Chronic LBP

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Concord Sport & Spine Physiotherapy

LBP in Adolescents – Part 3: Linking research to the clinical picture

An area of particular interest to me is the correlation between prolonged sitting, or sitting posture, and low back pain. While a cause and effect relationship is widely assumed, and accepted in many circles, there is a lack of evidence for a direct correlation. In addition, there is a wealth of research evidence disputing any connection (Battie et al 2002; Callaghan & Dunk 2002; Claus et al 2008; Hartvigsen 2000; Murphy et al 2004; Williams & Sambrook 2011). From a general health perspective, it is concerning that the majority of people in developed nations spend substantial parts of the day sitting. And the habit is being promoted from a very young age. But what is this doing to our spines? In my opinion, it is causing individuals to be more prone to injury, and more likely to suffer the typical recurrent low back pain that we all see clinically. In this newsletter, I will present some of the indirect evidence that supports my opinion.

Motor control factors:

There is evidence to show that static postures may affect motor-control strategies (Mitchell et al, 2008; O'Sullivan et al 2017; Perich et al 2006). In other words, as I often tell my patients, "how you sit determines how you move". Or as O'Sullivan et al (2017) describe it, "a postural signature may be carried into dynamic tasks". In support of this, a study in undergraduate nurses with and without LBP showed that sitting posture was related to posture while bending and lifting (Mitchell et al 2008). Numerous studies have found a link between faulty movement patterns and LBP. One study in adolescent rowers found that those with LBP were more likely to position their spines closer to end range flexion (Ng et al 2015). It is probable that individual movement patterns affect vulnerability to low back stress in other sports as well.

Posture:

A 'flat back' posture has been purported to increase the risk of back injury (Adams et al 1999; Scannell & McGill 2009; Smith et al 2008). Such a posture equates to a more flexed spine, and this is observed in most people when they sit. I would propose that individuals who, from a very young age, engage in minimal physical activity and sit frequently, will be more likely to develop a flat back posture. This assertion is not yet supported by any research. And from my years of observing posture and treating LBP, I would also propose that those who sit with their spines in greater flexion (a "reversed" lumbar curve), will be more vulnerable to bending-related injury, and more likely to suffer recurrent LBP

Proprioception:

Research has clearly demonstrated that people with persistent LBP demonstrate proprioceptive deficits when compared to healthy individuals (Astefelack et al 2013; Elgueta-Cancino, et al 2015). Research has also shown that lumbar spine repositioning sense (i.e. proprioception) is reduced after sitting slumped for as little as 5 minutes (Dolan & Green 2006).

Epidemiological studies:

Kelsey in 1975 identified sedentary occupation as one of the more significant risk factors for LBP. And in a review of epidemiological studies, Williams (1991) postulated that individuals in occupations that involved prolonged periods of sitting experienced a

higher incidence of LBP. A study in apprentice construction workers found that those who were sedentary outside of work were three times more likely to suffer from work related low back pain (Merlino et al 2003). A study in school children found a link between LBP & the amount of time spent watching television (Asteflack et al 2010).

Muscle endurance factors:

While reduced lumbar extensor muscle endurance has been reported as a risk factor for low back injury in adults (Biering-Sorensen 1984; McGill 2007), the link in adolescents is less clear. A study in female adolescent rowers found a link between lower limb and lumbar endurance deficits and LBP (Perich et al). They also found those with LBP were more likely to demonstrate slumped sitting posture. An interventional study showed that an improvement in sitting posture was associated with better low back muscle activation, and this was correlated with improved low back muscle endurance (O'Sullivan et al 2006).

Aggravating factors:

Anecdotally, the vast majority of patients who attend my clinic with acute and chronic LBP, nominate sitting as the main, or one of the main aggravating factors for their pain. I also find that patients who do not minimize sitting frequency post-injury will experience delayed recovery compared to those who do.

In summary, I would argue that while the research may fail to demonstrate a clear link between static sitting posture and low back pain in adolescents, such posture contributes to greater vulnerability during dynamic tasks. This is comparable to a scenario I often see in adult patients. They sit with slumped posture for 40 hours+ per week, and injure their back while bending in the garden on the weekend. The injury is subsequently attributed by the patient to bending, not the habitual posture.

I leave you with a classic quote from a world-renowned LBP researcher. I would attribute habitual sitting as the main contributor to the "huge increase in back-related disability that occurred during the latter half of the 20th century, despite a concomitant progressive reduction in the physical stress at work!" which "flies in the face of what most…tend to believe about back pain, which is that it is caused by lifting and injury" (Adams et al 2013, p 219).

References:

1. Adams, M et al (2013). The Biomechanics of Back Pain, 3rd ed. Churchill Livingston Elsevier.
2. Adams, M et al (1999). Personal risk factors for first-time low back pain. Spine, 24, 23, 2497-2505.
3. Astfalck, R et al (2013). Lumbar spine repositioning sense in adolescents with and without non-specific chronic low back pain – an analysis based on sub-classification and spinal regions. Manual Therapy, 18, 410-417.
4. Astfalck, R et al (2010). A detailed characterisation of pain, disability, physical and psychological features of a small group of adolescents with non-specific chronic low back pain. Manual Therapy, 15, 240-247.
5. Battie, M et al (2002).Occupational driving and lumbar disc degeneration: a case-control study. The Lancet, 360, 2, 1369-1374.
6. Biering-Sorensen, F (1984). Physical measures as risk indicators for low back trouble over a one-year period. Spine, 9, 2, 106-119.
7. Callaghan, J & Dunk, N. (2002). Examination of the flexion relaxation phenomenon in erector spinae muscles during short duration slumped sitting. Clinical Biomechanics, 17, 353-360.
8. Claus, A et al (2008). Sitting versus standing: does the intradiscal pressure cause disc degeneration or low back pain? Journal of Electromyography and Kinesiology, 18, 550-558.
9. Dolan, K & Green, A (2006). Lumbar spine reposition sense: the effect of a 'slouched' posture. Manual Therapy, 11, 202-207.
10. Elgueta-Cancino, E et al (2015). Validation of a clinical test of thoracolumbar dissociation in chronic low back pain. Journal of Orthopaedic and Sports Physical Therapy, 45, 9, 703-712.
11. Hartvigsen, J et al (2000). Is sitting-while-at-work associated with low back pain? A systematic, critical literature review. Scandinavian Journal of Public Health, 28, 230-239.
12. Kelsey, J (1975). An epidemiological study of acute herniated lumbar intervertebral discs. Rheumatology and Rehabilitation, 14, 3, 144-159.
13. McGill, S (2007). Low back disorders – Evidence based prevention and rehabilitation (2nd ed). Human Kinetics, Champaign, Il.
14. Merlino, L et al (2003). Symptoms of musculoskeletal disorders among apprentice construction workers. Applied Occupational and Environmental Hygiene, 18, 1, 57-54.
15. Mitchell, T. et al (2008). Regional differences in lumbar spinal posture and the influence of low back pain. BMC Musculoskeletal Disorders, 9, 152.
16. Murphy, S et al (2004). Classroom posture and self-reported back and neck pain in school children. Applied Ergonomics, 35, 113-120.
17. Ng, L et al (2015) Spinal Kinematics of Adolescent Male Rowers with Back Pain in Comparison with Matched Controls During Ergometer Rowing. Journal of Applied Biomechanics, 31, 6, 459-468.

18. O'Sullivan, P et al (2017). Understanding adolescent LBP from a multidimensional perspective: implications for management. JOSPT, 47, 10, 741-751.
19. O'Sullivan, P. et al (2006a). Effect of different upright sitting postures on spinal-pelvic curvature and trunk muscle activation in a pain-free population. Spine, 31, 19, E707-E712.
20. Perich, D et al (2011). Low back pain in female adolescent rowers: a multi-dimensional intervention study. Knee Surgery, Sports Traumatology & Arthroscopy, 19, 1, 20-29.
21. Scannell, J & McGill, S (2009). Disc prolapse: evidence of reversal with repeated extension. Spine, 34, 4, 344-350.
22. Smith, A et al (2008). Classification of sagittal thoraco-lumbo-pelvic alignment of the adolescent spine in standing and its relationship to low back pain. Spine, 33, 19, 2101-2107.
23. Williams, F & Sambrook, P (2011). Neck and back pain and intervertebral disc degeneration: role of occupational factors. Best Practice and Research Clinical Rheumatology, 25, 69-79.

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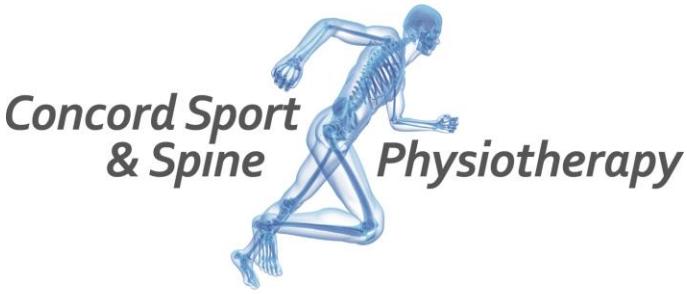

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