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Understanding Mechanical Neck Pain in College Students Due to Smartphone Use: A Narrative Review

[1] Dr. Bhargavi HS, [2] Dr. Mohammed Yaseen

[1] Lecturer, Department of Physiotherapy, Heritage City College of Physiotherapy, Mysore, RGUHS, Mysore, Karnataka, India
[2] Clinical Physiotherapist, Heritage City College of Physiotherapy, Mysore, RGUHS, Mysore, Karnataka State, India

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Corresponding Author: **Dr. Bhargavi HS**

Abstract

The widespread and prolonged use of smartphones among college students has led to a growing prevalence of mechanical neck pain (MNP), a condition primarily driven by sustained poor posture, particularly forward head posture (FHP), and prolonged static neck positioning. As students increasingly rely on mobile devices for academic, social, and recreational activities, the cervical spine is placed under abnormal mechanical loads, resulting in muscular fatigue, restricted mobility, and postural imbalances. This narrative review aims to explore the pathophysiology of smartphone-induced MNP, its behavioral and ergonomic risk factors, and emerging non-invasive strategies for its management.

Among the various conservative treatment approaches, kinesio taping (KT) has gained prominence as a potential adjunct therapy. KT involves the application of elastic therapeutic tape to support muscles and joints, promote circulation, enhance proprioception, and reduce pain without restricting movement. This review synthesizes current evidence regarding the application and effects of KT on neck pain, with particular focus on its relevance to young adult populations affected by smartphone overuse.

While several studies report positive outcomes with KT in managing neck pain, limited research specifically targets its use in smartphone-related MNP among college students. Additionally, standardized protocols for KT application in this context are lacking. Therefore, this review highlights the importance of developing structured pilot trials and randomized controlled studies to validate the efficacy of KT in this subgroup.

By identifying key gaps in the literature and outlining theoretical and clinical frameworks, this paper provides a foundation for future research into conservative, accessible interventions for technology-related musculoskeletal disorders.

Keywords: Mechanical Neck Pain, Kinesio Taping, Smartphone Use, Forward Head Posture, College Students

Methodology

This narrative review was conducted by searching electronic databases including PubMed, Scopus, and Google Scholar for relevant literature published between 2014 and 2024. Keywords used included “mechanical neck pain,” “kinesio taping,” “smartphone use,” “forward head posture,” and “college students.” Studies were included if they were peer-reviewed, in English, and examined musculoskeletal effects or therapeutic interventions related to smartphone-induced neck pain. Foundational or landmark studies older than 10 years were included where necessary to support key concepts. Articles focusing on non-mechanical neck pain, non-relevant populations, or editorials were excluded. The selection process prioritized relevance to the review’s objectives rather than strict methodological quality, as is typical in narrative reviews.

1. Introduction

In recent years, the rapid proliferation of smartphones has significantly altered daily routines, especially among college students. These devices are widely used for academic, recreational, and social activities, often requiring sustained periods of neck flexion and poor postural alignment. This shift in behavior has coincided with an increase in musculoskeletal complaints, particularly mechanical neck pain (MNP) — a condition marked by localized, posture-related discomfort in the cervical region. Unlike cervical radiculopathy or other neurological disorders, MNP primarily arises from biomechanical stress and muscular fatigue due to prolonged static postures [1]. Students are especially vulnerable due to long study hours, lack of ergonomic awareness, and limited physical activity. The growing prevalence of smartphone-induced neck pain highlights an urgent need

for conservative, accessible interventions. Among various non-invasive therapies, kinesio taping (KT) has emerged as a potential modality to support muscle function, correct posture, and relieve pain. This review explores the interplay between smartphone use, MNP, and the therapeutic role of KT.

2. Smartphone Usage and Postural Strain

Smartphone usage has become deeply integrated into the daily lives of college students, leading to prolonged periods of device engagement in suboptimal positions. One of the most concerning consequences is the development of forward head posture (FHP), a musculoskeletal imbalance where the head protrudes anteriorly relative to the spine. This misalignment significantly increases the load on the cervical spine. Hansraj [2] demonstrated that the effective weight of the head, normally around 4.5 to 5.5 kg in a neutral posture, can increase up to 27 kg when the neck is flexed at a 60-degree angle—a typical posture when using a smartphone. This excessive load leads to overactivation and fatigue of posterior neck muscles, reduced cervical range of motion, and stress on intervertebral discs and ligaments, thereby contributing to mechanical neck pain (MNP) [3, 4].

Research suggests that college students spend an average of 5 to 8 hours daily on smartphones, with much of this time spent in flexed, unsupported postures [5]. The cumulative effect of poor ergonomics, physical inactivity, long study hours, and high stress levels compounds the risk of developing MNP. Without intervention, these repetitive strain injuries may lead to chronic pain, postural deformities, and reduced functional performance over time.

3. Mechanical Neck Pain: Clinical Features and Implications

Mechanical neck pain (MNP) is a musculoskeletal condition characterized by localized, non-radiating pain in the cervical region, typically aggravated by neck movement or sustained static postures [6]. Unlike neuropathic or discogenic disorders, MNP originates from mechanical stress affecting muscles, ligaments, and joints without neurological involvement. Common symptoms include stiffness, muscle tightness, localized tenderness, and in some cases, tension-type headaches. Although not considered neurologically severe, if left unaddressed, MNP can progress to chronic pain, leading to long-term postural changes and reduced physical function.

Among college students, MNP significantly interferes with daily activities such as studying, sleeping, and attending classes. Research indicates a strong association between the severity of neck pain and impaired sleep quality, increased anxiety levels, and reduced attention span [7]. These psychosocial effects further decrease academic performance and well-being. Early identification and intervention are crucial to prevent chronicity and promote a return to normal function, especially in student populations heavily reliant on digital devices.

4. Conservative Management Approaches

The management of mechanical neck pain (MNP) primarily focuses on conservative, non-invasive interventions aimed at reducing symptoms and preventing recurrence. Standard approaches include postural correction, ergonomic education, stretching exercises, strengthening of cervical and upper back muscles, and various forms of manual therapy such as massage or mobilization techniques [8]. These interventions aim to relieve muscle tension, improve joint mobility, and restore functional alignment. In recent years, kinesio taping (KT) has emerged as a promising adjunctive therapy. KT is a skin-applied elastic tape designed to support muscles and joints without restricting movement. It is increasingly being explored for its potential to reduce pain, enhance proprioception, and improve posture in individuals with neck pain.

5. Kinesio Taping: Mechanism and Relevance

Kinesio Taping (KT) is a therapeutic technique developed by Dr. Kenzo Kase in the 1970s, designed to facilitate the body's natural healing processes while providing support and stability to muscles and joints. Unlike traditional athletic taping methods that restrict movement, KT uses elastic, breathable tape that mimics the elasticity of human skin, allowing for full range of motion. The tape is applied to the skin with varying degrees of tension, depending on the desired therapeutic effect.

The proposed mechanisms of KT include lifting the skin to create space between the dermis and underlying tissues, which is believed to improve circulation and lymphatic drainage, reduce interstitial pressure, and alleviate irritation on pain receptors [9, 11]. KT also enhances proprioceptive feedback, promoting better posture and motor control [10]. Depending on the direction and tension of application, KT may be used to either facilitate weak muscles or inhibit overactive ones.

Several clinical studies have demonstrated short-term benefits of KT in reducing neck pain, improving range of motion, and enhancing patient satisfaction [12, 13]. Its non-restrictive nature makes it particularly suitable for young, active populations such as college students, offering a practical and cost-effective tool for managing smartphone-related mechanical neck pain.

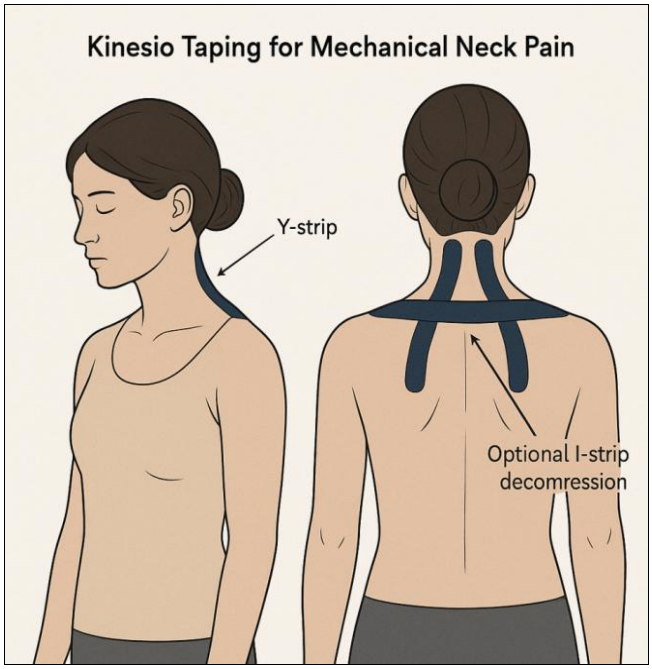

Fig 1: Posterior view of kinesio taping for mechanical neck pain, generated using OpenAI's ChatGPT (2025)

Summary of the KeyWords	
Purpose	To reduce pain, support cervical muscles, and encourage posture correction
Muscles Targeted	Upper trapezius, levator scapulae, cervical paraspinals
Tape Type	Standard Kinesio Tex Tape (elastic, breathable, hypoallergenic)
Tape Length	Cut into I-strips and Y-strips (approx. 15–20 cm depending on neck size)
Tension Applied	10–25% for postural support and pain modulation
Position of Application	Neck in flexed position (head slightly bowed forward)
Frequency/Duration	Apply for 3–5 days; rest 1–2 days before reapplying
Technique	2 I-strips or 1 Y-strip from upper thoracic to suboccipital region; optional decompression strip horizontally across pain point

6. Gaps in Literature and Need for Study

While kinesio taping (KT) has been explored across various musculoskeletal conditions such as cervical spondylosis, whiplash injuries, and general neck pain, there is a notable lack of targeted research focusing on smartphone-induced mechanical neck pain (MNP), particularly among college students. This subgroup is increasingly at risk due to prolonged digital device use, academic demands, and a sedentary lifestyle. Existing studies tend to group neck pain populations broadly without accounting for the unique behavioral patterns and postural challenges associated with smartphone use. Moreover, there is no universally accepted KT protocol for this condition, leading to inconsistencies in application technique, tension levels, and outcome measures. These gaps highlight the need for well-designed pilot studies and controlled clinical trials that specifically assess the efficacy of KT in managing MNP linked to smartphone usage, with a focus on standardized methods, measurable outcomes, and long-term benefits.

7. Conclusion

Mechanical neck pain is becoming a significant health concern among college students, driven by excessive smartphone use and poor postural habits. As a conservative, non-invasive intervention, kinesio taping shows potential to alleviate symptoms by supporting cervical alignment, enhancing proprioception, and reducing muscular strain. While preliminary evidence suggests short-term benefits, there remains a pressing need for targeted, population-specific research to confirm its effectiveness in smartphone-related MNP. This narrative review not only synthesizes current understanding but also lays a foundation for future experimental research, including pilot trials, protocol development, and randomized studies that can establish kinesio taping as a reliable component of conservative care in this emerging musculoskeletal issue.

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