

## Winged Scapula about a Clinical Case

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### Abstract

Winged scapula is a rare injury, caused by the alteration of neuromuscular balance in the scapular-thoracic pseudoarticulation and therefore around the shoulder. Has varied etiology, especially paralysis of the serratus anterior injury of the long thoracic nerve, generating a potentially disabling condition where the shoulder just giving in, causing deformity and limitation to perform basic daily activities. In this article we present a case of a patient with post-traumatic winged scapula, clinical diagnosis and late rehabilitation treatment and partial improvement after five years of evolution, in contrast to the literature review, where it is argued that regardless of the magnitude of injury, the outcome is usually satisfactory in less time, so the appropriate clinical evaluation is suggested, support, electromyography onset of early rehabilitation treatment and trauma reevaluation at least every 6 months, according to evolution, with surgical resolution be relevant.

**Keywords:** Winged scapula; Long thoracic nerve injury; Anterior serratus muscle paralysis

### Introduction

The Winged Scapula, whose first description was made by the French surgeon Alfred Velpeau in 1837 [1], is a rare lesion, produced by the alteration of the neuromuscular balance in the scapulo-thoracic pseudoarticulation and therefore in the rest of the shoulder. This pathology has varied etiology, being its main cause, the paralysis of the anterior serratus muscle due to injury of the long thoracic nerve, generating a potentially disabling condition, where patients try to compensate for the lack of scapulo-humeral movement at the expense of the scapular joint. thoracic, which ends up claudicating and producing the deformity [2] and limiting the ability to perform activities of daily living (AVD) or basic daily activities (ABC) [3]. From this condition derives the importance of expanding knowledge regarding the diagnosis and treatment of this clinical entity.

### Bibliographic Review

#### Etiology

The etiology is classified in primary or neurological origin more frequently after the injury of the Long Thoracic nerve and in lesser frequency of the XI Accessory Spinal cranial nerve or Dorsal Scapula nerve [4,5]. And secondary to Gleno-Humeral or Sub-Scromial pathology [2]. In turn, the primary causes are subdivided into:

**Traumatic:** Bad positioning in anesthetic and surgical procedures of upper limbs, head or neck (more frequent) [1,3,6,7].

**Invasive procedures:** minimally cardiac surgery, radical mastectomy with lymph node removal, first rib resection, trans axillary sympathectomy, internal jugular canalization, axillary canalization, use of interscapular coil or coil, minimal thoracotomies, inadequate

incision techniques and sternal retraction, surgery of the anterior column.

**Sports activities:** volleyball, weightlifting, archery, athletics, baseball, basketball, soccer, golf, gymnastics, hockey, tennis and wrestling; where the lower angle of the scapula compresses or stretches the long thoracic nerve or by abrupt contractions of the scalene in forced cervical rotations [1,3].

Closed trauma with compression or traction in falls or collisions and puncture-penetrating trauma to the chest and shoulder girdles [3,6,7]. And whiplash for traffic accidents. Although they usually have a self-limited course, they can sometimes cause irritation of the brachial plexus and alteration of the peripheral nerves, such as the long thoracic nerve [3]. F. Others: Work accidents (in mechanics, naval aviators, welders, etc.), repetitive movements, use of axillary crutches [3], loading of very heavy objects on the shoulder that force it to descend, [1], use of orthotics to scoliosis, electrocution [6,7] [2].

a. Non-traumatic to viral (parvovirus, poliomyelitis) and non-viral diseases (leprosy, diphtheria, tetanus) [3].

b. Vaccines or immunization.

c. Allergic drug reactions.

d. Vitamin deficiency and metabolic disorders.

e. Toxic exposure and drug overdose. And infiltration or rarely tumor compression. Post-radiation [6,7].

F. Compressive hematoma in patients with anticoagulant treatment or during arteriography.

g. Radiculopathy mainly C7, myelopathy at this level or plexitis [3,6,7].

h. Muscular dystrophy of the shoulder girdle (for example, humeral scapulo fascio dystrophy (FSHD), which is usually bilateral.

i. Amyotrophic neuralgia: Parsonage-Turner syndrome, which is believed to be of autoimmune origin, although it is also classified as Idiopathic.



**Figure 1:** Shoulder asymmetry with anteriorization and descent of the affected side.

#### Clinical table

The clinical picture is presented with:

- Shoulder asymmetry, with anteriorization and descent of the affected side, ascent and protrusion of the scapula, weakness and progressive muscular hypotrophy of the shoulder girdle (Figure 1) [2].
- Limited mobility in flexo-elevation and abduction of the affected shoulder above 90° [1].
- Limitation on activities of daily living (AVD) or basic daily activities (ABC), such as: combing, taking objects from shelves, driving for long periods of time [7].
- Intense and continuous, somatic and neuropathic pain in the affected shoulder, ipsilateral scapular region or posterior chest wall, which can self-limit. For the diagnosis it is important to perform a good interrogation and clinical examination, knowing the mechanism of the lesion, since the pathology can initially occur without pain, only with functional alterations [7].
- Pain in advanced stages with muscular contracture, secondary to a compensatory overload of the undamaged muscles, including in some cases the cervical paravertebral, perceived as cervicobrachialgia [2,7].

The inspection is carried out with the examiner behind the patient, initially in a neutral position and then with active movements of flexion and abduction of shoulders, he is ordered to press his hands against the front wall and it is visualized that the protrusion of the scapula is accentuated affected, with postero-lateral inclination of its lower angle, due to weakness of the anterior serratus, transferring loads to the glenohumeral joint. This sign is known as "Sprengel's Sign" [2]. This allows differential diagnosis with the winged scapula secondary to spinal accessory nerve injury, as this maneuver does not accentuate it [3,8], however, external tilting of the lower angle of the scapula occurs, due to the predominant action of the serrato anterior [4].

#### Diagnosis

The diagnosis is carried out by clinical and electromyographic findings, although for the differential diagnosis, the following are indicated: X-ray of the cervical spine, shoulder and thorax (preferably in a lordotic position), Computed Axial Tomography to rule out the existence of osteochondromas and Magnetic Resonance to rule out spinal, radicular or brachial plexus compression [6,7]. EMG is indicated to confirm peripheral nerve injury and perform differential diagnosis with C6 and C7 radiculopathies, brachial plexopathy and myopathies. Being useful in determining diagnosis, intensity of the lesion, prognosis, evolution and knowing the most appropriate time for surgical intervention if there is a possibility of nerve release at the site of compression or constriction. The Electrodiagnostic as an extension of the neurological physical examination, in this case, is performed in two parts:

1. Electromyography (EMG) of the anterior serratus muscle (also in trapezius and rhomboids), through the insertion of a needle electrode (monopolar or coaxial), for the evaluation of the electrical activity generated in response to thoracic nerve stimulation long, spinal accessory and dorsal of the scapula, and thus determine the existence and magnitude of axonal injury. The findings can be: Increased insertion activity, signs of denervation in variable magnitude and/or signs of reinnervation according to its evolution, decreased recruitment pattern proportional to the intensity of the lesion.

2. Nerve Conduction of the Long Thoracic, Spinal Accessory and Dorsal of the Scapula, for the recording and measurement of its motor potential, by electrical stimulation to determine its functional and structural integrity (myelin and axon). The findings can be: prolongation of latency, drop in amplitude and increase in duration of the potential for motor action, depending on the magnitude of the lesion.

## Treatment

The treatment is aimed at reducing pain and improving the patient's functional capacity. Conservative treatment consists of:

Physical rest

(2 to 3 weeks depending on the case) [1].

Drugs

Non-steroidal anti-inflammatory or analgesic, neuromodulators and muscle relaxants, depending on the symptoms. In cases of severe pain, an anesthetic block of the ultrasound-guided nerve can be performed [1].

Rehabilitation to physiotherapy

Thermotherapy, electrotherapy (analgesic and my stimulant), ultrasound, scapula mobilizations, myofascial release, neurodynamic techniques, musculoskeletal stretching of the shoulder girdle, active-assisted and passive shoulder joint mobilization, initially to tolerance, active cervical spine, exercises of shoulder strengthening (mainly of the previous serrate, having recovery potential) and proprioceptive neuromuscular facilitation (PNF) techniques, with a view to reaching, as far as possible, the ideal condition.

Occupational therapy

Therapeutic activities to improve the range of joint movement, muscle strength and postural perception, avoiding scoliotic postures.

Recommendations

Maintain postural hygiene and ergonomic care, avoid activities that generate fatigue and muscle pain, avoid the use of bags on the affected shoulder [1] and practice swimming.

Surgical treatment is indicated in penetrating thoracic trauma or for aesthetic and functional purposes, in case of no improvement with conservative treatment after 12 months of injury. The techniques range from neurolysis, dynamic stabilization of the scapula with musculotendinous transposition of the sternal head of the pectoralis greater than the lower angle of the scapula [2,9] and static stabilization by slices of fascia lata to the spinal spinous processes (in disuse due to limitation of the scapular tilt and recurrences), up to the scapulo-thoracic arthrodesis that provides a rigid fixation of the scapula on the thorax. Technique with which a high incidence of complications is reported, therefore, is only indicated as a salvage procedure in cases of recurrences, after the use of other techniques [5,9,10].

## Forecast

Generally good, with improvement of pain and recovery of strength in most cases, in a period of 6-12 months [6]. On the other hand, in the case of Parsonage-Turner Syndrome, authors report persistence of pain and weakness in 66% of cases at 3 years and in contrast other authors claim improvement in 75% of cases between 6 months and 5 years. The delay in recovery is usually proportional to the intensity and duration of pain and the degree of muscle weakness [1], a condition that can be improved if the diagnosis and adequate and timely treatment can be established.

## Case Report

25-year-old male patient, who reports trauma to the right shoulder on 05/05/08 during working hours, when he was cleaning a moving

escalator, being trapped by compression forces on the right shoulder blade with the support of the clavicle on the same side, meriting abrupt movement of withdrawal or disengagement, causing crepitation, increased volume and hematoma in the scapular area, and severe pain in the right interscapular and paravertebral area, being evaluated by the traumatology service of the nearest hospital, where they diagnose scapulothoracic dissociation or dislocation and place immobilizer Universal shoulder of ipsilateral, being used permanently for 9 months and intermittently for the next 3 months, persisting muscular hypotrophy and functional limitation. It is reassessed one and a half years after the injury, when they diagnose *ESCAPULA ALADA* and indicate imaging studies and interconsultation with hand surgery, considering the scapulo-thoracic arthrodesis, which was subsequently ruled out, perform bandages in eight and indicate rehabilitation, which, fulfilled for 2 years, 2 times/week with alternating thermotherapy (did not tolerate analgesic electrotherapy), mobilizations and strengthening exercises of the right shoulder, referring to having achieved improvement in 60% mobility and 50% muscle strength. Subsequently, he continued an exercise program on his own, improving trophism and muscular strength in flexo-extensors of the right elbow. Even today it refers pain with physical exertion and cold, cramps at the level of the major rhomboid, feeling of currents at the level of the scapula elevator, however it refers to general improvement by 70%.

## The Physical Examination Showed

Mild hypotrophy and Tense bands in the right shoulder girdle (including pectoralis minor), with painful points in the trapezius, scapula, wide dorsal, anterior serratus, scalenes and slightly in the infraspinatus. Positive Sprengel sign. Limitation in active joint mobility of the right shoulder, achieving 70° of flexo-elevation and° of abduction and° of extension. Muscular weakness in the right shoulder girdle: 3/5 scapula adductors and abductors, 3 5 shoulder flexors, 4-/5 abductors, extenders, adductors, internal and external rotators and 4+/5 scapula elevators.

## Electrodiagnostic findings

### Electromyography

Decrease in Insertion Activity in the right trapezius (fibrous tissue), Positive Waves (denervation) scarce in the right anterior serratus. Voluntary Activity with potential motor units of normal configuration and incomplete Recruitment Pattern in trapezium and right anterior serratus. Conclusion: Axonotmésis of the Long Thoracic Nerve and in less intensity of the Right Accessory Spinal Nerve.

## Discussion

The Winged Scapula is an under-diagnosed clinical entity, despite being a major cause of upper limb disability. Early diagnosis is difficult to make, often going unnoticed. Therefore, a thorough history, physical examination and an electromyographic evaluation of all peri-scapular muscles should be performed to confirm the clinical diagnosis and decide behavior [3]. The etiology of the most frequent long thoracic nerve injury is related to poor positioning during anesthetic and surgical procedures. Despite not being the cause of the case, we highlight the importance of the correct position of the patient during any medical procedure, always taking into account the path of this nerve, for its protection. In the patient studied, electromyographically,

the lesion consisted of intense axonotmésis (partial axonal disruption according to Seddon) of the right Long Thoracic Nerve and less intensity of the ipsilateral Accessory Spinal Nerve, 5 years after the injury, which would explain the evolution of said patient. However, one of the authors cited indicates that the electromyographic findings do not always correlate with the clinic, and another author refers that despite the severity, most patients usually improve within 1 year.

### Conclusion and Recommendation

In the reported clinical case, the patient presented partial improvement after a 5-year evolution with winged post-traumatic scapula, in contrast to the literature review, which states that despite the magnitude of the lesion, the evolution is usually satisfactory. 12 months however, we find in this case: prolonged immobilization, late clinical diagnosis and rehabilitative treatment, so that adequate clinical evaluation is suggested, support in the electromyographic study, the start of early rehabilitative treatment and traumatic reassessment at least every 6 months, according to its evolution, for its surgical resolution to be relevant.

### Summary

The Winged Scapula, is a rare lesion, produced by the alteration of the neuromuscular balance in the scapulo-thoracic pseudo articulation and therefore throughout the shoulder. It has varied etiology, mainly the paralysis of the anterior serrate due to a long thoracic nerve injury, generating a potentially disabling condition, where the shoulder ends up claudicating, producing deformity and limitation to perform basic daily activities. In the following article we present the clinical case of a patient with post-traumatic winged scapula, clinical diagnosis and late rehabilitative treatment, and partial improvement after 5-year evolution, in contrast to the literature review, which states that regardless of the magnitude of the lesion, the evolution is usually satisfactory in less time, so it is suggested the adequate clinical

evaluation, support in electromyography, initiation of the early rehabilitative treatment and traumatological reassessment at least every 6 months, according to the evolution, with surgical resolution of be relevant.

### References

1. Bachelor R, Casellas M, Trias E, Vazquez J, Perez A (2011) Regarding a post-traumatic winged scapula case. clinical cases of residents in orthopedic surgery and traumatology of the spanish society of orthopedic surgery and traumatology. *J Orthop Res* 12: 194-196.
2. Avarguez M, Enguix A, Gomis S (2012) Idiopathic winged scapula. clinical cases of residents in orthopedic surgery and traumatology of the spanish society of orthopedic surgery and traumatology. *J Orthop Res* 12: 204-206.
3. Nieto-Blasco J, Castiella-Muruzábal S, Tuda-Flores J, Fernández-Cuadros M, Oliveros-Escudero B, et al. (2012) Winged scapula, an entity of the surgical area. *Spanish Journal of Anesthesia and Resuscitation*.
4. Martin R, Fish D (2008) Scapular winging: Anatomical review, diagnosis, and treatments. *Curr Rev Musculoskelet Med* 1: 1-11.
5. Fogerty S (2012) Scapulothoracic fusion Orthopedics and Trauma: Mini-symposium less common shoulder problems. *Orthop j* 4: 385-390.
6. Friedenber SM, Zimprich T, Harper CM (2002) The natural history of longthoracic and spinal accessory neuropathies. *Muscle Nerve* 25: 535-9.
7. Meininger A, Figuerres B, Goldberg B (2012) Scapular winging: An update. *J Am Orthop Surg* 19: 453-462.
8. Martínez-García P, Sibón Olano A, Martínez Pérez-Crespo P, Vizcaya Rojas M (2010) Incision-stabbing wound and scapula alata: A case report. *Cuad. med. Forensic* 1 (1).
9. Peña L, Alvarez R, Lopez H, Perez G, Vega E (2003) Transposition of the sternal head of the pectoralis major to the scapula. *Cuban Journal of Orthopedics and Traumatology* 17: 14-21.
10. Oliveira MA, Alfaro Y, Kotzias Neto A, Korman MC (2019) Subscapular Osteochondroma as a differential diagnosis of winged scapula. *Rev Bras Ortop* 54:241-246.