

FURTHER THOUGHTS

ON SHOULDER DYSFUNCTION:

The Sternoclavicular Fixation.

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ABSTRACT.

The role of subclavius is looked at in relation to a possible new fixation pattern found in shoulder dysfunction involving a fixation at the sternoclavicular joints where subclavius is found to be weak bilaterally.

INTRODUCTION

The shoulder is in Cyriax's¹ view the most rewarding joint on the whole body possessing as he nicely puts it the salient merits of honesty and curability. He goes on to point out that since problems in the shoulder can be solved only clinically, diagnosis is open to every clinician whether he/she has access to hospital facilities or not. Therefore in his inimitable style, he advises every clinician when faced with a painful shoulder, to 'do it yourself'. It is, perhaps a little ironic, given his hostility to those such as osteopaths and chiropractors, with most skill and experience with such problems, that it is just such professionals especially those skilled in Applied Kinesiology,

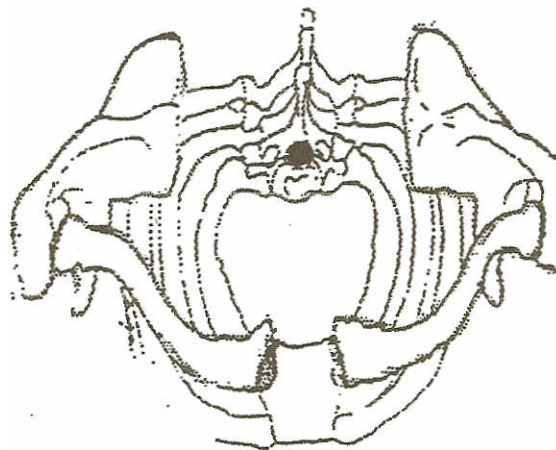


Fig 1. The Clavicle and ribs from above showing yoke structure of the shoulder girdle

who may well be the ones most able and willing to take his advise to heart.

In previous papers²³ I have tried to explore the role that AK can have in unraveling many of the functional problems of the shoulder region and here I wish to open for discussion and your evaluation some initial and very recent and therefore tentative findings on some new ways in which the shoulder region may go wrong and we may use AK to evaluate and treat the problem. This focuses particularly on the role of the small and often overlooked role of the subclavius muscle.

In his original work on the frozen shoulder Goodheart⁴ pointed out the, sometimes pivotal role of this oft forgotten muscle. Hutchin⁵ more recently took our view of the role of fixation complexes further with her

² Lindley-Jones C. **Applied Kinesiology and the Thoracic Outlet Syndromes.** I.C.A.K. – Europe Collected Papers 1992. pp 60-67

³ Lindley-Jones C. **Applied Kinesiology and the Frozen Shoulder Syndrom** I.C.A.K. Europe Collected Papers. 1991 pp. 118-127

⁴ Goodheart G. **The Frozen Shoulder Syndrome** Collected Published Articles and Reprints 1st Ed. 1969 p.57

⁵ Hutchin A. **Fixation of the Manubrio-Sternal joint and its Lovet Brother Relationship to the Xiphi-sternal Joint** I.C.A.K Europe Collected Papers 1991. pp. 128-130

¹ Cyriax J. **Text Book of Orthopaedic Medicine** vol 1 1982. p127

work on the role of the joints around the sternum. Following on an interest here I wish to propose the possible role of subclavius in a new fixation that of the sternoclavicular joints bilaterally.

But first a look at the anatomy of the area.

ANATOMY

Subclavius is a small triangular muscle, between the clavicle and the first rib. It arises from the junction of the first rib and its costal cartilage, in front of the costo clavicular ligament by a thick tendon which is prolonged along the interior margin of the muscle. It proceeds obliquely upwards and laterally to the groove on the under surface of the middle third of the clavicle where it attaches by muscle fibres. Occasionally, the latter attachment may also be to the coracoid process in addition to, or instead of the scapula.

Its posterior surface is separated from the first rib by the subclavius vessels and brachial plexus, its anterior surface from the pectoralis major muscle by the clavipectoral fascia.

Remembering the importance of the role of anterior scalene as a possible entrapper of the neuro-vascular bundle that passes between it and the middle scalene it is important to note here that the sheath of the anterior scalene unites with that of the

subclavius muscle to surround the subclavian vein. It is possible thereby to see the close interrelation of subclavius with the anterior scalene: treatment of one causing stretching of the other.

FASCIA

Barral⁶ well illustrates the importance in the thoracic inlet of the thoracic fascial system.

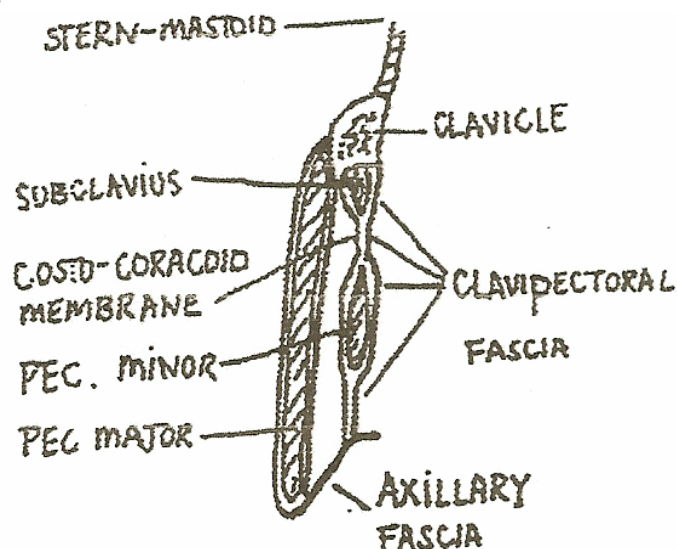


Figure 2. Showing the Clavipectoral fascial connection of subclavius and Pectoralis Minor (After Barral)

To further our understanding of the role of subclavius in this area it is useful to understand the way in which the subclavian aponeurosis attaches to the anterior, inferior and posterior walls of the osteofibrous sheath of the subclavius muscle the superior part being formed by the clavicle. The clavipectoral fascia inserts superiorly on the sheath of the subclavius muscle and on the coracoid process. Lower down, it covers the clavipectoral

⁶ Barral J-P The Thorax 1991 p.19

triangle connecting the subclavius and pectoralis muscles. It surrounds the latter and merges with its aponeurosis, the skin of the axillary fossa and the brachial aponeurosis at the level of the coracobrachialis muscle and the short head of biceps brachii here becoming the suspensory ligament of the axilla. Any pull on the clavipectoral fascia possibly induced by dysfunction in the pectoralis muscle will then affect the subclavius.

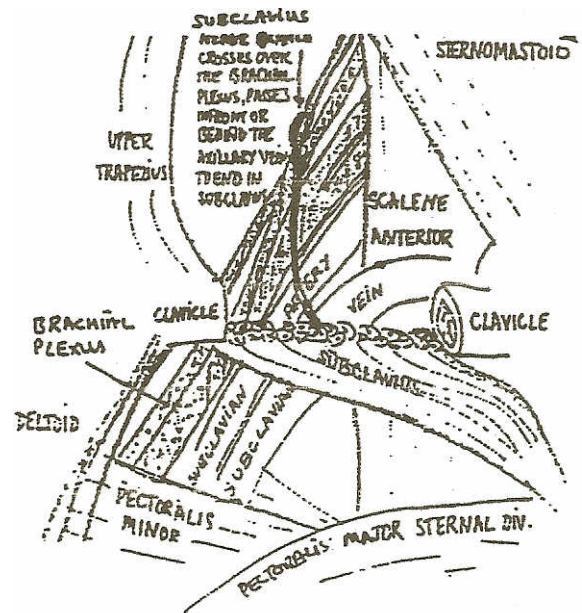


Figure 3. View of subclavius and brachial plexus and nerve

NERVE SUPPLY

Nerve supply to subclavius is by a branch of the brachial plexus which derives its fibres from C5 & 6, passing in front of, or behind, the axillary vein before ending in subclavius.

Fibres of these nerves anastomose with the phrenic nerve, which explains why irritation of the phrenic nerve may affect the subclavius. As Barral⁷ points out, such irritations can be of visceral (lung, liver, bladder) or peritoneal origin, since the peritoneum is partially innervated by the superior part of the phrenic nerve.

ACTION

Interestingly the precise action of subclavius is not totally clear. Gray's sees it as probably pulling the points of the shoulder downwards and forwards and steadying the clavicle, during movements of the shoulder, by bracing it against the articular disc of the sternoclavicular joint. Grant's Anatomy⁸ taking the more static 'cadaveral' approach of the surgeon considers the subclavius an unimportant muscle valuable only as a buffer between a fractured clavicle and the subclavian vessels. Willard⁹ also sees a small role for subclavius as a stabiliser of the clavicle seating the head of the clavicle into the sternoclavicular joint. Its leverage being low.

Subclavius is both difficult to palpate and to investigate electromyographically. Walther¹⁰ states that it appears to participate

⁷ Barral op.cit p.19

⁸ Grants Atlas of Anatomy Ed. Anderson J.E. Edition 1978. 9-7

⁹ Willard F. **The Thoracic Musculature and Viscera Seminar.** The European School of Osteopathy 23.1.98

¹⁰ Walther D. **Applied Kinesiology vol 1.** 1982 p386

in the "crank" like action of the clavicle during shoulder abduction. Clearly it must assist in protraction in some way drawing the shoulder ventrally and caudally, and in so doing, controlling upward movement of the clavicle.¹¹ It appears to be partly responsible for the rotation motion of the clavicle during arm abduction. Walther¹² points out that when there is limitation of arm movement that equates with the 30° of scapula rotation obtained by clavicular rotation, the subclavius should be considered for possible involvement. This is because the distal end of the clavicle elevates with 30° of hinge-type movement at the sternoclavicular articulation and rotation of the crank shaped clavicle gives an additional 30° for a total of 60° elevation.¹³

APPLIED KINESIOLOGY & SUBCLAVIUS.

Classically, within AK, subclavius has not been associated with any meridian or organ, only neurolymphatic reflexes, anteriorly at the junction of the clavicle, sternum and 1st rib and posteriorly, at the lamina of T1.

Treatment has generally been related to direct treatment to the muscle using proprioceptive, fascial release or possibly spray and stretch techniques. It has not been thought possible to test the muscle directly,

rather an indirect test has been prescribed using therapy localization as near to the muscle as possible and watching for a strong muscle to weaken, Remembering that this only tells where and not what is being therapy localised.

True to form, however, Beardell dividing the muscle into clavicular and scapular divisions devised tests to evaluate their actions. These are primarily in the first 10° of abduction with the arm held in full internal rotation in 180° of flexion held against the ear. This requires assistance from a healthy deltoid muscle. While some disagreement remains in some circles as to the correctness of Beardell's directions for these tests, clinical use has proved productive as I hope to show below.

Before going further however, it is of significance to note that Barral¹⁴ observed that, it is mainly the smaller muscles of the thorax, such as subclavius, that are the focus of his attention. He finds problems of the larger muscles, such as trapezius, are often secondary i.e. due to an "overflow" or cascade of decompensations arising from dysfunctions else where in the body. It is Barral's view, which contrasts somewhat with aspects of Applied Kinesiology, that small muscles retain the "memory" of trauma much longer than large muscles and therefore have

¹¹ Lockhart R. Hamilton G. & Fyfe F. *Anatomy of the Human Body* 1969. p199

¹² Op. cit

¹³ Walther D. *Applied Kinesiology: Synopsis* 1989 p.439

¹⁴ Barral op. cit. p18

a greater overall effect on the body and are more likely to be pathogenic and primary.

Beardell's muscle tests for subclavius requires the supine patient to abduct the arm 180° to the side of the head. Internally rotate the arm until the palmar surface of the hand faces away from the head. The doctor stands ipsilaterally braces the contralateral shoulder, with contact on the ipsilateral forearm to abduct the arm through the coronal plane.

RECENT FINDINGS

In recent months while researching this area in my practice I have noticed three factors of note:

Firstly, the subclavius is involved in reactive muscle dysfunctioning with other related muscles far more often than I had previously thought.

Secondly, the so called "Limbic Fixation" of C7 and the First rib is also often found, although it has not found favour in recent AK literature.

Thirdly, and most recently, I have observed what appears to be a new fixation, at the sternoclavicular joint, which is invariably found in bilateral weakness of subclavius.

REACTIVE MUSCLE PATTERNS

It appears necessary to employ the muscle tests devised by Beardell to find the often related reactive patterns between subclavius, upper

trapezius, pectoralis minor and supraspinatus. This latter can be tested quite adequately in the standard classical manner.

LIMBIC TECHNIQUE

In his article on Pitch, Roll & Yaw Technique and Limbic Technique Goodheart¹⁵ goes to great and interesting length to explain the hypothesized relationship he observed between therapy localization to the nose, imbalance between the left and right sides of the brain and weakness in an indicator muscle which is neutralised by head turning to left and right. This Goodheart thought, indicated a fixation of the 7th cervical first rib area and a potential fixation of the 1st lumbar and 12th rib area, on a Lovett reactor basis.

As might be surmised from its attachments, I have observed a close relationship between weak ipsilateral subclavius muscles and this, now less commonly discussed C7 1st rib fixation.

FIXATION OF THE STERNOCLAVICULAR JOINT

In inspiration the movement of the rib cage is assisted by the secondary respiratory functions of the scalenes and sternocleidomastoid as well as the intercostals. As Hutchin¹⁶ observed in relation to fixations in the manubrium sternum, with inspiration the whole of the shoulder girdle is raised by these muscles elevating the upper ribs,

¹⁵ Goodheart G. Pitch, Roll and Yaw Technic and Limbic Technic Journal of IAPM Spring 1983

¹⁶ Hutchin A. op. cit.p128

thrusting their anterior extremities forward, and carrying forwards and upward the body of manubrium sternum. The clavicles attach to the manubrium on its super lateral border at the sternoclavicular joint. This joint possesses some 60° range of elevation, 60° of rotation and 30° of forward movement, the range being limited by the fact that the trapezius and rhomboid muscles are at full stretch restraining the scapula. Movement of the joint can be envisaged if one sees it as being at the apex of an imaginary cone. The circumference of the base of this cone is described by the lateral end of the clavicle, which can sweep in a circle. As Basmajian¹⁷ observed, while the lateral end of the bone sweeps at will in arcs of many circles, the medial end has merely to glide in its socket. With its strong ligaments, articular disc and the subclavius muscle acting as a dynamic ligament this remains a surprisingly stable joint.

Cyriax¹⁸ notes a rare condition, he calls a posterior sternoclavicular syndrome. Pain is in the posterior neck but all structures are found to be normal there. Resolution is only to be found according to Cyriax by addressing the posterior sternoclavicular joint, with a syringe in his case. Could he have stumbled on a fixation pattern? Perhaps not!

When a bilateral subclavius weakness is observed, get the patient to therapy localise over the sternoclavicular joints

with one hand. As with fixations nothing will occur until the area is in motion. At this point a change in muscle strength will be observed.

Thoughtful readers will at this stage say to themselves, ah yes, but what about K27. It is well known that at the junction of the first rib, clavicle and sternum lie two important points from the AK point of view. The first is Kidney 27 two tsun from the mid line, this point along with CV8 at the umbilicus, and other points and actions is used to screen for neurological disorganisation. It is, therefore mandatory to screen this out before diagnosing a fixation at this point as this could confuse the issue and lead to erroneous results.

The second point to remember is that this same point is the anterior neurolymphatic reflex for both the subclavius and the intrinsic muscles of the spine. It is, therefore important to know what one is on and what the significance of that is before jumping to conclusions.

Interestingly, I have observed an, as yet unresolved facet to this phenomenon, namely that if the patient T.L's the joint *and* the occiput at the same time then muscle strength will change without movement of the joint. This suggests some direct cranial interconnection. While this is not hard to envisage the exact reason for this is as yet unclear.

TREATMENT

¹⁷ Basmajian J. **Primary Anatomy** 7th.Ed. 1976. p87

¹⁸ Op.cit.p125

To find the correct direction to treat this, challenge the clavicle in different directions with the thumbs and treat in the phase of respiration that negates the challenge. This is usually inspiration.

Occasionally direct work on the subclavius may be required, but normally releasing the sternoclavicular joint will be sufficient

CONCLUSION

After an in depth look at the anatomy of the area, noting, particularly the fascial connections between pectoralis minor and subclavius, and the phrenic nerve's anastomosing with the nerve supply to subclavius from C5 & 6, a subtle role for the subclavius muscle in shoulder dysfunction has been observed.

The role of subclavius in C7 first rib fixations, the so called 'Limbic technique' was explored.

The role of subclavius and Beardell's muscle tests for it, pectoralis minor and upper trapezius, are introduced as a further means of deepening your evaluation of shoulder dysfunction particularly related to sometimes overlooked reactive muscle patterns.

This links a newly postulated fixation pattern of the sternoclavicular joint to shoulder, thoracic outlet, cervical dorsal and first rib dysfunction, leaving still some questions unanswered to date, regarding the role of the cranium or stomatognathic system in this finding.