THE EFFECTS OF MYOFASCIAL RELEASE AND CORRECTIVE EXERCISES ON CERVICOGENIC HEADACHE AMONG DENTAL STUDENTS

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INTRODUCTION

Cervicogenic headache (CGH) is a secondary headache characterized by unilateral headache and symptoms and signs of neck involvement[1]. It is often worsened by neck movement, sustained awkward head position or external pressure over the upper cervical or occipital region on the symptomatic side[2].

The International Headache Society Published their international classification of headache Disorders 2nd edition, identifying 14 different types and sub classifications of headaches[3]. There are 2 basic categories of headaches, primary and secondary. Primary headache includes those of vascular origin (cluster and migraine headache) as well as those of muscular origin (tension-type headaches). Secondary headaches result from another source including inflammation or head and neck injuries[4,5]. Norwegian physician Dr. Ottar Sjaastad coined the term, "cervicogenic headache" in 1983 by recognizing a sub-group of headache patients with concomitant head and neck pain; therefore, CGH are considered "secondary headaches"[6].

ANATOMY: However, CGH has the following features. It begins in the neck or occipital region and can refer to the face and head[7]. The specific sources of CGH are any structures innervated by the C1 to C3 nerve roots, including: Govind and Bogduk found that the "C2-3 zygapophysial joint is the most common source of headache" in individuals where headache is their main complaint and in individuals where their neck pain is more intense than their headache. The upper cervical muscles, suboccipital muscles,sternocleidomastoid,trapezius (especially the upper fibres),The C2-3 disc,The vertebral and internal carotid arteries,The dura mater of the upper spinal cord and posterior cranial fossa[8,9].

This referral of pain to the head from the neck can be explained by the convergence (overlap) of the trigeminal afferents and cervical afferents from the upper three cervical spinal nerves[10].

- The trigeminal nucleus caudalis descends down to C3 or C4. This nucleus borders the grey matter of the spinal dorsal horn (i.e. the trigeminocervical nucleus)
- The interneurons in the trigeminocervical nucleus enable sensory information to be exchanged between the upper cervical spinal nerves and the trigeminal nerve
- Through this exchange, nociceptive signals from the upper cervical spine can be referred to the areas supplied by the trigeminal nerve in the head and face[11,12.]

Most of this nociceptive information is exchanged through the ophthalmic division of the trigeminal nerve (cranial nerve V). Thus, pain generated in the cervical spine will most likely refer to the temple, orbit and forehead[13].

There is also some exchange of sensory information with the maxillary division of cranial nerve V, so pain generated in the upper cervical spine can also be referred to the face.

Neck muscles can also refer pain to the head and face.

Cervicogenic headaches (CGH) are a prevalent and often debilitating condition, particularly among individuals who engage in repetitive postural strain or sustained static positions for long periods, such as dentists. These headaches originate from cervical spine disorders and are typically characterized by pain referred from the neck region to the head, causing discomfort that can range from mild to severe. For dentists, the risk of developing cervicogenic headaches is heightened due to their unique work posture, which often involves prolonged periods of head and neck flexion, improper ergonomics, and repetitive movements.

MYOFASCIAL RELEASE

Myofascial release is a safe and very effective hands-on technique that involves applying gentle sustained pressure into the myofascial connective tissue restrictions to eliminate pain and restore motion (Kwong 2008).

Myofascial technique refers to the manual technique for stretching the fascia and releasing bonds between fascia and muscles, bones with the goal of eliminating pain, increasing range of motion and balancing the body.

Fascia is the connective tissue and it is divided into three different layers. First layer is superficial fascia consists of connective tissue and adipose tissue. It provides a path for nerve and blood supply. Second layer is the potential space. This area can become inflamed, which shows that it can be injured or stretched with any type of injury.

By myofascial release there is a change in the viscosity of the ground substance to a more fluid state which eliminates the fascia's excessive pressure on the pain sensitive structure and restores proper alignment. This is accomplished by relaxing contracted muscles, increasing circulation, increasing venous and lymphatic drainage and stimulating the stretch reflex of muscles and overlying fascia **(myofascial** manipulation theory and clinical application 2nd edition Robert I cantu).Aim of MFR was to decrease pain, to promote healing, to reduce tension.

APPLICATION:

Gentle and sustained, pressure should be applied for a prolonged period of time 60-120 seconds. This amount of time permits fascia to naturally elongate and return to normal resting length which will restore the healthy status, giving greater flexibility, mobility and eliminating pain.

CORRECTIVE EXERCISES:

Myofascial release (MFR) and corrective exercises have gained recognition as effective interventions for alleviating musculoskeletal pain and dysfunction, including cervicogenic headaches. Myofascial release is a manual therapy technique designed to release tension and tightness in the fascial tissues, which can contribute to pain and restricted movement in the neck and upper body. Corrective exercises, on the other hand, aim to address and correct faulty movement patterns, strengthen weak muscles, and improve posture, which are essential for preventing and managing musculoskeletal pain, including CGH.

Given the high incidence of cervicogenic headaches among dentists, it is essential to explore effective therapeutic approaches to address this condition. Myofascial release and corrective exercises not only provide immediate relief from pain but also promote long-term improvements in posture, movement efficiency, and muscle balance. This study seeks to investigate the combined effects of myofascial release and corrective exercises on the severity, frequency, and duration of cervicogenic headaches among dentists, examining whether these interventions can serve as viable treatment options to improve both short-term and long-term outcomes for those affected by this condition.

Common Causes of Cervicogenic Headache in Dental Students

- **Forward Head Posture (FHP):** Bending the neck forward for prolonged periods increases stress on the cervical spine.
- **Poor Sitting Posture:** Slouched sitting or excessive leaning leads to muscle fatigue and strain.

- **Repetitive Neck Movements:** Continuous tilting, twisting, or bending of the neck while performing dental procedures.
- **Lack of Breaks:** Sustained static postures without frequent breaks increase muscle tension.
- **Improper Workstation Ergonomics:** Incorrect chair, table, or patient positioning contributes to poor posture.

POSTURAL EDUCATION:

Postural education is essential for preventing cervicogenic headaches among dental students. Implementing proper ergonomics, posture correction techniques, strengthening exercises, and regular breaks can significantly reduce headache occurrences and improve musculoskeletal health. By integrating these strategies into daily practice, dental students can enhance their comfort, efficiency, and overall well-being.

These headaches originate from the cervical spine and are often caused by poor posture and muscle tension. Leaning forward for prolonged periods while treating patients. Poorly adjusted dental chairs and workstation ergonomics. Lack of neck and upper back movement due to prolonged static postures, Stress-related muscle tension.

Maintaining an ergonomic working posture reduces strain on the neck and shoulders. Proper posture improves circulation and reduces musculoskeletal discomfort. Preventing excessive forward head posture decreases cervical spine stress[2]. The aim of the study is to find out the effects of Myofascial Release and Corrective Exercises on cervicogenic headache among Dental students.

MATERIALS AND METHODOLOGY:

Total 30 samples who fulfilled both inclusion criteria Age group – 19 to 27years **,** Patients diagnosed with cervicogenic headache and exclusion criteria Fracture around cervical region. Any surgical procedure around cervical region. Dislocation or subluxation around cervical or shoulder, Any neurological disorder, Malignancy or referred pain of cervical region were taken for the study. Detailed history was obtained and examination for cervicogenic headache was carried out for all the participants in both the groups. Samples were given written informed consents prior to commencement of treatment. They were randomly divided into two groups. Each group has 15 samples, Group A(15 samples) – Myofascial Release with corrective exercises. Group B(15 amples) – Postural education. Samples in both groups received treatment for 5 days for 6 week.

The investigator had given a detailed orientation to the various test procedures such as NDI for pain and craniovertebral angle measurement for forward head posture. The concern and full cooperation of each participant was sought after complete explanation of the condition demonstration of the procedure involved in the study. Pre and post test values were statistically analysed after 6 weeks of intervention.

TREATMENT PROCEDURE

GROUP A -A sample of 15 was selected according to the convenience from the population of the study.

STEP 1: A Pre-test measurement of pain and range of motion were taken using neck pain disability index and goniometer respectively.

POSITION: The patient was positioned in comfortable seated position.

★ Myofascial release for **UPPER TRAPEZIUS** were given for Group A.

PATIENT POSITION: Sitting with head neutral.

THERAPIST POSITION: Standing behind the patient

PROCEDURE: Placing one hand on the patient's shoulder and the other hand placed on trapezius muscle. The therapist hand are aligned along the direction of the muscle fibers. A local myofascial stretch is applied slowly for about 20 seconds and start with gentle compression and gradually increase the pressure as tolerated and repeated 3-4 times.

STEP 2:

★ Myofascial release for **RHOMBOIDS** were given for Group A.

PATIENT POSITION: Prone lying

THERAPIST POSITION: Stand beside the treatment table.

PROCEDURE: Palpate the medial border of the scapula to locate tight bands or trigger points in the rhomboid muscle. Use fingers or knuckles to apply sustained pressure to the identified area. Start with gentle compression and gradually increase the pressure as tolerated and repeated 3-4 times.

STEP 3:

★ Myofascial release for SUBOCCIPITAL REGION were given for Group A.

PATIENT POSITION: Supine lying.

THERAPIST POSITION: Sitting behind the patient

PROCEDURE: For the application of the technique, the patient position is supine lying with the head fully supported on therapist's hands and therapist places 3 middle fingers just inferior to the nuchal line and moves the hand slightly downward until the suboccipital muscles are palpated. Gentle upward pressure is then applied.

CORRECTIVE EXERCISE:

After filling the consent forms, the participants demographic data including age, gender, height, weight, average work experience and average number of daily working hours were taken.

Day	Exercise	Details	Sets × Reps
Day 1	Stretching – Pectoralis major & minor, trapezius (upper fibres), levator scapulae	Flexibility training	1 × 5
	Strengthening – Neck flexors, trapezius	Muscle strengthening	1 × 10
Day 2	Same as Day 1	–	–
Day 3	Stretching – Pectoralis major & minor, trapezius (upper fibres), levator scapulae	Flexibility training	2 × 5

	Strengthening – Neck flexors, trapezius	Muscle strengthening	2 × 10
Day 4	Same as Day 3	–	–
Day 5	Stretching – Pectoralis major & minor, trapezius (upper fibres), levator scapulae	Flexibility training	2 × 10
	Strengthening – Neck flexors, trapezius	Muscle strengthening	2 × 15
Day 6	Home Exercise Program (same as Day 5)	Self-practice	–

GROUP B
POSTURAL EDUCATION STRATEGIES

1. ERGONOMIC MODIFICATIONS IN DENTAL PRACTICE:

- Maintain a **neutral spine** while working, avoiding excessive neck flexion.
- Adjust the **chair and stool height** to keep the feet flat on the ground and knees at 90°.
- Position the **patient chair at an appropriate height** to minimize excessive bending or twisting.
- Use **magnification loupes** to reduce excessive forward bending.

2. PROPER SITTING AND STANDING POSTURE:

- Keep the **ears aligned with the shoulders** to prevent forward head posture.
- Sit with the **back fully supported** against the chair.
- Avoid excessive leaning and maintain a **balanced distribution of weight**.
- Stand with feet shoulder-width apart and avoid prolonged static standing.

3. STRENGTHENING AND STRETCHING EXERCISES:

- **Chin Tucks:** Helps in correcting forward head posture.
- **Cervical Retraction Exercises:** Strengthens deep neck flexors.
- **Upper Trapezius and Levator Scapulae Stretch:** Relieves tension in neck muscles.
- **Scapular Retraction Exercises:** Strengthens postural muscles.

4. WORK BREAKS AND MICROBREAKS:

- Take short breaks **every 30–45 minutes** to relieve muscle strain.
- Perform **neck and shoulder stretches** during breaks.
- Practice **deep breathing exercises** to reduce tension and improve posture awareness.

5. MINDFULNESS AND AWARENESS:

- Maintain **conscious posture awareness** throughout the day.
- Use **reminders or posture-tracking apps** to avoid prolonged poor postures.

DATA ANALYSIS :

TABLE 1 SHOWING CRANIOVERTEBRAL ANGLE BETWEEN GROUP – A AND GROUP - B IN PRE AND POST TEST

CRANIOVERTEBRAL ANGLE	GROUP -A			GROUP - B		
	MEAN	SD	T VALUE	MEAM	SD	T VALUE
PRE TEST	42.64	1.394	57.5174	45.50	1.67	1.5772
POST TEST	48.067	1.232		46.32	1.13	

TABLE 2 SHOWING NECK PAIN AND DISABILITY INDEX BETWEEN GROUP – A AND GROUP - B IN PRE AND POST TEST

NECK PAIN AND DISABILITY INDEX	GROUP -A			GROUP – B		
	MEAN	SD	T VALUE	MEAM	SD	T VALUE
PRE TEST	40.47	4.17	24.0512	42.13	4.69	4.0904
POST TEST	29.00	4.00		41.20	4.99	

TABLE 3 SHOWING COMPARISON OF GROUP – A AND GROUP - B IN PRE AND POST TEST(CVA)

OUTCOME		PRE TEST		POST TEST		PAIRED 't' VALUE	P VALUE
		MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION		
CRANIOVERTEBRAL ANGLE	GROUP A	42.640	1.394	48.067	1.232	57.5174	.0001
	GROUP B	45.50	1.67	46.32	1.13	1.5772	

TABLE 4 SHOWING COMPARISON OF GROUP – A AND GROUP - B IN PRE AND POST TEST(NDI)

OUTCOME		PRE TEST		POST TEST		PAIRED 't' VALUE	P VALUE
		MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION		
NDI	GROUP A	40.47	4.17	29.00	4.00	24.0512	.0001
	GROUP B	42.13	4.69	41.20	4.99	4.0904	

RESULT

Group A showed a significant improvement in craniovertebral angle (CVA) from 42.64° to 48.06° (p = <0.0001), indicating effective improvement. Group B had a minor CVA change from 45.50° to 46.32°, with a non-significant result, suggesting minimal improvement. Neck Disability Index (NDI) scores in Group A improved significantly from 40.47 to 29.00 (p = 0.0001), showing reduced neck pain and better function. Group B had a small NDI reduction from 42.13 to 41.20, indicating limited impact on neck disability. The findings highlight the superiority of the structured intervention in Group A for postural correction and pain reduction.

DISCUSSION

The study investigated the effectiveness of myofascial release and corrective exercises in improving neck posture and reducing diability among dental students experiencing cervicogenic headache. The analysis of craniovertebral angle (CVA) and Neck Disability Index (NDI) in two groups shows a clear difference in treatment effectiveness. Group A experienced significant improvements in both posture and neck pain after the intervention, suggesting it effectively corrected forward head posture and reduced neck strain. In contrast, Group B showed only minor changes, indicating that its intervention was less effective.

The study compared two groups, A and B, to evaluate treatment effectiveness for neck posture and disability. Group A showed a significant improvement in craniovertebral angle (CVA), indicating better cervical posture. The intervention in Group A effectively reduced forward head posture and improved spinal alignment. Group B showed only a minor improvement in CVA, suggesting its intervention was less effective.

Group A's treatment likely focused on strengthening neck muscles, improving flexibility, and reducing pain, leading to better overall outcomes. On the other hand, Group B's approach may have been less intensive or not well-targeted for strengthening the neck muscles and postural correction.

The results highlight the importance of myofascial release in reducing neck pain and posture correction. Future research should explore long-term effects, larger sample sizes, and different treatment approaches to enhance rehabilitation strategies. However this study had some limitations. The sample size may not have been large enough to generalized the findings broadly. Additionally, the duration of the intervention might not fully capture the log term sustainability of the improvements. Future research should focus on longer follow-up periods, larger populations, and potentially include ergonomic training to further enhance the effectiveness of therapeutic intervention.

David Alan Titcom which concluded that postural education and corrective exercise are effective in improving craniovertebral angle in young adult with forward neck posture.

Mst. Sohana Akter The result of this study in paired t-test has shown that the effectiveness of Myofascial Release technique and conventional physiotherapy treatment both are effective but some domain of Myofascial Release group shows superior effectiveness then Conventional physiotherapy after four sessions of treatment for patients with Cervicogenic pain.

CONCLUSION

These results emphasize the importance of targeted physiotherapeutic interventions in managing forward head posture and neck disability. A structured rehabilitation program focusing on postural correction, muscle strengthening, and ergonomic modifications can lead to significant improvements in cervical alignment and overall function. Future research should explore longterm follow-ups, larger sample sizes, and different intervention protocols to further validate these findings and optimize treatment strategies for postural and musculoskeletal disorders.

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