ISSN: 2832-7926
DOI: 10.33552/GJAGR.2024.03.000567
Global Journal of Aging & Geriatric Research
Iris Publishers

Research Article

Cervical (Neck) Joint Osteoarthritis and Chronic Pain: Overview of Possible Underlying Neural Sources and Control

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Received Date: December 10, 2024

Published Date: December 18, 2024

Abstract

In man, the cervical spine composed of a cylinder of seven interlocking bony units or vertebrae and articulated via a series of synovial joints and designed to afford both mobility and stability is highly vulnerable to injury and the development of the painful joint disease termed osteoarthritis. Here we discuss the key sensorimotor features of cervical located regional spinal and central connections that appear of paramount importance in the control of neck movements and their possible implications for intervention and prevention, a topic not well articulated to date in 2024, but one with possible clinical implications as well as the ability of older adults to live independently.

Keywords: Cervical Motor Control; Cervical Osteoarthritis; Chronic Neck Pain; Proprioception

Introduction

The cervical spine comprising a cylinder of seven vertically oriented bone units or vertebrae, and their spinous bone projections plus associated articulations, and commonly denoted as C1-7 are vital to the ability of humans as well as other species to function optimally as shown in cases where injury damages one or more of these entities and their associated tissues located in the neck region of the body. Structured to house the spinal cord, and extending from the base of the head to the thorax, the seven vertebral bodies separated by shock absorbing restraining intervertebral discs, plus a series of synovial or freely moving apophyseal facet joints located separately on their superior and inferior surfaces along with pseudo joints termed unco vertebral joints are well designed to foster both stability as well as motion and convey neural messages to and from many body parts as well as the brain via eight key spinal nerves denoted C1-C8 and their diverse connections. These neural connections are observed to enter the cervical vertebrae through small openings called transverse foramina and function to provide a means of ensuring head support, the ability to pivot the head, protect the brain and spinal cord, control neck, arm, and hand motions harmoniously, posture, functional stability and balance. Indeed, this C1-C7 region and its C1-C8 innervation that enables neck extension, flexion, side-to side and rotary movements and others is well suited to permit high levels of neuromotor control and coordination to occur automatically as well as 'on demand' during everyday life. Owing to the proximity of the C1-C7 region to nerves located in the surrounding muscles, ligaments, nerve sheaths,

tendons, and joint capsules, and their vascular connections, damage to any of these sites as well as impaired network stimuli due to a narrowing of the cervical body foramina or the impingement of the vertebral artery and cervical nerves or nerve roots, may have profound implications for these joints and function as a whole [1-3].

Indeed, while structurally and physiologically very effective under physiological conditions, the spinal neural networks linked to and within the cervical spine joints may function less optimally in multiple ways if injured or subject to the painful joint disease termed osteoarthritis that is almost inevitable with age, and often results in nerve-root and spinal cord compression, inflammation and pain [1, 4, 5]. In addition, there may be a loss of vertebral disc height, painful nerve impingement, bone and ligament damage, and ensuing bone and synovial tissue related bioactive substance production and a host of adverse local and central neural responses [6].

Today, and as populations age, this health challenge is a major concern because with the presence of persistent cervical pain older adults may experience a marked reduction in their ability to function physically and confidently. This can prove even more disabling if their condition causes or fosters a state of disequilibrium between the anabolic and catabolic normal tissue interactions of the neck joint support tissues, such as cartilage, in favor of noxious catabolic processes as well as abnormal muscle responses and adaptations. Moreover, as time advances, it is common to observe signs of possible progressive declines in desirable joint based cellular biosynthetic activities, an increase in pain and possible numbness in the neck and arm as well as neck stiffness and neck muscle weakness, which can greatly affect function and the ability to readily pursue a life of independence and high quality [7, 8].

Ozen et al. [9] notes this above scenario is likely to occur quite frequently because the cervical spine is one of the major affected areas in axial spondylarthritis, and this may be partly due to its serving as an essential region for housing proprioceptive receptors that can be impaired over time but are vital for motor control and joint protection. However, unraveling the source of neck pain and effectively mitigating this when present is commonly challenging as multiple pain inputs and others may interact at one or more levels of the cervical column cartilaginous vertebral body components, plus their associated ligaments and dura-mater protective tissue covering the dorsal and ventral horns of the spinal cord and brainstem, plus the dorsal compartment joints of the vertebral arches and their ligaments and muscles [2, 9, 10].

If severe and unrelenting, those inherent motor control interactions that normally protect the individual may fail to display those adaptive neural actions that would otherwise foster optimally efficient and timely well-modulated motor movements and posture and may further induce an even more serious condition termed cervical myelopathy - the most common cause of spinal cord impairment among older people. This is a highly disabling condition and one to avoid if possible because affected cases typically present with multiple signs of gait dysfunction as well as hand impairments, and/or the presence of long term adverse neural tract signs of dysfunction including: clonus, the Hoffman and Babinski signs, possible inverted radial reflexes and a high rate of neurological decline. Moreover, even if only mildly impacted, a degree of cervical-spine sensorimotor dyscontrol that becomes chronic is strongly associated with a recurrence or perpetuation of neck pain and possible heightened rates of joint dysfunction [3, 5, 11, 12].

The ability to isolate the causative factor[s] underlying the presence of chronic neck pain and possible functionally undesirable preventable degrees of osteoarthritis pathology, is thus of considerable import given the failures over the years to overcome these disabling conditions. Especially challenging in this regard is accurate and precise isolation and detection of any lesion and its underlying causes. Yet not only are many measures commonly used shown to be less than accurate or reliable, but these may fail to capture or even attempt to capture those possible sensorimotor impairments that may be occurring and reoccurring in daily life and that can foster or exacerbate a progressive breakdown of a healthy joint[s]. Even if assessed using statically oriented tests, these may well fail to represent what actually emerges during 'real time' daily actions and encounters [5] and thus may not represent the important role played by the processes of kinesthesia and proprioception sensations and their attributes that underpin the integration of information from multiple tissue sources such as the skin, joints, muscles, and tendons and joints. Their projected influences and role in mediating or moderating joint stability and load distribution in the cervical spine of those with neck pain may hence be overlooked or underestimated [5].

Indeed, a study of 135 cases with neck pain recently revealed subnormal findings with respect to direction-specific repositioning tests generated during flexion, extension or rotations that implied the possible influence of subnormal central and peripheral sensorimotor adaptations [5] plus the presence of poorly integrated information from the surrounding neck joint and muscle receptors [13]. Findings may also have implicated suboptimal co-ordination of several key muscles in this regard [2] and that can be altered by age, osteoarthritis or other joint diseases, trauma or some form of associated joint dysfunction [6] such as abnormal side to side as well as rotary movements of the neck [3, 5] plus head posture [5] and shoulder girdle misalignments and does not discount changes in the integrity of periarticular ligaments and muscles in the presence of disease.

Peng [14] proposes that chronic neck pain can cause structural and functional impairments of several articular tissues such as the muscles of the neck; the excessive activation of pain evoking receptors located in degenerative cervical discs and facet joints that can likely produce a large number of erroneous sensory or stimulatory signals. In addition, Sung [15] proposes problems that occur in the ligaments or muscles of the upper cervical spine can cause a form of proprioceptive confusion, and possible subsequent inaccuracy of information to the vestibular nucleus, resulting in abnormal motor reactions or adaptations that can lead

to cervicogenic dizziness. There may also be measurable instances of extreme hypersensitivity of the neck neural receptors that are evoked by even by the most modest movement and/or thermal stimuli rather than those directly associated with the disease specifically [16]. Indeed, despite years of research, how to reverse chronic neck pain or even attenuate this effectively is not a simplistic task and its persistence has specific as well as far reaching personal and socioeconomic impacts that have been discussed for some time without resolution [17].

In an effort to try to meet the increasing challenges faced by older adults with osteoarthritis, the purpose of this paper was to investigate if inroads could be made here as far as its presence in the neck or cervical region. The focus was on reviewing what is known of the morphology, function, and clinical relevance of the joint as well as the muscle spindle receptors in the region of the joints of the cervical spine and their central and spinal connections rather than the well-established pathological findings of the disease. It was thereby hoped the literature could possibly provide some form of guidance to more ably support a neural based rationale that could be effectively applied to craniocervical disorders of biomechanical origin such as cervical osteoarthritis.

Methods

To uncover any relevance that might emerge after decades of basic and cervical oriented anatomic research in animal models, a broad-based scoping literature overview and scan was conducted and designed to include historically based as well as contemporary observations regarding cervical motor control issues and how these afford human postural, balance, eye and mandibular function. Links to cervical osteoarthritis as observed on the PUBMED, PubMed Central and Google Scholar database sites were specifically sought using the terms cervical osteoarthritis, pain, and motor control. The terms postural and kinesthetic perceptions that also served as key words were used and followed that described by the authors. These data were taken to represent the neural attributes of the conscious awareness of static joint position, as well as movement sense and direction plus velocity as involved in everyday joint movements and protection, as well as posture and stability. The article does not discuss the role of osteoarthritis biology, pharmacologic and possible gene therapy, or any invasive forms of cervical spine intervention or the biochemistry of osteoarthritis degenerative processes. Moreover, it does not differentiate between the differing articular receptors specifically as aspects of the total neck or cervical spine nerve network and its importance as regards neck pain and injury in the absence of a cervical osteoarthritis diagnosis. All years of study were acceptable as were all forms of study and study substrates as long as there was a bearing on understanding the complexity and underlying nerve linkages to osteoarthritis and neck related pain. The term proprioception that refers as per Ozen et al. [9] to the awareness of body parts including joint position sense, kinesthesia, and the sense of muscle force is increasingly thought relevant to understanding the pathology of chronic pain and joint dysfunction. The term cervical osteoarthritis was used throughout although the term cervical spondylosis is used to similarly describe a wide range of progressive degenerative changes that affect all the components of the cervical spine of many adults after age 50 [18]. A detailed overview on cervical spine anatomy and its implications is located at the Cleveland Clinic website: https://my.clevelandclinic.org/health/articles/22278-cervical-spine

Key Findings

Since the inception of efforts to understand neck motion and its dysfunction when it arises, it has been clear that understanding the role of the joint sensory receptors and their connections in this regard could help explain or predict the oftentimes intractable nature of pain produced in the neck region and its possible advancement due to osteoarthritis associated damage. The study of the nerves and their ramifications and functions in the neck region while initially largely conducted in isolation, and in animal models under anesthesia or on tissue samples of deceased animals or surgically removed human tissues is indeed now seen as a possible parameter of note to pursue further in clinical efforts to understand the nature of cervical damage commonly affecting one or more cervical vertebrae in many older adults as well as younger adults. Such research seems quite urgent if we consider the possible impact of neck pain on vertigo or dizziness, and nystagmus, as well as locomotor performance disturbances that may be provoked readily and lead to falls and further injury and debility [16].

In this regard, even though cellular and molecular aspects of osteoarthritis are studied intently, a wealth of cumulative literature does point to a considerable role for one or more sensory alterations in the extensive sensorimotor receptor system surrounding the neck joints and bone surfaces that could provoke pain and dysfunction as predicted to some degree by early studies performed by Wyke and Palacek [19]. This group repeatedly found as with all mammalian joints those of humans were supplied by four basics albeit differing functionally diverse joint receptor types that interacted to foster facilitatory or inhibitory reflex like influences on the ipsi- as well as the contralateral striated musculature of the neck, trunk, and limbs, as well as respiratory muscles in response to changing mechanical stresses on the joint tissues. These reflexes were considered of extreme importance in the control of posture, gait and respiration and were also found to influence the reactivity of the ocular as well as the mandibular muscles [19]. They had further influenced upper extremity limb movement and cortical interactions [20]. In addition, some cervical nerves supplying the surrounding muscles or running through muscle and their vertebral attachments were implicated in posture control [11]. As well, many nociceptors or pain nerve receptor endings were located not only around the cervical joints, but in the adjacent connective tissue coverings of the cervical vertebrae and its ligaments, as well as the adventitia of its related blood vessels that were normally quiescent.

These pain receptors that are normally considered inactive, were observed however to be triggered in the face of excess mechanical deformation and tension, as well as direct mechanical or chemical irritation to induce pain and possible postural and functional changes as found in cervical osteoarthritis [10, 21, 22]. Moreover, these evoked responses were found to not only discharge for long time periods but to have widespread effects on distant tissues and

the kinematics of the normal sub adjacent vertebral segments with possible resultant larger than desirable translation displacement in the extension mode and high degrees of motor dysfunction. Later, McLain [23] who studied 21 cervical facet capsules taken from three normal human subjects, identified mechanoreceptors in 17/21 specimens and as classified according to the scheme for encapsulated nerve endings established by Freeman and Wyke were found constituted by 11 Type I, 20 Type II, and 5 Type III receptors, as well as a number of small, unencapsulated nerve endings. Free (nociceptive) nerve endings were found in sub synovial loose areolar and dense capsular tissues, and these were taken as proof that these tissues are monitored by the central nervous system and that neural input from the facets is important to proprioception and pain sensation in the cervical spine and possibly in preventing joint instability and degeneration.

According to Johnson [24] the results of studies examining the innervation patterns of the facet or zygapophysial joints of the cervical spine were similarly found to be partly innervated by sensory nerves and in addition appeared to travel along sympathetic pathways. These studies also demonstrated that the neuropeptide levels in the cell bodies located within the dorsal root ganglion of these sensory nerves fluctuated according to the physiological state of joint. Additional to the sympathetic nerves accompanying the vertebral artery, the innervation patterns of dural tissue and posterior longitudinal ligament in the upper cervical spine were notable distinctive features of the examined cervical spine innervation extent. Recent data further alludes to a role for cervical spine meniscoids or intra articular synovial membrane folds thought to be pain associated and that can be innervated and appear to vary in morphology in the presence of articular degeneration. In a clinical population, moreover, it appeared associations have been observed between cervical spine meniscoids morphology and the presence of cervical spine symptoms [25]. A parallel change in muscle function and volume plus fat content that may implicate cervical neural processes has also been observed in cases with chronic nonspecific neck pain [26].

On the other hand, Peng [14, 27] and others have tended to emphasize the importance of proprioceptive mechanisms in neck pain development and progression. As well Peng [14, 27] reports, that based on the available evidence, it is recommended that patients with neck pain should be assessed and managed for cervical proprioceptive impairment and sensorimotor control disturbances that may underpin or invoke pain as well as structural muscle and bone features. As discussed by Chen [28] since pain is the main complaint of neck sufferers the existence of pain receptors in the facet joint capsule tissues must be acknowledged rather than overlooked in efforts to avert their subnormal functions that can collectively or independently heighten a state of extensive, intensive and widespread pain sensitivity [16].

In other research, even if not a factor, it has been observed that neck pain cases tend to show an overall stiffer and more rigid neck motor control pattern compared to healthy controls and one that that may implicate proprioception as well as the presence of a lower than desirable degree of neck flexibility, a slower movement velocity, an increased degree of head steadiness and a more rigid head trajectory and head motion pattern. While it appeared only neck flexibility showed a significant association with the clinical features among those with neck pain, many factors were not studied and those that were may have altered selected response patterns due to fatigue or pain or both [29].

Nobe [17] proposed that based on their research in specific neck pain patients, the activity of the cervical extensors and flexors associated with neck motion increased with an imbalance in activity between these muscles compared to their activity in healthy adults. In addition, the presence of fibromyalgia like muscle pain and impaired cervical proprioception especially in the face of muscle fatigue were cited as having a possible bearing on explaining an indirect neck related loss of balance control [30]. Injury to a cervical located joint also appears to have the possible effect on fostering dorsal root ganglion changes in inflammatory provoking chemicals that sensitize joint afferents to mechanical stimulation and spinal inflammation [31, 32].

Ohton et al. [33] who were interested in understanding why patients with cervical facet lesions and whiplash sometimes experience diffuse neck pain, headache, arm, and shoulder pain, alluded to a possible role of the sensory innervation of the facet joint derived from the C1-T3 dorsal root ganglia and the fact some enter the paravertebral sympathetic trunks and reach the dorsal rooy ganglia at multi segmental levels. This potentially widespread form of multi segmental innervation that arises from a single facet joint may thus have immense treatment implications.

Research by Bogduk et al. [34] also revealed nerve receptors in the cervical intervertebral discs that may be damaged at one or more neck sites and implicated in cervical spine pain and the pain provoked by discography. In addition, recent research shows proprioception is impaired in subjects with cervical spondylosis when compared to a healthy control group and that higher pain intensity is associated with greater cervical joint position sense defects in these patients. Reddy et al. [35] also found neck extensor endurance a capacity somewhat vital for maintaining optimal cervical spine function was often defective along with position sense in those with chronic neck pain. Moreover, the direction and velocity receptors of joint movements believed of great import may be impaired and misinterpreted by the central nervous system on receipt thereof [14, 36].

This above scenario concurs with observations from the clinic where patients may voice concerns about their vision and balance as well as referred pain and headaches [37-39] and a reduced ability to render timely postural adjustments during certain neck movements [40]. Damage to either the joint capsules or nerves or cortical pathways and cerebellum can indeed induce neck muscle tone alterations and possible movement dysfunction, postural abnormalities, and widespread pain, especially if these factors are overlooked [19, 41, 42]. In addition, vestibular abnormalities such as vertigo may arise if abnormal cervical proprioceptive discharges originating in the cervical joint, muscles, tendons and tendon junctions, and ligaments remain undetected, especially those

located in the C1-3 cervical regions [43, 44].

In turn, prolonged dysfunction of one or more of the cervical sensory receptors can alter the normal integration of well-timed and modulated sensorimotor control responses that protect joints and render movement efficient at low energy cost. Over time, there may also be associated changes in cervical joint position sense, eye movement control and postural stability, reports of dizziness and unsteadiness along with pain regardless of originating site of dysfunction [9, 45]. As a result, Lin et al. [46] conclude that specific aspects of the postural control system may warrant attention in efforts to avert or minimize damaging alterations in the control of joint stability, performance-based balance, posture, and cervical proprioception, and long-lasting pain problems [43, 44, 46-48].

Discussion

Years of study devoted to uncovering the intricacies of the articular neurology of the cervical spine in various invertebrate and vertebrate models plus efforts to tease out causes of neck pain other than age, have tended to point to a strong interaction between neural based impulses and joint biomechanics among other health related factors. On the whole, it is now increasingly challenging to argue against the need to better understand cervical spine degeneration mechanisms plus the idea that the whole motor system may be implicated [49].

In this regard, mounting evidence points to a role for the disruption of normal sources of proprioceptive activity and their responses as these may affect head, limb, eye, and lower limb functions as well as cervical spine integrity [50]. In particular, several sources discuss a key role for muscles around deranged neck joints that may react by exhibiting muscle spasm and various degrees of dysfunction, contractures, or alternately hypotonia, weakness, a reduced irritability threshold and pain. Sensory abnormalities arising in weak or atrophied muscles or deranged ligaments may fail to repeatedly exert timely and well-modulated motor responses to perturbations that in turn lead to the gradual or acute attrition of one of more cervical spinal structural elements.

Other data show that clinically there may be typical patterns of muscular response in the face of cervical joint osteoarthritis presence that fosters various degrees of muscle imbalances [49] and with some being over reactive and others under reactive. This situation commonly obviates the attainment of what is normally an inherently generated ideal cervical joint positioning set of responses and consequent movements, or non-movements designed to foster joint protection. In the face of prolonged muscle imbalances, one can thus expect increasing bouts of uneven joint loading, increased stresses on some joints and soft tissues, additional pain and possible alterations in muscle afferent inputs and afferent neural traffic patterns [49] that engender joint inflammation, and further cervical proprioception deficits [9, 50, 51].

Gracovetsky and Farfan [52] listing the essentials of a healthy joint including [1] having an intact sensory system; 2] CNS coordination; 3] muscle responsiveness and the well-timed and modulated integration actions thereof to maintain structural integrity. In this regard, not only must muscles be capable of well-timed and appropriately modulated contractions, but without the correct amount and rate of tension joint destruction would almost be assured as proposed by Salo [53].

However, as a result of deafferentation, age and/or a lack of appropriate articular sensory feedback processes, reaction time as well as force generating reactions may be altered within the muscular system such that repetitive impulse loading of poorly protected joints is likely to manifest during activity with dire consequences. Over time exposure to perpetual and abnormal joint stresses may induce joint degenerative changes that become rapidly progressive or chronic at some point. Moreover, if remediation is suboptimal or not forthcoming and carefully integrated in consideration of the diverse morphology, joint and muscle nerve supply of the diseased or painful neck joints their functionally beneficial relationship to head posture and movement control may wane, even if the local cervical pain relief is forthcoming via injections or surgical intervention [53, 54]. Additional deterministic factors that may also have an influence include injury, injury severity, injury location and extent, overall health status, body mass factors, age, and overall general prognosis [55].

In light of the above, it is our view that to advance the well-being and life quality of those with neck pain and/or chronic osteoarthritis lesions of one more cervical spinal origin, it is clear no single remedy can uniformly induce cessation of the disease or pain remittance readily and completely. Since surgery is a last resort and may not be completely without risk, non-pharmacologic therapies used with some success for some time including thermotherapy, lasers, and ultrasound may be helpful [56]. A combination of high-intensity laser therapy and exercise therapy may further provide substantive pain relief [57] as may exercises that build on proprioceptive neural facilitation understandings [58].

Likewise, acupuncture especially electroacupuncture appears to be a further promising pain alleviating approach as well one that seems to work well when applied incrementally and should be explored further along with the application of percutaneous neuromuscular stimulation [59,60]. In all these cases there may be a high chance of improving upon current successes by insightful efforts to selectively stimulate those neck receptors that are suppressed, while deactivating those that are triggered excessively and as advocated in accord with the Gate Control Theory of pain production and amelioration.

Manipulation and mobilization therapies conducted manually as well as massage and traction should proceed cautiously in our view however, especially if the case in point has had recent analgesic injections or is using narcotics, skeletal muscle relaxants, and exhibits frailty, although it may help quite effectively when carried out by a skilled professional [61]. The patient however should avoid excess muscle or capsular stretching even though touted to be beneficial [16,31,32].

A role for vitamin C and possibly other supplements that build cartilage and bone tissues, as well as those that reduce joint inflammation, along with neck supports and assistive devices

should not be ruled out. In comparison to the possible benefits of Tai Chi and Qigong exercises that can impact posture and pain safely, a failure to carry out joint protection and desirable ergonomic home and workplace strategies, as well as the application of psychological interventions used in isolation are less likely in our view to prove impactful and may not address the sources of neck dysfunction readily and significantly. In all instances, and until more research, including anatomical as well as radiological, neural, cellular and molecular aspects of clinical discomfort or cervical joint disease is forthcoming, it appears safe to say that very careful understandings and analyses of the possible sources of cervical pain in any region are paramount to the rational selection of treatments and although likely to differ widely are expected to prove additive in benefits rather than not.

Moreover, based on what we know about the painless origins of most osteoarthritis forms, it appears that even if no observable or measurable evidence of any joint lesion prevails this situation should be monitored prospectively as it can yet induce a long term loss or disturbance of the neck afferent inputs plus gait, as well as postural disturbances dizziness, reflex adjustments, including ocular reflexes that govern postural equilibrium and movement awareness that appear hard to initially detect [62]. There is also evidence regarding possible more complex innervation networks and implications than perceived earlier [63], plus largely unexplored psychological ramifications of neck neural origins that may hasten cervical derangement and destruction in its own right as well as disability. Thus, managing pain, and enhancing pain coping, as well as extensive diagnostic follow ups along with efforts towards mitigating any negative associated affect as much as possible in its own right may not only have functional benefits even in the face of irreversible pathology, but appears imperative, in all intervention attempts [64].

Final thoughts

Although this article is one that may have omitted salient research inadvertently, based on a 25-year study by the author of this topic, and many clinical years of practice, it appears safe to say:

- When attempting to understand the nature of painful cervical osteoarthritis, the role of afferent signals arising from the joint and muscle receptors and their cortical influences and functional significance should not be overlooked.
- Combination therapies applied over time are more likely to succeed than singular approaches implemented on a single occasion or sporadically.
- To avert a widespread potentially increasing threat to optimal health, longevity and life quality among many older as well as younger adults experiencing chronic cervical pain and degeneration determinants should be studied and solutions to mitigating these health challenges must be sought including more intensive and groundbreaking research, possibly using artificial intelligence and the ability to map nerves and their ramifications in three dimensions along with tissue and muscle spindle and synovial fluid assays and cartilage biomechanical properties.

Currently, it appears safe to predict less harm will emerge to aging adults as well as health systems and costs if all cases reporting persistent neck discomfort are subject to early sustained monitoring and screenings plus interventions that are enacted both insightfully and with fidelity so as to avert a multitude of cascading biochemical and biomechanical disturbances and their possible untold costs. In addition to lifting limits on access to therapies that may require prolonged therapeutic efforts and resource access, public and local campaigns to promote safe driving, sports, workplace, and environmental safety, and general awareness and the importance of preventing "cervical spine locomotive syndromes" including chronic neck pain may be warranted.

In the interim, we agree with Ferreira and de Luca [65] that cervical osteoarthritis encompasses more than just pain and has immense ramifications for the wellbeing and independence of older people within the community. At present though, despite its global burden, spinal pain in this group is often poorly managed, and knowledge of safe and effective treatment strategies are lacking perhaps because of the common exclusion of older people in the realm of clinical research. It is, however, a potent disabler of older adults not simply just a burden of pain; and its physical and personal impact directly threatens efforts to support healthy ageing locally and globally.

Acknowledgement

None.

Conflict of Interest

No conflict of interest.

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