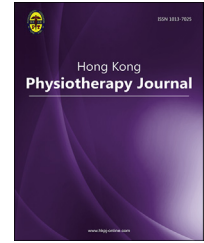




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RESEARCH REPORT

Transverse oscillatory pressure in management of cervical radiculopathy: A randomised controlled study



Adesola O. Ojoawo, PhD ^{a,*}, Ayo Olabode, BMRPT ^a,
Oluwadamilare Esan, FWACS ^b, Abiodun Badru, MSc ^c,
Sunday Odejide, MSc ^c, Bose Arilewola, MSc ^c

^a Department of Medical Rehabilitation, Faculty of Basic Medical Sciences, Obafemi Awolowo University, Ile Ife, Nigeria

^b Department of Orthopaedics and Traumatology, Obafemi Awolowo University, Ile Ife, Nigeria

^c Department of Physiotherapy, Obafemi Awolowo University Teaching Hospitals Complex, Ile Ife, Nigeria

KEYWORDS

cervical
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neck disability;
pain intensity;
transverse oscillatory
pressure;
visual analogue scale

Abstract *Background:* Cervical radiculopathy is an important subgroup of neck disorders causing severe pain and disability.

Objectives: The study assessed the effect of transverse oscillatory pressure (TOP) on pain intensity and functional disability of patients with cervical radiculopathy.

Methods: Twenty-six individuals with unilateral radiating neck pain were randomly allocated into Group A (8 males and 5 females) and Group B (6 males and 7 females). Participants in the two groups received kneading massage, cryotherapy, and active isometric exercises to the posterior paraspinal muscles, trapezius, and sternomastoid muscles. TOP was administered to Group A, whereas Group B served as control. Treatment was applied three times per week for 4 weeks, making 12 treatment sessions for each participant. Visual analogue scale and Neck Disability Index were used to assess pain intensity and neck disability, respectively, at baseline, 2 weeks, and 4 weeks. Data were analysed using repeated-measures analysis of variance.

Results: There was a significant improvement in pain intensity and neck functional disability of patients between baseline, 2nd week, and 4th week of treatment sessions in Groups A and B ($p < 0.05$). There was a significant reduction in pain intensity in Group A ($f = 7.08$, $p < 0.05$) at the 2nd week and 4th week compared with Group B.

* Corresponding author. Department of Medical Rehabilitation, Faculty of Basic Medical Sciences, College of Health Science, Obafemi Awolowo University, Ile Ife, Nigeria.

E-mail address: aojoawo@yahoo.com (A.O. Ojoawo).

Conclusion: It can be concluded that TOP reduces pain faster in patients with cervical radiculopathy.

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Introduction

Cervical radiculopathy resulting primarily from an inflammation of a cervical nerve root induced by a lesion that reduces the intervertebral foramen formed an important subgroup of neck disorders which lead to more severe pain and disability [1–7]. Cervical radiculopathy is a disease process marked by nerve compression from herniated disc material or arthritic bone spurs which typically produces neck and radiating arm pain or numbness, sensory deficits, or motor dysfunction in the neck and upper extremities [8]. An epidemiologic survey showed the annual age-adjusted incidence of radiculopathy to be 83 per 100,000 persons [1]. Persons reporting radiculopathy were aged between 13 years and 91 years, and men were affected slightly more than women [8]. More than 14% of persons with radiculopathy reported antecedent physical exertion or trauma, and only 21.9% had an accompanying objective disc protrusion on imaging with spondylosis, disc protrusion, or both, which accounted for nearly 70% of cases [8].

The cervical spine has cervical nerve roots that exit above the level of the corresponding pedicle. For instance, the C5 nerve root exits at the C4–C5 disc space, and a C4–C5 disc herniation typically leads to C5 radiculopathy [8]. The exiting nerve root can be compressed by herniated disc material (soft disc herniation) or through encroachment by surrounding degenerative or hypertrophic bony elements (hard disc pathology). In either case, a combination of factors, such as inflammatory mediators (e.g., substance P), changes in vascular response, and intraneural edema, contribute to the development of radicular pain [9]. Pain radiation varies depending on the involved nerve root in which some distributional overlap may exist but absence of radiating extremity pain does not preclude nerve root compression; at times, pain may be isolated to the shoulder girdle [10]. Similarly, sensory or motor dysfunction may be present without significant pain. Symptoms are often exacerbated by extension and rotation of the neck (Spurling sign), which decreases the size of the neural foramen [11].

The main objectives of treatment in patients with cervical radiculopathy are to relieve pain, improve neurologic function, and prevent recurrences [12]. Some investigators have advocated the use of short-term immobilisation (<2 weeks) with either a hard or a soft collar (either continuously or only at night) to aid in pain control [13]. Exercise therapy—including active range-of-motion exercises and aerobic conditioning (walking or use of a stationary bicycle), followed by isometric and progressive-resistive exercises—is typically recommended once pain has subsided in order to reduce the risk of recurrence, although this recommendation is not supported by evidence from clinical

trials [12]. Manual techniques are the therapeutic tools therapist uses to assist the body in the repair and adaptation processes [14]. The main aim of manual therapy is to decrease pain and increase functional activity in areas that are limited, whether they are joints, connective tissue, or skeletal muscles [15]. Joint movement and isometric muscle contraction stimulate joint and muscle proprioceptors [16]. This is theorised to produce pain relieve according to the gate-control theory of Melzack and Wall [17], where mechanoreceptor afferents are carried through large-diameter axons to inhibit nociceptive afferents at the dorsal horn of the spinal cord, therefore causing inhibition of pain.

An extensive literature review carried out by Haldeman et al [6] found that transverse oscillatory pressure (TOP), which is one of the techniques of manipulation, provides some benefit in the treatment of chronic mechanical neck pain. Empirical observations of Maitland [18] reported that TOP was recommended for unilaterally distributed symptoms of cervical origin. Egwu [19] studied the manual forces applied during vertebral mobilisation to the cervical spine and found that less time was spent in the use of anterior posterior unilateral pressure and posterior anterior unilateral pressure; he also noted that significantly more patients were pain-free with the use of these techniques when compared to cervical oscillatory rotation and TOP. TOP, originated by Nwuga [20], although one of the frequently used manipulative techniques by physiotherapists, has been claimed to be effective in amelioration of pain intensity especially radiating pain in cervical, thoracic, and lumbar regions [20,21]. It involves mobilisation of the spinous process of the vertebrae in the region of the spine that had mechanical pain [21]. This technique was reported to be useful when pain has a unilateral distribution, whether localised to the neck or referred to the upper limb [21]. However, there was dearth of documenting evidence on the efficacy of TOP in the management cervical radiculopathy. Therefore, the aim of the study was to examine the effect of TOP on pain intensity and the Neck Disability Index (NDI) of participants with cervical radiculopathy.

Methods

The participants for this study were 26 (14 males, 12 females) individuals referred for physiotherapy at the Obafemi Awolowo University Teaching Hospital Complex, Ile-Ife, Nigeria, with cervical radiculopathy in either right or left upper limbs. They were recently diagnosed patients from the orthopaedic clinic of the same hospital.

All participants had cervical radiculopathy with a symptom of radiating neck pain of not less than 6 weeks' duration with no history of vertebrobasilary artery

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