

# Physical Therapy Management of Scapular Winging

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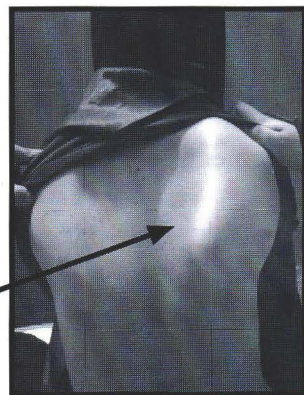
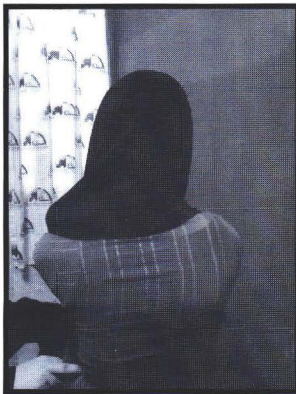
## ABSTRACT:

Winging of Scapula is an atypical condition in which medial border appears prominent and scapula rotates and displaced away from the body. This altered biomechanics is an indication of weakness of serratus anterior, trapezius and rhomboid muscles. It is also termed as Sprengel shoulder or Scapula alata. It may have either a neurological, muscular or structural origin. A review article, unravelling some fundamental facts and significance of physical therapy is presented here.

**Keywords:** Scapula winging, Scapula alata

## INTRODUCTION:

Scapular winging is considered as one of the most common scapulothoracic disorders. This devastating condition is caused by different pathological conditions which results in functional limitation of activities of the upper limb<sup>1,2,3</sup>.

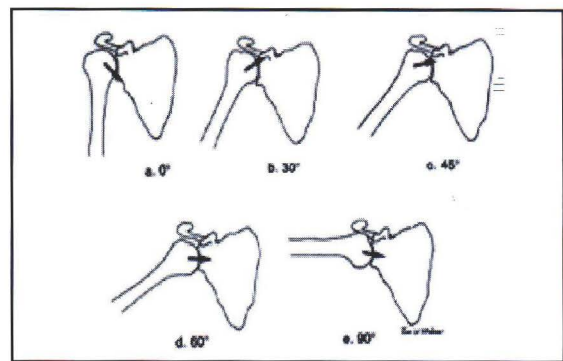


A Case of Classic Winging of Scapula, at Baqai Institute of Physical Therapy & Rehabilitation Medicine

## BIOMECHANICAL ANALYSIS:

Being the largest bone of the shoulder girdle complex, the scapula has a large number of muscle attachments<sup>4</sup>. These muscles contribute greatly in the maintenance of the normal anatomy as well as the functional status of the upper extremity. Any alteration in scapulohumeral rhythm, results in degradation of muscle power and restrict the normal ranges of motion, specifically flexion and abduction of the

upper extremity. They set up as a base of significant pain around scapular region<sup>2</sup>.



Gleno-Humeral Rhythm<sup>12</sup>

## Scapular Dyskinesia (Abnormal Scapular Rhythm):

The term scapular dyskinesia refers to the change in the scapular location & altered scapulo-thoracic rhythm<sup>5</sup>. Most of the times it is confused with other shoulder joint pathologies. This scapular dyskinesia helps to determine the appropriate management of shoulder joint pathologies<sup>5</sup>. Winging of scapula is one of the examples of scapular dyskinesia which results in functional loss, periscapular pain & asymmetry of the shoulder girdle.

## ETIOLOGY:

Scapular winging has got muscular or neurological connections<sup>6</sup> including idiopathic or traumatic course of actions which either results in nerve injury of the

long thoracic and spinal accessory nerves or muscular deficit of either the serratus anterior, trapezius, or rhomboid muscles.

#### a) Musculo-Skeletal Origin:

The above mentioned muscles contribute to keep the medial border of the scapula protracted against the posterior thoracic wall, and denervation or paralysis of any of these muscles results in the winging of the medial border of the scapula as it lifts off the thoracic wall<sup>7</sup>. The end results of the Scapular winging is functional loss, pain all over the scapular capsule, and altered biomechanics of the shoulder joint<sup>3</sup>.

#### b) Neurological Origin:

Neurologically winging of scapular results due to the paralysis of nerve to serratus anterior which is also termed as long thoracic and spinal accessory nerve<sup>2,13</sup>. It might result due to any trauma to the brachial plexus.<sup>13</sup>

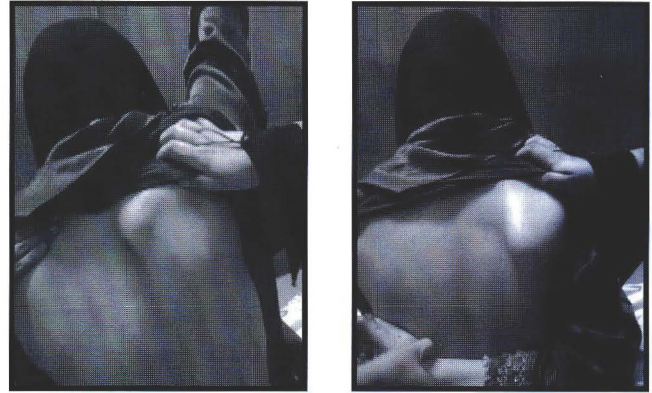
#### Classification:

Scapular winging possibly result due to variety of different clinical perspectives, like traumatic or sports injury, iatrogenic or spontaneous in nature<sup>4</sup>. Winging of scapula can be classified as:

- **Primary**
  - **Secondary**
  - **Voluntary**
- **Primary scapular winging:**  
It results due to any neurological injury (Nerve of Bell) or musculo-skeletal changes in the anatomy like bone or periscapular soft-tissue malfunction.
  - **Secondary scapular winging:**  
It results due to glenohumeral and subacromial pathologies and also those conditions which are unresolved after the primary pathologic conditions.
  - **Voluntary scapular winging:**  
It is associated with some fundamental psychological issues and not really due to any anatomical disorder<sup>3,9</sup>.

#### DIAGNOSIS:

Evaluation of Scapulo-thoracic articulation is one of the crucial aspects of shoulder joint assessment. Clinical assessment of scapulo-humeral activity has established as a challenging condition because of both the widespread muscular attachment around the scapula and a variety of movements which take place at shoulder joint<sup>5</sup>. Diagnosis can be easily made on evident examination of the scapular medial prominence (due to serratus anterior paralysis<sup>4</sup>.



Marked winging of scapula can be easily seen (BMU)

Winging of scapula is a source of asymmetry or unevenness of the shoulders, but the abnormality may not be apparent until the patient attempts to challenge the serratus anterior muscle in opposition to any resistance<sup>7</sup>.

#### Physical Therapy Management:

The core objective of physical therapy management is to strengthen the weakened muscles specifically the serratus anterior and upper trapezius to re-establish the normal mobility of shoulder girdle. Majority of cases of winging of scapula unexpectedly resolve within 2 years<sup>2</sup>. A conservative approach of treatment is usually the treatment of choice. For this purpose, a time frame of 6–24 months is often recommended for spontaneous revival, after that period the patient turn out to be a candidate for remedial surgical procedure<sup>2</sup>.

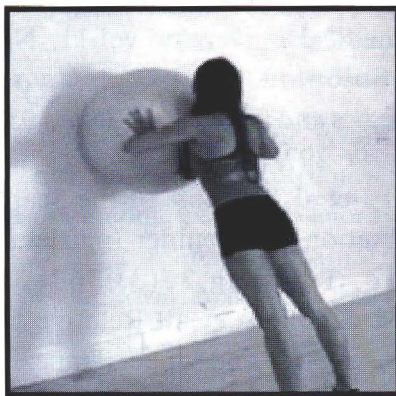
#### EXERCISES:

Exercises are focused to strengthen the core muscle i.e., serratus anterior and upper trapezius muscles<sup>7</sup>.

Other scapular stabilizer muscles can be incorporated in physical therapy programme. Exercises are selected on electromyographic facts or clinical skills<sup>8</sup>. Numerous researchers recommend that during the initial stages of rehabilitation, exercises must be performed with the arm below 90° of humeral elevation. This results in prevention of rotator cuff injuries<sup>8</sup>.

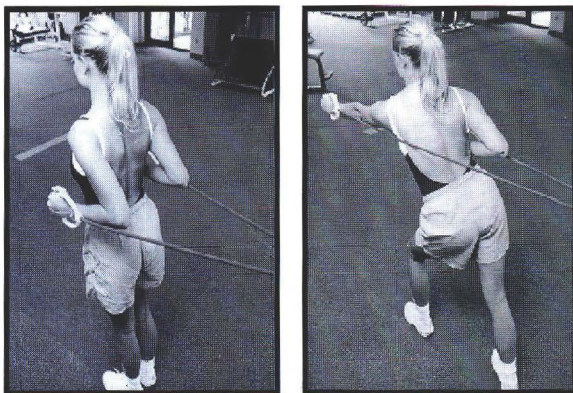
### 1) Press ups against a wall :

This exercise can be performed with or without a swiss ball by standing just over an arms length away from a wall as shown in the figure, Lean into the wall, bend the arms and push away. Repeat 10 times. Aim for 3 sets of 10 repetitions.



### Serratus Anterior Punches:

The serratus anterior is also known as the punching muscle. Wall push up is the easiest exercise to start with and progress to the hardest i.e., full push-up with scapular protraction<sup>10</sup>. Serratus anterior punches with



Serratus Anterior Punch<sup>9</sup>

theraband strengthen the serratus anterior and the rotator cuff muscles as well. This exercise is effective in increasing the range of motion and strength of periscapular muscles<sup>9</sup>. These strengthening exercises must be incorporated with stretching exercises of opposite muscle group<sup>9</sup>.

### Military Type Push-Up:

The serratus anterior muscle works more actively during the military type push-up with scapular protraction<sup>1</sup>. It is least active when performing the same push-up activity against the wall in the standing position. Beside serratus anterior (SA), upper trapezius (UT) is one of the most important muscles in moving the scapula in different overhead activities<sup>4</sup>. The action of SA (punching action) and the UT is used to shrug the shoulders. If these two muscles do not work together, it might lead to different shoulder issues. If serratus anterior contraction is weak or the upper trapezius contraction is too strong, it might lead to wing out instead of lying flat against the rib cage. If we want to have a biomechanical rhythm we have to possess coordinate between the UT and the SA muscles<sup>10</sup>.

### ORTHOTIC MANAGEMENT:

Orthosis are considered as a non-invasive alternative to the surgical treatment for scapular winging or scapular stabilization<sup>11</sup>. Winging of the scapula is the prominence of the medial border of the scapula. The winged scapula may also be rotated or displaced medially or laterally<sup>4</sup>. Orthosis is the device which can restrict this abnormal scapular displacement. The combination of physical therapy and the orthotic management can give a significant improvement both in the range of motion and muscle strength. The patient still continues to gain strength. The orthosis has a negligible affect on pain alleviation<sup>4</sup>.

### DISCUSSION:

The scapula takes part in numerous actions to facilitate the shoulder function by interacting with anatomy and biomechanics and to induce an efficient movement.

The limitation or weakness of the scapular stabilizer frequently modifies the biomechanics of the shoulder girdle. Due to this alteration in biomechanics, an abnormal stress force is generated around the joint<sup>9</sup>. These scapular stabilizer (serratus anterior and subscapularis) generate a forceful pulling effect to keep the scapula adherent with the chest wall. Some other muscles are also responsible for the scapular stabilization, especially levator scapulae, rhomboids major and minor. These muscles work together to have a balance and coordinated movement. This is the only way to maintain a scapulohumeral rhythm. The importance of these stabilizers increases thousand folds when glenohumeral joint moves above 90° of flexion or abduction. Therefore it is quite clear that the role of the scapula must be cautiously tackled in upper extremity, in any shoulder rehabilitation programme. The physical therapist should first assess the patient and find out the accurate reason of the scapular dyskinesis.

#### CONCLUSION:

It has been suggested that the patients with scapular winging can be benefited from physical therapy treatment. This conservative treatment would also prove consistency in a clinical situation to the patients who need remedial care. How the scapular muscles influence function, at the shoulder, builds a strong foundation for the clinician therapist who develop a rehabilitation program for the shoulder. The scapular muscles have to work dynamically so that well-organized glenohumeral movement can take place. To achieve that goal Physical therapy has its own proved importance.

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