

POSTURE: PART 2

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SUBOPTIMAL POSTURE IN THE LUMBOPELVIC REGION

When assessing posture from the side using a plumbline, four posture types are commonly seen. Flatback, swayback and lordotic postures reflect the alignment of the pelvis relative to the lumbar spine. Kyphotic posture shows the alignment of the thoracic spine (Figure 1).

Flatback posture

In an optimal posture the greater trochanter of the hip lies on the posture line. The pelvis remains level, with a line through the anterior superior iliac spine (ASIS) and posterior superior iliac spine (PSIS) being roughly horizontal (5° anterior tilt). In a flatback posture, the pelvis remains level or is slightly posteriorly tilted, but the most important feature is the reduction or loss of the lumbar lordosis. Effectively each lumbar vertebra becomes slightly flexed relative to its neighbour, although on closer examination the loss of lordosis may be more noticeable in the upper or lower lumbar spine. The distinction into upper or lower regions occurs due to the postural stress that has been imposed on the spine. When lumbar flexion is led by posterior pelvic tilt (sitting or drawing the knees to the chest), the lumbar spine flexes from below upwards, so L5 moves before L4 and L3. Where lumbar flexion is led by forward bending (stooping and lifting actions), lumbar flexion occurs from above downwards (L1 moving before L2 and L3). The former stress (sitting) tends to flatten the lower lumbar curve, and the latter (stooping) the upper.

The flatback posture typically shows thickening within the spinal musculature that responds well to massage. Once the muscles begin to relax (reduce tone), they should be gently lengthened by encouraging supported lumbar flexion, either lying and drawing the knees to the chest

This is the second of two articles by Dr Chris Norris that looks at the importance of posture in clinical practice. In Part 1 (sportEX dynamics Apr 2011) he looked at optimal posture and postural assessment. In this second part the author examines methods to correct suboptimal posture using soft tissue therapy and exercise.

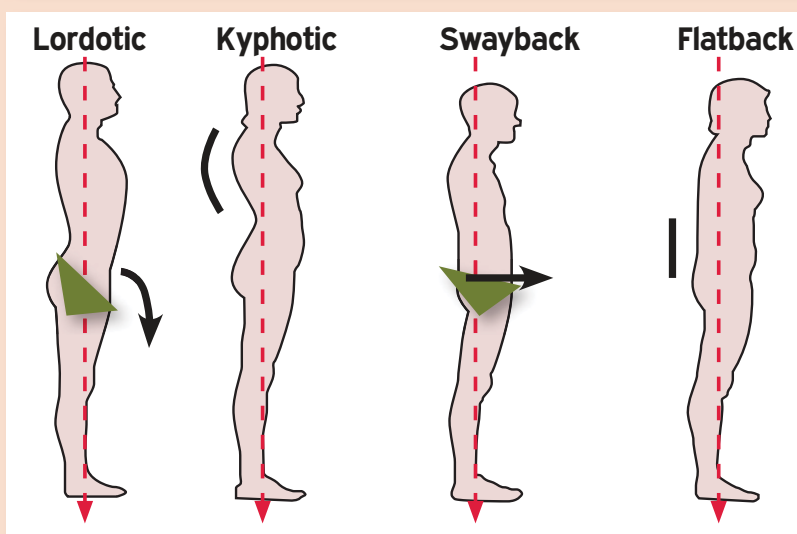


Figure 1:
Posture types



Figure 2: Supported lumbar flexion in lying



Figure 3: Supported lumbar flexion in standing

(lower lumbar spine) (Figure 2) or standing and flexing the spine while taking the bodyweight through the arms (Figure 3). As the flatback posture is typically caused by prolonged flexion actions, back care advice is essential and spinal extension movements (McKenzie programme) are often used by a physiotherapist to restore the lumbar lordosis.

Lordotic posture

With a lordotic posture the lumbar lordosis is increased and the pelvis anteriorly tilted so that the ASIS is substantially lower than the PSIS. This may occur in upper or lower portions, with obesity and lax abdominal muscles tending to give a lower lordotic posture and an upper lordotic posture often being associated with a swayback posture (see below).

The classic imbalance of the lordotic posture is lengthening of



Figure 4:
Stretching tight hip flexor muscles in lying (Thomas test position)

an area for 20–30 seconds and then releasing to allow fresh blood to rush back in and flush the area) and fascial stretch (stretching the skin and underlying fascia lengthways for 10–20 seconds until resistance reduces) may be used to reduce local trigger points. The abdominal muscles are shortened using inner range actions such as a trunk curl exercise from a raise (wedge or cushion) (Figure 4). The tight hip flexor muscles are stretched using static stretching (stretch and hold for 20–30 seconds) while maintaining lumbopelvic alignment. A half-kneeling lunge action (Figure 5) is used, pressing the pelvis forwards to encourage hip extension with the knee flexed to target the rectus femoris muscle. Care must be taken not to allow the lumbar lordosis to increase.

the abdominal muscles and shortening of the hip flexor muscles. The erector spinae muscles tighten and shorten and the gluteal muscles often waste. Soft tissue therapy is aimed at reducing pain within the erector spinae and encouraging contraction of the gluteals using muscle facilitation techniques. To use facilitation, the patient consciously tries to contract the muscle as you stimulate the skin over the muscle using tapotement. Following back pain there are two main reasons that a muscle does not contract. The first is inhibition (pain inhibition), whereby the body tries to protect itself by deliberately not moving. The second reason is poor recruitment, where nervous impulses are not getting through to a muscle because it has been inactive for so long. To manage pain inhibition the physiotherapist targets the cause of the pain, but for poor recruitment we can use tapotement as muscle facilitation and combine this with exercise. Over time, facilitation is reduced and exercise increased as the muscle recovers its contractile ability. Tapotement techniques including tapping, flicking, hacking and shaking are traditionally used to facilitate contraction of low-tone (hypotonic) muscle. When contraction occurs, isometric actions (tense and hold) are used, building up the holding time (3–5 seconds initially) to encourage postural endurance.

Effleurage and petrissage may be used to increase muscle blood flow and reduce lactate build-up within the muscle, which is a cause of ischaemic pain. Focal pressure techniques such as ischaemic compression (pressing

Swayback posture

In the lordotic posture the greater trochanter stays on the posture line but the pelvis tilts. In the swayback posture the pelvis remains more or less level, but the whole pelvis is thrust forwards, so that the greater trochanter lies anterior to the posture line. In an optimal posture the sternum is the most anterior bony point of the body, but with a swayback the ASIS is the most anterior. The swayback is often called the “slouch posture” as it occurs with prolonged standing when relaxed. Essentially the patient is balancing on the elasticity of their anterior hip tissues, and the posture often favours one leg (asymmetrical swayback). Now, if the left leg is locked out straight and the right bent at the knee, the patient presses their pelvis forwards and to the left, placing their body weight

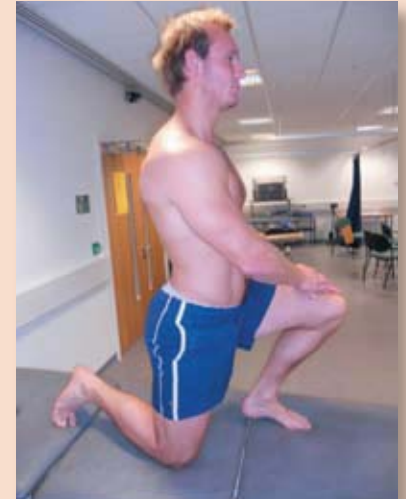


Figure 5:
Hip flexor stretch – half lunge position



Figure 6:
Swayback posture position

over the straight leg. The body is now supported by the hip abductor muscles straight (left) leg and the elasticity of the anterior hip structures of the same leg. The bent (right) leg plays little part in taking body weight, acting more for balance (Figure 6).

Clinically it becomes obvious that problems will ensue because most of the body weight is taken on only one leg over a long period. Hip and knee pain are the classic conditions seen, with the powerful hip abductor muscles (gluteus medius) becoming fatigued and the patient relying on the tensor fascia lata muscle and iliotibial band (ITB) instead. The ITB presses against the greater trochanter at the hip and the lateral epicondyle at the knee, sometimes giving rise to ITB friction

“ THE POSITION OF THE SPINE IS ONE OF EXTENSION AND SIDE FLEXION (MORE ACCURATELY SIDE SHIFT), LEADING TO TISSUE SHORTENING ON ONE SIDE AND LENGTHENING ON THE OTHER ”



Figure 7: Supported side-bend action over a bench



Figure 8: Side-shift action against a wall

syndrome.

The position of the spine is one of extension and side flexion (more accurately side shift), leading to tissue shortening on one side and lengthening on the other. Soft tissue therapy aims to release the tight tissue and should be followed by stretching to regain tissue length. Consider using massage in a sitting position with the patient supported and side flexed away from the tight side, or side lying over a roll with the tighter side uppermost.

As the swayback is often an asymmetrical posture, exercise therapy is asymmetrical as well. Supported side-bend actions (Figure 7) over a bench and side-shift actions (Figure 8) against a wall are useful. Re-education

takes place by regularly practising good alignment. This can be performed as a home exercise, but due to the regular supervision and motivation required it is often more successful to refer a patient to a Pilates or yoga class.

SUBOPTIMAL POSTURE IN THE SHOULDER REGION

Kyphotic posture

Within the thoracic region postural changes are seen to the scapulae and thoracic curve, with the two being intimately connected. Optimally, the scapulae lie three finger widths from the spine, with their straight medial border vertical. The inferior angle of the scapula typically lies level with T7, the root of the scapular spine with T4 and the superior angle with T1. Our modern daily living sees us working at desks, using tools and driving, all activities that require us to flex and adduct the arms. As a result the scapulae often move apart and away from the midline (scapular abduction). At the same time they often downwardly rotate, pointing the glenoid cavity further downwards. This posture has important implications for coordinated movement of the scapula and humerus and is a risk factor for shoulder impingement conditions. The forward motion of the scapula draws the whole weight of the arm forwards and away from the posture line, increasing the arm's leverage effect. The result is that the thoracic spine follows the motion and flexes, increasing the curvature of the thoracic kyphosis, giving the classic kyphotic posture.

The abducted and downwardly rotated position of the scapulae in the kyphotic posture places stress on the rhomboid muscles and levator scapulae. These muscles often develop trigger points that respond well to soft tissue therapy, as do the thoracic erector spinae. Soft tissue therapy should be paralleled by exercise to retract and stabilise the scapulae and press the thoracic spine into extension. The sternal lift exercise (Figure 9) is a typical action where the patient draws their scapulae down and together, while lifting the sternum and straightening

“FOR POOR RECRUITMENT WE CAN USE TAPOTEMENT AS MUSCLE FACILITATION AND COMBINE THIS WITH EXERCISE”

the thoracic spine. Where the thoracic spine is very stiff, passive stretching over a roll or gym ball may also help to extend the thoracic spine and open up the ribcage (Figure 10).

Later in life, the kyphotic posture may result from osteoporosis, with the anterior portion of the vertebral body narrowing to give a wedge shape. The rarefied nature of the thoracic vertebrae contraindicates powerful massage techniques, but less forceful actions are still very useful to relieve pain. Most of the postural pain in late-



Figure 9: Sternal lift exercise



Figure 10: Thoracic spine passive stretch over a roll

stage kyphosis is still from soft tissues, so massage and exercise play a vital role. Taping and bracing may also be used to support the area and unload the painful tissues.

- In a lordotic posture, what happens to the length of the abdominal muscles and hip flexors?
- If the recruitment of a muscle is poor, would you expect the tone to be higher or lower than normal on palpation?



THE AUTHOR

Christopher Norris is a physiotherapist specialising in musculoskeletal treatment.

He is an external lecturer and external examiner to several universities and runs postgraduate continuing professional development courses (listed on his website at www.norrisassociates.co.uk). He is the author of several therapy books (see panel on the right).

FURTHER READING



1. Back Stability: Integrating Science and Therapy. Christopher M. Norris. **Human Kinetics Europe 2008. Buy on Amazon ISBN 0736070176** <http://bit.ly/ijGyNN> (£32.29).



2. Managing Sports Injuries: a guide for students and clinicians. Christopher M. Norris. **Churchill Livingstone 2011. Buy on Amazon ISBN 070203473** <http://bit.ly/g70031> (£47.49).



3. The Complete Guide to Abdominal Training. Christopher M. Norris. **A & C Black 2009. Buy on Amazon ISBN 14081102106** <http://bit.ly/mH118Z> (£10.91)



4. The Complete Guide to Stretching. Christopher M. Norris. **A & C Black 2009. Buy on Amazon ISBN 0713683481** <http://bit.ly/iTC2R1> (£10.45).



5. Bodytoning: Principles and Practice. Christopher M. Norris. **A & C Black 2003. Buy on Amazon ISBN 0713661720** <http://bit.ly/ke9NQU> (£14.44).



6. Acupuncture: Treatment of Musculoskeletal Conditions. Christopher M. Norris. **Butterworth-Heinemann 2001. Buy on Amazon ISBN 0750651733** <http://bit.ly/l2baQv> (£43.69).



7. The Complete Guide to Sports Injuries. Christopher M. Norris. **A & C Black 2011. Buy on Amazon ISBN 1408130777** <http://bit.ly/mL01Qg> (£10.45).



8. Stretching for Racquet Sports: Chris Norris's Three-phase Programme. Christopher M. Norris. **A & C Black 2008. Buy on Amazon ISBN 1408106957** <http://bit.ly/kDexIE> (£7.19).



9. Stretching for Running: Chris Norris's Three-phase Programme. Christopher M. Norris. **A & C Black 2008. Buy on Amazon ISBN 1408106949** <http://bit.ly/ifrsaJ> (£7.19).



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Video 2: Lumbar lordosis - stretching hip flexors



Video 3: Lumbar lordosis - stretching abdominals



Video 4: Kyphotic posture




Video 5: Swayback posture




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abdominals



Video 4:
Kyphotic
posture





Video 5:
Swayback
posture

