Manual therapy improves pain for articular dysfunction pattern in patient with mechanical neck pain: A Case Report

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Abstract

Background: Neck pain is one of leading causes of disability around the world. It has been defined and classified by numerous authors and through different models. Articular dysfunction patterns are a consolidated way to identify and classify impairments in coordination with other related factors. A sound clinical reasoning is immensely needed to identify patients with predominantly mechanical nociceptive pain from articular structures. Current practice uses a lot of combination of manual mobilization and/or manipulation in mechanical neck pain. We used mobilization with the range of motion and muscle performance exercises to decrease pain and reduce impairments.
Case Description: A 27-year-old female teacher by profession presented with a history of one-week neck pain and movement restriction. On active movement examination, the patient's pain is provoked on left side rotation and bending, and these movements are restricted. The right-side rotations and side bending are restricted and cause muscle tension and stretch. There were no red and yellow flags evident on examination. Based on physical examination, the patient was diagnosed as mechanical neck pain with articular dysfunction of convergence type.
Discussion and Conclusion: The patient reported a significant decrease in the pain intensity. The identification of convergence articular dysfunction pattern resulted in better clinical reasoning and selecting the mobilization technique and thus leading to improved ranges and decreased pain intensity.

Keywords: Articular dysfunction, neck pain, nociception, manual therapy, Kaltenborn mobilization.

Background

Neck pain is considered a global health issue with varied prevalence in literature [1]. Majority of individuals will experience an episode of neck pain at least once in their lifetime[2]. The occurrence of neck pain among the world population ranges from 16.7% to 75.1%[3]. The point prevalence for neck pain varies from 6% to 22 % and the one-year prevalence varies between 1.5% and 75% [1]. A systematic review reported that an average prevalence of 15% to 50 % [1]. It accounts for almost 25% of visits to outpatient musculoskeletal physiotherapy setups [4]. Global burden of disease study ranks neck pain as 6th among 25 leading cause of disability and injury[5]. It is a major contributor to the increased burden of disease on health care expenditure and a cause of disability. The varied prevalence is attributed to the heterogeneity in the way we define neck pain, different epidemiological studies have considered neck pain differently.

Neck pain has been always been defined by different authors, which has led to numerous classifications of neck pain. Till date, neck pain has been classified based on duration, severity, aetiology/structure, and type to name a few[2]. Most of the studies have defined neck pain according to one of these classifying factors. Neck pain is usually categorized as nonspecific neck pain (no pathoanatomical cause), specific neck pain (specific anatomical cause) and mechanical or non-mechanical (origin other than the cervical spine), with either of them defined separately in the literature. Mechanical neck pain is defined as pain located in the cervical spine, including the cervicothoracic junction, which is exacerbated by cervical motion, sustained postures, and/or palpation of the cervical musculature[6]. Among all these classification factors duration is the best predictor of effect based on evidence. For a variety of different treatments, the shorter duration is associated with a better prognosis than long-standing pain[2], [7].

A Physiotherapist uses different management strategies for acute mechanical neck pain [6], [8]–[11]. Among various strategies, there has been extensive use of manipulations and mobilizations. An approach for treating neck pain should be based on sound clinical reasoning. We used articular dysfunction patterns to guide our choice of selecting the appropriate manual therapy

approach for the patient [12]. The articular dysfunctions are classified as convergence and divergence patterns identified based on a clinical algorithm [12]. The present case was assessed using the same clinical reasoning principles to identify an articular dysfunction. We used specific manual therapy techniques to manage the symptoms of the patient.

Case Description

Subjective examination

A 27-year-old female teacher by profession presented with a history of one-week neck pain and movement restriction. The pain developed gradually over a period without a traumatic antecedent. There was no radiation of pain into the arm. She had a similar episode three months for which she took rest and medications. Her chief complaint was neck pain, the location of pain was between the occiput and left shoulder blade. Pain aggravates on movements of the neck; the pain has a movement association and changes with specific movements. The patient experienced a feeling of locking while looking over her left shoulder and moving her head towards extension and left rotations and side bending. She scored her pain as 5 on the numeric pain rating scale (NPRS) and 7 when doing certain movements specifically left rotations and side bending. There was no pain at night while sleeping. No technical investigations were performed. The medication was not recommended. None of the reported symptoms was significant regarding the yellow flag and red flag detection. She reports that due to the pain she had difficulty in doing her basic activities of daily living.

Physical Examination

On observation, she had a forward head posture and she is not able to actively correct the posture as it is resulting in pain. Her neck muscle has hypertonicity on both sides with the left side having more tension. There is no evident swelling and redness in the region of pain. On active movement examination, the patient's pain is provoked on left side rotation and bending, and these movements are restricted. The right-side rotations and side bending are restricted and cause muscle tension and stretch. Passive elevation of the left shoulder improves side bending and rotation to the left side. On palpation, she had grade 2 tenderness of right upper trapezius and along with tender facet joints of C4-C5 and C5-C6 on the right side. The flexion rotation test was done and the rotations towards the left were found to be limited. On combined movement testing of extension, left side bending and left rotation is limited and painful. On testing the passive intervertebral motion there was a restricted downslope gliding at left C4/C5 and C5/6zygapophysial joint. Central PA glide on the same segments resulted in pain provocation. No significant neurological findings were present. Based on physical examination, the patient was diagnosed as mechanical neck pain with articular dysfunction of convergence type.

The physiotherapy (PT) management was designed based on the physical examination. The following were the goals of PT management:

1. Decrease Pain
2. Increase range of motion
3. Improve joint mobility

The long-term goal was to improve the muscle performance of neck musculature. Four sessions were initially decided in a week to achieve the goals, for long term goal a home exercise program was prescribed to the patient.

PT Management

The management was divided into different phases depending on the goals. The initial attempt was to reduce the acute pain the patient presented with. The patient was advised for a total of 8 visits and pain was the only outcome measure we considered pre- and post-treatment.

Pain Management

On the initial visit of the patient, the hot pack was used for 10 minutes over the neck region in prone position with the head turned towards the non-painful side. The patient was advised to be calm and relaxed and avoid any movements. After hot pack, Kaltenborn method of mobilization was used to aid in pain relief. Grade I distraction was used for the upper cervical spine; the patient position was supine. Focused distraction was applied at C3/C4, C4/C5 and C5/C6. The distraction was sustained for 10-15 seconds and was repeated for five times for the first visit. This was followed by grade I upslides was given using focus and lock techniques at C3/C4, C4/C5 and C5/C6. The glides were sustained in nature and the hold for the glide was 10 seconds. The patient was advised not to sit for a prolonged duration during work hours and should allow a shift in positions every hour.

Joint Mobility and Range of motion

The range of motion was initiated once there was a reduction in pain. The goal was a significant reduction of pain on movement which were painful in the initial assessment. The protocol was divided into two forms of exercises:

a. Range biased exercises

Muscle energy technique was used for upper trapezius to increase the cervical range along with this normal range of motion exercise that is flexion, extension, rotations, and side bending in a back supported seated position were prescribed. The patient was instructed to hold the end position for 5 seconds to provide stress to capsuloligamentous structures. Along with these Kaltenborn, up slides were used (grade II and grade III) to gain further range.

b. Muscle performance exercises

For improving muscle performance chin tuck exercises in supine lying were initiated and later progressed in a seated position. The patient was also asked to perform neck isometrics in front of the mirror and try to correct the posture actively whenever possible.

Outcome Measure

The pain intensity was the outcome used; it was measured using numeric pain rating scale. Pain intensity was measured pre- and post-treatment. The pain intensity was documented on the initial visit and at the eight-session. The pain intensity on the initial visit was 7 which reduced to 2 on the final visit. Patient's ranges also improved and were pain-free.

Discussion and Conclusion

The case report emphasizes the importance of using clinical reasoning for choosing the appropriate methods of treatment for the patient. The masterclass paper highlights three different types of articular dysfunction patterns among mechanical neck pain patients [12]. Each dysfunction has specific characteristics which should be used to identify the pattern present in the patient. The case report used mobilizations for relieving pain as well as improving ranges. The literature suggests that mechanical stimuli provided by cervical manipulation reduce the nociceptive related biomarkers [13]. A recent systematic review concluded that thoracic manipulation and cervical manipulation resulted in a similar reduction in pain and disability [6]. In the present case, we used sustained mobilization along with exercises. Though there has been a lot of studies examining the effect of either thoracic versus cervical manipulation or manipulation versus mobilization have elicited mixed results. Coulter [14] rated the evidence for manipulations and mobilizations as low to moderate. Few studies suggested the addition of cervical and scapular stabilization exercises to the treatment does have an additional effect on patient-reported outcomes [11]. The management of patients with neck pain has moved towards a more eclectic approach. The reports use of manual therapy with range of motion exercises, muscle performance exercises and muscle energy technique.

The finding cannot be generalised as it is a single patient description. Further studies may try to validate the presence of the articular dysfunctions and their association with patient-reported disability and pain. The identification of convergence articular dysfunction pattern resulted in better clinical reasoning and selecting the mobilization technique and thus leading to improved ranges and decreased pain intensity.

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Appendix

We used distraction, upslides (focus and caudal locking technique) for C3/C4, C4/C5 and C5/C6 segments. The techniques were based on the principles presented by Kaltenborn and Dewitte [12].

A. Distraction Technique

If we are distracting the C3/C4 the therapist positions the head and cervical spine (chin hold) with the right hand contacting the articular pillar of the superior segment (C3). The head is positioned in left rotation and right-side bending. Slight flexion or extension can be added as a third component. The thrust direction is perpendicular to the joint plane with the right hand placed onto the articular pillar of the C3 segment.

B. Translatoric upslide (focus technique for the right C3/4 segment)

The therapist positions the head and cervical spine (cradle hold) with the right hand contacting the articular pillar of the superior segment (C3). The head is positioned in left rotation and right-side bending. Slight flexion can be added as a third component. The thrust is directed to the left eye (ventrocranial)

C. Translatoric up slide (caudal locking technique for the right C3/4 segment)
The therapist stabilizes the caudal segments by placing them in a non-physiological position (slight extension, left rotation and right-side bending). The affected C3/4 segment is placed in a physiological position (slight extension, left rotation and left side bending) and a translation is given in an upslope direction