Cervical Multifidus contraction is associated with isometric contraction of shoulder muscles

1. **Leila Rahnama**, PT, PhD candidate, School of Rehabilitation, Shahid Beheshti University of Medical Sciences (SBMU)
2. Asghar Rezasoltani, PhD, Professor, School of Rehabilitation, SBMU
3. Farhang Nouri Kochi, MD, Radiologist, Shiraz University of Medical Sciences
4. Minoo Khalkhali, PhD, Assistant professor, School of Rehabilitation, SBMU
5. Alireza Akbarzadeh Baghban, PhD, Associate professor, School of Rehabilitation, SBMU

**Corresponding author:** Leila.rahnama@sbmu.ac.ir; lrahnama@gmail.com
Deep neck muscles provide the stability of cervical spine both at rest and during movements.

Cervical multifidus muscle (CMM) known as a deep stabilizer.

In which movements CMM is participated to provide the cervical stability?
Is CMM contracted during upper extremities” task to provide the cervical stability?
Ultrasound imaging of right and left CMM at the level of C4

Anterior-posterior dimension (thickness) of CMM was measured.

Measurements were at rest and at 25, 50, 75 and 100% maximal voluntary contraction (MVC) of right shoulder muscles.

6 directions of shoulder motions (abduction, adduction, flexion, extension, external rotation and internal rotation).

A total of 23 healthy subjects
3 Within Subjects factor

- Forces (0, 25, 50, 75 & 100% MVC)
- Directions (abd, add, int rot, ext rot, flex & ext)
- Sides (Right & Left)
Right CMM imaging at C4

At rest

At 100% MVC
Results

• The CMM thickness increased as isometric contraction of shoulder muscles increased (P=0.00).

• However, there was no significant difference among force directions and between sides on the muscle thickness.
Interactions:
- Force*direction*Side
- Force*direction
- Direction*side
- Force*side

Main effects:
- Force (P<0.001)
- Direction
- Side

Significant
The main effect of force on CMM thickness (APD)
• **CMM** is contracted when shoulder muscles are contracted isometrically to **provide the stability** of the cervical spine.

• It may lead to **design an indirect method for CMM training** in conditions in which the direct contraction of CMM is impossible or prohibited because of pain or injury.


Disclosure declaration

None of the authors has any potential conflict of interest