

Percutaneous vertebroplasty, balloon kyphoplasty and osteoporosis

What is osteoporosis?

Osteoporosis occurs when the struts which make up the mesh-like structure within bones become thin causing them to become fragile and break easily, often following a minor bump or fall. These broken bones are often referred to as 'fragility fractures'. The terms 'fracture' and 'broken bone' mean the same thing. Although fractures can occur in different parts of the body, the wrists, hips and spine are most commonly affected. It is these broken bones or fractures which can lead to the pain associated with osteoporosis. Spinal fractures can also cause loss of height and curvature of the spine.

What is a spinal compression fracture?

A spinal compression fracture is a fracture which affects one of the bones in the spine. In people with osteoporosis spine fractures can occur without severe injury or trauma. Spine compression fractures may also be referred to by other names including a 'vertebral' compression fracture or a 'wedge' fracture.

What are the symptoms of a spinal compression fracture?

For some people these fractures seem to occur gradually and may be painless, while for others there may be severe pain at the time of fracture. Pain due to a recent fracture will usually reduce as the fracture heals in about 6-8 weeks time. If several fractures occur, then people may notice a loss in height or a change in posture and experience chronic (long-term) back pain. This chronic pain is likely to be caused by the vertebra in its new shape irritating nerves as well as muscle spasm and ligament strain as a result of any postural changes.

Sometimes, however, spinal fractures appear to remain painful because of delayed healing of the fractured bone.

This delay in healing can cause characteristic changes on imaging such as on a magnetic resonance scan (MRI). It is generally only in these circumstances that vertebroplasty or balloon kyphoplasty will be considered as a treatment option.

What is percutaneous vertebroplasty?

Vertebroplasty is a procedure which involves the injection of bone cement into one or more spinal bones or vertebrae (hence the name vertebroplasty). The aim of the procedure is to relieve pain in a poorly healed bone.

What is balloon kyphoplasty?

Kyphoplasty is a procedure which is similar to vertebroplasty except it involves inserting a balloon into the vertebra and slowly inflating it to create a space in the bone. The balloon is then deflated and the space is filled with bone cement. As with vertebroplasty, kyphoplasty is also used to relieve the pain of spinal compression fractures associated with osteoporosis. It may also improve the shape of the bone although, in practice, for most people there is unlikely to be any noticeable change in body height.

Both vertebroplasty and kyphoplasty are procedures that are used to help relieve pain due to fractures. They do not improve bone strength or reduce fracture risk so it is crucial that anyone having one of these procedures for osteoporotic fractures also has appropriate investigation and drug treatment for their osteoporosis to reduce the chance of further fractures occurring.

Who are these techniques appropriate for?

Vertebroplasty and kyphoplasty are not generally useful to treat longstanding back pain associated with spinal compression fractures or other conditions. They are generally considered for people whose spine fractures haven't healed properly and who continue to have severe pain.

The techniques are more likely to be effective in the early months after fracture but most compression fractures heal without intervention within 6-8 weeks with improvement in pain.

Vertebroplasty and Kyphoplasty are not generally considered until after this time. An individual decision will be made about suitability of treatment on the basis of the pain, examination findings and tests which usually include a MRI scan.

Why would doctors use these techniques instead of conventional methods of pain relief?

Although pain relieving drugs and various other pain relieving strategies can be very effective in controlling the pain associated with a new spinal compression fracture, this may not always be the case.

In both vertebroplasty and kyphoplasty studies, it has been shown that injecting the fractured vertebrae with a type of bone cement may reduce or relieve pain in some cases.

How are vertebroplasty and kyphoplasty carried out?

The procedures are carried out in a hospital setting by a specially trained team of medical professionals including a radiologist (a doctor who diagnoses illness using x-rays and performs procedures under x-ray control). They can be undertaken in one to two hours depending on how many vertebrae are to be treated. Sometimes an overnight stay is required. The treatments can be carried out either using a general anaesthetic (where you are 'put to sleep') or a local anaesthetic that numbs the area to be treated. If you have a local anaesthetic, you may also be given sedation which will make you feel sleepy.

For both procedures you will need to lie on your stomach until the cement has set. For vertebroplasty to be performed, a hollow needle is inserted through the skin into the collapsed vertebrae. The doctor is able to guide the needle into the correct place by using special x-ray equipment. Surgical cement is then injected into the bone to relieve pain and to stabilise the fractured vertebrae. Each vertebra that is being treated may require one or possibly two injections into it.

Kyphoplasty also involves a hollow needle being introduced into the collapsed vertebrae. A special balloon is then inserted into the collapsed vertebrae and is guided into the correct position by using x-ray equipment as above. The balloon is then inflated prior to being injected with bone cement. More than one vertebra can be treated at the same time if required.

Are there any side effects or risks involved in this procedure?

As with all surgical procedures there are risks involved, though they are uncommon. If you are having a general anaesthetic there may be a small risk associated with this. General fitness and the presence of other medical problems will be taken into account when assessing your fitness for the treatment.

Side effects related to the procedure include cement leaks, infection, pulmonary embolus with cement blocking the blood vessels in the lungs, allergic reactions, spinal cord or nerve root injury as well as balloon rupture (with kyphoplasty).

In the long term, there are concerns that the treated vertebrae may cause an increased risk of fracture on adjacent vertebrae by increasing the pressure on them. Although recent research failed to confirm this, it remains a potential risk.

Are vertebroplasty and kyphoplasty only used to treat osteoporotic spinal compression fractures?

No. They may be used also to treat painful spine compression fractures associated with cancer or trauma.

How do I find out if this treatment is appropriate for me?

Currently, vertebroplasty and kyphoplasty are not routine procedures and are only carried out in a few specialist centres in the UK. Initially, you would need to discuss this matter with your doctor who can refer you, if appropriate. Specialists differ in their views on the use of these procedures. Some feel that they are effective, others that the benefits are still unproven and fractures generally get better on their own.

In England and Wales, NICE has recently recommended that both procedures should be available for those who have been properly assessed (see below). However, in practice, as not all hospitals provide facilities for these techniques, people may have to travel in order to be assessed and treated.

Is anyone monitoring the use of vertebroplasty and kyphoplasty in the UK?

The National Institute for Health and Care Excellence (NICE) has produced guidance on both of these procedures. In these reviews, NICE indicated that there is now evidence to show that they are safe and work well enough for use in the NHS with a full explanation given to anyone receiving this procedure about the possible risks and benefits. NICE has stated that these procedures should only be undertaken when there are arrangements for good access to a spinal surgery service. The decision to treat will usually be made by a multidisciplinary team (experts from various specialities), who will consider each case on an individual basis.

The most recent NICE guidance has recommended that both procedures are options for treating osteoporotic vertebral compression fractures in people 'who have severe ongoing pain after a recent, unhealed vertebral fracture despite optimal pain management' and 'in who the pain has been confirmed to be at the level of the fracture by physical examination and imaging (usually MRI scanning).'

You can obtain the NICE guidance for the public by visiting nice.org.uk or ringing **0300 3230140** and asking for information on guidance number TA279.

For further information about other ways to manage the pain associated with spinal fractures caused by osteoporosis, see our factsheet [Managing persistent pain after fractures](#).

This information reflects current evidence and best practice but is not intended to replace the medical advice provided by your own doctor or other healthcare professional.

This is one of many information resources available about osteoporosis and bone health. View the range at theros.org.uk and order more by calling us on **01761 471 771** or emailing info@theros.org.uk

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