

# Association and Effects of Neck Pain with Scapular Dyskinesia - A Narrative Review

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## ABSTRACT

**BACKGROUND:** Neck pain, affecting 30-50% of adults, often results from soft tissues and joints abnormalities. Scapular dyskinesia, marked by abnormal scapular movement due to muscle imbalances, poor posture, or repetitive activities, exacerbates neck pain and contributes to work-related musculoskeletal disorders. This condition can lead to mechanical strain on cervical spine structures due to shared muscle attachments. Diagnosed through tests like the lateral scapular slide test (LSST), treatment involves scapular stabilization exercises, postural correction, and manual therapy. Addressing muscle imbalances and maintaining proper posture are crucial for managing pain and preventing further dysfunction.

**METHOD:** The study design is a Narrative review of the literature. A literature search of original full-text research articles in PubMed and Google Scholar was conducted for publication between the years 2020 and 2024. The keywords used for searching articles were Scapular Dyskinesia and Neck Pain.

**RESULT:** A total of 25 articles were searched for the given topic. Out of which 16 articles were identified on removal of duplication and reviews were removed, of which only 10 Articles for the reviewed as per the inclusion and exclusion criteria.

**CONCLUSION:** Scapular dyskinesia is associated with increased neck and shoulder pain, muscle tightness, and functional impairment with high prevalence among office workers, dentists, and patients with chronic neck pain, particularly in those with postural deviations. Effective management requires addressing scapular stability through targeted exercises, posture correction, and in some cases, thoracic mobilization to give results.

**Keywords:** Neck Pain, Scapular Dyskinesia

## INTRODUCTION

Neck pain is a common musculoskeletal complaint with a 12-month prevalence of 30-50% in adults. <sup>(1)</sup> Work-related musculoskeletal disorders are the most common self-reported problems from office workers to manual material handlers.

Studies show that 36-56% of workers have CANS (complaints of arm, neck, and shoulder). <sup>(2)</sup>

Neck pain results from abnormalities in the soft tissues, such as muscles, ligaments, and nerves, as well as in bones and joints of the spine. The most common causes of neck

pain are soft-tissue abnormalities due to injury or prolonged wear and tear. In some people, neck problems may be the source of pain in the upper back, shoulders, or arms.<sup>(3)</sup>

Scapular dyskinesia refers to abnormal movement or positioning of the scapula during shoulder motion, often due to muscle imbalances, poor posture, or repetitive overhead activities.<sup>(4,5)</sup> Common types include inferior angle dysfunction, medial border winging, and superior border elevation. Scapula dyskinesia thus increases the risk of work-related musculoskeletal disorders or injuries in these offices, service, and healthcare staff.<sup>(6)</sup>

Scapular dyskinesia is associated with the neck, along with a limited range of motion. Scapular dysfunction is thought to perpetuate mechanical strain to pain-sensitive cervical spine structures because of shared muscle attachments between the scapula and the cervical spine. Scapular dyskinesia is linked to repetitive strain or cumulative trauma to the tissues, typically as a result of work.<sup>(7)</sup> Diagnosed through clinical tests like the lateral scapular slide test (LSST), treatment includes scapular stabilization exercises, postural correction, and manual therapy. Addressing muscle imbalances and improving scapular mechanics are key to recovery, particularly in individuals with chronic pain or repetitive stress injuries.

The relationship between scapular dyskinesia and neck pain, while it is known that alterations in scapular kinematics can affect shoulder function and contribute to neck pain, the specific muscle activation patterns underlying these relationships require further investigation. Hence, guiding them, about proper posture while working and encouraging them to regularly undertake scapular muscle stretching and strengthening exercises would aid in minimizing early muscular fatigue, pain, and scapular dysfunction.

## METHODS

This narrative review was conducted to synthesize recent research on neck pain and scapular dyskinesia. Data were sourced from PubMed and Google Scholar, selected for their comprehensive collections of peer-reviewed medical literature. Inclusion criteria encompassed studies specifically focused on the relationship between neck pain and scapular dyskinesia, published between 2020 and 2024. Only articles with full-text availability in English were considered, ensuring comprehensive data and conclusions. Articles lacking proper results, conclusions, or full-text access were excluded, as were conference papers and abstracts due to their incomplete nature. The keywords used for searching articles were Scapular Dyskinesia, and Neck Pain. The study original research articles such as experimental study and randomized controlled trial. This approach ensured a thorough and relevant review of the current literature.

## RESULT

A total of 25 articles were searched for the given keywords. Out of which 16 articles were identified on removal of duplication and reviews were removed, of which only 10 articles for the reviewed as per the inclusion and exclusion criteria. The research articles are tabulated (in shown in Table 1). The findings indicate a consistently high prevalence of scapular dyskinesia (SD) with neck, (shoulder, and scapular) pain individuals with musculoskeletal discomfort, particularly those engaged in office-based work, clinical practice, and patients with chronic neck pain.

### Prevalence of Scapular Dyskinesis:

Across office workers, the prevalence of SD was observed to range from 89.9% to 90%, with a higher occurrence on painful sides of the scapula.<sup>(8,9,10)</sup> A higher prevalence of SD in patients with forward head posture (9.44%) compared to those with normal posture (4.44%). In other populations, such

as dentists, SD was more common on the dominant side, indicating an occupational link with overuse and posture-related issues. (11)

**Impact on Pain and Functionality:**

Studies consistently found a significant relationship between SD and increased pain and functional impairment. (9) demonstrated that patients with SD had higher neck pain (VAS) and disability (NDI) scores. Similarly, SD was associated with elevated night pain (VAS) and muscle shortness in the pectoral and latissimus dorsi muscles. (12,13)

**Postural Deviations and Muscle Imbalances:**

Rounded shoulders and forward head posture were common in SD patients. (8) Muscle tightness in the

pectoralis minor and levator scapulae was found in 100% and 93% of participants, respectively. (14) Muscle strength in the scapular region, particularly in the serratus anterior and trapezius muscles, significantly correlated with neck pain and disability scores.

**Effectiveness of Treatment Interventions:**

Scapular stabilization exercises were shown to improve cervical range of motion (ROM), pain, and disability. (16,17) demonstrated significant improvements in patients receiving scapular stabilization and thoracic mobilization therapies compared to standard care alone. (12) Neck stabilization exercises resulted in superior outcomes in reducing pain and improving mobility in females with chronic mechanical neck pain compared to scapular stabilization exercises alone.

AUTHOR & YEAR	SUMMARY
Vongsirinavarat et al. 2022 <sup>(8)</sup>	A study of 99 office workers with neck and scapular pain found a high prevalence (90%) of scapular dyskinesia (SD), especially on painful sides. Common postural issues were rounded shoulders and forward head posture, with muscle tightness prevalent in the pectoralis minor and levator scapulae.
Moon & Kim et al. 2023 <sup>(9)</sup>	In 109 computer office workers, 89.9% had SD, with higher neck pain and disability scores. Scapular displacement was significant in SD cases, correlating with increased neck and shoulder pain.
Güler et al. 2022 <sup>(10)</sup>	In a study of 180 patients with chronic neck pain, SD was more prevalent in patients with forward head posture (9.44%) than those with normal posture. SD was more commonly associated with medial margin issues in forward head posture cases.
Amin et al. 2023 <sup>(11)</sup>	This study of 108 dentists showed a high prevalence of SD, particularly on the dominant side. Overuse, poor posture, and muscle weakness were identified as contributing factors.
Wadee Mawad et al. 2021 <sup>(12)</sup>	In females with chronic neck pain, neck stabilization exercises were more effective than scapular stabilization in reducing pain and disability, showing better overall outcomes in pain reduction and functional mobility.
Sağlam & Telli et al. 2022 <sup>(13)</sup>	In 121 patients with neck, back, or shoulder pain, 41.9% had SD, with a higher prevalence in those with back and shoulder pain. Night pain scores were higher, and muscle shortness was common, particularly in the pectoral and latissimus dorsi muscles.
Elraof & Abdelmegeed et al. 2024 <sup>(14)</sup>	A study on patients with chronic mechanical neck pain found that pain intensity correlated with neck disability index (NDI), and scapular muscle strength affected pain and disability. Strengthening specific scapular muscles was crucial for functional improvement.
Kibler et al. 2020 <sup>(15)</sup>	A review of scapular dyskinesia management emphasized a holistic approach focusing on mobility, strength, and motor control across the scapula, humerus, trunk, and legs for effective treatment.
Ganvir & Kadam et al. 2023 <sup>(16)</sup>	In young adults with Upper Cross Syndrome, scapular stabilization exercises combined with thoracic mobilization significantly improved neck pain and range of motion more than exercises alone.
Abbas et al. 2022 <sup>(17)</sup>	A study on 30 patients with chronic neck pain found that scapular stabilization exercises combined with standard physical therapy yielded greater improvements in pain, range of motion, and disability than standard therapy alone.

## DISCUSSION

The high prevalence of scapular dyskinesia in individuals with musculoskeletal pain, particularly in office workers and clinical professionals such as dentists, underscores the strong association between repetitive occupational tasks, poor posture, and the development of SD. Studies consistently show that SD is often accompanied by postural deviations such as forward head posture and rounded shoulders, as well as muscle tightness and weakness, particularly in the pectoralis minor, levator scapulae, and serratus anterior muscles.

The link between SD and increased pain, particularly in the neck and shoulder regions, suggests that addressing scapular positioning and stability is critical in managing chronic pain. The lateral scapular slide test (LSST) was frequently used to identify scapular displacement, with results indicating a clear relationship between SD and impaired scapular movement.<sup>(9)</sup>

Effective interventions focusing on scapular stabilization, combined with thoracic mobilization, offer superior results in improving cervical ROM and reducing pain.<sup>(16)</sup> The inclusion of thoracic mobilization enhances the mechanical alignment of the upper body, thereby optimizing the scapular mechanics. However, neck stabilization exercises may yield better outcomes than scapular-focused rehabilitation in certain populations,<sup>(12)</sup> indicating that individualized treatment plans should consider the specific biomechanical deficits of each patient.

The findings suggest that the integrated function of the scapula with the neck, shoulder, and upper back is paramount in both the development and rehabilitation of musculoskeletal pain. Comprehensive management should address scapular mobility, strength, and motor control,<sup>(15)</sup> emphasizing a holistic approach that includes posture correction, muscle strengthening, and flexibility exercises.

## CONCLUSION

The prevalence of scapular dyskinesia is notably high among office workers, dentists, and patients with chronic neck pain, particularly in those with postural deviations like forward head posture. Scapular dyskinesia is associated with increased neck and shoulder pain, muscle tightness, and functional impairment.

Effective management requires addressing scapular stability through targeted exercises, posture correction, and in some cases, thoracic mobilization to optimize outcomes. Individualized treatment plans that incorporate both scapular and neck stabilization exercises are essential for reducing pain and improving functionality in patients with scapular dyskinesia. Future research should explore the long-term effects of combined treatment approaches on musculoskeletal health in at-risk populations.

### *Declaration by Authors*

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