Spinal manipulative therapy and its role in the prevention, treatment and management of chronic pain

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Chronic pain is a worldwide epidemic. It is characterized as "pain that persists beyond normal tissue healing time"[1] and is physiologically distinct from acute nociceptive pain. The current research estimates the prevalence of chronic pain in the general population to be anywhere from 10–55%,[2] predominantly affecting the adult population. Studies indicate that the prevalence of chronic pain in the over-60 age group is double that for younger adults.[3] Furthermore, over 80% of elderly (over 65) adults suffer from some form of painful chronic joint disease[4] and greater than 85% of the general population will experience some form of chronic myofascial pain during their lifetime.[5]

Chronic pain has substantial impact on sufferers, often citing significant impairments in physical, social and psychological function.[6] Many patients suffer from progressive health and physical deterioration owing to sleep and appetite disturbances, anxiety, depression, decreased physical energy and activity as well as excessive use of medication.[6] Chronic pain often leads to social withdrawal, impaired personal relationships and job loss.[1] Recent estimates suggest that 50–85% of adults report some degree of pain that may interfere with daily activities and quality of life.[7]

Chronic pain sufferers are five times more likely to utilize health care services than non-pain sufferers.[8] Conservative figures estimate that the annual cost of managing chronic pain in the United States currently exceeds $40 billion annually.[9] Of greatest concern is the fact that the ratio of the over-65:under-65 segments of the population is projected to double by 2050,[10] promising to make chronic pain one of healthcare's foremost challenges in the future.

Aging population

Age-related changes in the nervous system present unique challenges to the treatment and management of chronic pain in the aging population. In general, the body of research currently suggests that pain thresholds increase[11]

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and pain tolerance decreases[12] with advancing age; however, the specific qualities of these differences are dependent upon the nature of the noxious stimulus (thermal, mechanical) as well as the stimulus duration, size and location.[13] In addition, endogenous descending inhibitory mechanisms, which evoke profound inhibitory influence on the excitability of dorsal horn neurons, have also been shown to decline with age.[14,15] These age-related changes contribute to the susceptibility of older adults to central sensitization[13] and ultimately chronic pain.

Central sensitization is a neuradaptive response characterized by an increased responsiveness to input stimuli of neurons within the central nervous system. This heightened input-response profile manifests in the form of decreased pain thresholds and increased pain intensity and duration.[16] The phenomenon of central sensitization has been linked to the pathophysiology of widespread chronic clinical pain syndromes[17] such as myofascial pain[18] and fibromyalgia.[19] For this reason, the therapeutic management of central sensitization is of primary importance to the effective treatment and management of chronic pain.

According to the Neurogenic Hypothesis,[20] chronic myofascial pain is not a primary musculoskeletal condition; it is a neurogenic manifestation of central sensitization which arises from a remote primary pathologic focus(either somatic or visceral) originating within the common neuromeric field (neurologic segment) of the involved muscle(s). In other words, chronic myofascial pain is the clinical expression of localized or widespread pain resulting from a state of sensitization within the central nervous system that is caused by a distinct and remote source of persistent peripheral nociception, and not by localized pathology within the symptomatic muscle. The incidence of both chronic myofascial pain and degenerative joint or spinal disease correlate closely with age;[21] accordingly, we hypothesize that degeneration of the spine and joints may be the primary pathophysiologic mechanism responsible for the clinical manifestation and maintenance of chronic pain in the adult population.

The role of Spinal Manipulation

Spinal manipulative therapy may play an important role in the conservative prevention, treatment and management of chronic pain via two primary mechanisms. Firstly, we hypothesize that spinal manipulation evokes systematic physiologic and therapeutic effects by fundamentally modulating the neuradaptive phenomenon of central sensitization. Unpublished work by Srbely et al.[22] demonstrates robust segmental antinociceptive effects in myofascial trigger points of humans post-manipulation. Given that the pathophysiology of trigger points has been linked to central sensitization,[18] these observations led the authors to postulate that the physiologic mechanism of spinal manipulation is based on the principle of modulation of central sensitization within the manipulated segment(s).[20]

The prevention of degenerative disorders of the spine and joints may be the most important consideration in the continuing battle against chronic pain. Biomechanical joint dysfunction has been identified as one of the primary determinants of degenerative spine and joint disease.[23] Spinal manipulation optimizes joint mechanics[24] making it an important component of a lifelong preventive strategy to reduce the progression of chronic degenerative joint disease and, ultimately, mitigate the impact of chronic pain.

Conclusion

Chronic pain promises to be one of the foremost challenges to our health delivery system in the future. The accumulating body of research demonstrates that chiropractic medicine may have an important role to play in the conservative and cost-effective management of chronic pain. In this capacity, future research initiatives must aim to elucidate the preventive impact of spinal manipulation on the pathophysiology of degenerative conditions in the spine and joints. Additionally, further studies are needed to better characterize and quantify the precise physiologic impact of spinal manipulation on central sensitization. Elucidating these mechanisms will provide insight into the important role of spinal manipulation in the conservative treatment of chronic pain as well as providing a viable and cost-effective therapeutic alternative to the long term preventive management of this prevalent and costly disorder.

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