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a core concepts musculoskeletal health group newsletter

How to Reduce the Risk of Serious Spinal Pain in the Office

Spinal pain is the second largest cause of work absenteeism and the largest cause of lost productivity in the workplace². And musculoskeletal complaints are the most common medical cause of long term work absence, accounting for over half of all the sickness absences lasting more than 2 weeks⁶.

Several risk factors have been shown to be significant in the development of spinal pain. Suggesting that we may be able to predict who are more at risk of developing pain in the future.

Proactively managing this problem reduces the development of more serious musculoskeletal pain⁵. It therefore makes sense to manage spinal pain early before major problems can develop.

So what are the key risk factors?

There are a number of general risk factors that are relevant to most office-based workers. These include people aged between 35 and 55; working in jobs primarily involving sitting; and having increased job psychological demand². Unfortunately, these general factors are often beyond the control of most individuals.

However, there are 4 key factors that we can positively influence that will significantly reduce the risk of more serious spinal pain developing. The 4 risk factors are *history of spinal pain*, *posture*, *range of movement* and *stability*

1. History of spinal pain

People with any history of pain are significantly more likely to develop serious problems in the future¹⁰. This is an important factor that should be monitored closely.

What can be done

It is worthwhile considering all patients with spinal pain as suitable candidates for specific musculoskeletal screening, even if it is the first episode of pain.

Completing a 'Subjective Outcome Measure' can be a very effective way of establishing the severity of the condition, monitor the change in the patient's status over time, and also use as a comparison for any future episodes the

same patient may have.

Two reliable and valid outcome measures are the 'Oswestry' and the 'Neck Disability Index'^{3,11}. The measurements are very simple; the patient is required to complete a short questionnaire concerning their pain. The higher the reported score, the more significant the problem is deemed to be.

2. Posture

Working postures appear to play a major role in spinal pain. In the neck it has been shown that with an increased head forward position there is greater disability and function loss⁴, and also an increased likelihood of the development of upper limb problems⁹. In the lower back the loss of the natural curve is of key importance in the development of pain¹. In poor postural positions uneven load is distributed across joint structures and soft tissues. With



Figure 1:

BEFORE

- Cervical: head forward position creates tension specifically at the upper cervical region and the cervical-thoracic junction.
- Shoulders: reaching forwards – further promotes 'rounded' cervical and lumbar posture
- Lumbar: No lumbar lordosis -increases the intradiscal pressure.

AFTER

- Cervical: Neutral – centre of ear over the centre of the shoulders and hip. Also increased height of monitor so the patient looks directly ahead and not down at an angle
- Shoulders: Neutral. To facilitate this the keyboard has been moved closer to body.
- Lumbar: Lordosis present and supported by the chair back. Chair height increased (hip above level of knee). Chair brought closer to desk (chair without arms).

enough load the structures will eventually generate pain and increase the likelihood of 'wear and tear'.

What can be done

Providing patients with postural advice is a good start. See *Figure 1* for a real life example of how sitting ergonomics have been altered.

However, even if we correct the workplace ergonomics, the individual may still not be able to maintain a good position if they do not have sufficient flexibility, or do not have the correct muscular control and levels of endurance to sustain these positions. This relates directly with the remaining factors - ROM and Stability, and the role of physiotherapy plays in these factors.

3. Range of movement (ROM)

Reduced Spinal ROM is a consistent predictive factor in pain development. In the cervical spine loss of cervical side-bending and rotation was the most significant predictive value⁹. In the Lumbar spine reduced side-bending alone was the most consistent value¹. The loss of ROM may be due to joint stiffness or muscular tightness but results in abnormal mechanics at the joints involved. If this continues it will reduce the function at the joints significantly and produce pain.

The role of physiotherapy

Physiotherapists can use joint movement tests and palpation skills to evaluate the relative joint or muscle stiffness. From this assessment the therapist will apply suitable joint mobilization or use myofascial release techniques to restore the joint glide and muscle length.

4. Stability

Studies have shown that people with spinal pain have significantly weaker 'core' muscles compared to the non-painful population⁷. The core muscles are responsible for maintaining neutral spinal positions. However if weak, or not functioning correctly, spinal stability is reduced and the load on pain sensitive structures will increase⁸.

Common signs of reduced spinal stability are the presence of muscle spasm, lack of control of spinal movement and

inability or reduced endurance when trying to maintain neutral sitting and standing postures.

The role of physiotherapy

A number of tests can be conducted to establish the effectiveness of the patient's cervical and lumbar core muscles. Once a problem is identified the patient will be required to complete certain graded core exercises usually over a period of 4 to 12 weeks to regain strength and endurance.

Two stability tests are described below.

Cervical Stability Test

The cervical 'Deep Neck Flexor muscles' (DNF's) are the 'core muscles' of the neck and provide stability to the joints when they are working optimally. To test them a device called a Pressure Bio-Feedback (PBF) is placed underneath the patient's neck in a lying position. The patient is asked to hold a neutral 'chin tuck' position against 20mmHg of resistance of the PBF and complete 10 x 10 second static holds. A problem will be suspected if the patient is unable to complete the test comfortably or displays overuse of the external musculature as this suggests weakness or reduced endurance capacity of the DNF's.

Lumbar Stability Test

In the *Supine Heel Lift* test, the PBF is placed underneath the lower back in a lying position. The PBF is set to 30mmHg and the patient is asked to hold a neutral pelvic position. The patient is then asked to maintain the pelvic neutral and lift 1 leg, bending the knee to 90 degrees. The PBF measurement should not move above or below 30mmHg during this action. A problem will be suspected if there is movement of more than 10mmHg above or below 30mmHg as this indicates inability of the Lumbar core muscles to stabilize the spine during the lower limb movement.

In Conclusion

It is important to assess and treat spinal pain as early as possible to prevent the risk of more serious problems develop-

ing. Assessing and recording levels of pain using 'Subjective Outcome Measures' and advice on postural correction together with good ergonomics should be in the forefront in the management of these conditions. Later, if the patient is suspected to have reduced spinal ROM or problems with stability it is worthwhile taking a detailed bio-mechanical assessment and treatment as required.

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References

1. Adams, M., Mannon, A., Dolan, P. (1999) Personal Risk Factors for First-Time Low Back Pain. *Spine* Vol 24, Issue 23, p 2497-2505
2. Borenstein, D., Wiesel, S., Boden, S., (2004) Low back and neck pain: comprehensive diagnosis and management Elsevier Health Sciences
3. Fairbank J., Pynsent P., (2000) The Oswestry Disability Index. *Spine*, Vol 15;25(22), p 2940-52
4. Ho, C., Tai, T., Tung, A., (2008). The relationship between head posture and severity and disability of patients with neck pain. *Manual Therapy* Vol 13, Issue 2, p 148-154
5. Laestadius, J., Ye, J., Cai, X., Ross, S., Dimberg, L., Klekner, M., (2009) The Proactive Approach—Is It Worthwhile? A Prospective Controlled Ergonomic Intervention Study in Office Workers. *Journal of Occupational and Environmental Medicine*. Vol 51, p1116-1124
6. Niu, S. (2010) Ergonomics and occupational safety and health: An ILO perspective. *Applied Ergonomics*. Vol 41. p 744-753
7. Rasouli, O., Arab, A., Amiri, M., Jaberzadeh, S. (2011) Ultrasound measurement of deep abdominal muscle activity in sitting positions with different stability levels in subjects with and without chronic low back pain. *Manual Therapy – In Press*
8. Reeve, A. Dille, A. (2009) Effects of posture on the thickness of transversus abdominis in pain-free subjects. *Manual Therapy*. Vol 14, Issue 6, p 679-684
9. Szeto, G., Straker, L., O'Sullivan, P., (2005). A comparison of symptomatic and asymptomatic office workers performing monotonous keyboard work—2: Neck and shoulder kinematics. *Manual Therapy*. Vol 10. p 281-291
10. Tubach, F., Leclerc, A., Landre, M., Pietri-Taleb, F. (2002) Risk Factors for Sick Leave Due to Low Back Pain: A Prospective Study. *Journal of Occupational & Environmental Medicine*. Vol 44, Issue 5, p 451-458
11. Vernon, H., Mior, S., (1991) The Neck Disability Index: a study of reliability and validity. *Journal of Manipulative and Physiological Therapeutics*. Vol 14(7), p 409-15.

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