

## Case #1

Please use this link as it is a published case study:

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5735863/>

## Case #2 Plugged Ears

60 year old female with chief complaint of right ear “feeling plugged” for over 6 months. Was referred to me from a current patient. Visual inspection revealed that when she spoke something didn’t seem right with her jaw. Let me explain why this was clinically important to me:

There is a muscle in the inner ear called the tensor tympani. It attaches to the neck of the malleous. The malleous articulates with the incus and the stapes bones so together they dampen noise by helping the tympanic membrane absorb the sound inside the inner ear canal. If the tensor tympani muscle doesn’t work correctly, the malleous does not move and this creates more tension in the tympanic membrane which actually increases the volume and sharpness of sounds - and research also suggests it can cause a “feeling of ear fullness.” Anatomically there is more compelling evidence. The tensor tympani muscle is innervated by a branch of the trigeminal nerve - the same nerve that supplies the masseter, temporalis, medial and lateral pterygoid muscles. These muscles open and close the jaw (TMJ). In addition the lateral pterygoid attaches to the tensor tympani muscle via the posterior elements of the tempomandibular disc. And lastly, researchers have found that inflammatory chemicals which cause motor inhibition (Substance P, CGRP) can be found in the tensor tympani. If this is all true then we can postulate that any dysfunction in the lateral pterygoid can inhibit the tensor tympani muscle.

### Assessment

- Cervical spine ROM: 45 deg L, 60 deg R
- Inspection of her bilateral TMJ revealed IDD (inter-dental distance) of 8 mm (normal considered 12 mm)
- Intra-oral palpation revealed very taut and tender right sided temporalis and lateral pterygoid muscles.

Treatment: 3 visits in total over 5 days.

- Intra-oral release of the temporalis and lateral pterygoid muscles.
- Electro-acupuncture to the lateral pterygoid motor point and trigeminal nerve trunk at low freq for 10 mins.

Follow up visit 10 days later:

- Patient reported that the morning following her last treatment the “feeling of fullness” was gone. It has been gone ever since.

### Case #3

#### Case #3: Acute Shoulder Injury

##### History

Hockey player 13 yrs old boy sustained a right shoulder injury after being driven into the boards by an opposing player. The lateral portion of the right glenohumeral joint collided with the boards and the patient instantly felt pain throughout the shoulder region and they became temporarily winded.

The patient was unable to move the shoulder after impact and went to the emergency room where x-rays were taken and the patient's right arm was placed in a sling. X-rays were read by the ER doctor and they determined it was unremarkable.

The next day the patient presented to me with his shoulder in a sling complaining of right shoulder pain in the glenohumeral region upon movement in any direction. He had no pain at rest - even with the arm out of the sling. Pain was graded a 0/10 at rest and 8/10 during shoulder movement in any direction.

##### •Physical/Functional Assessment Cervical Spine

##### -Active ROM

All active cervical planes of movement were UNR and WNL.

##### -Orthopedic Exam

Jackson's cervical compression UNR

Maximum cervical compression UNR

##### EXSTORE Functional Assessment

##### Shoulder

##### -ROM

##### Left:

Flexion, Extension, Abduction, Internal/External Rotation: UNR/WNL

##### Right:

The shoulder ROM was unable to be assessed because the patient was unable to actively move it without pain.

##### Passive ROM Right Shoulder

With the patient seated I was able to take the patient through passive ROM of the right shoulder, gently in flexion and extension of 30 deg without pain. Passive movement above 30 deg in flexion and extension was not attempted. Passive internal/external rotation and lateral flexion was not attempted as the patient appeared to show apprehension of discomfort on approach.

Extension, Abduction, Internal/External Rotation were unable to be performed due to pain.

-Musculoskeletal Strength Testing

Left Glenohumeral Joint:

- Anterior, middle, posterior deltoid 5/5
- Internal/External Rotators of glenohumeral joint 5/5
- Supraspinatus 5/5

Left Scapulo-thoracic Joint

- Serratus Anterior 5/5

Right Glenohumeral Joint:

Unable to put joint in any position to strength test because patient was in pain.

Right Scapulo-thoracic Joint

Unable to put joint in position to strength test because patient was in pain.

•Treatment Goal

To restore ROM, strength and stability of the glenohumeral joint on the right by addressing the neuromuscular junction of the serratus anterior motor point which influence scapulo-thoracic joint strength and stability.

•Initial Treatment

Access and Stimulate Motor Point of Right Serratus Anterior Muscle (SP 19)

-Patient side laying on their left side with their shoulder passively in flexion 100 deg and in adduction so that their hand/forearm are resting on the pillow.

-Landmark the fourth intercostal space right above the nipple line. Draw an imaginary line from the anterior fourth intercostal space into the lateral portion of the sub-scapular fossa on the side of the lateral scapular border (through SP 19).

-Here the tissue is grasped with my non-dominant hand to separate the serratus anterior and

surrounding tissue associated with the latissimus dorsi which attach to the lateral border of the scapula.

-The needle: .22mm thick, 75mm in length is inserted parallel to the contour of the ribcage as it is presented along the mid axillary region. The needle depth is approximately 2-3cm and the non-dominant hand grasps the tissue throughout the entire insertion to ensure the needle stays parallel and not perpendicular to the contour of the ribcage.

-With the non-dominant hand still in place, the needle was stimulated by the Pointer Plus, preset at 10 hz at an intensity of '4'. This elicited a motor response in which the entire shoulder girdle moves in an oscillatory movement of scapular protraction.

-This stimulation was done consecutively 4 times for 15 seconds each.

#### •Outcome of Initial Intervention

-Immediately after the motor acupuncture treatment the patient was re-assessed.

#### Right Shoulder Glenohumeral Joint

-ROM

Flexion: 150 deg

Abduction: 90 deg

Internal/External Rotation: Full to end range

Extension: 60 deg

-Strength

#### Left Glenohumeral Joint:

-Anterior, middle, posterior deltoid 5/5

-Internal/External Rotators of glenohumeral joint 5/5

-Supraspinatus 5/5

#### Left Scapulo-thoracic Joint

-Serratus Anterior 5/5

#### Right Scapulo-thoracic Joint

Serratus Anterior 3/5 (tested at 135 deg of resisted shoulder flexion) without pain.

\*Follow up Visit next day :

Pain was still graded a 0/10 at rest and patient is able to move the shoulder in all directions with pain graded at 1-2/10.

•Reassess

Cervical Spine

-all movements were UNR and WNL

Shoulder

- Active ROM

Left:

Flexion, Extension, Abduction, Internal/External Rotation: UNR/WNL

Right:

Flexion 170 deg

Extension 90 deg

Abduction 120 deg

Internal/External Rotation 75 deg/80 deg

-Musculoskeletal Strength Testing

Left Glenohumeral Joint:

-Anterior, middle, posterior deltoid 5/5

-Internal/External Rotators of glenohumeral joint 5/5

-Supraspinatus 5/5

Left Scapulo-thoracic Joint

-Serratus Anterior 5/5

Right Glenohumeral Joint:

-Anterior Deltoid 3/5 without pain

-Middle Deltoid 3/5 without pain

-Posterior Deltoid 3/5 without pain

-Internal/External Rotators 3/5

-Supraspinatus: 3/5

## Right Scapulo-thoracic Joint

-Serratus Anterior 5/5 without pain

•Treatment performed that day

Motor point stimulation:

Anterior deltoid (From LI 15 move 2 cun distal)

Locate the anterior axillary fold and the top of the acromioclavicular joint and bisect the two. 50mm, .22mm needle was inserted 2.5 cm. The needle was stimulated by the Pointer Plus, preset at 10 hz at an intensity of '4'. This elicited a motor response in which the anterior deltoid began to oscillate. The muscle was stimulated 4 times for 15 seconds each.

\*Follow up Visit 8 days later

Pain was graded a 0/10. The movements of internal/external rotation, extension, and abduction were graded 0/10.

•Reassess

Cervical Spine

-all movements were UNR and WNL

Shoulder

-Active ROM

Left:

Flexion, Extension, Abduction, Internal/External Rotation: UNR/WNL

Right:

Flexion 180 deg

Extension 90 deg

Abduction 120 deg

Internal/External Rotation 75 deg/80 deg

## -Musculoskeletal Strength Testing

### Left Glenohumeral Joint:

- Anterior, middle, posterior deltoid 5/5
- Internal/External Rotators of glenohumeral joint 5/5
- Supraspinatus 5/5

### Left Scapulo-thoracic Joint

- Serratus Anterior 5/5

### Right Glenohumeral Joint:

- Anterior Deltoid 5/5 without pain
- Middle Deltoid 5/5 without pain
- Posterior Deltoid 4/5 without pain
- Internal/External Rotators 5/5
- Supraspinatus: 5/5

### Right Scapulo-thoracic Joint

- Serratus Anterior 5/5 without pain

\*No treatment performed that day.

\*The Children's Hospital where he visited the emergency room 10 days earlier had called him back as the radiologist re-read his initial radiograph. He reported a small fracture of the right lateral portion of the acromion. In my opinion, this gives credence to a couple of points within this case.

First, in retrospect the fact there is a fracture could help substantiate why the patient had pain rated 8/10 during arm/shoulder movement and 0/10 while at rest.

Second, this demonstrates the importance of musculoskeletal scapular stability after a blunt force traumatic injury to the shoulder girdle. It is well documented that activating inhibited muscles can overcome strength deficits of other muscles in neighboring regions. However, this case suggests that activating inhibited muscles (serratus anterior) can also help the musculoskeletal system overcome structural deficits (acromion fracture) in neighboring biomechanical regions to improve function.