Journal of Neonatal Surgery
ISSN(Online): 2226-0439
Vol. 14, Issue 32s (2025)
https://www.jneonatalsurg.com

OPEN ACCESS

Impact Of Cervical Stabilisation Exercises On Posture Ailment In Text Neck Syndrome

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Cite this paper as: Shashank Baranwal, Ajeet Kumar Saharan, Shantanu Sharma, Anuja Choudhary, Hari Narayan Saini, Shashank Shekhar Singh, Vanshika, (2025) Impact Of Cervical Stabilisation Exercises On Posture Ailment In Text Neck Syndrome. *Journal of Neonatal Surgery*, 14 (32s), 8814-8821.

ABSTRACT

Background: The solubilization of poorly soluble drugs belonging to Class II of the Biopharmaceutical Classification

Background: Text neck syndrome, also known as forward head posture (FHP), has emerged as a common musculoskeletal disorder among smartphone users. Global prevalence ranges from 32% to 68.1%, with particularly high rates among university and medical students. This condition leads to altered cervical biomechanics, reduced craniovertebral angle (CVA), neck pain, and functional limitations.

Objective: To evaluate the effectiveness of cervical stabilization exercises in correcting forward head posture associated with smartphone use.

Methods: Evidence from clinical trials and systematic reviews was analyzed. Outcomes included changes in CVA, pain reduction measured by the Visual Analog Scale (VAS), and functional improvement using the Neck Disability Index (NDI). Interventions reviewed encompassed deep cervical flexor training, pressure biofeedback, scapular stabilization, and McKenzie-based protocols.

Results: Cervical stabilization programs consistently improved CVA by 6–10° and reduced pain scores by 2.5–4.5 points on the VAS within 4–8 weeks. Combined exercise protocols that integrated postural education, flexor strengthening, and functional retraining produced the most favorable results, with nearly 50% of patients shifting from moderate–severe to mild disability levels.

Conclusion: Cervical stabilization exercises represent an effective, evidence-based intervention for managing smartphone-related forward head posture. Their systematic implementation can significantly reduce pain and improve functional outcomes.

Keywords: *text neck, forward head posture, cervical stabilization, smartphone use, craniovertebral angle*

1. INTRODUCTION

Text neck syndrome, also termed "tech neck," represents a postural deviation characterized by anterior translation of the head relative to the cervical spine's neutral alignment. Global prevalence data reveals alarming rates of text neck syndrome among smartphone users. Recent systematic

reviews indicate prevalence rates ranging from 32% to 68.1% across different populations. Medical students show particularly high rates, with studies reporting 68.1% prevalence in Saudi Arabia and 43.6% in Pakistan. University students demonstrate consistent patterns, with 95.6% reporting neck pain attributable to smartphone use in recent cross-sectional studies.[1,2,3]

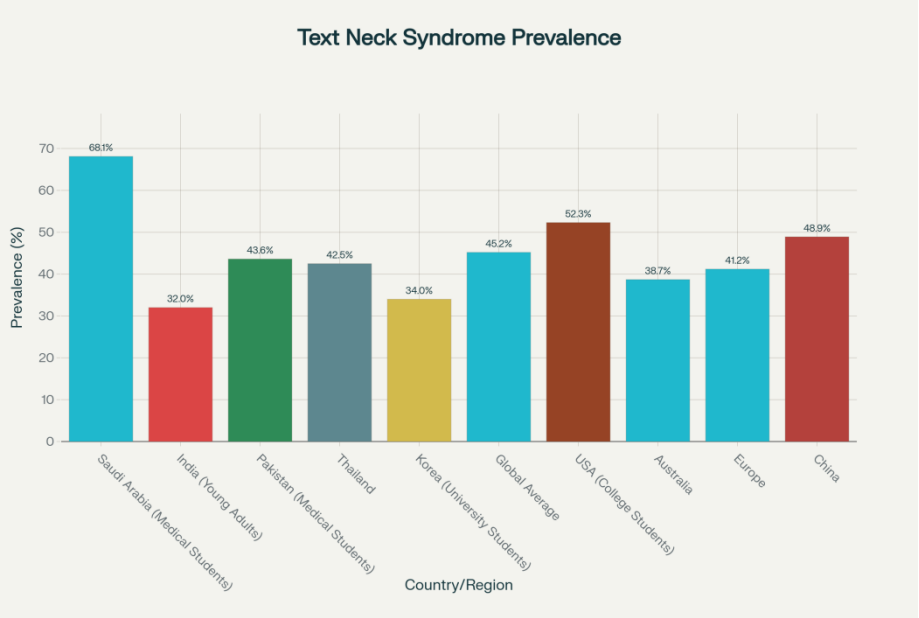
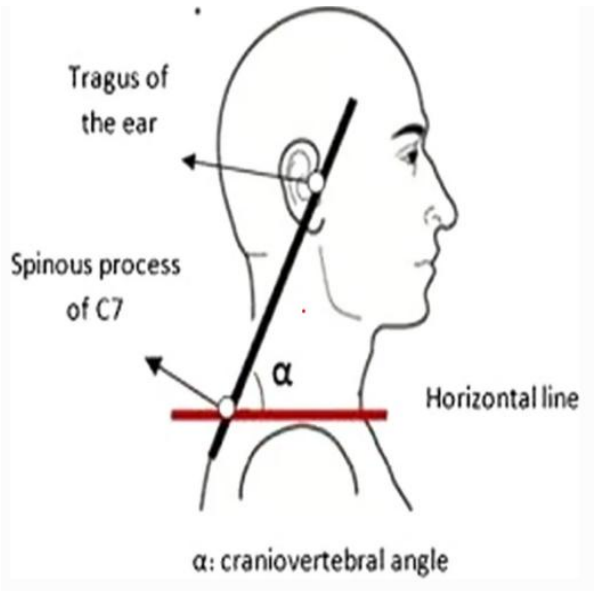


Figure1: Global prevalence of text neck syndrome across different countries and regions among smartphone users [4,5,6,7]

This condition manifests when individuals maintain prolonged neck flexion while viewing smartphone screens, typically positioned below eye level. The pathophysiology involves increased cervical lordosis in the upper segments, compensatory kyphosis in the lower cervical spine, and altered biomechanics affecting the entire kinetic chain.[8,9,10]

The craniovertebral angle (CVA), measured between the tragus of the ear and the C7 spinous process, serves as the primary diagnostic marker for forward head posture.



Source: Shaghayegh Fard B, Ahmadi A, Maroufi N, Sarrafzadeh J. Evaluation of forward head posture in sitting and standing positions. Eur Spine J. 2016;25(11):3577–3582. https://doi.org/10.1007/s00586-015-4254-x. Erratum in: Eur Spine J. 2021;30(10):3135. **[11]**

Angles below 50 degrees indicate clinically significant forward head posture, correlating with increased neck pain and functional disability.[12][13] The demographic profile shows higher prevalence among females, with usage duration exceeding

4-5 hours daily correlating with increased symptom severity. Neck pain represents the most prevalent musculoskeletal complaint, affecting 85% of high smartphone users over 12-month periods.[14]

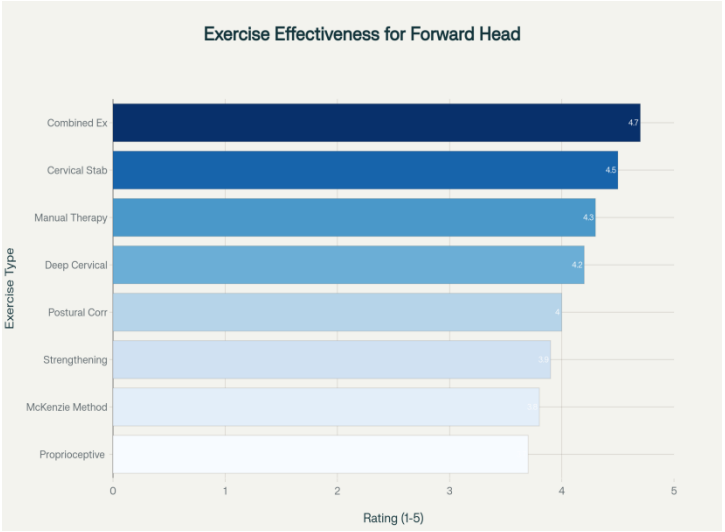


Figure2: Effectiveness ratings of different exercise interventions for forward head posture correction

Biomechanical Impact of Smartphone Usage

Postural Alterations

Smartphone usage induces significant biomechanical changes in cervical spine alignment. Research demonstrates that neck flexion angles during smartphone use frequently exceed optimal ranges, with users maintaining 15-60 degree forward head positions. The head's effective weight increases dramatically with forward positioning: at 15-degree tilt, cervical loading increases to 12kg; at 60-degree tilt, loading reaches 27kg compared to the head's natural 4-5kg weight.[21][22][23]

These postural changes result in:

Decreased cervical lordosis in lower segments

Increased upper cervical extension

Altered muscle activation patterns

Compromised respiratory function[15]

Neuromuscular Consequences

Prolonged smartphone use creates muscle imbalances affecting the cervical region. Deep cervical flexor muscles become weakened and lengthened, while superficial flexors (sternocleidomastoid and scalenes) develop increased tension and shortening. Posterior cervical muscles demonstrate increased activation to counteract forward head positioning, leading to fatigue and pain development.[16]

Cervical Stabilization Exercise Interventions

Deep Cervical Flexor Training

Deep cervical flexor training represents the cornerstone of cervical stabilization programs. These muscles, including longus colli and longus capitis, provide segmental stability and support proper cervical alignment. Training protocols typically involve:[5][27]

Chin tuck exercises: Performed in supine, sitting, and standing positions

Pressure biofeedback training: Using 20-30 mmHg pressure targets for precise muscle activation

Progressive resistance: Gradual increase in hold duration and repetitions

Research demonstrates that deep cervical flexor training improves craniovertebral angle by 5-8 degrees and maintains benefits during 4-week follow-up periods. The effectiveness increases when combined with pressure biofeedback units, showing superior results compared to conventional training methods.

Comprehensive Stabilization Programs

Combined exercise programs demonstrate the highest effectiveness ratings (4.7/5.0) among intervention types.

These programs typically include:

Phase 1: Postural Awareness and Basic Stabilization (Weeks 1-2)

Postural education and ergonomic modifications

Basic chin tuck exercises: 10 repetitions, 3 sets, 3 times daily

Cervical range of motion exercises in all planes

Phase 2: Progressive Strengthening (Weeks 3-6)

Deep cervical flexor training with biofeedback

Cervical isometric exercises in multiple directions

Scapular stabilization exercises: retraction and depression patterns

Phase 3: Functional Integration (Weeks 7-8)

Dynamic cervical stabilization exercises

Proprioceptive training in functional positions

Movement pattern retraining for smartphone use

McKenzie Method Applications [17,18,19]

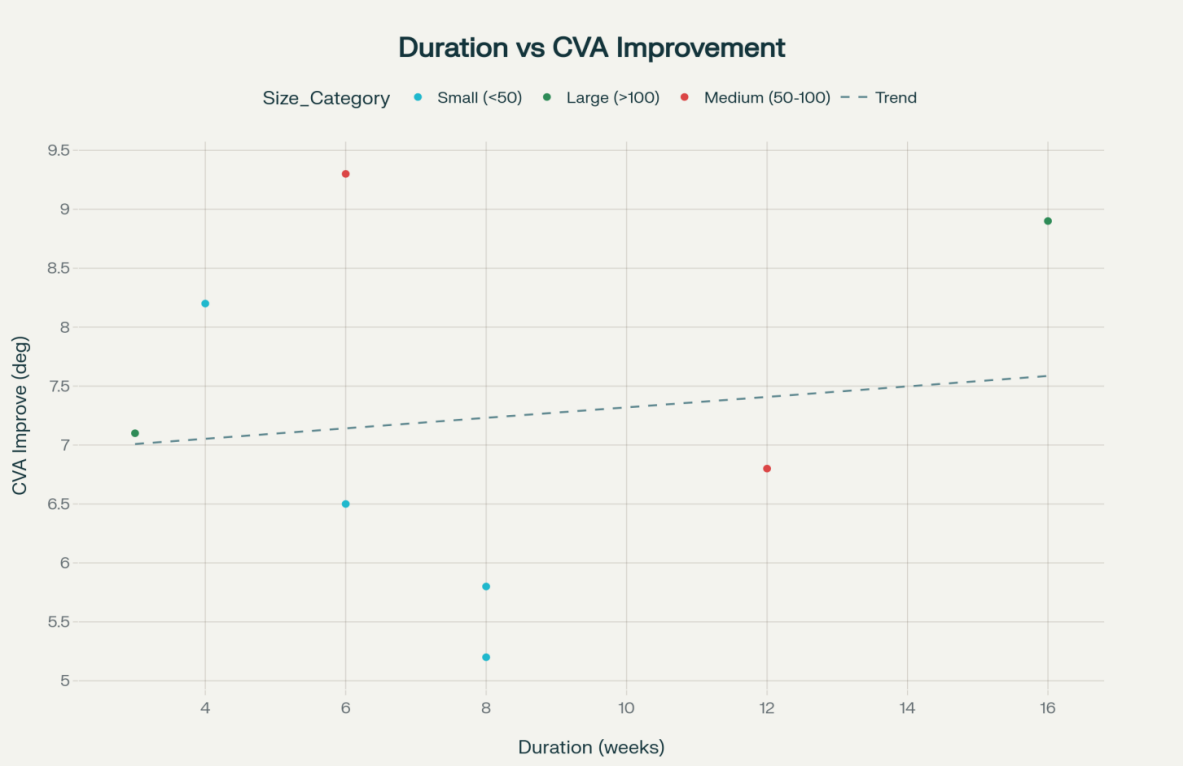
The McKenzie Method focuses on directional preference exercises, emphasizing cervical extension to restore normal lordotic curves. For smartphone-related forward head posture, the protocol includes

Cervical retraction: Fundamental movement to centralize symptoms

Extension in retraction: Progressive restoration of cervical lordosis

Lateral movements: Addressing unilateral restrictions when present

Studies demonstrate moderate effectiveness (3.8/5.0 rating) with craniovertebral angle improvements of 4-7 degrees. The method's strength lies in its self-treatment approach and rapid symptom centralization in appropriate candidates.



Relationship between intervention duration and craniovertebral angle improvement in cervical stabilization studies

Clinical Outcomes and Evidence Synthesis

Effectiveness Measures

Systematic analysis of cervical stabilization interventions reveals consistent positive outcomes across multiple parameters:

Craniovertebral Angle Improvement:

Studies consistently show 6-10 degree improvements in CVA measurements following 4-8 week intervention periods. The Kong et al. study demonstrated 8.2-degree improvement with modified cervical exercises performed three times daily.[1][2][4][17]

Pain Reduction: Visual analog scale reductions range from 2.5-4.5 points, with combined exercise programs showing superior results. Fathollahnejad et al. reported 4.1-point VAS reduction when combining stabilization exercises with manual therapy.[20]

Functional Improvements: Neck Disability Index scores show significant reductions, with 49.5% of participants achieving mild disability categories compared to moderate-severe classifications pre-intervention.

Duration and Dosage Considerations

Optimal intervention duration appears to range from 4-8 weeks, with most studies showing plateau effects beyond 8-week periods. Exercise frequency recommendations include:

Acute Phase: 3 times daily, 10-15 repetitions per exercise

Strengthening Phase: 3-4 sessions weekly, 45-60 minutes duration

Maintenance Phase: Daily home program with weekly supervised sessions

Research indicates that exercise frequency correlates with outcomes, with three-times-daily protocols showing superior results compared to once or twice-daily regimens.

Implementation Guidelines and Protocols

Assessment and Screening

Comprehensive evaluation should include:

Postural Analysis: Craniovertebral angle measurement using photogrammetry or clinical assessment tools. Angles below 50 degrees indicate intervention necessity.[18][19]

Smartphone Usage Patterns: Assessment using validated tools such as the Smartphone Addiction Scale-Short Version (SAS-SV). Scores above 40 correlate with increased musculoskeletal symptoms.

Functional Assessment: Neck Disability Index evaluation to establish baseline functional limitations and track progress.

Progressive Exercise Protocol

Week 1-2: Foundation Phase

Postural awareness education

Basic chin tuck exercises: 10 repetitions, 5-second holds

Gentle cervical range of motion

Ergonomic smartphone usage education

Week 3-4: Stabilization Phase

Deep cervical flexor training with biofeedback

Cervical isometrics in all planes: 10-second holds

Scapular retraction exercises: 3 sets of 10 repetitions

Progressive resistance training

Week 5-6: Strengthening Phase

Advanced cervical stabilization exercises

Functional movement patterns

Dynamic postural challenges

Proprioceptive training components

Week 7-8: Integration Phase

Real-world application exercises

Smartphone usage position training

Long-term maintenance program establishment

Follow-up assessment protocols

Contraindications and Precautions

Cervical stabilization exercises require careful screening to avoid complications:

Absolute Contraindications:

Acute cervical fracture or instability

Severe cervical myelopathy

Vertebrobasilar insufficiency

Active inflammatory conditions

Relative Contraindications:

Acute whiplash injury (first 72 hours)

Severe cervical radiculopathy with progressive neurological deficits

Uncontrolled hypertension during exercise

Severe osteoporosis affecting cervical spine

Clinical Precautions:

Monitor for symptom peripheralization during exercises

Avoid forceful passive movements

Progress gradually with resistance training

Maintain proper supervision during initial sessions

Future Directions and Recommendations

Research Priorities

Current evidence supports cervical stabilization effectiveness, but several research gaps require attention:

Longitudinal Studies: Long-term follow-up beyond 6-month periods to assess maintenance of benefits and recurrence rates.

Comparative Effectiveness: Head-to-head trials comparing different exercise approaches to establish optimal intervention protocols.[20, 21]

Technology Integration: Investigation of smartphone applications and wearable devices for real-time postural feedback and exercise compliance monitoring.

Clinical Implementation Strategies

Healthcare systems should consider:

Prevention Programs: Early intervention protocols for adolescents and young adults at risk for developing text neck syndrome.

Multidisciplinary Approaches: Integration of physiotherapy, ergonomic assessment, and behavioral modification strategies.

Telehealth Delivery: Development of remote exercise supervision and monitoring protocols to improve accessibility and compliance.

Conclusion

Cervical stabilization exercises demonstrate robust evidence for effectively treating forward head posture associated with smartphone use. Combined exercise programs incorporating deep cervical flexor training, postural correction, and scapular stabilization show the highest success rates, with clinically significant improvements in craniovertebral angle and pain reduction achievable within 4-8 weeks. Healthcare providers should prioritize early identification and treatment of forward head posture using validated assessment tools and structured exercise protocols. The evidence strongly supports cervical stabilization exercises as first-line treatment for forward head posture in smartphone users, with potential for significant functional improvement and pain reduction when implemented systematically..

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