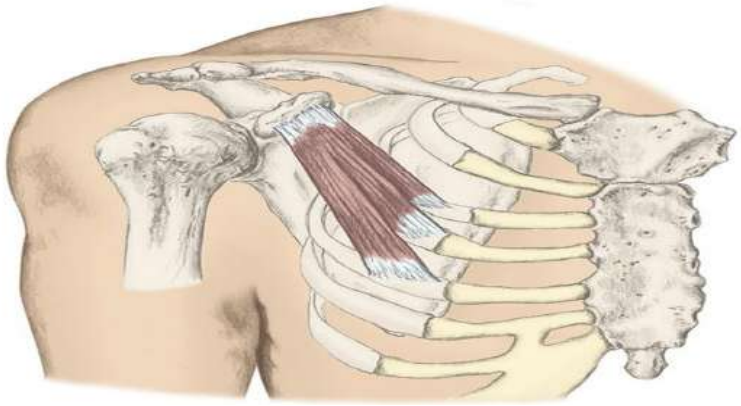
Medial border half of the clavicle, sternum and cartilage of first through sixth ribs

Insertion:

Medial border of scapula between the spine of the scapula and acromion process

Nerve:
Medial pectoral nerve

Pectoralis Minor



Origin:

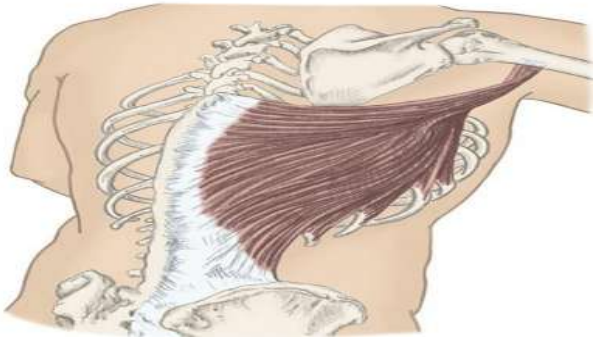
Third, fourth and fifth ribs

Insertion:

Medial surface of coracoid process

Nerve:
Medial pectoral with fibers from a communicating branch of the lateral pectoral

Latissimus Dorsi:

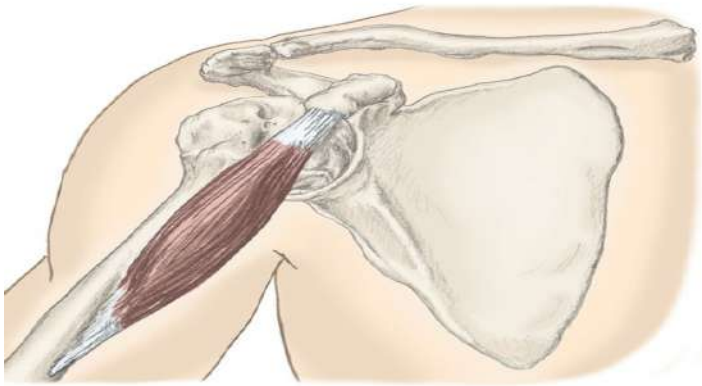


Origin: Inferior angle of scapula, spinous processes of last six thoracic vertebra, last three or four ribs, thoracolumbar fascia and posterior iliac crest

Insertion: Intertubercular grove of humerus;

Nerve: Thoracodorsal

Coracobrachialis:



Origin:

Coracoid process of scapula

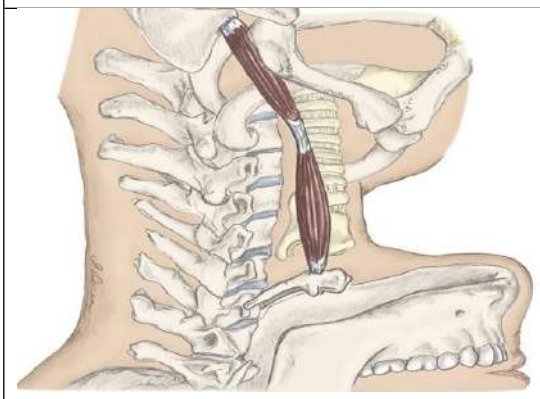
Insertion:

Medial surface of mid-humeral shaft

Nerve:

Musculocutaneous

Omohyoid:



Origin:

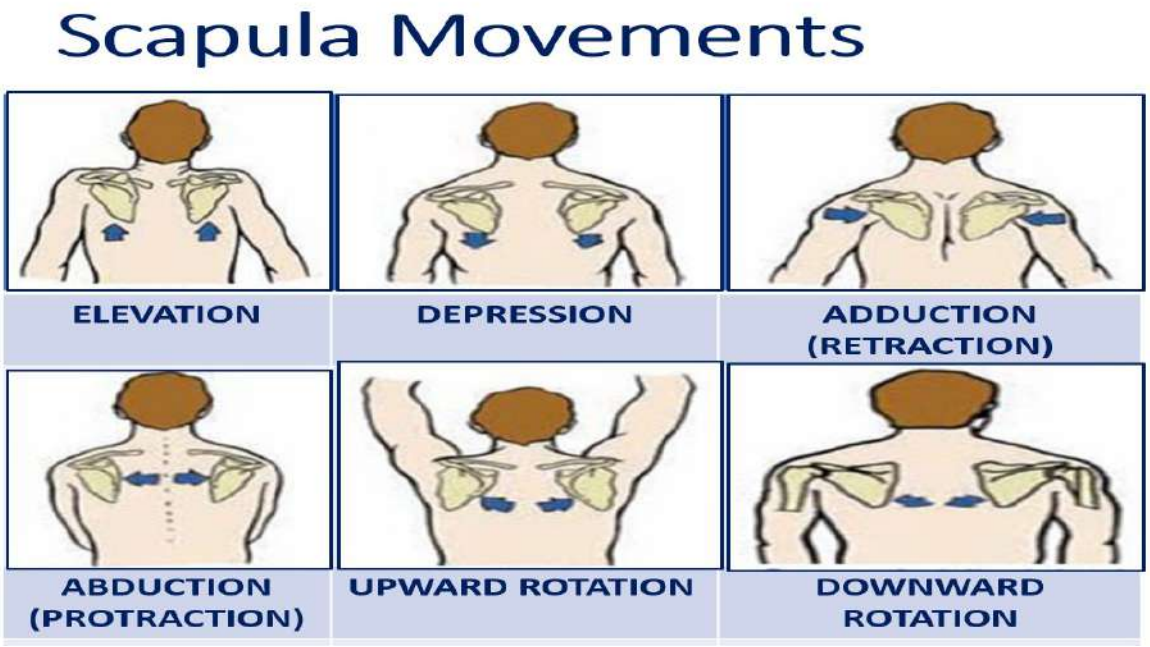
Superior border of the scapula

Insertion:

Hyoid bone

Nerve:

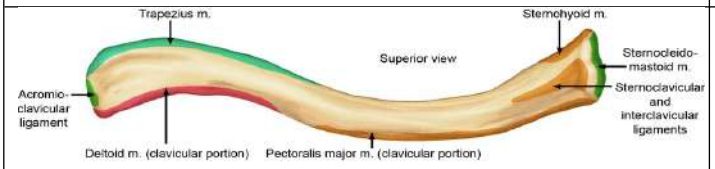
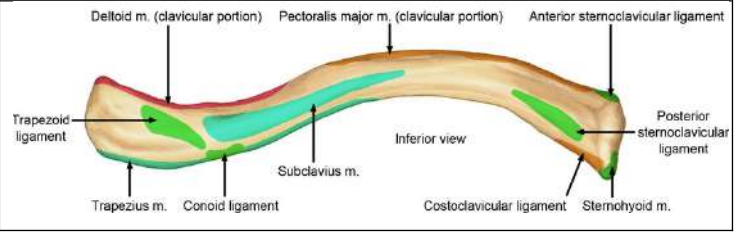
C1, 2, 3



Anatomy of the Clavicle

The clavicle connects the shoulder to the rest of the skeleton. It's positioning allows for increased range of motion of the shoulder away from the body and helps protect the arm by dispensing force transmitted through direct contact. It's rounded medial end articulates with the manubrium of sternum at the sternoclavicular joint. The lateral end is flattened which is also called as acromial end articulates with the acromion process of the scapula.

Bony landmarks of the Clavicle

Superior View	Inferior View
	

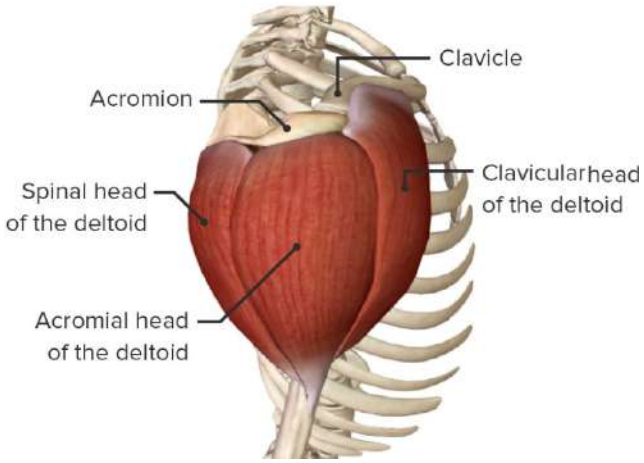
Sternoclavicular joint - the articulation of the proximal end of the clavicle and the clavicular notch of the manubrium

Clavicle - medial to lateral, comparing both sides.

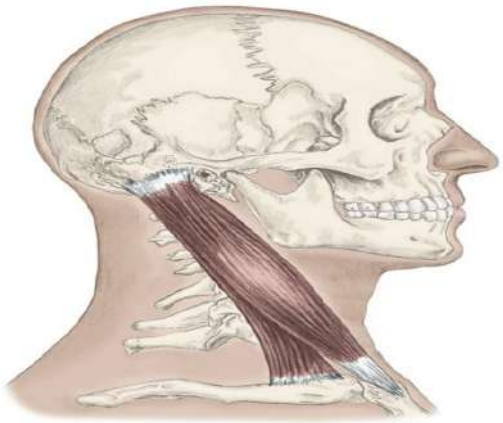
Acromioclavicular joint - the articulation between the distal end of the clavicle and the acromion of the scapula.

Attachments of the Clavicle:

A total of five (5) muscles attached to the clavicle they're listed in the following table.

Deltoid	
	**Origin:** Lateral one-third of clavicle acromion and spine of scapula **Insertion:** Deltoid tuberosity **Nerve:** Axillary

Sternocleidomastoid:



Origin:

Sternal head: Top of manubrium

Clavicular head: Medial one-third of clavicle

Insertion:

Mastoid process of temporal bone and the lateral portion of superior nuchal line of occiput

Assist to elevate the ribcage during inhalation

Nerve:

Spinal accessory

Pectoralis Major

Origin:

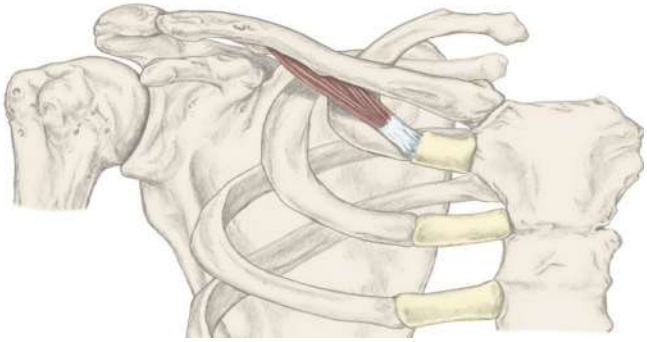
Medial border half of the clavicle, sternum and cartilage of first through sixth ribs

Insertion:

Medial border of scapula between the spine of the scapula and acromion process

Nerve: Medial pectoral nerve

Subclavius:



Origin:

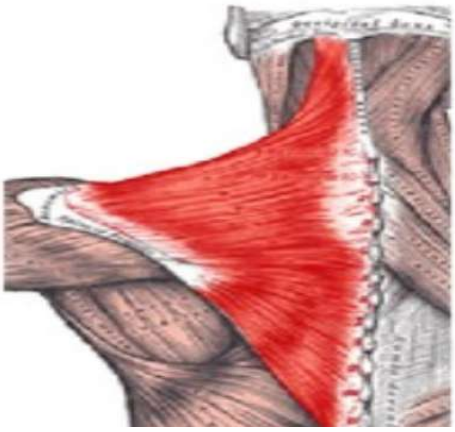
First rib and cartilage

Insertion:

Inferior surface of middle one-third of clavicle

Nerve:

Subclavian

Trapezius:	
	**Origin:** External occipital protuberance, medial portion of superior nuchal line of the occiput, ligamentum nuchae and spinous processes of C-7 through T-12; **Insertion:** Lateral one-third of clavicle, acromion and spine of the scapula **Nerve:** Spinal portion of cranial nerve (accessory) and ventral ramus

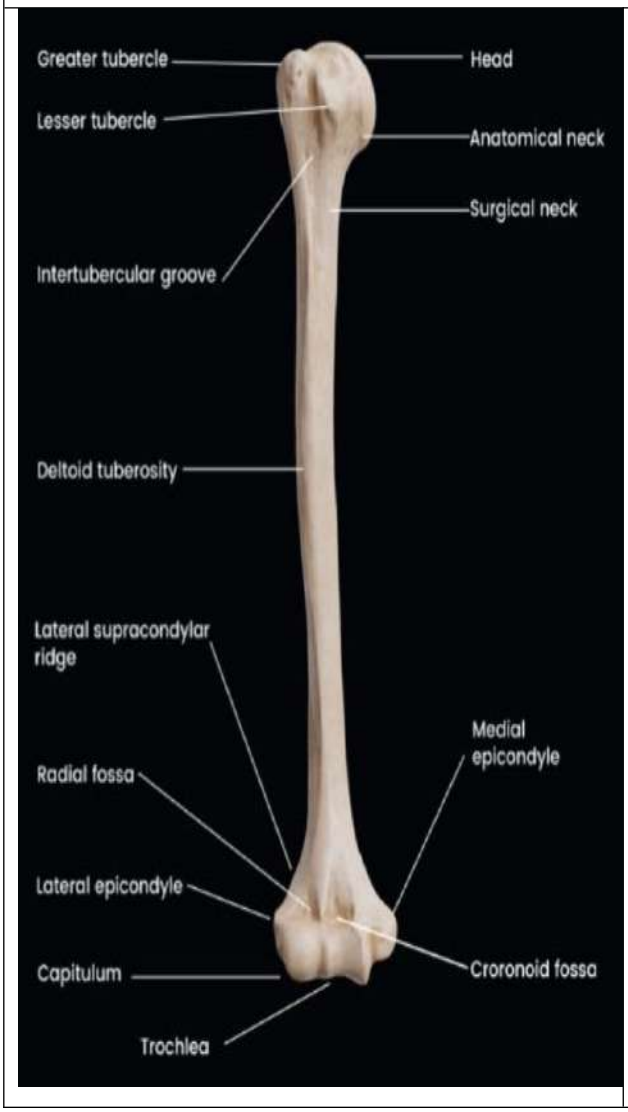
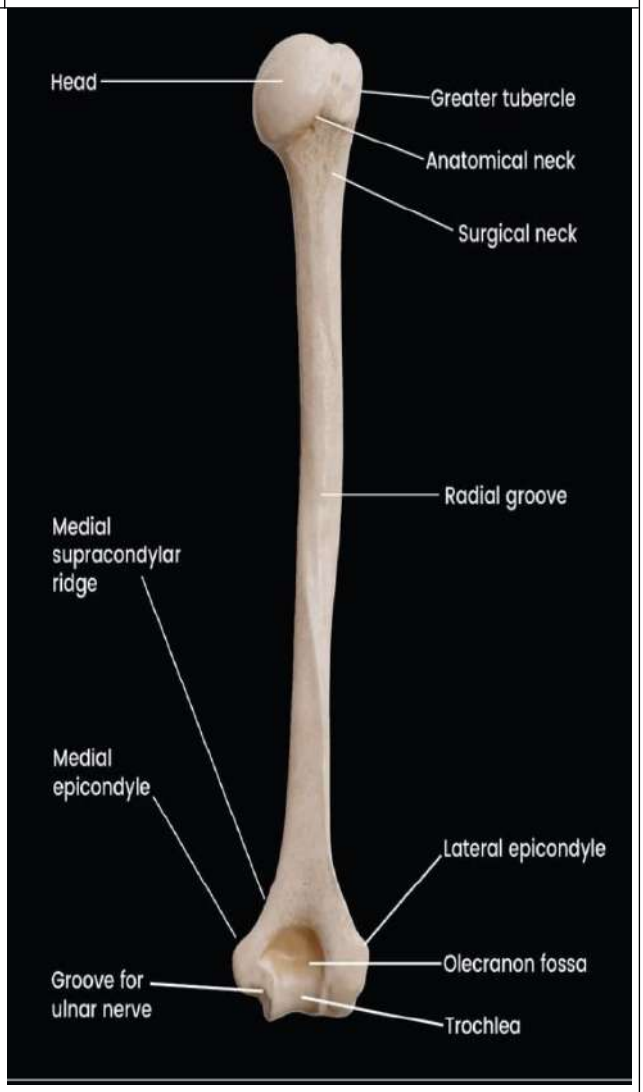
Anatomy of Humerus

The humerus is the largest bone of the upper extremity and defines the human brachium (arm). It articulates proximally with glenoid cavity via the glenohumeral joint and distally with the radius and ulna at the elbow joint.

Bony landmarks of the Humerus:

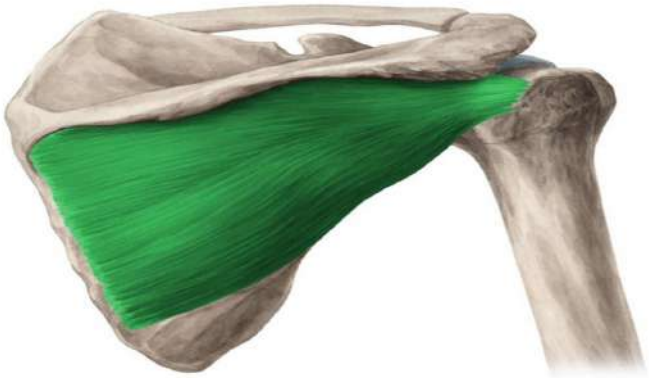
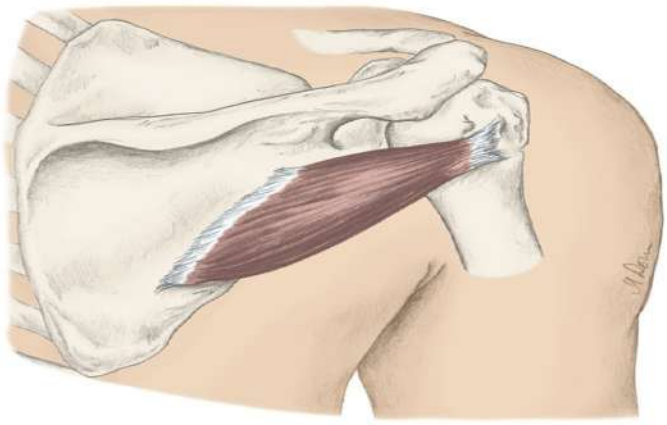
The head of the humerus is the proximal articular surface of the upper extremity which is an irregular hemisphere. It articulates with the glenoid cavity of the scapula and forms the glenohumeral joint. The glenohumeral joint is structurally a ball and socket joint and functionally is considered as diarthrodial multiaxial joint. The articulating surface of both having lining of articular cartilage. The glenoid cavity is a shallow osseous element that is structurally depend by a fibrous cartilage rim called as the glenoid labrum that spans the osseous periphery of the vault. The labrum is continuous with the tendon of the biceps at its superior aspect (source: with the glenoid cavity of the scapula. Just inferior to the head of the humerus is the anatomical neck of the humerus which divides the head of the humerus from the greater and lesser tubercle. The anatomical neck of the humerus is the residual epiphyseal plate. An intertubercular groove appears proximally which demarcates the two tubercles vertically. Following the tubercle is the surgical neck of the humerus which is commonly suspectable for fractures. Humerus has cylinder shape shaft of the humerus which deltoid tubercle where deltoid muscle inserts. Distally humerus has small ball like projections that is called as medial

and lateral epicondyles which are covered by articular cartilage which make elbow joint. It has three borders (Anterior, lateral and medial) and three surfaces (Antero-lateral, Antero-medial and posterior).

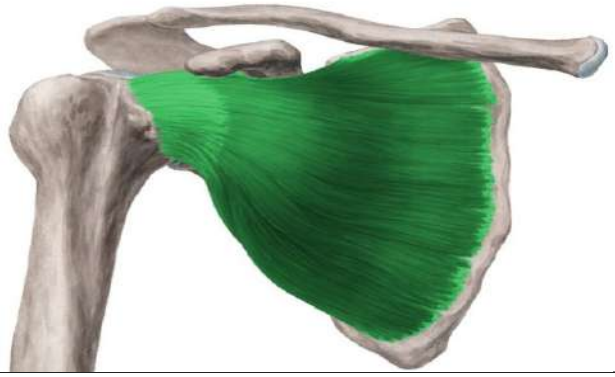
Humerus (Anterior View)	(Posterior View)
	

Attachments of the Humerus:

Humerus attaches thirteen (13) muscles which contribute to movements of the shoulder, hand and elbow

Supraspinatus:	
	**Origin:** Supraspinous fossa of the scapula **Insertion:** Greater tubercle of humerus **Nerve:** Suprascapular
Infraspinatus:	
	**Origin:** Infraspinous fossa of the scapula **Insertion:** Greater tubercle of humerus **Nerve:** Suprascapular
Teres Minor	
	**Origin:** Upper two-third of lateral border of the scapula **Insertion:** Greater tubercle of the humerus **Nerve**: Axillary

Subscapularis:



Origin:

Subscapular fossa of the scapula

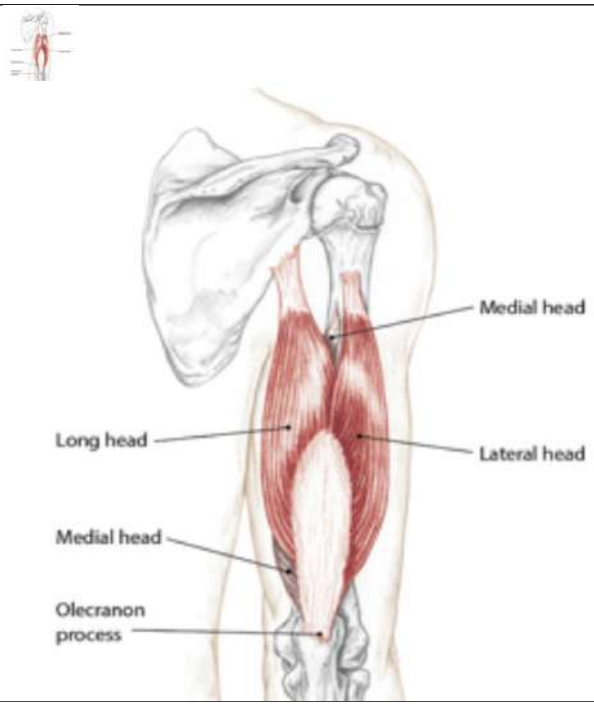
Insertion:

Lesser tubercle of humerus

Nerve:

Upper & lower subscapular

Triceps Brachii:



Origin:

Long head: Infra-glenoid tubercle of the scapula; *Lateral head*: Posterior surface of proximal half of humerus; *Medial head*: Posterior surface of distal half of the humerus

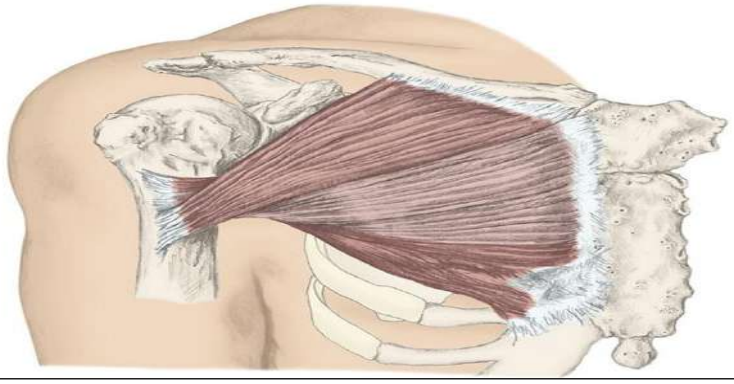
Insertion:

Olecranon process of the ulna

Nerve:

Radial

Pectoralis Major



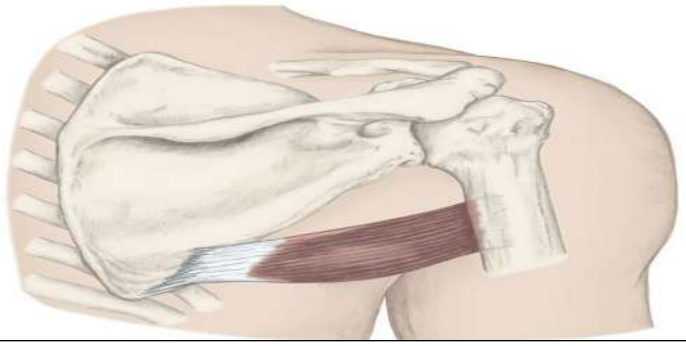
Origin: Medial border half of the clavicle, sternum and cartilage of first through sixth ribs

Insertion: Medial border of scapula between the spine of the scapula and acromion process

Nerve: Upper Fibres: lateral pectoral

Lower fibres: lateral and medial pectoral

Teres Major:



Origin: Medial border half of the clavicle, sternum and cartilage of first through sixth ribs

Insertion: Medial border of scapula between the spine of the scapula and acromion process

Nerve: Medial pectoral nerve

Brachioradialis:

Origin:

Proximal two-thirds of the lateral supracondylar ridge of humerus

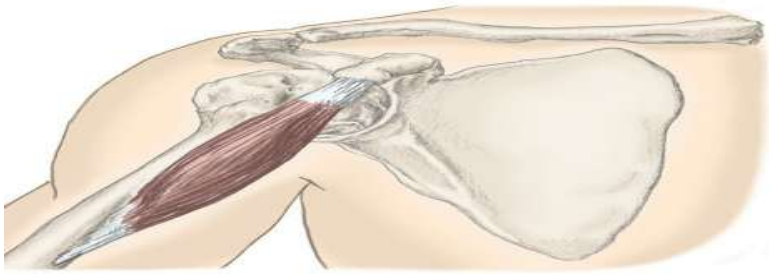
Insertion:

Styloid process of radius

Nerve:

Radial

Coacobrachialis:



Origin:

Coracoid process of scapula

Insertion:

Medial surface of mid-humeral shaft

Nerve:

Musculocutaneous

Extensor Carpi Radialis longus:

Origin:

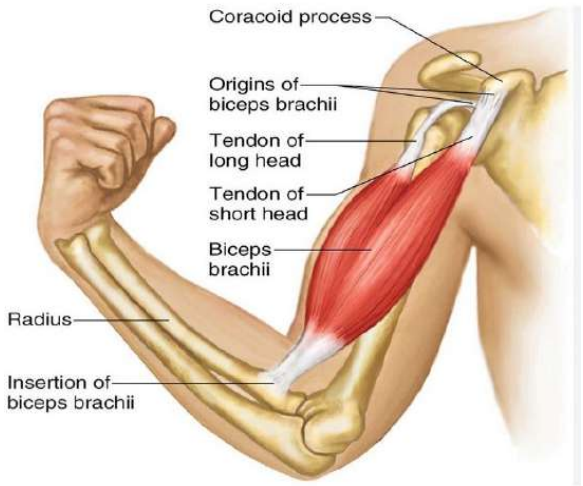
Distal one-third of the lateral supracondylar ridge of humerus

Insertion:

Base of second metacarpal

Nerve:

Musculocutaneous

<table>
<tr><td colspan="2">Biceps brachii:</td></tr>
<tr><td> 
</td><td>Origin:
Long Head: Supraglenoid tubercle of scapula
Short Head: Coracoid process of scapula
Insertion:
Tuberosity of the radius and aponeurosis of the biceps brachii
Nerve:
Musculocutaneous</td></tr>
<tr><td colspan="2">Latissimus dorsi</td></tr>
<tr><td>  </td><td>Origin:
Distal half of anterior surface of humerus
Insertion:
Tuberosity and coronoid process of ulna;
Nerve:
Musculocutaneous, small branch from radial</td></tr>
</table>

Physiology of the Shoulder Girdle

The human shoulder is the most mobile joint in the body. This mobility provides the upper extremity with tremendous range of motion such as **adduction, abduction, flexion, extension, internal rotation, external rotation, and 360° circumduction in the sagittal plane**.

The RC muscles are each used in a variety of upper extremity movements including flexion, abduction, internal rotation and external rotation. They are essential players in almost every type of shoulder movement. Balanced strength and flexibility in each of the four muscles are vital to maintain functioning of the entire shoulder girdle.

The glenohumeral joint is enclosed by a joint capsule that encapsulates the structures of the joint in a fibrous sheath. Structurally the joint capsule wraps around the anatomic neck of the humerus to the rim of the glenoid fossa. While the joint capsule itself is a contiguous supportive structure surrounding the articulating elements, the capsule-labral complexes include important characteristic thickened bands that constitute the glenohumeral ligaments. First described in 1829, the glenohumeral ligaments do not act as traditional ligaments that carry a pure tensile force along their length, but rather, the glenohumeral ligaments become taut at varying positions of abduction and humeral rotation. A synovial membrane forms the lining of the inner surface of the joint capsule. This membrane produces synovial fluid to reduce friction between the articular surfaces.

In addition to the synovial fluid reducing friction within the joint, there are multiple synovial bursae present as well. These bursae functionally act as a cushion between joint structures, such as tendons. The most clinically significant are the subacromial and subscapular bursae. There are numerous, including:

1. **Subacromial/subdeltoid bursa** - This structure lies between the deltoid muscle and joint capsule in the superolateral aspect of the joint. It is superficial to the supraspinatus tendon. This bursa reduces friction underneath the deltoid muscle, allowing an increased range of motion. This bursa, excluding anatomic variants, does not usually communicate with the shoulder joint itself.

2. **Sub coracoid bursa** - This bursa is between the coracoid process and the subscapularis.
3. **Subscapular bursa** - is located between the tendon of the subscapularis muscle and the capsule. It functions to reduces frictional damage to the subscapularis muscle during movement of the glenohumeral joint, particularly during internal rotation.

Static stabilizing structures include the osseous articular anatomy and joint congruity, the glenoid labrum, the glenohumeral ligaments, joint capsule, and negative intraarticular pressure:

A. **Glenohumeral ligaments**- Composed of a superior, middle, and inferior ligament, these three ligaments combine to form the glenohumeral joint capsule connecting the glenoid fossa to the humerus. Due to their location, they protect the shoulder and prevent it from dislocating anteriorly — this group of ligaments functions as the primary stabilizers of the joint.
B. **Coracoclavicular ligament** – This ligament is composed of the conoid and trapezoid ligaments and spans from the coracoid process to the clavicle. It functions to maintain the position of the clavicle in conjunction with the acromioclavicular ligament. Strong forces can rupture these ligaments during acromioclavicular joint injuries.
C. **Coracohumeral ligament** – This ligament supports the superior aspect of the joint capsule. It is a dense fibrous structure connecting the base of the coracoid process to the greater and lesser tuberosities. At its origin, the ligament is thin and broad, measuring about 2 cm in diameter at the base of the coracoid. Laterally, the CHL separates into two distinct bands that envelope the Long Head Biceps tendon at the proximal extent of the bicipital groove.

The Shoulder joint muscles and their specific actions are summarized in the following table:

Muscles of the Scapula	
Name of the Muscle	**Action**
Supraspinatus	Abduct the shoulder at glenohumeral joint
Infraspinatus	Laterally rotate the shoulder and adduct the shoulder at glenohumeral joint Stabilize the head of humerus in glenoid cavity
Teres Minor	Laterally rotate the shoulder and adduct the shoulder at glenohumeral joint Stabilize the head of humerus in glenoid cavity
Subscapularis	Medially rotate the shoulder glenohumeral joint Stabilize the head of humerus in glenoid cavity
Biceps Brachii	Flex the elbow at humeroulnar joint Supinate the forearm at radioulnar joint Flex the shoulder G/H joint
Triceps Brachii	All heads: Extend elbow at humeroulnar joint; Long head: Extend and adduct the shoulder at G/H joint
Levator Scapula	Elevate and downwardly rotate the scapula at S/T joint; Laterally flex & rotate the head and neck to the same side Bilaterally, extend the head & neck
Deltoid	*Anterior fibers:* flex, medially rotate and

	horizontally adduct the shoulder at G/H *Posterior fibers:* Extend, laterally rotate the shoulder at G/H joint
Trapezius	Upper fibres bilaterally: *Extend* the head and neck; Unilaterally: *Laterally flex* the head & neck to the same side. *Rotate* the head & neck to the opposite side *Elevate* the scapula (scapulothoracic joint). Upwardly rotate the scapula at S/T joint
Serratus anterior	Abduct, upwardly rotate and depress the scapula at S/T joint; Holds the medial border of scapula against the ribcage; with the scapula fixed may act to elevate the thorax during forced inhalation
Rhomboid Major	Extends, adducts and medially rotate the shoulder at G/H joint:
Rhomboid Minor	Extends, adducts and medially rotate the shoulder at G/H joint
Pectoralis Major	All fibres: adduct and medially rotate the shoulder G/H Joint Assist to elevate the thorax during forced inhalation (with the arm fixed) Upper fibres: flex and horizontally adduct the shoulder at G/H joint Lower fibres: Extend the Shoulder G/H joint
Pectoralis Minor	Depress and abduct the scapula at scapulothoracic joint; downwardly rotate the scapula; with the scapula fixed assist to elevate thorax during forced inhalation

Latissimus Dorsi	Extend, adduct and medially rotate the shoulder at G/H joint
Coracobrachialis	Flex and adduct the shoulder at G/H joint
Muscles of the Clavicle	
Deltoid	*Anterior fibers:* flex, medially rotate and horizontally adduct the shoulder at G/H *Posterior fibers:* Extend, laterally rotate the shoulder at G/H joint
Sternocleidomastoid	Laterally flex the head and neck to the same side Rotate the head and neck to the opposite side Bilaterally flex the neck
Pectoralis Major	Depression of the shoulder; protraction of the scapula;
Subclavius	Depress the clavicle and draw it anteriorly Elevate first rib (to assist during inhalation) Stabilize the sternoclavicular joint
Trapezius	Upper fibres bilaterally: *Extend* the head and neck; Unilaterally: *Laterally flex* the head & neck to the same side. *Rotate* the head & neck to the opposite side
Muscles of the Humerus	
Supraspinatus	Abduct shoulder at glenohumeral joint Stabilize the head of the humerus in glenoid cavity
Infraspinatus	Laterally rotate the shoulder and adduct the shoulder at glenohumeral joint Stabilize the head of humerus in glenoid cavity
Teres minor	Laterally rotate and adduct the shoulder at G/H Joint

	Stabilize the head of humerus in glenoid cavity
Subscapularis	Medially rotate the shoulder at glenohumeral joint; Stabilize the head of humerus in glenoid cavity
Triceps Brachii	All heads: Extend elbow at humeroulnar joint; Long head: Extend and adduct the shoulder at G/H joint
Pectoralis major	All fibres Adduct and medially rotate the shoulder at glenohumeral joint Assist to elevate thorax during forced inhalation Upper fibres: flex and horizontally adduct the shoulder at G/H joint Lower fibres extend the shoulder at G/H joint
Teres Major	Depression of the shoulder; protraction of the scapula;
Brachioradialis	Flex the elbow at humeroulnar joint Assist to pronate and supinate the forearm when these movements are resisted
Coracobrachialis	Flex and adduct the shoulder at G/H joint
Extensor carpi radialis longus	Extend and abduct the wrist at R/C joint Assist to flex the elbow at humeroulnar joint
Biceps brachii	Flex the elbow at humeroulnar joint Supinate the forearm at radioulnar joint Flex the shoulder G/H joint

Etiology

In order to best understand the clinical association of these conditions and causes, one must first address the bunch of symptoms by each clinical diagnosis and its associated terminology.

Rotator cuff Tendinitis / tendinosis:

Acute or chronic rotator cuff tendinitis or tendinosis is a result of repetitive eccentric forces experienced by rotator cuff causing insult to the soft tissues, this could be due inappropriate positions while performing any activity. This condition predominantly found in individuals who suddenly change their routine. Taking part in sports or any overhead activity which wasn't performed earlier until 30-40 years of age.

Shoulder Impingement (Internal Impingement):

This is a clinical term often used by medical practitioners which explains that soft tissues entrapment between acromion and humeral head usually found in those who performed overhead activity example; athletes, base-ball pitchers and javelin throwers and shuttlers. This condition is also found in adaptative changes include but are not limited to increased humeral retroversion and posterior capsular tightness. Pain felt on the top and outer side of the shoulder. This could be due to weakness in the arm, pain often at night and affect the sleep. Should is not stiffed in this condition.

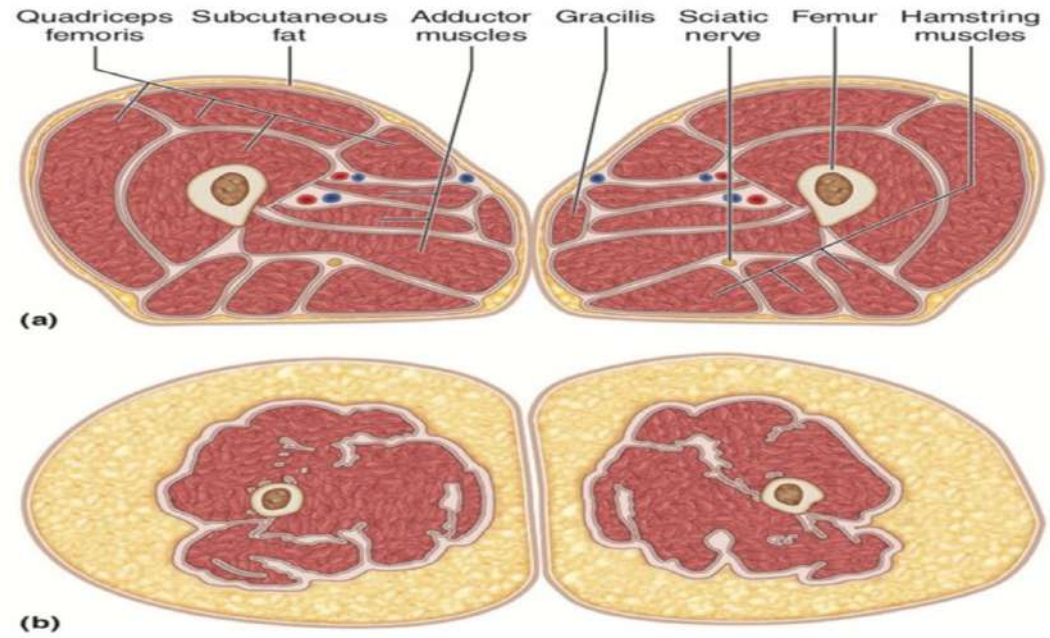
Shoulder Impingement (External Impingement):

The term external impingement is used synonymously with subacromial impingement syndrome. External impingement occurs when compressive sources (the acromion) leading to subacromial bursitis.

A recent research study by 'Varacallo M et al. states that while understanding the nature of rotator cuff pathology one must consider the historical evolving theories behind the etiology and pathophysiology of the RCS. There are extrinsic compressive theory and Intrinsic compressive theory in which external injury to the cuff and degenerative changes inside the glenohumeral joint are the primary source of pathology respectively.

Sedentary Life Style & Gradual Muscular atrophy

According to a research study by Davis TJ, et al. , recent decades have seen an increase in the prevalence of musculoskeletal pain (MSP) issues, which has resulted a significant increase in health care costs. The lack of awareness about physical activity among one-third of the world's population over the age of 15 has a negative impact on health. However, little is known about the health dangers that sedentary habits offer. In the adult population of Korea, sedentary behavior lasts an average of 8.3 hours a day, but in the adult population of America, it lasts an average of 7.7 hours. Due to a shortage of accessible places for exercise, an increase in occupational sedentary habits like office employment, and the rising use of television and video devices, inactive lifestyles are becoming more and more prevalent throughout the world. As a result, the related health issues are getting worse. The human body is impacted by a sedentary lifestyle in numerous ways. Inactivity affects lipid metabolism, protein transporter activity, muscle glucose, carbohydrate metabolism, and lipoprotein lipase activity. Additionally, it reduces vascular function and insulin sensitivity while increasing sympathetic nervous system activity and decreasing cardiac output and systemic blood flow.



Drawings based on CT Scans of Cross-sections of the thigh

Fig (a): Thighs of a 74-years old Triathlete showing how well muscle mass can be maintained in old age with exercise

Fi (b): Thigh of a sedentary 74-years old showing extensive muscle atrophy and replacement by subcutaneous fat

Epidemiology

The prevalence of rotator cuff syndrome (RCS) and its associated pathologies affects millions of patients on a global scale.[18] Shoulder pain accounts for approximately 4.5 million office visits and about $3 billion in healthcare costs in the United States alone.[44] RCS afflicts patient populations in an age-dependent fashion, from 5% to 10% of patients younger than 20 years of age to over 60% in patients over age 80 years. Overall, chronic shoulder pain in the adult population has a 67% lifetime prevalence rate.[24][18][45] SIS is considered the most common cause of acute and chronic shoulder pain. The literature supports an equal incidence of RCS and RC tears when comparing male and populations.

Pathophysiology:

The **extrinsic** compressive theory of subacromial Impingement Syndrome (SIS) supports the inciting factors leading to SIS being anatomic and/or mechanical in nature. These structures result in increased pressures and pathologic contact, leading to a susceptible and tendinopathic cuff. Extrinsic mechanisms include:

- Subacromial impingement syndrome
- Internal impingement

The **intrinsic** theory of SIS cites the predisposition for a weakened cuff that degenerates over time. Age, hand-dominance, vascular changes, and repetitive eccentric forces cause the cuff to weaken over time, compromising the dynamic stability of the shoulder. Consequently, the humeral head migrates proximally and decreases the acromiohumeral interval, predisposing the cuff to further injury and degeneration. Intrinsic mechanisms include:

- Tendon vascularity (the anterior critical zone of the supraspinatus tendon)
- Tendon biology
- Tendon mechanical properties
- Tendon morphology
- Genetic predisposition

Assessment & Treatment

Client X, May 16, 2022

X presented to the clinic with complaint of aching shoulder pain right side on the top of the shoulder and outer side of the upper arm. Pain is progressive in nature and increase on overhead activities.

Pain started 1year ago when she had stressful job during a weekend. Initially client got relief with some rest and advil tablet. Since then, pain gradually increased client found to be allergic to Ibuprofen and stopped any medication. She often gets pain while doing routine household chores like combing, cutting vegetables, lifting a glass of water. Client wasn't experienced any such pain in the past and has no family history of such pain. She had been to many physicians and physiotherapist but no improvement, pain subside for some time and restart again on any activity. X never been to gym or physical exercise Positive history of sedentary lifestyle.

Postural exam:

- ⇒ ↑ tenderness over upper trapezius, posterior fibers of deltoid and axilla
- ⇒ Neck Hump with forward head posture, upper traps contracted
- ⇒ Mild Genovalgum (Patients' knees are adducted and legs are abducted) position was noticed, there is marked swelling over the medial aspects of the knee probably? semimembranosus bursitis.
- ⇒ Medial side muscles look weak hypotonic compare to lateral muscles (peroneal).
- ⇒ Index finger is bigger that the big toe

Gait Analysis:

- ⇒ Right shoulder adducted (pulled medially) not moving freely as the left does.
- ⇒ Short neck and slump posture
- ⇒ Foot stance equal, landing on the metatarsal instead of big toe

Palpation

- ⇒ ↑ tenderness of lateral cervical region on right side
- ⇒ Upper trapezius, Elevator scapula, teres minor, infraspinatus and subscapularis muscles are hypertonic

⇒ Trapezius thick fibrous; Teres minor hard like calcified

⇒ ↑↑↑ tenderness in the axilla (armpit) pain increased while palpating of subscapularis

⇒ ↑↑ tenderness over posterior deltoid fibers and triceps brachii

Dermatomes: No abnormal findings

Myotomes: Cervical myotomes (C4 & C5) shoulder elevation and shoulder abduction painful compare to left.

Deep tendon reflexes: Bicep tendon reflex tested found to be normal

AROM in Capsular pattern as per the reach study (Baksh W. et al)

Active Range of Motion (AROM)	Unaffected	affected	Normal range
Flexion	160°	80°	160°-180°
Extension	50°	30°	50°-60°
Abduction	170°	120°	170°-180°
Adduction	50°	40°	50°-75°
Medial Rotation	60°	40°	60°-100°
Lateral rotation	80°	50°	80°-90°
Horizontal abduction and horizontal adduction	130°	80°	130°
Circumduction (Not performed due to pain)			200°

Note: Active Range of motion is markedly limited on affected side

Passive Range of Motion:

Passive Range of Motion (PROM)	Unaffected	affected	Normal
Flexion	Tissue stretch	Empty	Tissue stretch
Extension	Tissue stretch	Empty	Tissue stretch
Abduction	Tissue stretch	Empty	Tissue stretch
Adduction	Tissue approximation	Empty	Tissue approximation
Medial Rotation	Tissue stretch	Empty	Tissue stretch
Lateral rotation	Tissue stretch	Empty	Tissue stretch
Horizontal abduction and horizontal adduction	Tissue stretch	Empty	Tissue stretch

Note: Passive Range of motion is markedly limited and painful client found to be apprehension on affected side

Resisted Muscle Testing:

Isometric Action	Strength (+/-)	Pain Y/N	Suspected Tissue involved
Resisted Flexion	-	**Y**	Supraspinatus
Resisted External Rotation	-	**Y**	Teres Minor
Resisted Abduction	-	**Y**	Supraspinatus
Resisted Adduction	-	**Y**	Teres Minor, infraspinatus
Resisted Medial Rotation	-	**Y**	Subscapularis
Resisted Lateral rotation	-	**Y**	Teres Minor, Infraspinatus
Resisted Horizontal abduction and horizontal adduction	-	**Y**	Supraspinatus, Infraspinatus

Special Tests:

Special Test Performed	Result	Explanation of Result
Hawkin-Kennedy Impingement Test	POSITIVE	With the humerus 90° of flexion compression of the biceps long head tendon and the anterior superior margin of the gleno-humeral capsule are compressed which causing reproduction of the symptoms
Neer Impingement Test	POSITIVE	With the humerus in full flexion compression of the long head of biceps GH joint capsule and coracoacromial ligament occur
Cross Over Test	NEGATIVE	Absent of reproduction of pain while performing horizontal adduction or cross over test

Clinical Impression:

Client X shows sign of ↓ ROM, weakness and symptom of pain in the right shoulder consistent with chronic rotator tendinosis possibly due to overuse of muscles.

Treatment Goals (Sort term)	**Treatment Goals (Long-term)**
↓Pain, ↓SNS firing, Correct faulty biomechanics	↑ ROM, restore joint function
Treatment Schedule: One session per week for 8 session (May 23,2022)	
Symptomatic treatment planned using Non-Swedish Techniques:	
⇒ Reduced compression under coracoacromial arch ⇒ Faulty biomechanics corrected ⇒ Trigger points were deactivated ⇒ Reduce hypertonicity in surrounding musculature ⇒ Myofascial stretch with pin and stretch techniques ⇒ Remove adhesions and contractures from the axilla by pressure point techniques ⇒ Reduce hypertonicity from all adjacent tissues ⇒ Flushed out with final effleurage all over the shoulders	
Joint play: Purpose (by Noten S. et al) ⇒ To ↑ overall ROM and ↓ Pain ↓ Adhesions	
Axial Distraction; Lateral distraction; Inferior Glide; Posterior Glide & Anterior Glide was given	
Post Treatment Results: ⇒ ↓ Pain, ↓adhesions, improved ROM significantly	
Home Care assigned:	**FITT**
Remedial Strengthening Exercise External rotation to strengthen infraspinatus & teres minor using a rubber stripe or TheraBand attached to a fixed object securely pull with one arm 90° elbow flex similarly for subscapularis and teres major, latissimus dorsi, Pectoralis major, Trapezius and Rhomboids strengthening exercises were demonstrated	**2-3 sets (10-12 Rep per set) twice a day for 14 days (or until next visit)**
Remedial Stretching Exercise	
Stretching exercises for Rotator Cuff muscles (SITS) Pectoralis major, Latissimus dorsi, Serratus anterior Subclavius and Coracobrachialis were demonstrated by using a rubber stipe or a towel	**2-3 sets (10-12 Rep per set) twice a day for 14 days (or until next visit)**
Hydrotherapy: Hot water bag	**20-30 minutes on affected site twice a day for 14 days (or until next visit)**

Assessment & Treatment
Client X, May 23, 2022

Client X was in today for the first follow-up; There is significant improvement in ROM but pain still presented

Postural exam: No difference in right shoulder compare to left one.

⇒ Mild tenderness over upper trapezius, teres major & Teres Minor and axilla

⇒ Hump still appeared but less contracted traps compare to the last visit

⇒ Mild Genoval gum (Patients' knees are adducted and legs are abducted) position was noticed, there is ↓ swelling over the medial aspects of the knee bursitis with pain on pressure

Palpation

⇒ ↓ tenderness of lateral cervical region on right side

⇒ Upper trapezius, Elevator scapula, teres minor, infraspinatus and subscapularis muscles are still hypertonic

⇒ Trapezius thick fibrous; Teres minor softened compare to last visit

⇒ ↑tenderness in the axilla (armpit) pain slightly reduced while on palpating of subscapularis

⇒ No tenderness over posterior deltoid fibers and triceps brachii

Dermatomes: No abnormal findings

Myotomes: No significant change

Deep tendon reflexes: Normal biceps reflex

AROM in Capsular pattern:

Active Range of Motion (AROM)	Unaffected	affected	Normal range
Flexion	160°	100°	160°-180°
Extension	50°	40°	50°-60°
Abduction	170°	140°	170°-180°
Adduction	50°	40°	50°-75°
Medial Rotation	60°	50°	60°-100°
Lateral rotation	80°	60°	80°-90°
Horizontal abduction and horizontal adduction	130°	100°	130°
Circumduction (Not performed due to pain)			200°

Note: Improved Range of motion is noticed

Passive Range of Motion:

Passive Range of Motion (PROM)	Unaffected	affected	Normal
Flexion	Tissue stretch	Empty	Tissue stretch
Extension	Tissue stretch	Tissue stretch	Tissue stretch
Abduction	Tissue stretch	Empty	Tissue stretch
Adduction	Tissue approximation	Tissue Approximation	Tissue approximation
Medial Rotation	Tissue stretch	Empty	Tissue stretch
Lateral rotation	Tissue stretch	Empty	Tissue stretch
Horizontal abduction and horizontal adduction	Tissue stretch	Empty	Tissue stretch

Note: Improved Range of motion is noted, no apprehension while performing resisted PROM

But still there are few restrictions

Resisted Muscle Testing:

Isometric Action	Strength (+/-)	Pain Y/N	Suspected Tissue involved
Resisted Flexion	-	**Y**	Supraspinatus
Resisted External Rotation	-	**Y**	Teres Minor
Resisted Abduction	-	**Y**	Supraspinatus
Resisted Adduction	-	**Y**	Teres Minor, infraspinatus
Resisted Medial Rotation	-	**Y**	Subscapularis
Resisted Lateral rotation	-	**Y**	Teres Minor, Infraspinatus
Resisted Horizontal abduction and horizontal adduction	-	**Y**	Supraspinatus, Infraspinatus

Special Tests:

Special Test Performed	Result	Explanation of Result
Hawkin-Kennedy Impingement Test	POSITIVE	With the humerus 90° of flexion compression of the biceps long head tendon and the anterior superior margin of the gleno-humeral capsule are compressed which causing reproduction of the symptoms
Neer Impingement Test	POSITIVE	With the humerus in full flexion compression of the long head of biceps GH joint capsule and coracoacromial ligament occur
Cross Over Test	NEGATIVE	Absent of reproduction of pain while performing horizontal adduction or cross over test

Clinical Impression:

Client X shows sign of ↓ ROM, weakness and symptom of pain in the right shoulder consistent with chronic rotator tendinosis possibly due to overuse of muscles.

Treatment Goals (Sort term)	**Treatment Goals (Long-term)**
↓Pain, Correct faulty biomechanics of shoulder	↑ ROM, restore joint function
Treatment Schedule: One session per week for 8 session (May 31,2022)	
Symptomatic treatment planned using Non-Swedish Techniques:	
⇒ Repeated same techniques ⇒ Deep stripping with increased pressure TrP therapy in the axilla oven subscapularis	
Joint play: Purpose ⇒ To ↑ overall ROM and ↓ Pain	
Axial Distraction; Lateral distraction; Inferior Glide; Posterior Glide & Anterior Glide was given	
Post Treatment Results: ⇒ ↓ Pain, ↓adhesions, improved ROM significantly	

Home Care assigned: Increased Intensity of strengthening and stretching exercise (15-20 Rep)	
Remedial Strengthening Exercise	**FITT**
✓ Repeat the same strengthening exercises	**2-3 sets (15-20 Rep per set) twice a day for 14 days (or until next visit)**
Remedial Stretching Exercise	
✓ Repeat the same stretching exercises	**2-3 sets (15-20 Rep per set) twice a day for 14 days (or until next visit)**
Hydrotherapy:	
Hot water bag	**20-30 minutes on affected site twice a day for 14 days (or until next visit)**

Assessment & Treatment (May 31, 2022)

Assessment & Treatment

Client X was in today for the Second follow-up; There is significant improvement in ROM but pain still presented

Postural exam: No difference in right shoulder compare to left one.

- ⇒ Mild tenderness over upper trapezius, teres major & Teres Minor and axilla
- ⇒ Hump still appeared but less contracted traps compare to the last visit
- ⇒ Mild genovalgum (Patients' knees are adducted and legs are abducted) position was noticed, there is ↓ swelling over the medial aspects of the knee bursitis with pain on pressure

Gait Analysis:

- ⇒ Right moving freely as the left shoulder
- ⇒ Short neck and slump posture
- ⇒ Foot stance same as previous visit

Palpation

- ⇒ ↓ tenderness of lateral cervical region on right side
- ⇒ Upper trapezius, Elevator scapula, teres minor, infraspinatus and subscapularis muscles are still hypertonic
- ⇒ Trapezius thick fibrous; Teres minor softened compare to last visit
- ⇒ ↑tenderness in the axilla (armpit) pain slightly reduced while on palpating of subscapularis
- ⇒ No tenderness over posterior deltoid fibers and triceps brachii

AROM in Capsular pattern:

Active Range of Motion (AROM)	Unaffected	affected	Normal range
Flexion	160°	100°	160°-180°
Extension	50°	40°	50°-60°
Abduction	170°	140°	170°-180°
Adduction	50°	40°	50°-75°
Medial Rotation	60°	50°	60°-100°
Lateral rotation	80°	60°	80°-90°
Horizontal abduction and horizontal adduction	130°	100°	130°

Note: Active Range of motion is significantly improved on affected side

Passive Range of Motion:

Passive Range of Motion (PROM)	Unaffected	affected	Normal
Flexion	Tissue stretch	Empty	Tissue stretch
Extension	Tissue stretch	Empty	Tissue stretch
Abduction	Tissue stretch	Empty	Tissue stretch
Adduction	Tissue approximation	Empty	Tissue approximation
Medial Rotation	Tissue stretch	Empty	Tissue stretch
Lateral rotation	Tissue stretch	Empty	Tissue stretch
Horizontal abduction and horizontal adduction	Tissue stretch	Empty	Tissue stretch

Note: Passive Range of motion is significantly improved; no apprehension on affected side

Resisted Muscle Testing: as per the study by (Clarnette RG et al)

Isometric Action	Strength (+/-)	Pain Y/N	Suspected Tissue involved
Resisted Flexion	-	**Y**	Supraspinatus
Resisted External Rotation	-	**Y**	Teres Minor
Resisted Abduction	-	**Y**	Supraspinatus
Resisted Adduction	-	**Y**	Teres Minor, infraspinatus
Resisted Medial Rotation	-	**Y**	Subscapularis
Resisted Lateral rotation	-	**Y**	Teres Minor, Infraspinatus
Resisted Horizontal abduction and horizontal adduction	-	**Y**	Suprapinatus, Infraspinatus

Special Tests:

Special Test Performed	Result	Explanation of Result
Hawkin-Kennedy Impingement Test	POSITIVE	With the humerus 90° of flexion compression of the biceps long head tendon and the anterior superior margin of the gleno-humeral capsule are compressed which causing reproduction of the symptoms
Neer Impingement Test	POSITIVE	With the humerus in full flexion compression of the long head of biceps GH joint capsule and coracoacromial ligament occur
Cross Over Test	NEGATIVE	Absent of reproduction of pain while performing horizontal adduction or cross over test

Clinical Impression:

Client X shows sign of ↓ ROM, weakness and symptom of pain in the right shoulder consistent with chronic rotator tendinosis possibly due to overuse of muscles.

Treatment Goals (Sort term)	Treatment Goals (Long-term)
↓Pain, Correct faulty biomechanics of shoulder	↑ ROM, restore joint function
Treatment Schedule: One session per week for 8 session (May 31,2022)	
Symptomatic treatment planned using Non-Swedish Techniques:	
⇒ Repeated same techniques ⇒ Deep stripping with increased pressure TrP therapy in the axilla oven subscapularis	
Joint play: Purpose ⇒ To ↑ overall ROM and ↓ Pain and ↓ Adhesions	
Axial Distraction; Lateral distraction; Inferior Glide; Posterior Glide & Anterior Glide was given	
Post Treatment Results: ⇒ ↓ Pain, ↓adhesions, improved ROM significantly	

Home Care assigned: Increased Intensity of strengthening and stretching exercise (15-20 Rep)	
Remedial Strengthening Exercise	**FITT**
✓ Repeat the same strengthening exercises	**2-3 sets (15-20 Rep per set) twice a day for 14 days (or until next visit)**
Remedial Stretching Exercise	
✓ Repeat the same stretching exercises	**2-3 sets (15-20 Rep per set) twice a day for 14 days (or until next visit)**
Hydrotherapy	
Hydrotherapy: Hot water bag	**20-30 minutes on affected site twice a day for 14 days (or until next visit)**

Assessment & Treatment (June 1st, 2022)

Assessment & Treatment

Client X was in today for the Third follow-up visit; There is significant improvement in ROM but pain still presented

Postural exam: No difference in right shoulder compare to left one.

- ⇒ Mild tenderness over upper trapezius, teres major & Teres Minor and axilla
- ⇒ Hump still appeared but less contracted traps compare to the last visit
- ⇒ Mild genovalgum (Patients' knees are adducted and legs are abducted) position was noticed, there is ↓ swelling over the medial aspects of the knee bursitis with pain on pressure

Gait Analysis:

- ⇒ Right moving freely as the left shoulder
- ⇒ Short neck and slump posture
- ⇒ Foot stance same as previous visit

Palpation

- ⇒ ↓ tenderness of lateral cervical region on right side
- ⇒ Upper trapezius, Elevator scapula, teres minor, infraspinatus and subscapularis muscles are still hypertonic
- ⇒ Trapezius thick fibrous; Teres minor softened compare to last visit
- ⇒ ↑tenderness in the axilla (armpit) pain slightly reduced while on palpating of subscapularis
- ⇒ No tenderness over posterior deltoid fibers and triceps brachii

AROM in Capsular pattern:

Active Range of Motion (AROM)	Unaffected	affected	Normal range
Flexion	160°	100°	160°-180°
Extension	50°	40°	50°-60°
Abduction	170°	140°	170°-180°
Adduction	50°	40°	50°-75°
Medial Rotation	60°	50°	60°-100°

Lateral rotation	80°	60°	80°-90°
Horizontal abduction and horizontal adduction	130°	100°	130°

Passive Range of Motion:

Passive Range of Motion (PROM)	Unaffected	affected	Normal
Flexion	Tissue stretch	Tissue stretch	Tissue stretch
Extension	Tissue stretch	Tissue stretch	Tissue stretch
Abduction	Tissue stretch	Empty	Tissue stretch
Adduction	Tissue approximation	Tissue approximation	Tissue approximation
Medial Rotation	Tissue stretch	Tissue stretch	Tissue stretch
Lateral rotation	Tissue stretch	Empty	Tissue stretch
Horizontal abduction and horizontal adduction	Tissue stretch	Empty	Tissue stretch

Note: Passive Range of motion is significantly improved; client found to be no more apprehensive on affected side

Resisted Muscle Testing:

Isometric Action	Strength (+/-)	Pain Y/N	Suspected Tissue involved
Resisted Flexion	-	**N**	
Resisted External Rotation	-	**N**	
Resisted Abduction	-	**Y**	Supraspinatus
Resisted Adduction	+	**N**	
Resisted Medial Rotation	+	**Y**	Subscapularis
Resisted Lateral rotation	-	**Y**	Teres Minor, Infraspinatus
Resisted Horizontal abduction and horizontal adduction	-	**Y**	Suprapinatus, Infraspinatus

Special Tests:

Special Test Performed	Result	Explanation of Result
Hawkin-Kennedy Impingement Test	POSITIVE	With the humerus 90° of flexion compression of the biceps long head tendon and the anterior superior margin of the gleno-humeral capsule are compressed which causing reproduction of the symptoms
Neer Impingement Test	POSITIVE	With the humerus in full flexion compression of the long head of biceps GH joint capsule and coracoacromial ligament occur
Cross Over Test	NEGATIVE	Absent of reproduction of pain while performing horizontal adduction or cross over test

Clinical Impression:

Client X shows sign of ↓ ROM, weakness and symptom of pain in the right shoulder consistent with chronic rotator tendinosis possibly due to overuse of muscles.

Treatment Goals (Sort term)	**Treatment Goals (Long-term)**
↓Pain, Correct faulty biomechanics of shoulder	↑ ROM, restore joint function
Treatment Schedule: One session per week for 8 session (June 8th,2022)	
Symptomatic treatment planned using Non-Swedish Techniques: ⇒ Repeated same techniques ⇒ Deep stripping with increased pressure TrP therapy in the axilla oven subscapularis with multiple stripping of posterior deltoid and triceps brachii muscles ⇒ Deep pin and stretch techniques were added to the previous treatment	
Joint play: Purpose ⇒ To ↑ overall ROM and ↓ Pain ↓ Adhesions	
Axial Distraction; Lateral distraction; Inferior Glide; Posterior Glide & Anterior Glide with high intensity pull was given	
Post Treatment Results: ⇒ ↓ Pain, ↓adhesions, improved ROM significantly	

Home Care assigned: Increased Intensity of strengthening and stretching exercise (15-20 Rep)	
Remedial Strengthening Exercise	**FITT**
✓ Increase intensity of strengthening exercise with barbels starting light weight ✓ Repeat the same strengthening exercises ✓ Added light weight barbel exercise in addition to the regular strengthening exercise	**2-3 sets (15-20 Rep per set) twice a day for 14 days (or until next visit)**
Remedial Stretching Exercise	
✓ Increase intensity of stretching as muscle started developing strength ✓ Repeat the same stretching exercises ✓ Intensity increased to 20-30 Reps per set	**2-3 sets (20-30 Rep per set) twice a day for 14 days (or until next visit)**
Hydrotherapy:	
Hot water Bag	**20-30 minutes on affected site twice a day for 14 days (or until next visit)**

Assessment & Treatment (June 8th, 2022)

Assessment & Treatment

Client X was in today for the Fourth follow-up visit; There is significant improvement in ROM but pain still presented

Postural exam: No difference in right shoulder compare to left one.

⇒ Mild tenderness over upper trapezius, teres major & Teres Minor and axilla
⇒ Hump still appeared but less contracted traps compare to the last visit
⇒ Mild genovalgum (Patients' knees are adducted and legs are abducted) position was noticed, there is ↓ swelling over the medial aspects of the knee bursitis with pain on pressure

Gait Analysis:

⇒ Right moving freely as the left shoulder
⇒ Short neck and slump posture
⇒ Foot stance same as previous visit

Palpation

⇒ ↓ tenderness of lateral cervical region on right side
⇒ Upper trapezius, Elevator scapula, teres minor, infraspinatus and subscapularis muscles are still hypertonic
⇒ Trapezius thick fibrous; Teres minor softened compare to last visit
⇒ ↑tenderness in the axilla (armpit) pain slightly reduced while on palpating of subscapularis
⇒ No tenderness over posterior deltoid fibers and triceps brachii

AROM in Capsular pattern:

Active Range of Motion (AROM)	Unaffected	affected	Normal range
Flexion	160°	120°	160°-180°
Extension	50°	50°	50°-60°
Abduction	170°	160°	170°-180°
Adduction	50°	50°	50°-75°
Medial Rotation	60°	50°	60°-100°
Lateral rotation	80°	60°	80°-90°

Horizontal abduction and horizontal adduction	130°	100°	130°
Circumduction (Not performed due to pain)			200°

Note: Active Range of motion is markedly improved on affected side

Passive Range of Motion:

Passive Range of Motion (PROM)	Unaffected	affected	Normal
Flexion	Tissue stretch	Empty	Tissue stretch
Extension	Tissue stretch	Tissue stretch	Tissue stretch
Abduction	Tissue stretch	Empty	Tissue stretch
Adduction	Tissue approximation	Tissue approximation	Tissue approximation
Medial Rotation	Tissue stretch	Empty	Tissue stretch
Lateral rotation	Tissue stretch	Empty	Tissue stretch
Horizontal abduction and horizontal adduction	Tissue stretch	Empty	Tissue stretch

Note: Passive Range of motion is Significantly improved; client found to be no more apprehension on affected side

Resisted Muscle Testing:

Home Care assigned: Increased Intensity of strengthening and stretching exercise (15-20 Rep)	
Remedial Strengthening Exercise	**FITT**
✓ Increase intensity of strengthening exercise with barbels starting light weight ✓ Repeat the same strengthening exercises ✓ Added light weight barbel exercise in addition to the regular strengthening exercise	**2-3 sets (15-20 Rep per set) twice a day for 14 days (or until next visit)**
Remedial Stretching Exercise	
✓ Increase intensity of stretching as muscle started developing strength ✓ Repeat the same stretching exercises ✓ Intensity increased to 20-30 Reps per set	**2-3 sets (20-30 Rep per set) twice a day for 14 days (or until next visit)**
Hydrotherapy	
Hot water bag	**20-30 minutes on affected site twice a day for 14 days (or until next visit)**

Special Tests:

Special Test Performed	Result	Explanation of Result
Hawkin-Kennedy Impingement Test	POSITIVE	With the humerus 90° of flexion compression of the biceps long head tendon and the anterior superior margin of the gleno-humeral capsule are compressed which causing reproduction of the symptoms
Neer Impingement Test	POSITIVE	With the humerus in full flexion compression of the long head of biceps GH joint capsule and coracoacromial ligament occur
Cross Over Test	NEGATIVE	Absent of reproduction of pain while performing horizontal adduction or cross over test

Clinical Impression:

Client X shows sign of ↓ ROM, weakness and symptom of pain in the right shoulder consistent with chronic rotator tendinosis possibly due to overuse of muscles.

Treatment Goals (Sort term)	Treatment Goals (Long-term)
↓Pain, Correct faulty biomechanics of shoulder	↑ ROM, restore joint function
Treatment Schedule: One session per week for 8 session (June 16th,2022)	
Symptomatic treatment planned using Non-Swedish Techniques: ⇒ Repeated same techniques ⇒ Deep stripping with increased pressure TrP therapy in the axilla oven subscapularis with multiple stripping of posterior deltoid and triceps brachii muscles ⇒ Deep pin and stretch techniques were added to the previous treatment	
Joint play: Purpose ⇒ To ↑ overall ROM and ↓ Pain	
Axial Distraction; Lateral distraction; Inferior Glide; Posterior Glide & Anterior Glide with high intensity pull was given	
Post Treatment Results: ⇒ ↓ Pain, ↓adhesions, improved ROM significantly	

Home Care assigned: Increased Intensity of strengthening and stretching exercise (15-20 Rep)	
Remedial Strengthening Exercise	**FITT**
✓ Repeat the same strengthening exercises ✓ Added light weight barbel exercise in addition to the regular strengthening exercise ✓ If comfortable, increase the weight of the barbel	**2-3 sets (20-30 Rep per set) twice a day for 14 days (or until next visit)**
Remedial Stretching Exercise	
✓ Repeat the same stretching exercises ✓ Intensity increased to 20-30 Reps per set	**2-3 sets (30-40 Rep per set) twice a day for 14 days (or until next visit)**
Hydrotherapy	
Hot water bag	**20-30 minutes on affected site twice a day for 14 days (or until next visit)**

Assessment & Treatment (June 16th, 2022)

Assessment & Treatment

Client X was in today for the Fifth follow-up visit; There is significant improvement in ROM but pain still presented

Postural exam: No difference in right shoulder compare to left one.

- ⇒ Mild tenderness over upper trapezius, teres major & Teres Minor and axilla
- ⇒ Hump still appeared but less painful compare to the last visit
- ⇒ Mild genovalgum (Patients' knees are adducted and legs are abducted) position was noticed, there is ↓ swelling over the medial aspects of the knee bursitis with pain on pressure

Gait Analysis:

- ⇒ Right moving freely as the left shoulder
- ⇒ Slump posture improved
- ⇒ Foot stance same as previous visit

Note: Encouraged to adopt healthy life style modifications and gait and improved posture during the day; advised to stretch for 3-4 minutes on every 2-3 long working hours

Palpation

- ⇒ No tenderness on lateral cervical region on right side

AROM in Capsular pattern:

Active Range of Motion (AROM)	Unaffected	affected	Normal range
Flexion	160°	140°	160°-180°
Extension	50°	50°	50°-60°
Abduction	170°	170°	170°-180°
Adduction	50°	50°	50°-75°
Medial Rotation	60°	60°	60°-100°
Lateral rotation	80°	70°	80°-90°
Horizontal abduction and horizontal adduction	130°	120°	130°
Circumduction (Not performed due to pain)			200°

Note: Active Range of motion is markedly Improved on affected side

Passive Range of Motion:

Passive Range of Motion (PROM)	Unaffected	affected	Normal
Flexion	Tissue stretch	Empty	Tissue stretch
Extension	Tissue stretch	Tissue stretch	Tissue stretch
Abduction	Tissue stretch	Tissue stretch	Tissue stretch
Adduction	Tissue approximation	Tissue approximation	Tissue approximation
Medial Rotation	Tissue stretch	Tissue stretch	Tissue stretch
Lateral rotation	Tissue stretch	Tissue stretch	Tissue stretch
Horizontal abduction and horizontal adduction	Tissue stretch	Empty	Tissue stretch

Note: Passive Range of motion is markedly Improved; No more apprehension on affected side

Resisted Muscle Testing:

Isometric Action	Strength (+/-)	Pain Y/N	Suspected Tissue involved
Resisted Flexion	-	**N**	
Resisted External Rotation	-	**N**	
Resisted Abduction	-	**Y**	Supraspinatus
Resisted Adduction	+	**N**	
Resisted Medial Rotation	+	**Y**	Subscapularis
Resisted Lateral rotation	+	**N**	
Resisted Horizontal abduction and horizontal adduction	-	**Y**	Supraspinatus, Infraspinatus

Special Tests:

Special Test Performed	Result	Explanation of Result
Hawkin-Kennedy Impingement Test	POSITIVE	With the humerus 90° of flexion compression of the biceps long head tendon and the anterior superior margin of the gleno-humeral capsule are compressed which causing reproduction of the symptoms
Neer Impingement Test	POSITIVE	With the humerus in full flexion compression of the long head of biceps GH joint capsule and coracoacromial ligament occur
Cross Over Test	NEGATIVE	Absent of reproduction of pain while performing horizontal adduction or cross over test

Clinical Impression:

Client X shows sign of ↓ ROM, weakness and symptom of pain in the right shoulder consistent with chronic rotator tendinosis possibly due to overuse of muscles.

Treatment Goals (Sort term)	**Treatment Goals (Long-term)**
↓Pain, Correct faulty biomechanics of shoulder	↑ ROM, restore joint function
Treatment Schedule: One session per week for 8 session (Follow-up not needed if no pain)	
Symptomatic treatment planned using Non-Swedish Techniques:	
⇒ Continue home care exercise for 6 moths; advised to change of life style modification ⇒ Deep stripping with increased pressure TrP therapy in the axilla oven subscapularis with multiple stripping of posterior deltoid and triceps brachii muscles ⇒ Deep pin and stretch techniques were added to the previous treatment	
Joint play: Purpose ⇒ To ↑ overall ROM and ↓ Pain	
Axial Distraction; Lateral distraction; Inferior Glide; Posterior Glide & Anterior Glide with high intensity pull was given	
Post Treatment Results: ⇒ ↓ Pain, ↓adhesions, improved ROM significantly	
Home Care assigned: Increased Intensity of strengthening and stretching exercise (15-20 Rep)	
Remedial Strengthening Exercise	**FITT**
⇒ Continue all exercise on daily basis for 6 months	**2-3 sets (20-30 Rep per set) twice a day for 14 days (or until next visit)**
Remedial Stretching Exercise	
✓ Continue all Stretching exercise on daily basis for 6 months	**2-3 sets (30-40 Rep per set) twice a day for 14 days (or until next visit)**
Hydrotherapy:	**If Needed (PRN)**

Conclusion

Rotator cuff syndrome is a most common shoulder joint specific condition demands a thorough understanding of complexity of the glenohumeral joint and its structure. My client was overly diagnosed with multiple radiological investigation including X-Rays, CT scans and MRI. She also had several physiotherapy sessions since last one year with no significant improvement. The outcome of the treatment is depending on the complete cessation of the activity which causing pain. I've carefully monitored client's pain tolerance and provided soft tissue release techniques with intensified pressure around the rotator cuff tissues particularly subscapularis and teres minor which was almost calcified with multiple contractures.

I used pressure point and trigger point therapy with deep pin stretch techniques.

I found my client very cooperative and regularly performed whatever home care was given in the form of strengthening and stretching exercise.

I also found that hot water treatment is very effective in loosening stiffed chronic joints. It increases blood circulation by vasodilation around the joint.

During third session onwards, client showed gaining muscle strength. I kept her on intense workout with barbell weights which was increased during the fourth and fifth session. Initially started with short target then gradually increased the intensity.

The barbel workout was designed in four different directions like flexion of the shoulder 90° lateral rotation of the shoulder 90°, external rotation 90°, flexion above shoulder 90° and the Pushups on palms three sets (10-12 reps per set) twice a day. This workout keeps loosened tendons intact and also regeneration of new muscle fibers and increased muscle strength.

I also encouraged my client to take high protein diet with optimum rehydration as proteins are required to develop new muscle fibers.

The following points should be considered while treating a rotator cuff disorder.

- ✓ Thorough medical history of the client including physical activity during early childhood as literature (costa et al) suggest most of the muscles develops to its full strength at the age of 10-20 years. Physically active individuals may get early prognosis (Nakandala P.)
- ✓ Some of the special tests are found to be less significant clinically so one must consider all the possible conditions while making a clinical impression.
- ✓ Always encourage clients for home care exercise. Insufficient homecare exercises results poor outcome of massage treatment.
- ✓ Most of the clients think that massage therapy is just for relaxation purpose, we need to change this stigma and develops new techniques in therapeutic massages which can be only possible if practice evidence based therapeutic massage treatments.
- ✓ Occupational history is highly significant in therapeutic massages as per the research study by (Ch linaker). Professional massage therapist collects all the information related to work place, posture while performing a particular task at workplace and execute carefully designed techniques including strengthening and stretching exercise in the form of home care treatment.

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