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BACK AND NECK PAIN

This overview does not set out to be on the scale of 'Wikipedia', but it does give a brief description of the key points that relate to the assessment, diagnosis and treatment of back and neck pain.

Those interested will certainly be able to tap into the enormous wealth of information that can be found elsewhere on the internet (but see cautionary note below).

After a brief outline of spinal anatomy I'm going to keep to the conditions that come under the heading of 'mechanical neck and back pain'. There are other conditions that can lead to back and neck pain such as inflammatory conditions, e.g. rheumatoid arthritis, fractures (broken bones), lung and circulatory problems, and some cancers, but these are rare and one of our roles in assessing patients is to identify those things that aren't suitable for our treatment and need to be referred back to the GP.

It can be misleading – and even scary – to go too far into the signs and symptoms of these other conditions and internet searches can be a mixed blessing in providing information. Experienced physiotherapists are experts at clinical assessment and are very willing to explain and discuss their findings and plans before treatment. Most back and neck pain can be treated without needing further investigations but sometimes these are necessary and sensible before proceeding.

Spinal anatomy

The spine is a curved structure consisting of separate bones, called vertebrae, which are stacked on top of each other in a column – the spinal column.

Each vertebra has a larger bony 'body' with backward projections that join in the middle to enclose a hole through which the spinal cord passes from the brain. The holes align in the spinal column to form a tunnel that is called the spinal canal.

There are joints on either side between the backward projections of two neighbouring vertebrae, called the facet (zygapophyseal or apophyseal) joints, and a cartilage disc is placed between the bodies of most of the vertebrae – except at the top and bottom levels of the column. The facet joints are surrounded by a small bag or 'capsule', lined with a membrane that secretes lubricant fluid into the joint, and the whole column is supported by elastic ligaments, muscles and connecting inelastic tissue called fascia. Any of the structures mentioned above can be a cause of back pain.



Spine structure

As the spinal cord passes through the central spinal canal, pairs of nerves leave at each level on either side, to pass through small holes on each side of the column and then to provide a nerve supply to structures within the head and neck, mid and lower back, arms and legs. The 'roots' of the nerves, where they leave the spinal cord, can become inflamed, sometimes by being irritated by a neighbouring bulging (prolapsed or herniated) disc; this can also be a cause of pain that can travel into the arm and to the hand (brachialgia) or into the leg to the foot (sciatica). This condition can also cause pins and needles, numbness and weakness and is sometimes known as a 'slipped disc' or 'trapped nerve' – but neither term really describes the situation well.

The spinal column is divided into regions: cervical spine, thoracic spine, lumbar spine, sacrum and coccyx. The sacroiliac joints lie alongside the sacrum and are also an important consideration in low back pain.

Cervical spine consists of seven vertebra that are distinctive as they have additional holes in their sideways projections, which provide a tunnel for the important vertebral arteries that provide much of the blood supply to the brain. The upper two vertebrae are a little unusual. The uppermost vertebra is called the atlas, a wide bone that sits under the globe of the skull. If you run your fingers downwards from the base of the ears to the level of the corners of the jaw bone you can feel a tender bony point on each side of the neck. This is the edge of the atlas and gives you an idea of the width of the bone. The small 'yes' nodding movement of the head happens at this level. The atlas does not have a bony body but instead has a large hole that receives the upward pointing peg of the vertebra below, the axis, that provides a pivot for the rotating 'no' movement of the head. The peg is held in place by a ligament that spans the hole within the bony ring of the atlas.

There are twelve vertebrae in the **thoracic spine**, which is easily distinguishable as the part of the column that provides attachment for the rib cage. If you drop your head forwards and slide your fingers lightly downwards from the centre of your skull you'll come across a bony lump that marks the junction between the cervical and thoracic spine. If we adopt a persistent slumped posture with a poking chin, this area can become more pronounced as a fleshy so-called 'Dowager's hump'. The thoracic spine is the stiffest part of the spine and problems tend to arise more from the small joints where the ribs attach, and the facet joints, than from the thoracic discs between each pair of vertebrae.

The **lumbar spine** consists of five large vertebrae designed for weight-bearing. It starts at approximately the lower edge of the rib cage and runs to just below the brim of the pelvis. The discs between the lumbar vertebrae act as shock absorbers and also help to distribute forces during movement. The stability in this region comes from the size and shape of the joints, strong ligaments that span the joints and core abdominal and small muscles that pass across the lumbar joints, together forming long pillars of muscles on either side of the spine. Low back pain is very common, especially arising from the lower levels of the lumbar spine where the more flexible region meets with the fused sacrum below.

The **sacrum** is a triangular shaped bone that sits at the bottom of the lumbar spine as a wedge between the two wings of the pelvis. Use a fist to punch yourself lightly at the bottom of the spine and you'll feel it as solid bone. It is formed by five fused sacral vertebrae. In its position within the ring of the pelvis, it supports and transmits bodyweight between the trunk and the lower limbs.

The final part of the spinal column is known as the **coccyx** (pronounced 'cock-six') and it is often referred to as the tailbone. It may consist of between three or five vertebrae that literally tail off in size; they may be separate bones or fused together. You can feel it as a tender bony point by pressing inwards and upwards towards the top of the buttock crease. A small disc usually exists between the bottom end of the sacrum and the top of the coccyx that does allow a small amount of movement between the two parts. Landing directly onto the coccyx may give rise to localised pain, known as coccydynia, but pain can also be referred to this region from problems in the lumbar spine.

The **sacroiliac joints** sit between each side of the sacrum and the posterior wings of the pelvis, which are known as the ilia. If you put your hands onto the sharp upper edge of the pelvis (hands on hips) and sweep your fingers backwards you will feel a bony prominence on each side of the solid sacrum at the base of the spine, and fall into a dimple just beyond. This is the position of the sacroiliac joint – you won't be able to feel the joint itself though, as it is supported by a thick mass of ligaments within and over the joint that are the strongest in the body. The sacroiliac joints transmit bodyweight to the lower limbs. They are solid interlocking joints that normally allow just a shuffle of movement while walking and moving between standing, sitting and lying. In pregnancy particularly, the softening of the ligaments can lead to excessive movement at the sacroiliac joints that can lead to pain. Some inflammatory conditions can also affect these joints.

The spine is meant to be curved and is mechanically stronger with two hollow curves at the cervical and lumbar regions that are balanced by the curve in the opposite direction at the thoracic spine. Problems may arise when the curves are too pronounced or too flattened however and attention to posture and the stability of the spine is bound to form part of the general management of neck and back pain.

Intervertebral discs

Let's talk about the 'discs', since they tend to get a lot of bad press as a cause of back and neck pain.

The intervertebral (i.e. between two vertebrae) discs vary in size and structure at the different levels of the spine. Particularly in the lumbar spine, they are thick, almost oval structures formed of ring-like layers of cartilage (rather like an onion) that both allow and provide constraint to the movements of the spine. The centre of the disc is gel-like up to the late teens/early twenties but then gradually becomes more tough, or fibrous. The centre of the disc acts as a ball bearing, allowing the spine as a whole to pitch and roll in all directions. The trouble is that the disc doesn't have a blood supply and relies on movement of the spine to squeeze the disc and spread nutrients to all parts of it, like a sponge. The nutrients seep through into the disc from the blood vessels in the vertebrae above and below the disc. That's why it's so important to keep moving to keep the disc healthy – sometimes the advice to avoid all bending has possibly gone a little too far.

Over time, the discs tend to dry out, or degenerate, but you can still have healthy discs in your eighties or degenerate discs in your thirties and forties, so it's not just down to ageing. This degeneration can lead to the formation of splits or 'fissures' in the disc substance, which can be a cause of pain in themselves, as there is a nerve supply in the outer layers of the disc that may transmit pain in this situation. Pain can also result if the weakened wall bulges, known as a disc protrusion.

Sometimes the splits in the outer layers will allow the material in the inner part of the disc to push completely through the outer wall; this is known as a disc prolapse, disc herniation or 'slipped disc'. The disc itself doesn't move or 'slip' though, so the description isn't quite accurate. In this situation, the extruded material may irritate the neighbouring emerging nerve root, leading to inflammation and pain that may extend into the arm or leg and be associated with pins and needles, numbness and/or weakness. 'Trapped nerve' is another term used here but although the nerve may be pressed against by the disc prolapse it can still move.

Pain arising from a prolapse with irritation of the nerve root is usually felt first in the back or neck, according to where the problem level is, and can then travel into the leg, chest or arm – usually becoming less in the back or neck as it does so. As mentioned above, in this situation you may also experience pins and needles, numbness or weakness.

This 'nerve' pain can be 'agony', disabling and frightening. It is often associated with strong muscle spasms in the low back or shooting twinges of pain that can take your breath away and even make you feel hot, nauseous and faint.

MECHANICAL BACK AND NECK PAIN

Mechanical means that the pain is arising from the joints, discs, ligaments or muscles in the back and neck. It can range from pain caused by faulty posture to a full blown disc prolapse as described above.

Mechanical pain accounts for approximately 95% of all back and neck pain and around 75% of people will experience mechanical back and neck pain at some point in their lifetime – some more severely than others. The pain can recur too, sometimes with gaps of years or sometimes every few weeks or so.

Non-mechanical back and neck pain can be caused by infection, some conditions affecting organs or the circulatory system, such as pancreatitis or aortic aneurysm; inflammatory arthritis, bone disease or malignancy (cancer) etc.

Physiotherapists need to be sure that a patient's pain is mechanical in origin and safe to treat. Before making that decision, a thorough assessment is needed to make sure that there are no so-called contraindications or 'red flags' that would either guide the treatment approach to be selected or suggest that further investigation is needed.

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TREATMENT OF BACK AND NECK PAIN

With all mechanical back and neck pain you will be advised to 'keep active' and the days of bed rest and months in a soft collar are long gone. Research has shown consistently that if you keep moving as normally as possible you will get better sooner.

The important message is that although you might be in pain you will not be doing any damage to yourself by moving. Even with back and neck pain that has been there longer than about three months you would do well to gradually build activity into your daily routine; it may be exhausting to start with but if you build a little more general activity into your life day by day you will gradually increase your fitness and your pain will lessen.

It's important to look at your diet and lifestyle habits too and to lose a bit of weight through sensible eating and to stop smoking can be enormously helpful as part of your general plan towards feeling better.

Physiotherapists are specialists in devising appropriate exercise programmes to help you to get better and to prevent recurrence of your pain. The exercises can include those to improve your movement and flexibility as well as to strengthen key muscles to improve and support your posture. You will be advised to get going with something you really enjoy: swimming and walking – with supportive footwear – Pilates or gym exercise classes, as well as tennis, badminton, golf etc. With appropriate treatment, advice, exercise and pacing, you can return to pretty well anything that you enjoyed before your back and neck pain came on.

As well as keeping active and following exercise programmes you may need specific treatment according to your particular problem. The treatment applied will aim to reduce your pain and to help you to get better more quickly.

The National Institute for Health and Care Excellence (NICE) guidelines recommend the use of manipulation and acupuncture for low back pain and there is a growing body of evidence that early treatment is better than leaving pain to become more chronic, complex and difficult to treat.

Physiotherapists use mobilisations, manipulation, soft tissue massage and stretching techniques to treat neck and back pain, including the use of traction to apply longitudinal stresses to the back or neck to create more movement at the affected levels. Acupuncture may be used for pain relief and some patients respond very well to this, making it easier for them to move about and to keep active. Electrical equipment and TENS (transcutaneous electrical nerve stimulation) may also play an important role in pain relief alongside the treatments applied