Massage and Myotherapy Australia

2022 Conference Presentation

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Introduction to, and the Importance of Manual Joint Mobilisations.

Why joint mobility investigation and treatment should be a priority for Manual Therapists.

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Introduction.

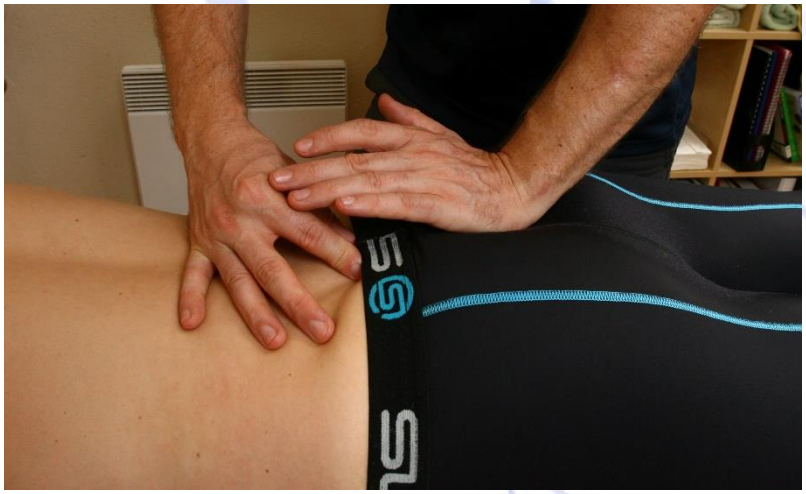
Our Musculo skeletal system prefers a synergistic balance in the length, strength, tension relationship to maintain a happily functioning Musculo skeletal system. This means everything functions together. The further from this balance, and the more likely is the potential for dysfunction or problems to develop.

We use mechanoreceptors, proprioceptors, and nociceptors to keep track of and control movement within pain free parameters.

When a joint is unable to move 'normally', several things can occur. Some of these are: loss of gross ROM, motor amnesia and an overactive stretch reflex. All this combines to create shortened range and high resting tone of the surrounding musculature, sometimes presenting as 'tight muscles'. When the joints are then able to reach their potential 'full normal' motion, a huge amount of this 'tightness' just disappears.

Come and learn to differentiate the true cause of problems with an introduction to manual joint mobilisations including NAG's, SNAG's, Glides, Mob's and accessory movements.

These are easily achievable and relatively pain free treatment options, that provide immediate, and lasting benefit for the patient.



What Is Mobilisation?

The term "mobilisation" is often used within the professions of Physiotherapy, Osteopathy and Myotherapy. Most often the term is used to describe a physical force which is applied to bone, or pair of bones at their articulation (joint), in order to improve the ability of that joint to move. Although the mechanism of this change is hotly debated, there are multiple mechanisms that contribute to change.

A mobilisation force should be conducted as either a sustained pressure or a Low Velocity, Low Amplitude LVLA -ALWAYS!

A chiropractic Manipulation is considered a High Velocity, Low Amplitude HVLA.

THERE IS NO CIRCUMSTANCE that Remedial Massage Therapists or Myotherapists are legally or ethically allowed to perform HVLA manipulations. This is not open for interpretation or personal belief system variance. If you perform HVLA manipulations in a Patient/Therapist relationship you are breaking the law and are risking serious injury to your patient. As this is outside the treatment scope of Massage therapy, you may also be subject to Criminal or Civil litigation.

In the more common and traditional context, mobilisations are applied to joints in a non-weight bearing position ie, patient is laying down. It is also common for these mobilisation forces to be applied in an oscillatory fashion and not held or sustained. It is important to realize that these traditional methods of mobilization are not wrong and that they do produce the desired result of improving range of motion. There are multiple variations of joint mobilisation. Each has its own positives and negatives. As always with Bodywork, each

patient can respond differently to each modality. The treatment needs to be match to how they test and respond. There is no 'one size fits all' treatment in Manual Therapy.

MET's can be used to increase mobility in and around joints if targeted.

Joint mechanics and technique developers

Mulligan's Concept of 'Positional Fault'

- Mulligan proposed that injuries or sprains may create a minor "positional fault" to a joint, causing restrictions in physiological movement. I.e., post ligament sprain creates dysfunction in the surrounding tissue creating movement limitations.
- The techniques have been developed to overcome joint `tracking' problems or `positional faults', i.e. joints with subtle biomechanical changes.
- Normal joints have been designed in such a way that the shape of the articular surfaces, the thickness of the cartilage, the orientation of the fibres of ligaments and capsule, the direction of pull of muscles and tendons, facilitate free but controlled movement while simultaneously minimizing the compressive forces generated by that movement.
- Normal proprioceptive feedback maintains this balance. Alteration in any or all of the above factors would alter the joint position or tracking during movement and would provoke symptoms of pain, stiffness or weakness in the patient. It is common sense then that a therapist would attempt to re-align the joint surfaces in the least provocative way

Vladimir Janda developed the patterns we recognise as the concept of upper and lower cross syndrome.

Prof Stuart Magill who coined the term gluteal amnesia where the gluteal muscles can become inhibited in stability and motion from joint or soft tissue dysfunction.

Thomas Hanna introduced the term 'sensory motor amnesia' which describes the negative effects of developing muscle memory; the state in which we have lost sensation and voluntary control of a movement or posture because it has become so deeply learned.

A joint can be considered Normal, if it has the ability to move through full, unimpeded range of motion with a normal end feel and displays no pain or muscle spasm through range or in over pressure.

Direct Mobilisations

Direct Mobilisations can be classified in the LVLA-Low Velocity Low Amplitude Category.

Most direct Joint mobilisation techniques aim to restore full 'Normal' joint motion.

The aim may also be to increase or restore either Accessory or Functional movement of a joint.

- Functional Movement- any movement the body can create actively. E.g., flexion/extension of the elbow.

- Accessory Movement- any movement the body cannot perform actively at that joint. E.g., rotation of an Interphalangeal joint.

Accessory Movement. Fingers.

Treatment

If a joint has limitations in its accessory movement capability. these limitations can create positional faults of the articular surfaces in motion, which may contribute to a painful response or limited range of functional motion. These restrictions can be created by limitations in the connective tissues around a joint.

Direct mobilisations to IP joints (inter-phalangeal joints)

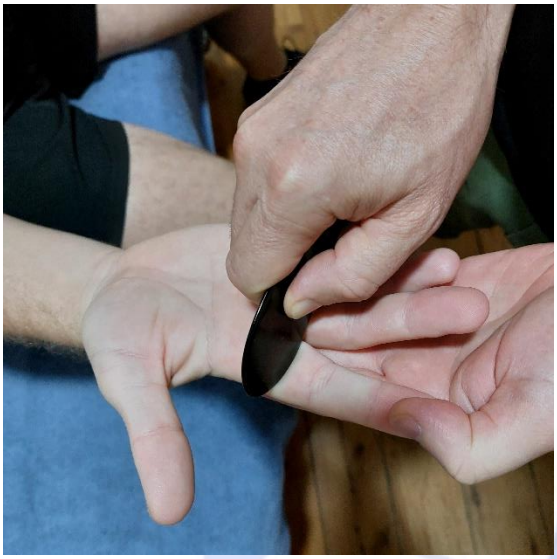
Aim to normalise the comparative Accessory movements at a joint, to allow normal Functional movement patterns

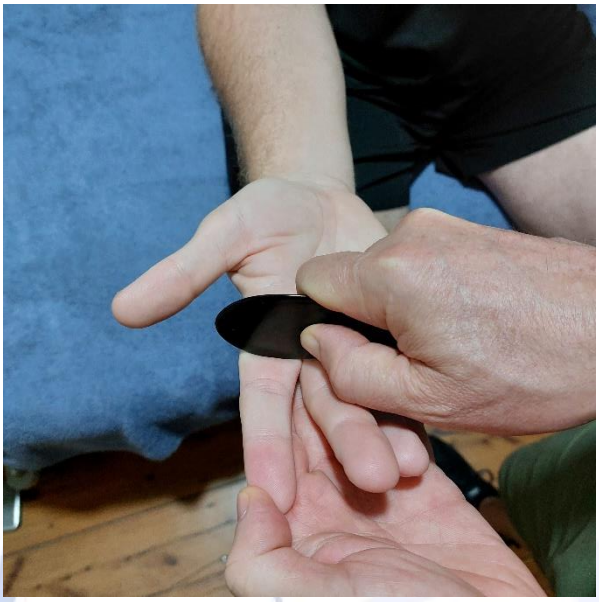

As above. Using your right hand, stabilise the proximal side of the joint being assessed. The more stable you have this, the more accurate your assessment will be. Using your left hand, create the movement of the distal phalangeal segment to systematically create all the accessory movements at that joint. Assess the normality of the accessory movements of the IP joint. Comparing asymptomatic to symptomatic joints on opposite hands. If a limitation in accessory movement is discovered, the treatment can be as simple as trying to increase the motion of that particular movement (i.e., if side bend is limited, then repeat that movement at the IPJ). If no improvement is seen, try to reproduce the other accessory movement that are found at that joint, and then reassess.

Scraping of connective tissue at or around a joint. (Scraping finger vid.)

The goal is to mobilise as much of the connective tissue around the joint as possible, using the tool to scrape the tissue. This can be a fast friction or a slower, deeper scrape. Depending on where the effect is wanted. If the patient's finger is held straight. This creates more tissue tension, which will keep the effect of treatment more superficial.

A softer bend of the joints, lowers the tissue tension, allowing a deeper effect of treatment.





- What are we treating?
- Connective tissue or musculature?
- What is around a joint?
- Did we even touch a muscle?
- What changed?
- What are we achieving?

*With treatment, we create a stimulus to elicit a change. Everything we do is about tricking the body into fixing itself.

Assessment Accuracy

Our perception of joint motion when palpating is a difficult concept to quantify. It is easy to imagine you have a perfect perception of what goes on below the skin, but in reality, that accuracy is yet to be shown true. The argument could be made that on some patients your accuracy is extremely high (patients with low body fat, musculature, fascial densification), but on other patients with high body fat, highly developed musculature and high levels of connective tissue densification, there is a very low probability that you are accurately assessing small structural articulations. This is a fact that our industry needs to accept. In this respect the need for multiple forms of assessment and compilation of results, combined with a good practitioner skillset needs to be used to increase our accuracy and outcomes.

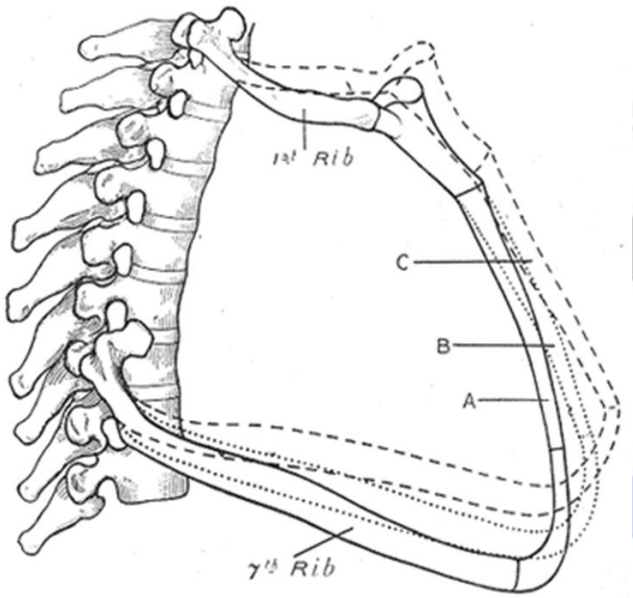
In the assessment process, a common problem that practitioners fall into is taking a small amount of information and forming a decision or diagnosis on a problem, then proceeding into the treatment. This can lead the practitioner into a closed-minded process where no further evidence is gathered, and a preconceived result is forced. A better mindset for the practitioner to be in is to resist the urge to make a final decision on what you're finding and instead, form a hypothesis. A hypothesis should be a continually evolving idea that can be modified at any point, as new evidence is discovered. The search for evidence should be continual throughout the treatment, and as you find new evidence, decide if that matches your original hypothesis. If the evidence doesn't match what you believe don't be concerned. Just understand that you don't have all the answers yet. It is a better idea to spend an hour searching for the correct evidence which leads you to a diagnosis, than an hour spent treating with no result.

Introduction to thoracic mobility.

Thoracic spine and rib mobility can have a huge impact, positively and negatively on many different areas of the body. It is easy to understand that if the rib cage can't expand during inspiration, then the lungs cannot expand to their maximum capacity. This can lead to decreased efficiencies of the lungs and a reduction of their volume and volumetric efficiency (the ability/efficiency to absorb more oxygen per breath). The detrimental flow on effects of this are numerous for function and disease. From a purely mechanical point of view, if the ribs or thoracic spine become dysfunctional, they tend to lead the body into a more Kyphotic thoracic body posture. A body will easily go further into dysfunction of the structure but generally never ease out of it. It must be assisted with treatment or exercised to maintain a better mobility. Meaning, over time this bad posture will only get worse unless you actively try to reverse it with treatment or prescriptive exercise.

Thoracic and rib movement with inspiration. All these movements must occur for full potential inspiration to occur

- Slight Thoracic extension
- Slight Anterior sternal movement.
- Elevation of sternum
- Hinge movement of the ribs posteriorly
- Mobility of the sternocostal cartilages anteriorly.
- Lateral expansion of the ribs
- All ribs elevate anteriorly with the movement of the sternum.



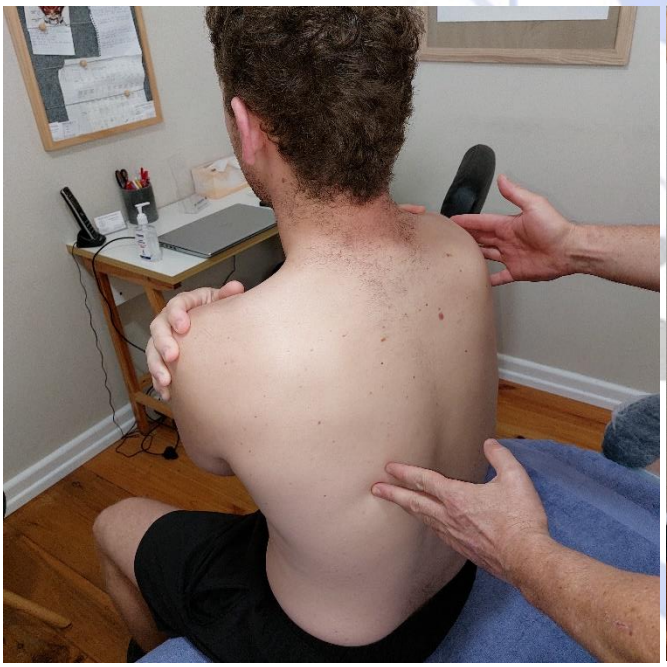
The ribs are ordered from proximal to distal numbered 1 to 12. The First 5 ribs are known as true ribs and have only a small costal cartilage attachment to the sternum. The next five ribs are known as false ribs and have a common attachment into a larger singular costal cartilage on each side. The last two ribs are known as floating ribs and only attach to the thoracic vertebra.

***Posture and considerations.** If a patient presents with a kyphotic thoracic spine, it is easy to assume they have 'bad posture' or they are in pain because of it. Strength is positional-meaning, you will get strong where you do the activity. A patient with a kyphosis can be very strong in that flexed position and have no pain or symptoms at all. If they try to complete a lot of exercises in an extended position, it may create problems and painful symptoms of the extensors. If a patient wishes to change their posture, ask them why. Is it because they believe they have 'Bad posture' or are they in Pain? They human body is extremely resilient to many different body shapes and postures. An extremely upright spinal position creates as many problems as an extremely kyphotic position over time for degenerative change. Spinal curves are our friend. The ability of the body to move the joints through range and control that movement through range should be our primary goal of treatment.

Remember: perfect symmetry and posture are overrated.

Primary assessment. Seated Thoracic Rotation

Used to correct: Poor kyphotic posture/thoracic mobility. Chest pain/tightness. Dysfunctional shoulder kinematics. Chronic neck issues. Thoracic outlet problems. Thoracic/Rib pain. Breathing difficulties



Patient seated in square position on table. Ensure patient maintains 'relaxed' and upright position during testing (Excessive flexion or extension relative to the patient's current posture will alter the results).

Patient to cross arms across their chest with hands on anterior chest/deltoid. Patient must be relaxed. The patient may try to hug themselves tightly. This may affect the results.

Holding the patient by their upper arms/shoulders, rotate them passively on the axis of the spine as far as possible, to find the end of passive rotation. Do not force this. Look for the first sign of resistance. Record the result. You may apply over pressure to gauge the end feel. This also lets the patient feel the level of restriction in rotation and gives them a comparison for when you re-test after treatment.

As you rotate the patient to the left, observe the available range of motion but also the shape of the ribs profile on the patient's right side. *Limitation to Left rotation suggests a problem in the Right-side ribs.

Record

- the quality of the rotation,
- the range of rotation,
- patient discomfort or pain during rotation.
- The resistance through range and at the end of range.
- Pain behaviour (local and referred) through the range.
- Visually observe any flat spots/asymmetry in the spine or ribs during rotation. This shows an area with less ability of the thoracic vertebrae and ribs to move independently of each other which translates into a restriction of movement.

Active V's Passive mobility## discussion.

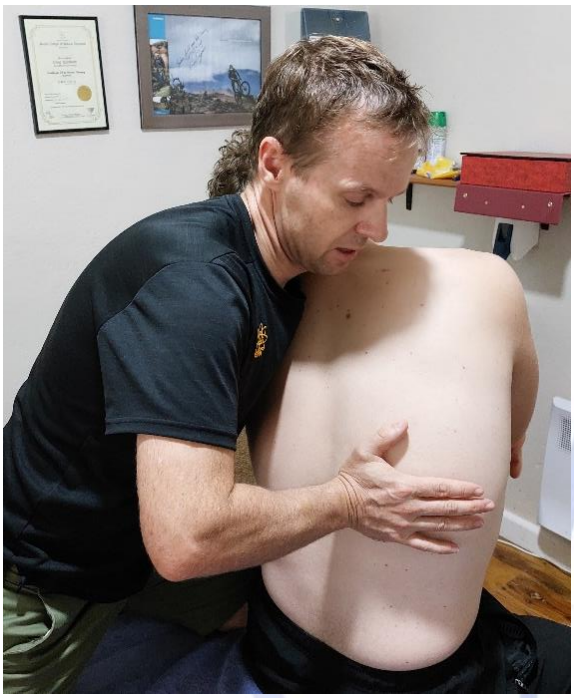
This difference in available motion is a concept that should be investigated far more often than it is currently used by practitioners. A simple way of comparing the differences, is if the passive range of motion is shorter than the desired goal of ROM, the patient needs treatment to regain full ROM.

If the patient has full passive ROM but not active ROM. Manual therapy is not needed. This patient needs exercise prescription to regain the motion.

The passive test shows what the patient should be capable of.

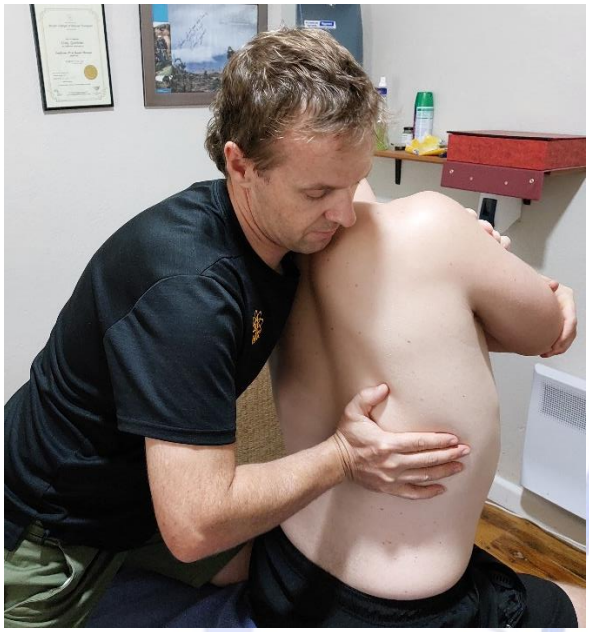
The active test shows what they are capable of producing at that point in time.

Treatment (Right side rib dysfunction):



- *Initially-Patient can be ‘pumped’ slightly through small flexion/extension movements, while moving right hand and assessing localised rib mobility up and down the spine.
- To start positioning. Patient upright. Block ribs w/right hand at treatment site.
- Allow upper spine to slump slightly and begin to side bend away from treatment side.

- Therapist’s Right hand maintains a solid contact with patient. The goal is to move the patient over your hand without moving the initial hand position. It should block the lower vertebrae from moving. All spinal and Rib movement should occur above the position of the therapist’s hand.
- Increase thoracic side bend away from treatment side.
- Start to increase spinal extension above the blocked position.
- Therapists right hand may require heavy resistance to maintain the position.



- Start to rotate the patient back to the treatment side, over your Right hand, as far as the body can comfortably move.
- Some side bend away is still maintained
- The patient's right side should now be extended, with your right hand in the middle of the arch.
- This is the starting position for the patient's resisted movement.
- Instruct the patient to 'Side bend to the right' or 'Pull the right shoulder down to your hip'.
- *Abdominals must be activated!

(Pic shows treatment for right side dysfunction)

Patient maintains same position as assessment on the table. Therapist positioned posterior- lateral to patient on non-symptomatic side. Place arm over non symptomatic shoulder reaching across the front of the patient to hold the patients opposite elbow. Patient to rest head on your shoulder. It is very important to keep thoracic extensors in a relaxed state. Place the heel of your right hand on patients lower thoracic just lateral to the spinous processes in the lamina. Use your left arm and body to extend the patient over your right hand as far as the spine will allow. Maintain a solid position with your left hand and make the spine and ribs extend over your stabile hand. Sometimes it can help to get them to assist you in this until you get them extended sufficiently. Side-bend them left (away from treatment side), by dropping your body weight slightly down onto their shoulder. This position can be tweaked now to optimise the position of treatment. Rotate the patient towards the symptomatic side slightly (right) while maintaining stiff right hand position (make them rotate over your hand) to block the ribs. Brace them in this position and instruct the patient to side bend right into symptomatic side. Your posterior hand acts as a fulcrum in this movement and focuses the release at the area you are holding (ribs). Make sure the patients abdominals are activating this movement, and also the shoulder is pulling down, as this ensures all the correct muscles are working to achieve the desired release.

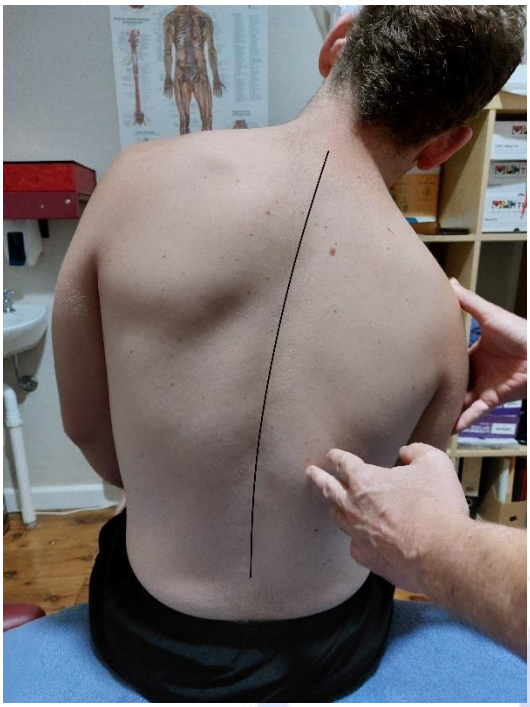
This procedure can be reproduced all the way up the spine and ribs segmentally, to mobilise the thoracic spine and the ribs. As you get higher it is more important for the patient to also be pulling the shoulder down as this activates the serratus anterior and assists the ribs to glide independently.

Side Bend Thoracic Mobilisation.

Use to correct: Poor kyphotic posture/thoracic mobility. Chest pain. Thoracic pain. Soreness/pain on spine.

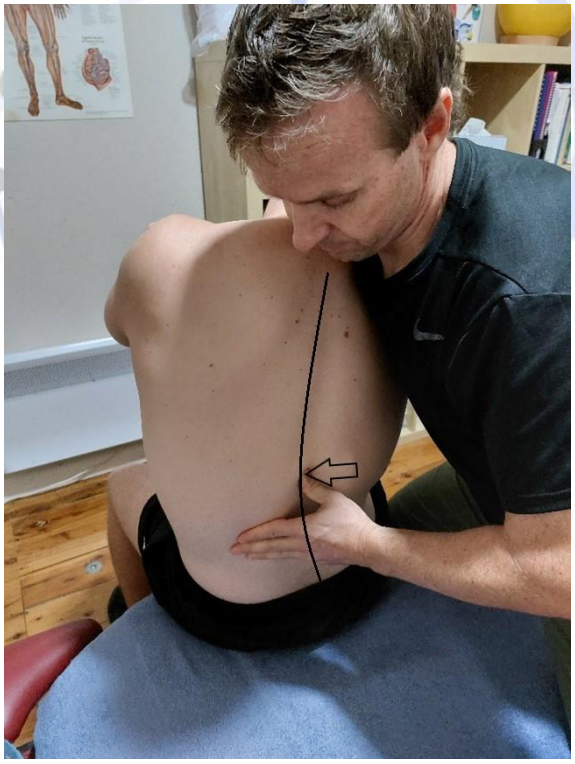
**Palpation of the space between the spinous processes that provide a painful response (usually noted as feeling bruised) indicates a limitation in mobility at that segment. Mobilise the superior vertebra of the pair for targeted treatment.*

Assessment:



Patient seated on table. Ensure patient maintains relaxed and upright position (Excessive flexion or extension relative to the patient's current posture will alter the results). Patient to cross arms across their chest with hands on anterior chest/deltoid. Holding the patient by their upper arms, help them passively side bend away from symptomatic side. Note the shape of the spine paying attention to the spinous processes as it bends noting any inconsistencies in the curve of the spines. Any areas of spinal straightness suggest immobility or dysfunction. Always compare both sides for symmetry. This can be done by standing behind the patient and holding them by the shoulders and side bending them, watching the spine almost passively or also as in the picture above, manually checking each vertebral segment for mobility.

Treatment:



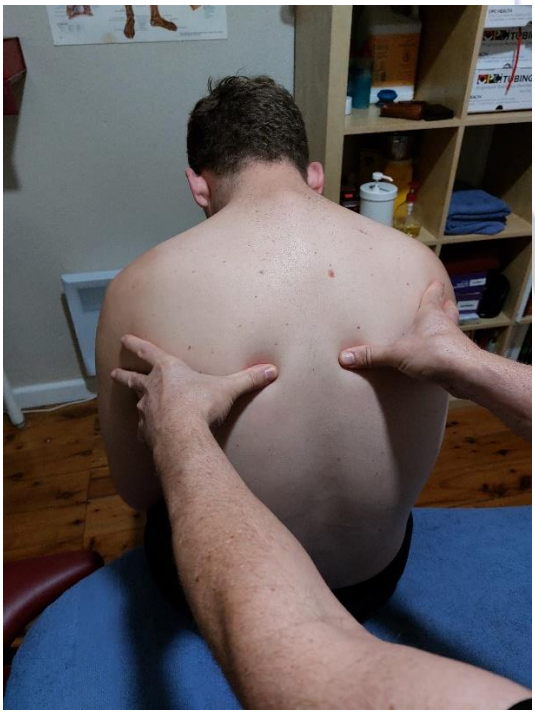
(Pic shows treatment for left side dysfunction) patient maintains same position as assessment on the table. Therapist positioned posterior-lateral to patient on non-symptomatic side. Place arm over non symptomatic shoulder reaching across the front of the patient to hold the opposite patient's elbow. Patient to rest head on your shoulder. Very important to keep thoracic extensors in a relaxed state. Patient can also be treated with the left arm place behind their body. This helps to shorten the Latissimus dorsi and softens the superficial tissue allowing the ribs and thoracic spine to move further into range. Place your left hand on the patients back. Position your thumb to the right of the spinous process at the level you wish to mobilise. Use your body to compress the patient's right side down to create a right side-bend of the spine. This has the effect of opening the left side of the vertebrae. Use your thumb as a fulcrum to optimise the focus of the side bend. You can apply a slight lateral pressure to the spinous process to exaggerate this movement.

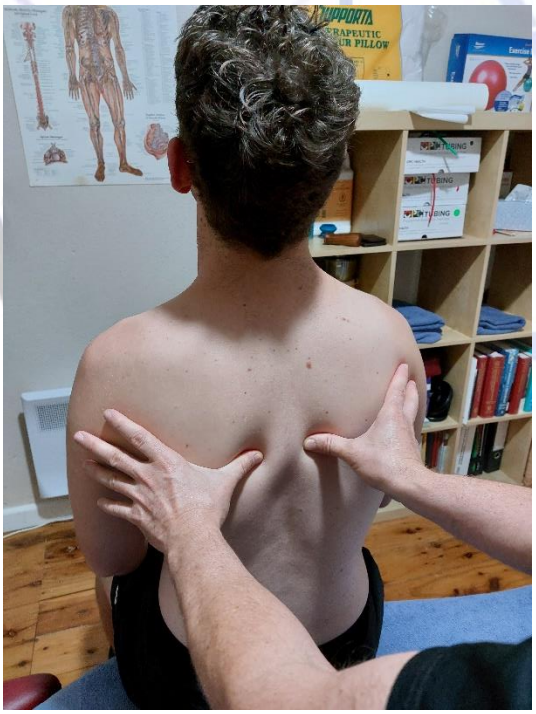
These previous two corrections can be used to help correct functional scoliosis (from the Greek language, meaning 'bent').*

There are two types of scoliosis. Functional and Structural

Functional scoliosis can be treated and corrected completely. Structural scoliosis cannot be corrected completely but must be managed over time with treatment and exercises. To differentiate between the two, you must assess the rotation and side bend of the spine, seated in full flexion and also in full extension. (A scoliosis is noted if the Transverse processes of 3 or more vertebrae appear deeper on one side than the other).

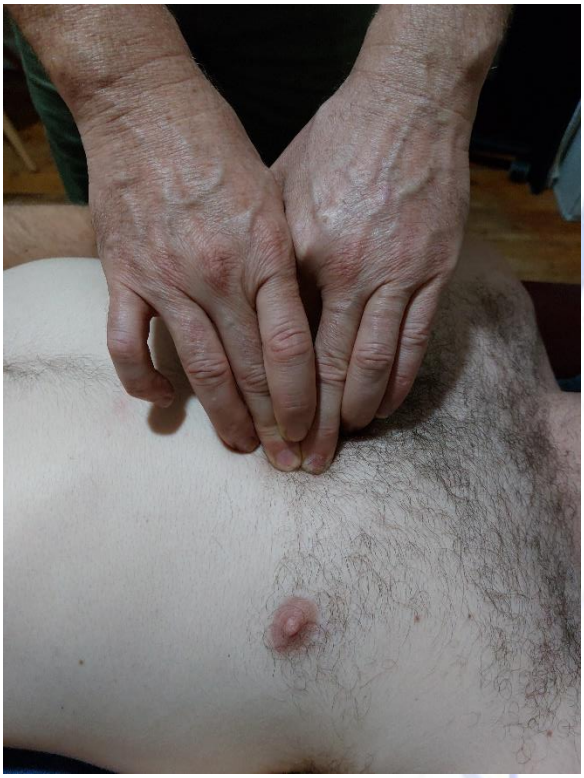
A functional scoliosis will be very different in either of these positions, sometimes almost gone completely in full flexion, whereas a structural scoliosis might be a bit better at either position but definitely not gone.





Costal Cartilage/Anterior Rib mobilisation:

The ribs are ordered from proximal to distal numbered 1 to 12. The First 5 ribs are known as true ribs and have only a small costal cartilage attachment to the sternum. The next five ribs are known as false ribs and have a common attachment into a larger singular costal cartilage on each side. The last two ribs are known as floating ribs and only have bony attachment to the thoracic vertebra.



Assessment: Patient supine. Assess the ribs on the opposite side that you stand on beside the patient. Palpate the intercostal spaces and the lateral border of the sternum to locate the position of the ribs. Place fingertips on top of the medial end of the rib/costal cartilage and gently press down (A-P) to assess the springy feel of the rib. A stiffer resistance offered, compared to the neighbouring ribs indicates a limitation of motion and a need for treatment. Assessment and treatment can be provided concurrently.

*If the patient is asked to take a deep breath in, it can be possible to see limitations in the expansion of the ribs anteriorly. The expansion of the ribs should be symmetrical through the entire breath. A common dysfunction is restriction in expansion in the later part of the breath.

Treatment: Patient supine. To treat the sterno-costal cartilages, stand beside the patient and treat across the midline, treating the opposite side of the body from where you stand. To locate the margins of the sternum, find the suprasternal notch at the proximal end of the sternum and also the xiphoid process at the distal end of the sternum. The sternum is approximately 2 to 3 cm wide. If you palpate the sternum from just above the xiphoid process, move just laterally to locate the intercostal spaces between the ribs. Move your fingertips on top of the costal cartilage (this will feel like a continuation of the rib) and apply a gentle posterior-lateral pressure. Maintain this gentle pressure for 5 to 10 seconds as the patient breathes normally or until the area softens. Release the pressure slowly and then move superiorly to the next rib and repeat. When you have mobilised all the ribs on that side. Move to the opposite side of the patient and repeat the process for the contralateral ribs.

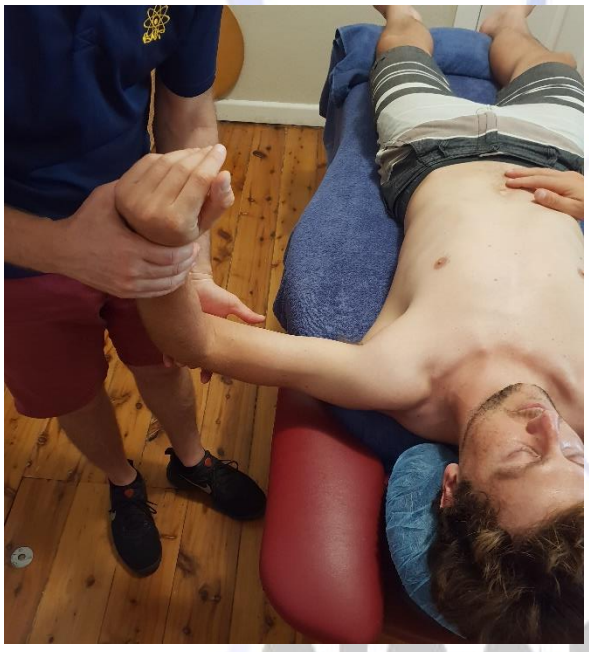
Clavicle Mobility.

For the shoulder and arm to have full 'normal' range of motion in abduction, the clavicle must have at least 40 degrees of elevation and 45 degrees of posterior rotation at the Sterno-clavicular joint. Restriction of this movement can occur from dysfunction in the SC and AC joints or the first rib or also the musculature/connective tissue around the area. The Clavicle has only 8 degrees rotation at the AC joint. The AC joint is a sliding gliding joint. Most rotation occurs at the SC joint.

Use to correct: Gleno-humeral joint problems, impingement syndromes. Upper anterior chest pain. Can be involved in neural arm problems. And cervical complaints.

Take the arm through full Internal/External rotation to gauge the range and end feel of the Glenohumeral joint first, then assess the clavicle.

Assessment:



Take the arm through full Internal/External rotation to gauge the range and end feel of the Glenohumeral joint first, then assess the clavicle

Patient supine, this can also be done seated. Passive movement at the Gleno-humeral joint (Assessment is for patients left clavicle). Stand beside the patient and cup their elbow in your left hand. Flex the elbow to 90 degrees and hold their wrist with your right hand. Their forearm should be A-P to their body. Passively abduct the arm at the GH joint, the arm should reach 90 degrees at least with very little soft tissue resistance. You should be able to see the clavicle angle upwards during this movement. If it doesn't move upwards, this usually presents as restricted shoulder abduction. Sometimes the patient will complain of a compressive feeling in the Axilla (Restriction in the

movement may require other testing). Place your left finger tips so they are resting gently on the anterior margin of the clavicle. Your right hand still holds the forearm. Externally rotate the Humerus and monitor the clavicle with your fingertips.

You should be able to feel the posterior rotation of the clavicle as you externally rotate the arm. 90 degrees is normal range of motion for Humeral external rotation in this position.

Treatment of the Sternoclavicular joint (SCJ).

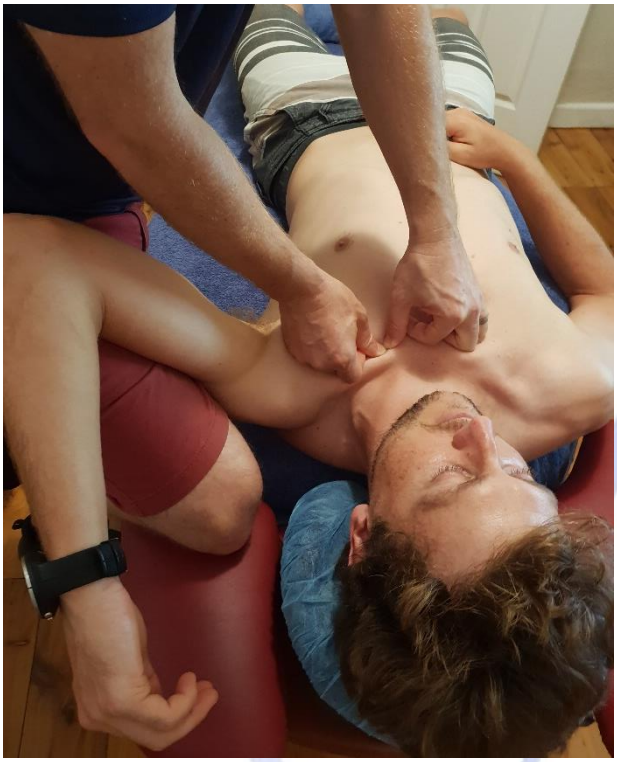
Treatment 1: Use If clavicle is restricted early in assessment of posterior rotation.

Patient supine. Place both thumbs under the medial portion of the clavicle Very gently apply a mobilisation to the clavicle in a superior direction. This can be held constant, allowing the patients breathing to assist or oscillated to gain mobility.

Treatment 2: Use if clavicle is restricted late in assessment of rotation.

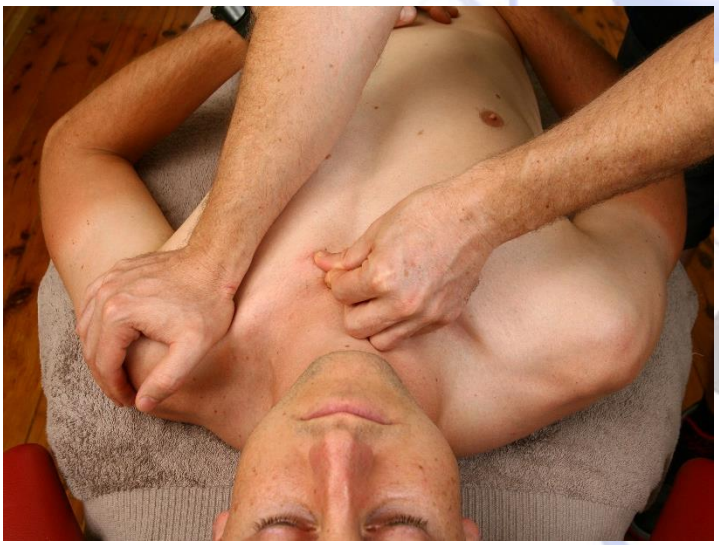
Patient Supine. Stand on the same side of the patient as the SCJ to be treated (Left shown here). Place your right knee onto the table just superior to the AC joint. Anteriorly flex and externally rotate the humerus with the elbow bent to lift their hand above the shoulder and rest their elbow over your knee.

Use 2 thumbs braced together to apply a constant superior force to the SC joint. Allow the connective tissue to adapt and mobilise. This can be modified by allowing the patients breathing to assist or with gentle oscillations to the pressure on the clavicle if needed.



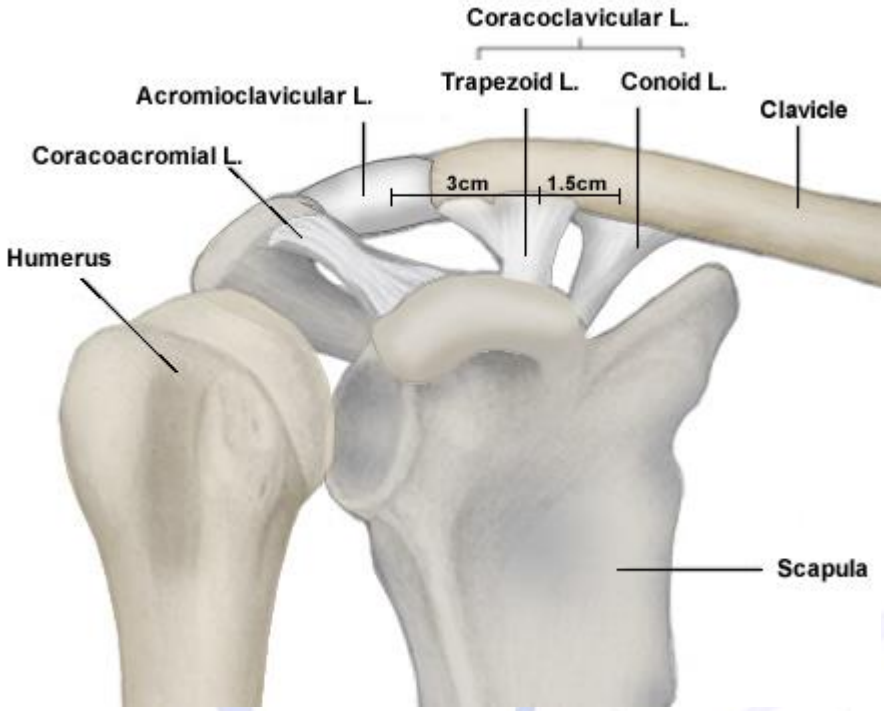
Treatment 3: The clavicle can also be mobilised at the SCJ laterally.

Patient supine, hands resting on lower chest. Position yourself beside the patient but on the opposite side. With your right-hand reach across and cup the coracoid process/anterior shoulder with a soft hand. Use your left thumb to apply a lateral mob to the medial end of the clavicle whilst applying a postero-lateral traction to the shoulder with your right hand.



Acromioclavicular joint Mobilisation (AC joint)

Prior to Mobilising the AC joint, ensure Pec Major and Minor allow an acceptable Range of Motion without restriction



https://www.orthobullets.com/shoulder-and-elbow/3033/acromioclavicular-joint

The major ligaments of the Acromioclavicular joint are

- Acromioclavicular ligament (AC)
- Coracoacromial ligament (CA)
- Coracoclavicular ligament (CC). (Formed by the Trapezoid (lateral) and Conoid (medial) ligaments).

The AC ligament provides horizontal stability. The CC ligaments provide vertical stability

With the patient seated, it is usually beneficial to friction the AC ligs and CC ligs before mobilising the AC joint. Form this position it is easy to access the more superficial fibres of the AC and CC ligaments. If the AC joint is still particularly immobile perform supine release.

Supine Coracoclavicular Ligament Release.

Patient supine. Stand beside patient on the side to be treated. Locate the Coracoid Process of the scapula. The target tissue to be treated is the two ligaments that form the Coracoclavicular ligament, the Conoid and Trapezoid ligaments. The Trapezoid ligament is found vertically from the medial edge of the Coracoid Process and the Conoid ligament is slightly more medial and deeper to the Trapezoid ligament.

Position yourself to be able to create a direct Anterior to Posterior (A>P) pressure on the ligaments. Using two braced thumbs or a tool, apply a direct pressure to the Trapezoid ligament first and hold until the feeling of rigidity yields. If the ligament already feels springy, it may not need to be treated for long or maybe at all. Move slightly more medial. The Conoid ligament usually travels at a 45 degree angle, medio-superiorly to the underside of the clavicle. Repeat direct A>P pressure until tissue yields or softens.

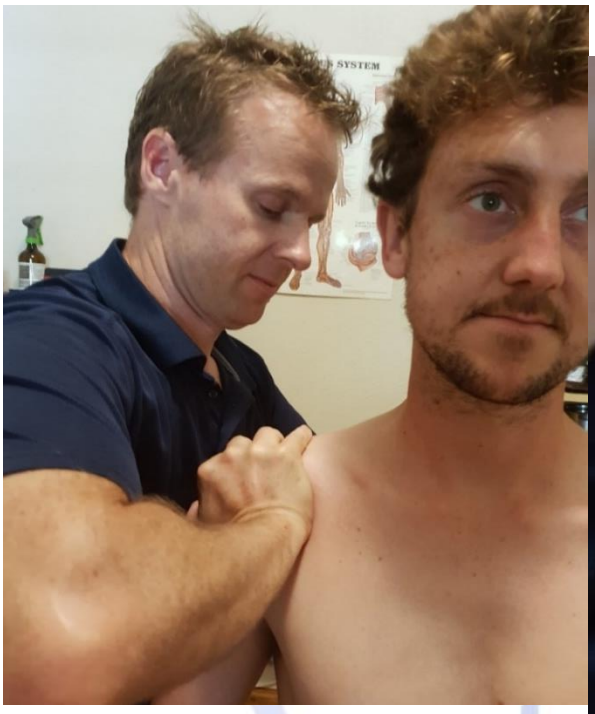
Thumbs positioned here, above the coracoid process on the Conoid ligament. Work systematically through the accessible ligaments.

Treatment: Acromioclavicular Ligament Mobilisation Seated

(Pic for Right AC ligaments).

Stand at patient's Right side. Cup their R shoulder with the Coracoid process sitting into the palm of your right hand and your fingers over the clavicle.

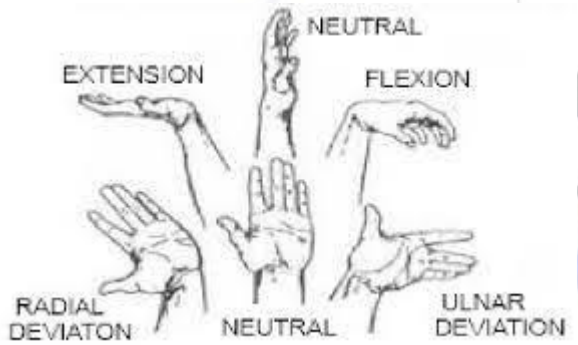
Place your left hand on the lower portion of the scapula with fingers pointing upwards. Use your left hand to stabilise the body as the right hand slowly pushes the coracoid process/shoulder posteriorly. Quite a lot of force can be used to stretch the anterior structures, as long as the patient is comfortable. When you reach the end of range of available mobility, hold this position and instruct the patient to take a deep breath in. This is a slow move against resistance not a forceful push. The AC joint quite often releases with a crack during this movement but that is not what we are trying to do. It is not important whether it does this or not. The action is about challenging the motion of the ligaments against a breath.



Manual Mob wrist. Frictions and Mobilisations.

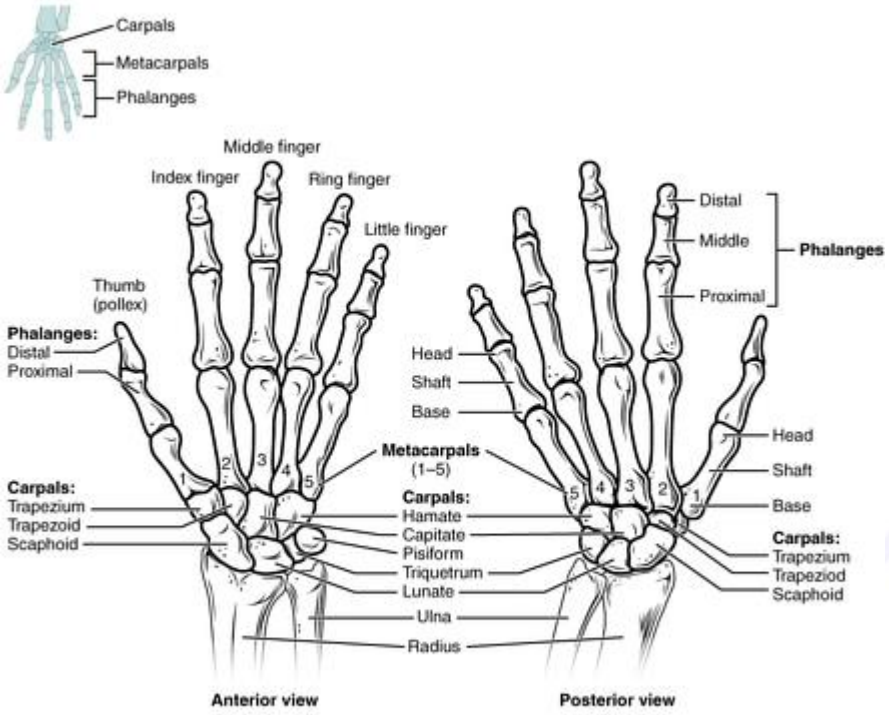
A generalised approach to mobility of the wrist.

Understanding the anatomy of the carpals and wrist movement.



To understand the mobility of the wrist is important to get an overview of the carpals and their articulations with the radius and ulna. Inherently there is a small amount of mobility between each of the carpals and metacarpals but the majority of flexion extension occurs between the scaphoid, lunate and the radial head. understanding this is critical for targeted mobilisations and to maximise your assessment accuracy.

As the hand moves from neutral into flexion,(fingers curl into a fist) the metacarpals Flex on the carpals, the carpals start to articulate into flexion and then the carpals Flex on the radius and ulna. all of these movements can happen together or independently but it is important for all of these motions to be able to occur for full, normal range of motion. The same motions should be able to occur, in opposite fashion into extension.



https://radiopaedia.org/articles/metacarpal-bones-1

Mnemonic:

Some Lovers Try Positions That They Can't Handle.

scaphoid, lunate, triquetrim, pisiform, trapezium, trapezoid, capitate, hamate.

Assessment.

Accessory movements between the carpals can be quite tricky to assess effectively. Therefore, practise and patience are crucial in understanding the feel of mobility in this area. With any degenerative or arthritic change in the carpals, this can create stiffness in the accessory movements, limiting overall ROM.

The carpals can be divided into two rows. The proximal and distal. The distal articulates with the metacarpals of the hand and the proximal articulates with the radius and Ulna bones of the forearm.

Normal values for wrist ROM are:

- 73 degrees of flexion,
- 71 degrees of extension,
- 19 degrees of radial deviation,
- 33 degrees of ulnar deviation,
- 140 degrees of supination,
- 60 degrees of pronation.

**Kim TS, Park DD, Lee YB, Han DG, Shim JS, Lee YJ, Kim PC. A study on the measurement of wrist motion range using the iPhone 4 gyroscope application. Ann Plast Surg. 2014 Aug;73(2):215-8. Doi: 10.1097/SAP.0b013e31826eabfe. PMID: 24322647.*

Movement values of the radio carpal joint are approximately 50* flexion and 35* extension. This is where the majority of the joint articulation occurs.

The ulna bone does not directly articulate with the carpals. Instead, it articulates with support of the triangular fibrocartilaginous complex (TFCC).

The triangular fibrocartilage complex has the following functions :

- main stabilizer of distal radioulnar joint (DRUJ)
- buttress to support the proximal carpal row
- allowing for transmission of a portion of the axial load from the carpals to the ulna (~20% of the force, with the remaining 80% through the radiocarpal joint)

**https://radiopaedia.org/articles/triangular-fibrocartilage-complex*

By far, the most common carpal bone fractured is the scaphoid:

Scaphoid: >50% of all carpal fractures

Triquetrum: ~20%

Trapezium: ~5%

Lunate: ~4%

Capitate: ~2%

Hamate: ~2%

Pisiform ~1%

Trapezoid <1%.

**Joshua A. Gordon, Adam Griska, in Orthopedic Secrets (Fourth Edition), 2015*

Assessment and Treatment position

Placing the wrist in a pronated position, the practitioner needs to methodically work across the carpals, applying dorsal/palmar accessory movements between each of the carpals. If any inconsistent stiffness is encountered between the carpals, the practitioner can mobilise these with the same accessory movements trying to restore the symmetry in Motion. Mobilise it where you find it. Deep focused frictions at the joint line between immobile carpals can help to stimulate the tissue to soften and allow more mobility.

To assess the movements between the carpals and the radius/ulna, the practitioner needs to stabilise the carpals with your thumbs on the dorsal surface of the wrist and wrap your index fingers under the carpals to

immobilise the carpals. You can guide the wrist into flexion/extension whilst assessing where the motion is occurring. Also assess the wrist into Ulna and Radial deviation

The amount of motion at this joint varies significantly between patients, with consideration to age-related changes, previous injuries etc, and for this reason, comparison must always be noted between the asymptomatic and symptomatic wrists.

You should also be able to produce a noticeable distraction at the wrist, between the carpals and radius. Creating a small clunk as the joints close after distraction.