

Manual Therapy and Acupuncture in the Treatment of Patient with Cervical Spondylosis with Radicular Pain- Case Report

Sokunbi OG*

Department of Medical Rehabilitation, College of Medical Rehabilitation, University of Maiduguri, Nigeria

*Corresponding author: Sokunbi OG, Senior lecturer, University of Maiduguri, Medical rehabilitation [physiotherapy], University of Maiduguri, Bama road, Maiduguri, Borno pmb 1069, Maiduguri, Nigeria, Tel: 00234 813 84684 12; E-mail: ganiyusokunbi@gmail.com

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Abstract

Backgrounds: Recently, studies have shown that acupuncture combined with manual therapy is effective for the treatment of cervical spondylotic with radicular pain. Both acupuncture and exercise have been reported to have significant effects on reducing pain and improving quality of life among neck pain sufferers. Recent guideline recommends physical therapy (in the form of manipulative therapy and exercise) and acupuncture among other interventions for the management of cervical radiculopathy.

Aim: The aim of this study is to present the use of manipulative therapy and exercise therapy alongside acupuncture, in a single case report of a patient with a C6/7 disc prolapse and radiculopathy.

Methods: A case report following sessions of manipulative therapy and exercise therapy administered thrice weekly over 6 weeks, alongside manipulative therapy for the treatment of a single patient with cervical spondylotic with radicular pain. Outcome measures used was Neck pain and disability (NPAD) scale which measured pain intensity, impact of neck pain on functions, activities of daily living (ADL) and emotion.

Results: The outcome of treatment showed that NPRS improved from 8/10 from the start of the treatment to 0/10 at the end of six weeks of treatment. Pain intensity and impacts of pain on functions improve by 100% while the impact of pain on ADL and emotion improve by more than 60% at the end of 6 weeks treatment. Patient was able to sleep comfortably at night and able to drive without neck pain.

Conclusion: Combination of manual therapy and acupuncture treatment was beneficial in reducing pain, improving function, ADL in patient with cervical spondylotic with radicular pain in this case study. However, the long term and short term efficacy of using these treatment modalities either singly or in combination with a non-intervention control group is further warranted.

Keywords: Acupuncture; Cervical radiculopathy; Manipulative therapy; Exercise

Introduction

Cervical radiculopathy is a dysfunction of a nerve root of the cervical spine. Cervical radiculopathy is caused by any condition that puts pressure on the nerves where they leave the spinal column [1]. The sixth (C6) and the seventh (C7) cervical nerve roots are the most commonly affected [1]. In the younger population, cervical radiculopathy could occur a result of a disc herniation or an acute injury causing foraminal impingement of an exiting nerve. Disc herniation accounts for 20-25% of the cases of cervical radiculopathy while 68% of cases appear to arise from a combination of discogenic and spondylotic causes. In the older patient, cervical radiculopathy is often a result of cervical spondylosis with its associated foraminal narrowing from osteophyte formation, decreased disc height, degenerative changes of the uncovertebral joints anteriorly and of the facet joints posteriorly. As the spine ages, several changes occur in the bones and soft tissues [2]. The disc loses its water content and begins to collapse, causing the space between the vertebrae to narrow. The added pressure may irritate and inflame the facet joints, causing them

to become enlarged [1]. When this happens, the enlarged joints can press against the nerves going to the arm as they try to squeeze through the neural foramina. Degeneration can also cause bone spurs (osteophyte) to develop. Bone spurs may put pressure on nerves and produce symptoms of cervical radiculopathy [1]. Factors associated with increased risk of cervical radiculopathy include heavy manual labour requiring the lifting of more than 25 pounds, smoking, and driving or operating vibrating equipment [1]. Other, less frequent causes include tumors of the spine, an expanding cervical synovial cyst, synovial chondromatosis in the cervical facet joint, giant cell arteritis of the cervical radicular vessels, and spinal infections [1,2].

Cervical radiculopathy can be a significant cause of neck pain and disability. The reported annual incidence of is 83.2/100,000 persons [1], while the reported prevalence is 3.5/1000 persons [2]. Gender preference varies [2]. Individuals are most commonly affected in the 5th and 6th decades of life [1]. Patients presenting with cervical radiculopathy most frequently complain of neck pain, paresthesia and radicular pain [1-3]. While sensory symptoms typically present along a dermatome. When present, dermatomal pain patterns are more frequent at the C4 level as compared to the C7 and C6 levels [1,3]. Scapular pain is found in 51.6% of cases [1]. Physical examination typically reveals painful cervical spine range of motion (ROM) and

decreased deep tendon reflexes [1]. Upper limb weakness involves only 15% of cases while decreased sensation is found in 1/3 of cases and muscle atrophy presents in less than 2% of cases [2].

Recent guideline recommends physical therapy and acupuncture among other interventions for the management of cervical radiculopathy from degenerative disorders [3]. Studies have shown that acupuncture combined with manual therapy is effective for the treatment of spondylotic related radiculopathy [4-6]. Both acupuncture and exercise have been reported to have significant effects on reducing pain and improving quality of life among neck pain sufferers [4]. A related study of 78 humans concluded that a combination of acupuncture, soft tissue manipulation and herbal medicine has a significant therapeutic effect on cervical spondylotic, and deserves clinical promotion and application [4]. Other studies have shown that in the short-term, acupuncture does have a positive effect on pain relief for pain but when compared to conventional or alternative therapies, it was found to be no more effective in reducing pain [7,8]. Thus, it could be that a combination of acupuncture, manual therapy and exercise will offer greater benefit to patients with cervical spondylotic radiculopathy. Positive reinforcement effects might occur whereby manipulation is used to reduce derangement due disk displacement [4] and exercises producing stabilising effects on the facet joint to ameliorate dysfunction due degenerative changes in the facet joint and acupuncture treatment mediating pain reduction. Acupuncture analgesia improved the noxious descending inhibitory controls and pain gate mechanism and, therefore, helped the patients' pain levels [5]. Exercises remain the most frequently prescribed non conservative treatment in the management of musculoskeletal spinal disorders [5]. Exercises for spinal disorders are typically designed with the goal of relieving pain, strengthening the muscles, increasing spinal flexibility, and improving functional activities and general wellness [5,6]. In the present study, chin retraction and neck isometric exercises were prescribed. Besides the gentle stretching effects accompanying chin retraction, these exercises are largely isometric in nature capable of generating muscular tension without joint movements. Thus, making it possible to exercise muscles on the sides of the neck where pain is felt without the risk of causing further pain aggravation.

The purpose of this article is to provide information on the presentation, assessment and treatment with manual therapy (manipulation and exercise therapy) and acupuncture treatment of cervical radiculopathy in a single case study.

Methods

Subject and case presentation

A 38 year old Man referred to the department of physiotherapy with a diagnosis of lower cervical pain and discomfort. He had previously consulted an orthopaedic surgeon and had been diagnosed as having a disk herniation in the right C6 and C7 region based on a computed tomography scan and magnetic resonance imaging results. He complained of pain radiating from the back of the neck to back of the right hand. Patient did not give any report of previous trauma and/or accident to the neck and the upper extremities. Patient also reported previously experiencing clinical symptoms such as numbness and tingling sensation down the right arm which has now subsided but still having difficulty with lifting of light and heavy objects with the right hand due to pain and discomfort. Patient reported sudden onset of symptoms 6 months prior to referral to physiotherapy treatment which also has been gradually getting worse. Precipitation of these

symptoms occurred by neck movements especially bending the neck to the right side, right side lying and driving and could be relieved by resting and by avoiding aggravating factors. Patients did not report any specific 24 hour pattern of symptoms but complaint of constant waking up at night caused by symptoms aggravation. Patient also presented a report of Magnetic Resonance Imaging of the cervical spine confirming reduced joint space, marginal osteophyte and disc herniation at C6 and C7.

Prior to commencing physiotherapy treatment patient reported having to discontinue pain medications he has been on for six months and which he claimed has produced little or no changes to his symptoms. Patient did not report any red flags such as thoracic pain, weight loss, past medical history of carcinoma, structural deformity etc. She had no complaints of cardiac, respiratory disorders. Patient did not give an account of previous ineffective treatment with manipulation, exercise and acupuncture. Patient's goal was to be able to sleep comfortably at night and continue to drive without neck pain.

Assessments and Physical Examination

On physical examination, the patient weighed 65 kg and was 1.67 m in height (body mass index = 23.3 kg/m²). On the 1st day of visit to our department, she walked with normal gait, with protracted scapular and with cervical spine postural asymmetry (neck deviated towards the left side of the body). Oxford muscle grading of all the shoulder, elbow and wrist joints muscles are within normal limit. Biceps, brachioradialis and triceps jerk reflexes were normal and intact.

Assessments of cervical spine for joint signs of capsular pattern of movement restriction and non-capsular pattern of movement restrictions caused by internal derangements as described by Cyriax et al. [10], comprising of active range of movement (ROM) of the cervical spine in extension followed by right and left side flexion and then right and left side rotation and then flexion. Pain and limitation on each active movements were noted for subsequent correlation with symptoms elicited by cervical spine passive ROM carried out in the same order, which immediately ensued [4]. Capsular pattern is limitation of movements in all directions, except flexion, which was within normal limit. The non-capsular pattern of internal derangement is pain and limitation of two, three or four movements. In the present case study, patient showed limitation of movements in both active and passive cervical ROM in extension, right side flexion and right side rotation typical of internal derangements and this findings provide justification for the use of manipulative therapy in this case study. Conditions where manipulation could prove dangerous such as cord signs and symptoms, adherent dura, drop attack, basilar artery insufficiency, rheumatoid arthritis were neither reported by the patient nor discovered during physical examination.

Outcome measures

The primary outcome measure, Numerical Pain Rating Scale (NPRS) was used to measure pain intensity. NPRS is a verbally administered scale that measures pain intensity (0 = "no pain at all" to 10 = "worst possible pain). Reliability and construct validity of NPRS with visual analogue scale was reported by von von Baeyer et al. [5]. The secondary outcome measure used in this study was a multidimensional Neck Pain and Disability Scale NPAD [6]. The NPAD consists of 20 questions that examine pain intensity and the impacts of neck pain disorders on the patient neck function, interference with activity of daily living and emotions. Patient

responds to each questions by marking a point along a 10-cm line Visual analogue scale (VAS), which is marked at 2-cm intervals so that the minimum score for each question is 0 and the maximum is 5. Following completion of the NPAD, the score for each question was calculated by measuring the distance of the patient's mark from the zero (0) end. The questions scores were added to give a total of score out of 100 which was then converted to a percentage. A low score represent a lower level of pain and disability and vice versa. Subsequently scores for each of the four key domains were calculated using the method describe by Wheeler et al. [7]. For each domain, a higher score (closer to 10) represents a higher impact. The NPAD was chosen for this study as it was specifically developed to evaluate the multidimensional effects of neck pain disorders. It has been demonstrated to have a good temporal stability (test-retest reliability) and construct validity [6].

Treatment Procedure

Treatment procedure including manual (manipulative) therapy and acupuncture was carried out as follows. All treatment were carried out thrice weekly for six weeks.

Manual Therapy (Manipulative therapy and Exercise therapy)

Left side flexion and rotation manipulative thrust (Figure 1): Side flexion and rotational thrust of the cervical spine as described by Cyriax et al. [10] was carried out. Prior to carrying out manipulation. Patient was requested to obtain clearance from his physician regarding conditions that are contraindicated to cervical manipulation such as cord signs and symptoms, adherent dura, drop attacks, rheumatoid arthritis and blood clotting disorders. Explanation was given to the patient on what to expect during the manipulation and on the possible after treatment effects such as delayed soreness and dizziness. In order to determine the patient suitability for this manipulative thrust a distraction test as described by Murphy [1] was carried out and the patient reported relief of pain by long-axis distraction. Basilar ischaemia test as described by Cyriax et al. [10] was carried out and the patient did not report vertigo on neck extension. For the manipulative thrust, patient was positioned in supine lying with his arms holding firm on the plinth to prevent slipping. Therapist's hand grip was for a straight pull with one hand supporting the patient occiput while the other hand hook under the jaw with the little finger clear of the trachea. For side flexion to the left, the therapist braced his left leg against the plinth and then lean back to produce the traction. He then kicked backward and to the left with his right leg to swivel his body to the left, as he swings round, the patient's head is side flexed until he approach of tissue resistance. Side flexion was performed away from the side on which the pain is felt, thereby opening up the affected side of the joint. The therapist arm pressing against the skull just above the ear was used to force side flexion at the last moment, the web of the other hand was pressed against the gap between C6 and C7 transverse process to concentrate side flexion at this segment. A quick thrust was given by the therapist drawing by his elbow crisply into his side. The patient was then re-examined. She reported pain relief and the manoeuvre was repeated three times and the result reappraised [4].



Figure 1: Left side flexion and rotation thrust manipulative procedure.

Exercise treatment: The patient was also instructed on how and required to follow a specific protocol of home exercise program that Included chin retraction exercises, and neck isometric exercises as described by Ebnezar [8]. For each of the exercise, muscle contraction was held for 5seconds and repeated 10 times.

Acupuncture treatment

The patient was properly instructed on what to expect in terms of the acupuncture treatment, the possible side effects and contra indications to acupuncture treatment. The patient's informed consent was obtained prior to treatment. The patient was in a prone lying position, with his face through the face hole, proper pillow support under the waist and ankle joints for comfort and relaxation. The patient received acupuncture treatment at selected acupuncture points for 20 minutes. The selected acupuncture points used in the present study, according to Stux and Pomeranz [9], are widely accepted for treating cervical spine disorders when there is pain along the lateral side of the neck and restricted movements and pain on turning the head namely LI4 (highest point of the adductor pollicis muscle), GB 20 (point of intersection between Sternocleidomastoid muscle and Trapezius muscle behind the neck) and GB 21 (middle of the line between C7 spinous process and coracoid process). At each point, the skin was wiped with alcohol, and the therapist's hands were cleaned with alcohol gel prior to needle insertion. Disposable stainless steel needles (0.2 mm × 40 mm, Seirin) were inserted into both sides of the neck at the points stated above to a depth of 10 mm using the sparrow pecking acupuncture technique (alternate pushing and pulling of the needle). When the subject felt dull pain or acupuncture sensation ('de qi': numbness, soreness and or radiating sensation), the needle manipulation was stopped, and the needle was left in position for another 20 minutes [9].

Results

The patient was seen and treated between August 5, 2014 and September 12, 2014, a period of six weeks. The outcome of treatment showed that NPRS improved from 8/10 from the start of the treatment to 0/10 at the end of six weeks of treatment. The effects of using manual therapy and acupuncture in the management of cervical radiculopathy is presented in Figure 2. There were no remarkable changes in term of reductions of symptoms assessed by the 4 different domains of NPAD at the end of the 1st and 2nd week of treatment. However at the end of 3rd week of treatment assessment showed at least 50% reductions in all the domains of assessment by NPAD. At the end of six week of treatment pain intensity and pain interference

with neck function was completely reduced to zero while pain interference with ADL was reduced by 83.4% and pain interference with emotion was reduced by 61.5%. Patient was to be able to sleep comfortably at night and able to drive without neck pain.

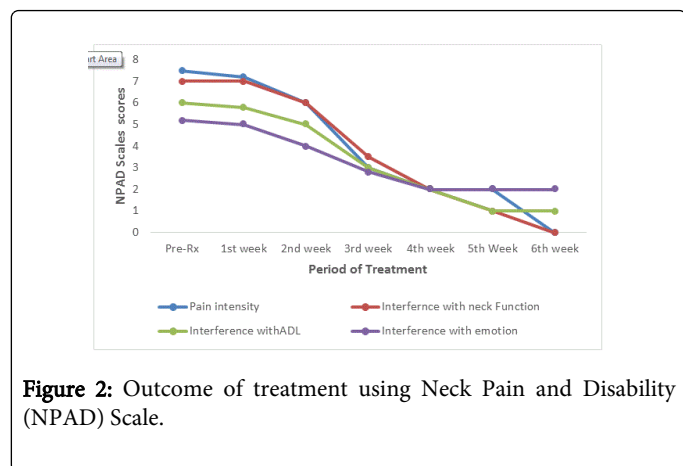


Figure 2: Outcome of treatment using Neck Pain and Disability (NPAD) Scale.

Discussion

The outcome of this study has shown the efficacy of using manual therapy (comprising of manipulative therapy and exercises) and acupuncture in the treatment of cervical spondylosis with radicular pain. The justification to use manipulative therapy is borne out of the assessment of joint signs of pattern of movement restriction which indicated movement restriction with pain in three different directions using both active and passive ROM test, which in turn indicated internal derangement. Cyriax et al. [10] advocated the use of manipulation to resolve neck dysfunction if internal derangement movement restriction pattern is established and in the absence of any other contraindication to manipulation. The MRI report presented by the patient also confirmed neck dysfunction due to spondylosis changes and disc herniation.

Although the patient did not report remarkable symptoms relieve till after the 3rd week of treatment, patient reported immediate increase in cervical spine active ROM with less pain immediately after each bout of manipulative thrust on each day of treatment. Other authors report similar changes with manipulative techniques in different part of the spine [10-12]. An extensive gap exists in the literature related in cervical manipulation techniques especially with cervical spine radiculopathy. It is also remarkable to mention that the patient did not report or demonstrate any ill effects from the manipulative procedure. The perceived benefit could be attributed to the uniqueness of the technique of manipulation employed in this study. The technique of manipulative thrust used in this study combined traction, side flexion /rotation and a quick thrust. The side flexion and rotation was performed away from the side on which the pain is felt, thereby opening the affected side of the joint. The importance of traction during the manipulative manoeuvre cannot be overestimated. It distracts the joint surfaces, tautens the ligaments and create centripetal pressure within the expanded joint space. This facilitates reduction and, by ensuring that if loose fragment moves, it move centrally [4]. However, as the efficacy of manipulation in the treatment of cervical radiculopathy from degenerative disorders still remain controversial, careful consideration should be given to ensure that this procedure is cautiously carried out only by a well-trained therapist since there are evidence suggesting that manipulation may

lead to worsened symptoms or significant complications when it is not properly carried out. Pre-manipulation imaging may reduce the risk of complications [4]. Also, the patient should be constantly re-examined after each manipulative manoeuvre to confirm that movement previously full and painless remain normal and only if there has been additional improvement, the manoeuvre should be repeated and the result reappraised [4].

Several studies have reported the success of acupuncture in the treatment of spinal disorders [10,13]. Possible therapeutic effects of acupuncture could be linked to enhancing activation of A- δ and C afferent fibres in muscle during needle stimulation of acupuncture points thus, signals are transmitted to the spinal cord, and via afferent pathways to the midbrain (9,13). The resulting flow and integration of this information among specific brain areas will leads to a change in the perception of pain via descending pain modulatory system. Acupuncture analgesia improved the noxious descending inhibitory controls and pain gate mechanism and therefore helped to reduce the patients' pain levels [9,13]. The evidence for the mediation of acupuncture analgesia by endorphin is very strong, while that of the involvement of monoamines need more work to verify the possible synergism of serotonin and nor epinephrine [9]. There has also been report that acupuncture stimulate the body's self-regulation of the immune system, improve the vertebral blood circulation, alleviate disc degeneration and their respective organizations [9].

Both acupuncture and exercise have been reported to have significant effects on reducing pain and improving quality of life among neck pain sufferers. Studies have shown that acupuncture is effective for pain relief in the immediate and post-treatment period [9,10,13-18]. Thus, acupuncture treatment was administered in this study for a possible positive reinforcement effects that might coexist in the use of acupuncture, manipulation and exercises. It was anticipated that acupuncture treatment might be useful to ameliorate transient pain that might accompany traction and thrust during the manipulation procedure and perhaps delay soreness after manipulation.

The exercise protocol used in the present case study [19,20], besides being capable of achieving pain reduction via cervical stabilization needed for long term pain reduction following the manipulative thrust, inherently could reduce the disc derangement and cause centralization. The likelihood of muscular contraction during exercises providing sensory input to activate different pain inhibitory mechanisms including a biochemical effect associated with the release of pain relieving substances such as serotonin have been reported by Sokunbi et al. [21]. However the question of what is an appropriate dosage of treatment with the type of exercises used in the present study that can be expected to achieve a desired outcome in terms of the serotonin levels were not addressed in Sokunbi et al. study.

Implication Of The Findings

It could be that findings from this study will stimulate further research in a large randomised control trials to establish the short and long term benefits of using a combination of treatment approaches in a more holistic way to manage cases of cervical spondylosis with radicular pain.

Limitation

The present study is a single case study, underpowered and thus its findings cannot be generalised to a wide range of population with

cervical spondylosis with radicular pain, other limitation to this case report is primarily due to the fact that cervical spine mobility was not objectively measured. However Cyriax et al. [10] approach to diagnosing cervical spine internal derangements which utilises passive and active cervical ROM was used to determine the suitability for cervical spine manipulative therapy was carried out. Thus there will be a need for a randomised controlled trial to further establish the efficacy of using these treatment modalities either singly or in combination and in which all the necessary objective assessments and outcome measures will be applied. The present study did not evaluate the relative effectiveness of carrying out a single dose thrust manipulation against the repetitive chin retraction exercises. A single dose of manipulative thrust might seem to be safer than repetitive thrust with/without the self-treatment by cervical retraction exercise. The relative contribution and the risk-benefit analysis of the components treatment used in this study were not investigated. The interventions used in this case study did not meet the criteria for level I treatment recommendations for cervical radiculopathy from degenerative changes. Despite this, 93% of surveyed chiropractors stated they would use manipulation in cases of suspected or confirmed cervical disc herniation [20,21]. Therefore, it could either be that a more detailed review of the existing studies may prove clinically valuable and/or combination of level II and III interventions in a more holistic approach might still produce evidence of the desired therapeutic results.

Conclusion

While more scientific data is needed to draw firm conclusions, the present case study suggests that spinal manipulation, exercise and acupuncture may be cautiously considered as a therapeutic option for patients suffering from cervical spondylosis with radicular pain.

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