



As a dental professional, it is difficult to avoid prolonged

static postures. Dr **James Tang**<sup>1</sup> provides practical guidance for dealing with musculoskeletal disorders.

# How's your back?

**M**ay I start by asking you two questions?  
*Do you think you are healthy?* It may seem a bit strange to ask

you this but according to the World Health Organisation, being healthy is a state of complete physical, mental and social well-being and not merely the absence of disease and infirmity.

*Do you suffer from back/neck pain or have you had back/neck pain in the past?* Although these conditions are common, they are preventable in most situations.

## Introduction

The human movement system (HMS) consists of the muscular system, the skeletal system and the nervous system. Throughout the body, muscles work in synchrony and rarely does a single muscle work without other muscles contributing. This is because the functioning of the body is an integrated and multidimensional system and consequently impairment in one system or the components of each system can lead to compensation and adaptation in other systems, thereby initiating the cumulative injury cycle.

In order to explain why static postures are detrimental, whether standing or sitting, we need to understand that muscles adapt to the positions we put them in. The longer we hold them in a certain position, the more tissue adaptation occurs. Muscles can therefore become adaptively shortened or lengthened depending on the position we put them in.

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This is because our bodies are not designed to maintain the same body position hour after hour, day after day. But, unfortunately, dental professionals often cannot avoid prolonged static postures. Although the body is efficient in adapting to the stresses that we place upon it, these adaptations will lead to muscle imbalances, predisposing to back and neck problems. The sooner we master the economic use of movements, as well as a posture that is friendly to the spine, the greater the chance of preventing associated musculoskeletal conditions.

**Why is good posture important in the prevention of neck and back pain?**

The spine has four natural curves in the saggital plane (ie when viewed from the side) – cervical lordosis, thoracic kyphosis, lumbar lordosis and sacral kyphosis – and these curves are essential for shock absorption (Fig. 1).

In the neutral position, the spine is mainly supported by the bony structures of the vertebrae resting on top of one another. When these curves become either exaggerated or flattened, the spine increasingly depends on muscles, ligaments and soft tissues to maintain its erect position – causing tension in these structures – leading to lower back strain and trigger points. Over time, this will lead to spinal disc injury.

It is important to remember the following points:

- Back and neck pain are common amongst dental professionals
- The vast majority of these conditions are musculoskeletal in origin, commonly caused by poor posture, leading to muscle imbalances and the formation of trigger points
- If you are unlucky enough to suffer from persistent neck or back pain, such conditions can probably be managed by using corrective exercises
- How do you know if your back pain is related to serious spinal injury? Well, if the pain persists for more than six weeks, is constantly intense, or is getting worse, it is definitely worth further investigation
- Everyone is different and if you do suffer from back or neck pain, it is advisable that you first seek medical advice to eliminate any underlying pathology such as problems with your intervertebral discs, osteoarthritis or a tumour etc
- In this article, the author is aiming to give you general advice purely from the perspective of an exercise professional. Furthermore, it is advisable to seek help

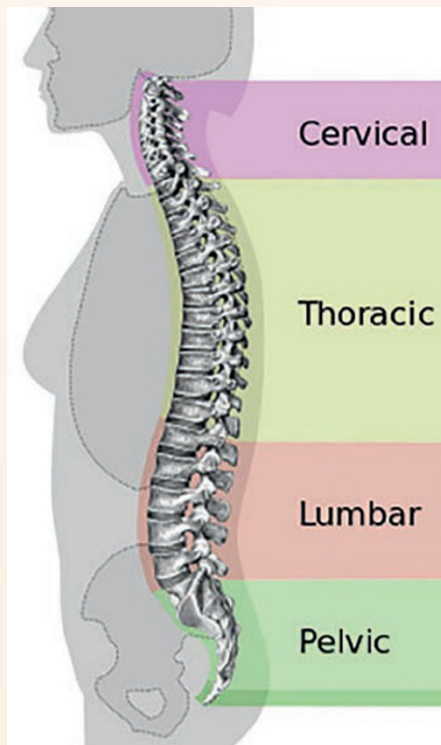


Fig. 1 Four spinal curves

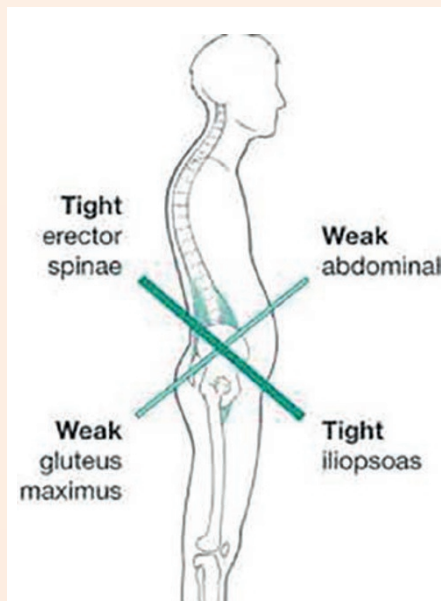


Fig. 2 Lower cross syndrome

from an appropriate professional who is able to devise a bespoke set of corrective exercises to suit your own individual circumstances.

**Reciprocal inhibition**

This is the process of muscles on one side of a joint relaxing to allow contraction on the other side of that joint.

If you sit down all day (hip flexion), your hip flexor will be in a constantly contracted state, whilst the gluteus maximus (antagonist)

will be neurologically switched off through the process of reciprocal inhibition. The glutes are therefore not able to contribute to hip extension and stabilisation. As a result, other helper muscles (the synergists) have to take over.

Movement occurs through the coordinated contraction of a number of muscles around a joint. If the prime mover (glutes) does not contract properly, then the brain will look for alternative solutions to create the same movement, resulting in the synergist taking over the role of the prime mover (ie synergistic dominance). This is a temporary solution to ensure that the correct movement occurs. But, synergists are not designed to be the agonist and they are less efficient. Over time, this can lead to dysfunctional movement patterns which can result in injury.

**Common postural problems associated with neck and lower back pain**

*Lower cross syndrome*

This is the result of muscle imbalances in the lower segment which can occur when muscles are constantly shortened or lengthened in relation to each other. Lower crossed syndrome is characterised by specific patterns of muscle weakness and tightness that cross between the dorsal and ventral sides of the body (Fig. 2). There is tightness of the erector spinae and the hip flexor group of muscles. In addition, there is weakness of the glutes and the deep abdominal core muscles. The hamstrings are also usually tight. These imbalances result in an anterior tilt of the pelvis, increased flexion of the hips and a compensatory hyperlordosis in the lumbar spine. Generally speaking, this postural deviation is prevalent in those who sit for a prolonged period of time, such as dental professionals. Corrective exercises involve the activation of the deep core abdominal muscles alongside the glutes. The tight hip flexors need to be stretched.

**Corrective exercises for lower cross syndrome**

*Hip flexor stretches*

Kneel with one knee on the floor and your other foot in front of you with the knee bent at a 90-degree angle (Fig. 3). Push your hip forward and keep your back upright. Hold until the tension alleviates; then, take the stretch further once more until the tension subsides.

*Activation of the transversus abdominis (TVA)*

Due to years of misuse, eg sitting on a stable



Fig. 3 Hip flexor stretch (posed by the author)

surface for a prolonged period of time, these stabilisation muscles are ‘switched off’. The TvA is one of the muscles responsible for the forced expiration of air when we cough. The TvA provides a stable base within the centre of the body for activities that are more distal, such as heavy lifting or indeed working on patients. With this in mind, it would be useful to be able to pinpoint the TvA and consciously activate it.

**Teaching points:** lie on your back with your knees bent at 90 degrees. Find a position two inches below the navel and two inches to either side. Press lightly on each side using the first two fingers of your hands (this is the location of the transversus abdominis) and then cough. You should be able to feel the contraction under your fingers as the TvA fires.

Breathe out completely, try to draw your navel in as far as possible and tilt your pelvis up very slightly. You should feel the contraction of the TvA. Start breathing normally whilst maintaining the contraction of the TvA.

The aim of the exercise is to try and replicate the contraction felt whilst coughing but without actually coughing.

Once you can contract the transversus abdominis, perform the same action without holding your breath or contracting the rectus abdominis.

**Glute activation exercises, eg glute bridge**

This is probably one of the most useful exercises ever, but all too often its benefit is negated by poor technique; it is important

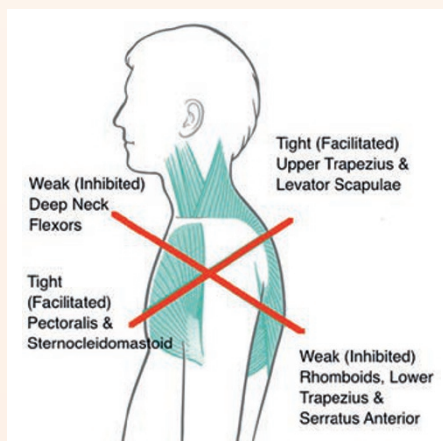


Fig. 4 Upper cross syndrome

to remember that you should not use your lower back or your hamstrings to perform this exercise.

Lie on the floor on your back. Bend your knees at a 90-degree angle. Contract or squeeze your glutes (you should be able to feel them tightening) to lift your hips and thighs off the floor to form a straight line between your knees and shoulders, maintaining a neutral spine with your core tightened.

**Upper cross syndrome (Fig. 4)**

For the upper body, dental professionals tend to bend forward, protracting their shoulders for a prolonged period leading to a hyperkyphosis and a forward head posture.

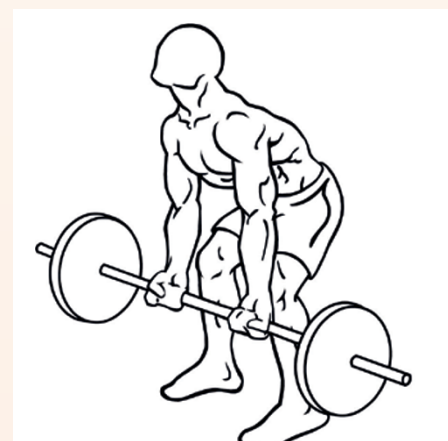


Fig. 5a Barbell bent-over row (begin)

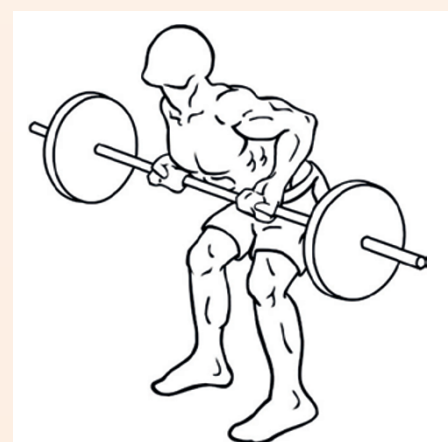


Fig. 5b Barbell bent-over (end)

**‘DENTAL PROFESSIONALS TEND TO BEND FORWARD, PROTRACTING THEIR SHOULDERS FOR A PROLONGED PERIOD’**

**Corrective exercises for upper cross syndrome**

**An example of a pectoral stretch**

Doorway chest stretch – stand in an open doorway and place your hands on the inside door frame with your arms at shoulder level, holding them straight. Lean forward until you feel a stretch in your chest.

**Examples of strengthening exercises for the middle trapezius and rhomboids: 3-4 sets of 12 repetitions.**

**Barbell bent-over row (Fig. 5):** stand holding a barbell with an overhand grip, your hands slightly more than shoulder-width apart. Push your hips back and bend forward until your torso is almost parallel to the floor. Draw the bar towards your rib cage. Pause and then lower the bar. Maintain a slight bend in your knees throughout the movement.

By holding the head and neck in an unbalanced forward position, the spine increasingly depends on soft tissues to maintain an upright position. For example, the upper trapezius and erector spinae must contract constantly to support the weight of the head in the forward posture, predisposing to the formation of trigger points in these muscles leading to the predictable referral pain patterns including tension neck syndrome characterised by headaches and chronic neck pain.

The pectorals are also tight. Those that are commonly weak include the deep cervical flexors, lower trapezius and rhomboids. If it has been determined that your neck pain is caused by muscle imbalances, this needs to be rectified by using the following corrective exercises.



Fig. 6 Seated row with resistance band

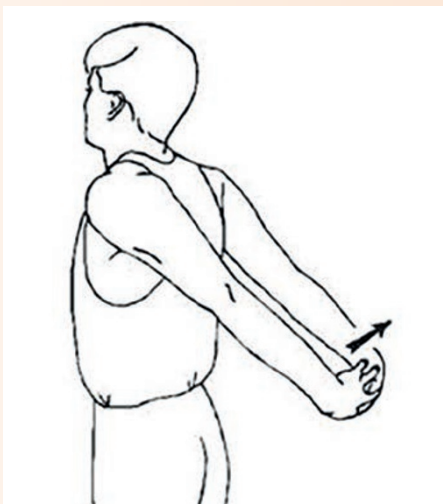


Fig. 7 Pectoral stretch with hands clasped at back

*Seated row with resistance band (Fig. 6)*

**Teaching points:** sit up straight on the floor and tighten your core to avoid injuring your lower back. Wrap the band around your feet, bend your elbows and pull the band towards your body, at the same time squeezing your shoulder blades. Hold for a few seconds and slowly return to the starting position.

You can actually stretch your pectorals and strengthen your upper back with one simple exercise that can be easily done regularly at work (for example, between seeing patients). Simply clasp your hands behind your back, retract your shoulders and squeeze your scapulae (Fig. 7) – hold this position for a few seconds before releasing.

*Strengthening exercise for the deep neck flexors*

Since weaknesses of the deep neck flexors are commonly associated with neck pain (similar to weakness of the transversus abdominis being commonly associated with lower back pain), there are exercises that can be used to reactivate these muscles.

Neck flexors can be activated by simple head-nodding motions (chin tucks), ie by moving the chin closer to your 'Adam's apple'.

**Teaching points of chin tucks:** stand against a wall so that when you retract your head, it just touches the wall. Hold this position while breathing normally for 10 seconds and repeat the process 12-15 times. Progression - hold for longer as you become stronger.

**Conclusion**

It must be emphasised that exercises alone are insufficient; you must also be mindful of the following advice.

Besides corrective exercises, it is imperative to develop good postural habits by improving your general work ergonomics. You should train your body so that you can recognise when you are adopting a poor posture. Correcting your posture may feel awkward initially because your body has adapted to sitting and standing in a particular way.

Only a limited variety of corrective activities for postural dysfunctions that predispose to neck pain have been mentioned and there are numerous alternatives available. The objective of this article is to simply highlight the harmful consequences of poor posture for the neck and lower back due to the practice of dentistry, as well as some of the ways to counteract these adverse effects. It is imperative that you engage an appropriate professional to give you advice and guidance to ensure that the correct activities are being selected for your particular situation.

*The author of this article injured his back when lowering a piece of luggage around 15 years ago. He realised that the reason his back was so vulnerable was due to his job as a dentist, which inspired his special interest and studies in lower back pain and postural dysfunction.*

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