

# Musculoskeletal dysfunction and the effects of: Prolonged poor sitting postures, work ergonomic settings and therapeutic exercises

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## Introduction

As a clinician dealing with musculoskeletal pains on a daily basis, patients often have a chief musculoskeletal pain complaint that becomes aggravated by their work situation; daily tasks or ergonomic settings. Office work is dominated by keyboarding while looking at visual display units often in a seated position. Poor sitting postures have been shown to have a strong influence in the development and perpetuation of musculoskeletal dysfunctions (MSD). Work related MSD as a result of prolonged poor sitting postures, means a musculoskeletal complaint that may have been induced by work and also worsens during working hours and days.<sup>1</sup>

Whilst physical therapy can be immensely helpful as part of a pain management plan for these work associated MSD, corrective exercises and ergonomic adjustments are just as, if not a more vital part of a pain management plan.<sup>2</sup>

The aim of this article is to bring awareness of the benefits of correct seated postures, good ergonomic settings and the benefits of therapeutic exercises, as a part of patients' pain management plan for MSD, that have been associated with prolonged poor seated postures.

## Body: the effects of prolonged poor sitting postures

Numerous studies have shown prolonged poor sitting postures have been associated with MSD. These dysfunctions can present as pain, inability to function at full potential or physical deformities. Common complaints can include neck and shoulder pain, tension headaches and lower back pain (LBP). When left untreated these complaints can turn into chronic pain and have devastating impacts on the quality of life and a decrease in work productivity.<sup>3</sup>

Headaches are a common complaint and reason for patients to seek physical therapy. Whilst there are numerous reasons for headaches, the aetiology can sometimes be idiopathic. Cervicogenic or tension headaches, are head pains that are referred to the head from bony structures or soft tissues of the neck. Patients who experience neck and shoulder pain, can often also complain of headaches.<sup>4</sup> Extensive and idle sitting can be a risk factor in the development of cervical MSD and headaches. More often than not, individuals who suffer from headaches and neck pain will exhibit poor sitting postures. A study conducted by Falla et.al.<sup>5</sup> showed that people who had a history of chronic neck pain were unable to maintain an upright seated posture, when performing distracting tasks over a 10 minute period. It also showed that specific corrective exercises, improved the same individuals ability to maintain an upright cervical posture during these same tasks. Having exhibited postural deviations after only assessing small 10 minute tasks, it can be postulated

that after an average working day of 8 hours, where majority of the time is spent seated and with few breaks, that these postural deviations would be remarkably worse. Postural deviations will also influence the intensity of MSD and its symptoms. This study also illustrates the benefits of specific corrective exercises on maintaining an upright seated posture.

As D. Falla et.al.<sup>5</sup> research shows, patients with a history of chronic neck pain were unable to maintain a correct cervical posture whilst seated. These postural deviations would therefore enhance the symptoms of MSD i.e. neck pain, headache and shoulder pain. The question needs to be asked, would the results be the same for the lumbar spine? Those who experience LBP can find it difficult to maintain an upright posture. This enhances spinal deviations and therefore can increase the symptoms of MSD. A person's work environment settings have a direct impact on a person and can directly affect the severity of MSD.

## Work ergonomic settings

As previously mentioned, computer and desk work dominates the occupational life. Work station modifications are becoming a greater concern for employers. Frequently addressed issues include; work station and chair surfaces and break frequency. A consistent trend supports the role of chair intervention to reduce MSD for workers who are required to sit for prolonged periods.<sup>3</sup> A chair has direct impact on body alignment and therefore MSD that are related to prolonged sitting. Incorrect dimensions of a chair impairs the ability of postural muscles to support the body and can result in abnormal strain on the neuromuscular system. Consistent neuromuscular strain can result in MSD and can lead to a decrease in work productivity and an increase in employee absenteeism.<sup>3</sup> Studies have shown adjustability of the chair height, and seat pan depth should be taken into account when selecting a chair. Additionally, when selecting an office chair, the curvature of the backing of the chair should also be taken into account, as an uncomfortable back support and prolonged sitting can also aggravate LBP.<sup>6</sup>

A study conducted by D. E. Grondin et.al. 2013<sup>7</sup> investigated the effects of a lumbar support pillow in office chairs on individuals who suffered from LBP and those who were asymptomatic. The results indicate that both groups who sat with a lumbar support cushion, were able to maintain a natural lumbar lordotic posture and were overall more comfortable. Maintaining a lordotic curvature whilst sitting allows for less spinal deviation from a neutral posture and therefore less neuromuscular strain that can result in MSD. Further studies are still required to investigate the clinical significance of lumbar support pillows in chairs over a long term period.

In addition to correct ergonomics and postures for prolonged sitting periods, the issue of break frequency also needs to be addressed. It has been shown that regular breaks throughout the day, that require workers to physically get up away from their desk, not only improves work productivity but helps increase metabolic rates and decreases biomechanical strains.<sup>2</sup> A decrease in biomechanical strain will also mean a decrease in prolonged sitting MSD.

### Benefits of therapeutic exercises

Therapeutic exercises are frequently prescribed by physical therapists, to give patients the tools to self-manage the symptoms of MSD. They can be stretches or strengthening exercises that patients can do in their own time in between physical therapy appointments and in order to enhance their treatment progression. They are also designed to correct certain actions that patients are either doing incorrectly or not at all.

A number of studies have investigated the efficacy of static, dynamic, strength, endurance and stretching exercises on MSD or musculoskeletal chronic pains. J. Ylinen et.al. 2012,<sup>4</sup> conducted a study that examined the efficacy of strength, dynamic and stretching exercises, over a 12 month training period on headache and upper extremity pain, in patients with non-specific chronic neck pain. It was found that all methods decreased headache severity. Additionally, stretching alone was effective in reducing head ache severity, however when combined with endurance and strengthening regimes was far more effective.

Another example that show cases the benefits of prescribed therapeutic exercises for patients self-management of MSD, is the McKenzie method. Whilst still a controversial treatment method, there are studies that show the McKenzie method to be beneficial in the treatment and management for mechanical musculoskeletal pains. Using directional preference (DP) repeated exercises are done in specific directions, which will either positively or negatively affect the patient's symptoms. Once the DP has been determined, patients are then able to conduct their exercises in their own time. The repetition of McKenzie exercises aims to reduce the symptoms of LBP; pain and limited movement. A decrease in pain intensity and an increase in mobility will also result in an increase in health related quality of life for individuals suffering with LBP.<sup>8,9</sup>

### Conclusion

As we can see research has shown that poorly prolonged sitting postures increases neuromuscular strain and has a direct impact on MSD. As majority of work places require extensive hours

of sitting, work environment settings need to be ergonomically set up in order to aid a decrease in work related MSD. This will involve assessing work station and chair settings and break frequency. The benefits of regular breaks that involve movement have also been shown to be beneficial in the management of MSD and work productivity. Furthermore therapeutic exercises; either static, dynamic, stretching or strengthening have also been shown to benefit MSD and their symptoms. In order to prevent further development of MSD and increase optimal musculoskeletal health, the above areas need to be considered when consulting with patients complaining of any musculoskeletal symptoms.

### References

1. Mehrdad R, Dennerlein JT & Morshedizadeh M. Musculoskeletal disorders and ergonomic hazards among Iranian physicians. *Iranian Medicine*. 2012; 15:370-74.
2. Toomongas A, Forsman M, Mathiassen SE, Heiden M & Nilsson T. Variation between seated and standing/walking postures among male and female call centre operators. *BMC Public Health*. 2012; 12 154-65.
3. Niekerk S, Louw QA & Hillier S. The effectiveness of a chair intervention in the workplace to reduce musculoskeletal symptoms. A systemic review. *BMC musculoskeletal disorders*. 2012; 13:145.
4. Falla D, Jull G, Russell T, Vicenzino B & Hodges P. Effect of neck exercises on sitting posture in patients with chronic neck pain. *J Physical Therapy*. 2007; 87: 408-16.
5. Ylinen J, Nikander R, Nykanen M, Kautiainen H & Hakkinen A. Effect of neck exercises on cervicogenic headache: a randomized controlled trial. *J Rehabil Med*. 2010; 42:344-349.
6. Yue P, Liu F & Li L. Neck/shoulder pain and low back pain among school teachers in China, prevalence and risk factors. *BMC Public Health*. 2012; 12:789-787.
7. Grondin DE, Triano JJ, Tran S & Soave D. The effect of a lumbar support pillow on lumbar posture and comfort during a prolonged seated task. *Chiropractic & Manual Therapies*. 2013; 21:21.
8. Mbada CE, Ayanniyi O, Ogunlade SO, Orimolade EA, Oladiran AB & Ogundele AO. Influence of McKenzie protocol and two modes of endurance exercises on health-related quality of life of patients with long-term mechanical low-back pain. *Pan Africa Medical Journal*. 2014; 17(Suppl):5.
9. Dunsford A, Kumar S & Clarke S. Integrating evidence 0into practice: use of McKenzie-based treatment for mechanical low back pain. *Journal of multidisciplinary Healthcare*. 2011; 4: 393-402.