



Keeping Bones Strong

*A practical summary of osteoporosis, menopause, fracture prevention
and the questions raised at the Northamptonshire support-group
meeting*

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This booklet summarises the talk and provides checked answers to questions that arose during the discussion. It is educational information, not a substitute for individual medical advice.

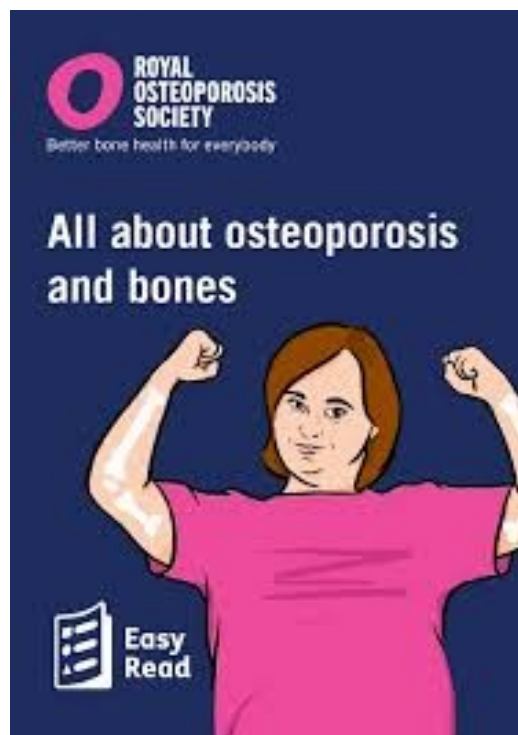
Thank you

Thank you very much for inviting me to speak to the Royal Osteoporosis Society Northamptonshire Support Group. It was a genuine pleasure to meet such an informed and engaged audience. The questions were excellent and, in several areas, deserved a more considered answer than could be given on the spot.

As a trauma and orthopaedic surgeon, I spend much of my working week treating the consequences of fragile bone: hip fractures, spinal compression fractures, wrist fractures and complex fractures around joint replacements. Modern surgery can be very effective, but prevention is better than even the best operation.

The central message

A low-trauma fracture is not simply bad luck. It is a warning sign that should lead to assessment of future fracture risk and, where appropriate, treatment to prevent the next fracture.



The Royal Osteoporosis Society provides reliable patient information and support.

Why osteoporosis matters

Osteoporosis is a condition in which bones lose strength and become more likely to break. It is often described as a silent disease because it usually causes no symptoms until a fracture occurs.

Osteoporosis itself does not usually cause generalised bone pain. Pain is more commonly caused by a fracture, altered posture, muscle fatigue, arthritis or another condition.

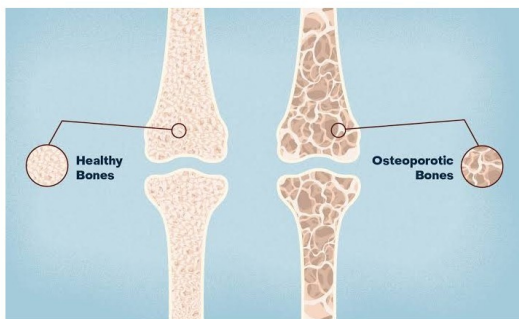
Hip fractures are particularly serious because they often cause a loss of mobility, confidence and independence. Even after technically successful surgery, many patients do not return completely to their previous level of function. The National Hip Fracture Database reports that more than 70,000 people sustain a hip fracture each year across England, Wales and Northern Ireland.

During the talk I used the fictional example of Mrs Smith: an active 72-year-old who trips, breaks her wrist, heals and is discharged without a bone-health assessment. Two years later she sustains a hip fracture. The wrist fracture was the opportunity to assess and reduce her future risk.

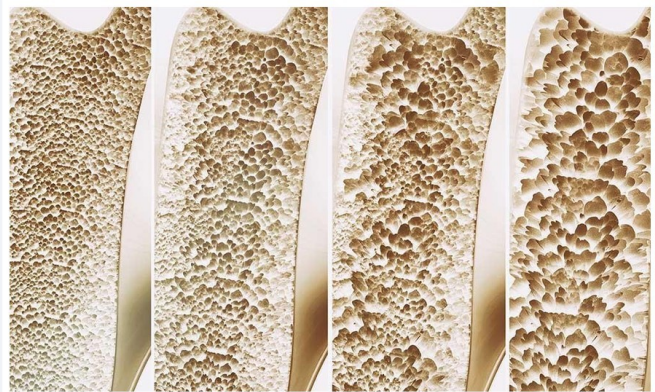
What happens inside bone?

Bone is living tissue. Throughout life, old bone is removed by cells called osteoclasts and new bone is formed by osteoblasts. In healthy adult bone these processes are broadly balanced. With ageing, menopause, illness, inactivity or certain medicines, bone removal can exceed bone formation.

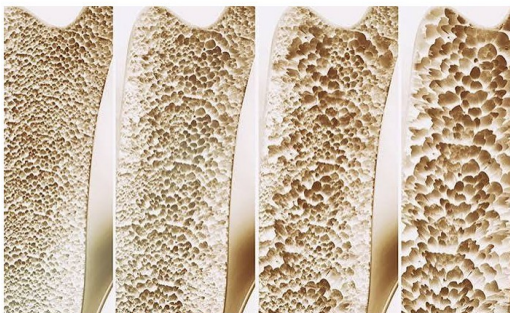
The internal structure of bone resembles a three-dimensional honeycomb. Osteoporosis thins and disconnects the struts within this framework. From the outside the bone may still appear normal, but internally it has less reserve and is more vulnerable to a fall or sudden load.



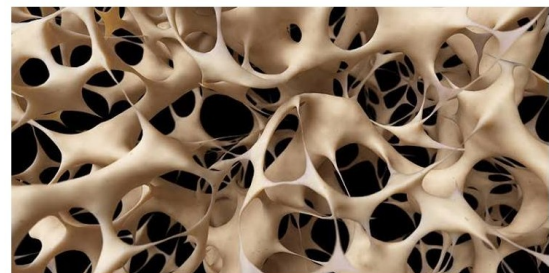
Healthy vs osteoporotic bone



Progressive loss of trabecular structure



Close-up of trabecular bone



Normal and osteoporotic proximal femur

The images show how the internal supporting architecture becomes thinner and more widely spaced.

Important distinction

Osteoporosis is reduced bone strength. Osteomalacia is poor mineralisation of bone, often caused by severe vitamin D deficiency. They can coexist, and both can produce a low DXA result, which is why blood tests matter.

Common risk factors

- Increasing age and a previous fragility fracture
- Menopause, premature ovarian insufficiency or early menopause
- Long-term oral glucocorticoids and some other medicines
- Low body weight, eating disorders, poor nutrition or malabsorption
- Coeliac disease, inflammatory bowel disease or previous bariatric surgery
- Rheumatoid arthritis and other chronic inflammatory conditions
- Overactive thyroid, hyperparathyroidism and chronic kidney disease
- Smoking, excessive alcohol and physical inactivity
- Parental hip fracture and other relevant family history

Risk is rarely determined by one factor alone. FRAX combines several clinical risk factors to estimate the 10-year probability of a major osteoporotic fracture and of a hip fracture.

Menopause, oestrogen and bone health

Oestrogen has a major protective effect on bone. As oestrogen levels fall around menopause, bone breakdown accelerates. The fastest loss commonly occurs during the years around and immediately after menopause, although bone loss continues more gradually thereafter.

This helps explain why osteoporosis is more common in postmenopausal women and why early menopause or surgical loss of ovarian function can have a substantial effect on lifetime bone health. It also explains why prevention should begin before the first fracture, rather than when someone is already elderly.

What HRT can - and cannot - do

Hormone replacement therapy can relieve menopausal symptoms, prevent bone loss and reduce fracture risk while it is being taken. It is particularly important for people with premature ovarian insufficiency or early menopause, unless there is a contraindication. For many otherwise healthy women who start HRT before 60, or within roughly 10 years of menopause, the benefit-risk balance is generally favourable.

HRT is not appropriate for everyone. The decision depends on symptoms, age, time since menopause, whether the uterus is present, previous breast cancer, unexplained vaginal bleeding, thromboembolic and cardiovascular history, migraine and other individual factors. Women with a uterus generally require a progestogen as well as oestrogen to protect the endometrium.

Transdermal oestrogen, given by patch or gel, avoids first-pass liver metabolism and is commonly preferred when thrombotic risk is a concern. The exact formulation and dose should be chosen with a GP or menopause specialist.

Starting earlier

The evidence and safety profile are best established when treatment begins near the menopause, particularly for significant menopausal symptoms or early loss of ovarian function.

Starting much later

There is no universal rule that HRT can never be started after 60 or more than 10 years after menopause, but the decision is more complex and usually warrants specialist assessment, lower starting doses and consideration of a transdermal route.

Correction and clarification

During the talk I was too absolute in suggesting HRT could simply be started or continued at any age.

There is no arbitrary mandatory stopping age, but treatment should be reviewed regularly and the balance of benefits and risks becomes more individual with increasing age and comorbidity.

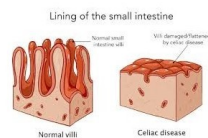
Can HRT be combined with romosozumab?

There is no routine blanket prohibition on combining HRT with romosozumab, but this is specialist territory. Romosozumab is reserved for people at very high fracture risk and is avoided in people with certain cardiovascular histories, particularly previous myocardial infarction or stroke. The osteoporosis specialist and menopause clinician should agree the plan, including what antiresorptive medicine will follow the 12-month romosozumab course.

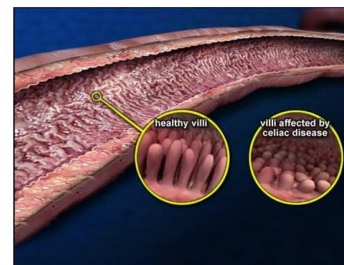
Coeliac disease and bone health

This subject is personally relevant to me because my own coeliac disease was identified only after my daughter was diagnosed. Coeliac disease is an autoimmune condition, not simply a food intolerance. Gluten exposure damages the small-intestinal lining, which may reduce absorption of calcium, vitamin D and other nutrients.

People can have coeliac disease with few or no classic bowel symptoms. Unexplained low bone density, iron deficiency, weight loss, recurrent abdominal symptoms or a first-degree family history may justify testing. The usual initial blood tests are tissue transglutaminase IgA and total IgA. Testing should be performed while the person is still eating gluten; starting a gluten-free diet first may produce a false-negative result.



Normal and flattened villi



Endoscopic appearance

Coeliac disease can flatten the small-intestinal villi and impair nutrient absorption.

Practical point

Bone density often improves after diagnosis and strict adherence to a gluten-free diet, but additional osteoporosis treatment may still be needed, particularly after menopause or after a fragility fracture.

Fragility fractures: the warning signs

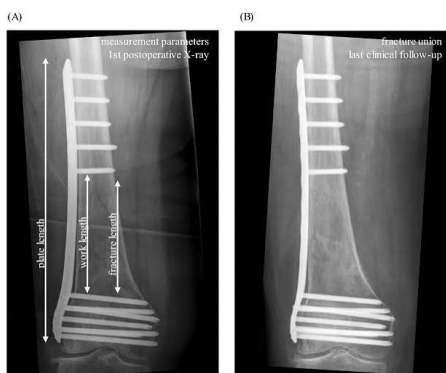
A fragility fracture usually follows an injury that would not be expected to break healthy bone, such as a fall from standing height. Common sites are the wrist, hip, spine, upper arm and pelvis. Fractures around existing implants can also be devastating when the remaining bone is weak.



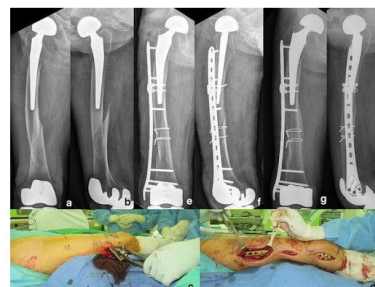
Vertebral compression fractures



Atypical femoral fracture



Distal femoral fracture fixation



Complex periprosthetic reconstruction

Examples discussed during the meeting. Complex surgery becomes much harder when fixation must hold in weak bone.

Vertebral fractures may present with sudden back pain, loss of height or increasing kyphosis, but some are discovered incidentally. A vertebral body may become wedge-shaped because its front portion collapses under load. A new vertebral fracture should trigger prompt assessment and treatment because the risk of another fracture is high.

The atypical femoral fracture shown above is a rare complication associated with prolonged antiresorptive treatment. Persistent thigh or groin pain while taking a bisphosphonate or denosumab should be reported and assessed; it should not be dismissed as ordinary arthritis without consideration of imaging.

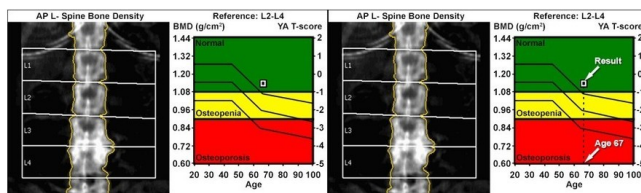
DXA and FRAX: what the tests mean



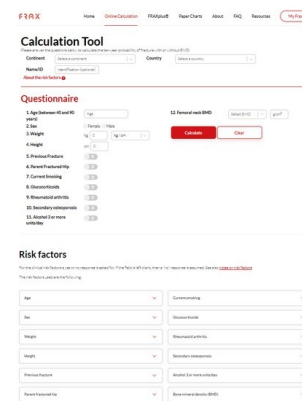
A modern DXA scanner



DXA positioning



Example result chart



FRAX risk calculator

DXA measures bone mineral density; FRAX estimates clinical fracture probability.

A DXA scan is quick, painless and uses a low radiation dose. It normally measures the lumbar spine and hip. The T-score compares bone density with that of a healthy young adult reference population:

- T-score -1.0 or above: within the expected range for a young adult reference.
- T-score below -1.0 but above -2.5: low bone mass, often called osteopenia.
- T-score -2.5 or below: osteoporosis by the usual densitometric definition.

A diagnosis and treatment decision should not rely on the T-score alone. A person may need treatment after a hip or vertebral fragility fracture even if a DXA scan has not yet been performed. Conversely, not everyone with osteopenia requires medication. Age, fracture history, steroid use, falls and FRAX probability all matter.

Degenerative arthritis, scoliosis, vertebral collapse and calcification can artificially increase the lumbar-spine measurement. In an older person with substantial spinal arthritis, the hip result may be more reliable. Clinicians should look at the images and the trend, not only the automated report.

How often should DXA be repeated?

There is no single correct interval for everyone. Repeating a scan within a few months is usually unhelpful because genuine biological change may be smaller than the measurement variation. In practice, repeat scanning is often considered after approximately two to five years, depending on the baseline result, treatment, new fractures, steroid exposure and whether the result would change management.

An 18- to 24-month minimum interval is commonly used by scanning services when monitoring active treatment, but this is not an absolute national rule. Some patients need longer intervals; others need earlier reassessment after a new fracture or major change in risk.

The trend matters

Ask for the actual hip and spine T-scores, the date of the scan and whether comparison with the previous scan used the same machine and appropriate precision standards.

Blood tests: looking for causes that can be treated

A normal blood calcium does not mean that the skeleton contains enough calcium. Blood calcium is tightly regulated and can remain normal even in severe osteoporosis. Blood tests are used mainly to identify contributing disorders and to make treatment safe.

A typical investigation may include full blood count, kidney and liver function, adjusted calcium, phosphate, alkaline phosphatase, 25-hydroxyvitamin D and thyroid-stimulating hormone. Additional tests are selected according to the clinical picture, for example:

- Parathyroid hormone when calcium is abnormal, kidney disease is present, vitamin D deficiency is significant, or hyperparathyroidism is suspected.
- Coeliac serology where malabsorption, iron deficiency or unexplained osteoporosis is possible.
- Inflammatory markers, myeloma screening or other tests when symptoms or results suggest another disease.
- Testosterone and related tests in selected men with osteoporosis.

Thyroid and parathyroid are different

The parathyroid glands regulate calcium and are assessed with a parathyroid hormone test. They are not part of the standard thyroid-function panel. For ordinary thyroid assessment, TSH is commonly the first test; free T4 and sometimes free T3 are added according to the result and clinical situation.

What to ask at your next appointment

- Was my fracture considered a fragility fracture?
- What were my hip and spine T-scores?
- Has my 10-year fracture risk been calculated?
- Have reversible causes such as vitamin D deficiency, coeliac disease or hyperparathyroidism been considered?
- What is the treatment plan, how long should I take it and when will it be reviewed?
- What should happen if I cannot tolerate the first medicine offered?

Exercise: bones need loading, muscles prevent falls

Walking is valuable for general health, weight-bearing activity and confidence, but it is not the whole answer. The strongest programme combines weight-bearing activity, progressive resistance exercise and balance training. Strengthening the legs, hips, back and upper limbs helps maintain function and reduces the chance that a stumble becomes a fall.

People with osteoporosis can usually exercise safely. Those with multiple vertebral fractures, significant pain, poor balance or recent surgery may need assessment by a physiotherapist with osteoporosis expertise before increasing intensity.

- Weight-bearing: brisk walking, stair climbing, dancing or other suitable impact activity.
- Resistance: weights, resistance bands, sit-to-stand exercises and supervised gym work.
- Balance: tai chi, heel-to-toe walking and structured falls-prevention exercises.
- Posture: back-extensor endurance and safe movement strategies after vertebral fractures.

After vertebral fractures

Avoid repeated forced or loaded forward bending, uncontrolled twisting and traditional sit-ups. Learn hip-hinge lifting, keep loads close to the body and build strength progressively. Sudden new pain, neurological symptoms or pain after a minor injury requires reassessment.

Falls prevention

Most non-vertebral fragility fractures follow a fall. Important measures include good lighting, secure footwear, removal of loose rugs and trailing cables, eyesight checks, access to handrails, appropriate walking aids and a review of medicines that cause dizziness or low blood pressure.

Postural hypotension means the blood pressure falls on standing, causing light-headedness or collapse. Blood-pressure treatment is important, but symptoms should prompt review rather than simply accepting recurrent dizziness.

Calcium, vitamin D and protein

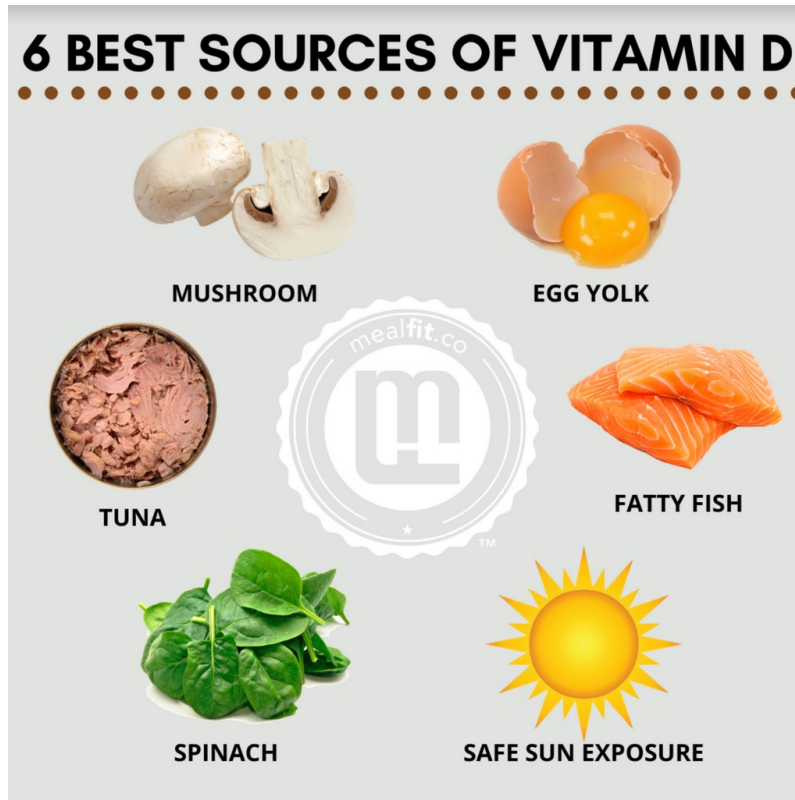
Most UK adults need about 700 mg of calcium each day. People with osteoporosis, those taking bone-strengthening medication or those with malabsorption may be advised to aim nearer 1,000 mg. Food is generally preferred to supplements, with tablets used to make up a genuine shortfall rather than added automatically.

Vitamin D helps the body absorb and use calcium. UK advice is that adults should consider 10 micrograms (400 IU) daily during autumn and winter. People who are housebound, have little sun exposure or are at higher risk of deficiency may need it all year. Osteoporosis specialists sometimes recommend higher daily doses, particularly when treating deficiency, but repeated very large intermittent doses are not advised.

Protein is essential for muscle, recovery and the bone matrix. Older adults commonly eat too little, particularly after illness or fracture. A balanced diet containing dairy or fortified alternatives, eggs, fish, meat, pulses, nuts and other protein sources is preferable to relying on supplements alone.

Vitamin K2

Vitamin K is involved in bone biology, but routine over-the-counter K2 supplementation is not established as standard osteoporosis treatment in UK guidance. Do not start vitamin K supplements without advice if you take warfarin or another vitamin-K antagonist.



Vitamin D comes from sunlight, selected foods and supplements; dietary sources alone are often limited.

Osteoporosis medicines: matching treatment to risk

Lifestyle measures support bone health, but they are not a substitute for medication when fracture risk is high. Treatment selection depends on fracture history, age, kidney function, gastrointestinal tolerance, adherence, cardiovascular history and whether risk is high or very high.

Treatment	How it is given	Key points
Alendronate / risedronate	Usually weekly tablets	Effective and cost-effective first-line options; must be taken exactly as instructed.
Zoledronic acid	Intravenous infusion, usually yearly	Useful after hip fracture or when tablets are unsuitable; kidney function and vitamin D need checking.
Denosumab	Injection every 6 months	Effective, including when oral treatment is unsuitable; doses must not be delayed or stopped without an exit plan.
Teriparatide	Daily self-injection for a limited course	Bone-forming treatment for selected people at very high risk; must be followed by an antiresorptive medicine.
Romosozumab	Monthly injections for 12 months	Bone-forming and antiresorptive effects; specialist treatment with cardiovascular precautions and mandatory follow-on therapy.
HRT	Tablets, patches, gel or other formulations	Useful for menopausal symptoms and bone protection in appropriate women; individual risk assessment required.

After teriparatide or romosozumab, an antiresorptive medicine is normally required to preserve the gain in bone density. Without follow-on treatment, benefit can be lost.

Bisphosphonates: benefits, rare risks and treatment reviews

Bisphosphonates slow the cells that remove bone. Alendronate and risedronate are common oral treatments; zoledronic acid is given intravenously. They reduce vertebral, hip and other fragility fractures in appropriately selected patients.

Oral tablets must be taken on an empty stomach with plain water, followed by remaining upright and avoiding food, drink and other medicines for the instructed period. This improves absorption and reduces irritation of the oesophagus.

What patients understandably worry about

Osteonecrosis of the jaw and atypical femoral fractures are real recognised complications. They are, however, rare at osteoporosis doses.

What often receives less attention

Hip and vertebral fractures are common, serious and can be life-changing. For a person whose fracture risk warrants treatment, the expected benefit usually outweighs these rare harms.

Osteonecrosis of the jaw most often presents with exposed bone, a non-healing extraction site, persistent swelling, infection, pain or loose teeth. The risk is much higher with high-dose intravenous treatment used in cancer than with ordinary osteoporosis treatment. Maintain dental hygiene, attend routine dental care and tell the dentist what medication you take. Do not stop treatment independently before dentistry.

Atypical femoral fractures may be preceded by persistent thigh or groin pain and can occur on both sides. Such symptoms warrant clinical review and usually imaging of the femur.

Is a “drug holiday” automatic?

No. Treatment should be reviewed, not simply stopped because a fixed number of years has passed. NOGG recommends reassessment after at least five years of oral bisphosphonate therapy or three years of intravenous zoledronate. Longer treatment is often appropriate for older patients, those with hip or vertebral fractures, people continuing glucocorticoids and those who fracture during treatment.

If treatment is paused, fracture risk should be reassessed within the planned interval and immediately after any new fracture. Lifestyle measures and adequate calcium and vitamin D continue during the pause.

Denosumab: never stop without a plan

Denosumab is given every six months. It is effective, but its effect wears off quickly if injections are delayed or stopped. This can lead to rapid bone loss and multiple vertebral fractures. Before starting denosumab, there should be a long-term plan, and any eventual discontinuation should be followed by another antiresorptive treatment arranged by the responsible clinician.

Do not miss the date

If a denosumab injection is late, contact the prescribing service promptly. Do not decide to “take a break” from denosumab in the way that may sometimes be considered with bisphosphonates.

Zoledronic acid and bone-forming treatments

Zoledronic acid is a bisphosphonate infusion, often given once yearly. A temporary flu-like reaction is common after the first dose. Kidney function, calcium and vitamin D status need checking. NOGG recommends intravenous zoledronate as a first-line option after hip fracture.

Teriparatide and romosozumab are used for selected people at very high fracture risk, such as those with multiple vertebral fractures or fractures despite treatment. Teriparatide stimulates bone formation. Romosozumab both increases formation and reduces resorption, but is unsuitable for some people with cardiovascular disease. Both are time-limited and should be followed by antiresorptive treatment.

Questions raised during the meeting

Can osteoporosis be reversed?

Bone density can improve and fracture risk can be reduced substantially. It is better to say osteoporosis can be treated and sometimes moved out of the densitometric osteoporosis range than to promise a complete cure. Existing vertebral deformity or loss of height usually does not reverse.

Can I start HRT 20 years after menopause?

Possibly, but not as a routine blanket treatment. Starting late requires individual assessment of symptoms, cardiovascular and thrombotic risk, breast and endometrial history and alternative osteoporosis treatments. A menopause specialist may recommend a low-dose transdermal approach in selected women.

Can HRT continue indefinitely?

There is no mandatory age at which every woman must stop. It should continue only while the individual benefits remain greater than the risks, with regular review. At advanced age, the decision becomes increasingly individual and HRT may not be the best primary osteoporosis treatment.

Does normal blood calcium mean my bones are fine?

No. Blood calcium can be normal despite osteoporosis. DXA and fracture-risk assessment measure different aspects of bone health.

Should everyone have parathyroid hormone checked?

Not necessarily. PTH is particularly useful when calcium is high or low, kidney disease is present, vitamin D deficiency is significant, kidney stones occur, or osteoporosis is unusually severe or unexplained.

Do thyroid tests always include T3, T4 and TSH?

No. TSH is usually the starting test. Free T4 and sometimes free T3 are added according to the result and the suspected condition. Excess thyroid hormone or over-replacement can contribute to bone loss.

How soon will HRT or medicine change my DXA scan?

Changes are slow. A meaningful difference may take one to several years and must exceed the scan's measurement variability. Clinical fracture protection may begin before a measurable DXA change is visible.

My spine improved but my hip did not - why?

Different skeletal sites respond differently. Spinal arthritis can also make the spine result look artificially better. The clinician should review the actual images and hip measurements rather than relying on a single headline number.

Is resistance exercise safe after vertebral fractures?

Usually yes when adapted. Progressive strengthening, balance and back-extensor work are beneficial, but repeated loaded forward flexion and uncontrolled twisting should be avoided. Multiple fractures or ongoing pain justify specialist physiotherapy.

Why am I still in pain after a vertebral fracture?

Medication prevents future fractures but is not a painkiller. Persistent pain may come from a recent or unhealed fracture, further collapse, muscle fatigue, altered posture, facet arthritis, disc disease or another diagnosis. Worsening or new pain deserves reassessment.

What happens when teriparatide stops?

The course is time-limited. An antiresorptive medicine such as a bisphosphonate or denosumab is normally started afterwards to preserve the gain. Without follow-on treatment, bone density can fall again.

Can I have dental treatment while taking bisphosphonates?

Usually yes. Tell the dentist, maintain good oral hygiene and discuss major extractions or implants with the treating clinician. The low jaw risk at osteoporosis doses must be balanced against the risk of stopping useful fracture prevention.

Should I take vitamin D with K2?

Routine K2 supplementation is not recommended as standard osteoporosis therapy in current UK guidance. Vitamin D and adequate calcium are established; additional supplements should be discussed, especially if taking warfarin.

Can coeliac disease be diagnosed by simply avoiding gluten?

No. Improvement on a gluten-free diet does not confirm coeliac disease. Blood testing should be performed while eating gluten, followed by the appropriate specialist pathway.

Does Kettering still provide DXA scans?

The Kettering General Hospital website currently lists an osteoporosis service with DXA scanning on Tuesday afternoons and Wednesdays. Access is through the appropriate NHS referral route, and service arrangements can change, so patients should confirm current details with their GP or the hospital.

What if my GP is not confident managing osteoporosis?

Ask for formal fracture-risk assessment and referral according to local pathways. Complex disease, multiple vertebral fractures, treatment failure, severe kidney disease, suspected secondary osteoporosis or the need for bone-forming therapy may justify specialist rheumatology, endocrinology or metabolic-bone input.

Why a Fracture Liaison Service matters

A Fracture Liaison Service is a coordinator-based system that identifies people after a fragility fracture, assesses fracture and falls risk, arranges appropriate tests, starts treatment and monitors adherence. It closes the gap between the fracture clinic, radiology, primary care, rheumatology, geriatrics and other services.

NOGG strongly recommends access to an FLS for all patients who sustain a fragility fracture. These services reduce re-fracture rates and improve survival. I continue to support the development of a comprehensive, consistently funded county-wide service across Northamptonshire.

In the absence of a fully comprehensive pathway, clinicians can still help by documenting that a fracture is likely to be fragility-related, calculating fracture risk, initiating appropriate investigations or treatment and giving clear recommendations to the GP. However, relying on individual clinicians is less reliable than a coordinated service, and some patients inevitably fall through gaps.

What should happen after a low-trauma fracture?

The fracture should be treated, but the job is not finished. Future fracture risk, falls, bone density where needed, secondary causes, nutrition and appropriate bone-protective treatment should all be considered.

Ten practical take-home messages

- Osteoporosis is common, often silent and treatable.
- A wrist, spine, hip, shoulder or pelvic fracture after minor trauma is a warning sign.
- DXA is important, but fracture history and FRAX risk are just as important.
- Normal blood calcium does not exclude osteoporosis.
- Menopause is a major turning point for bone health; HRT deserves an informed, individual discussion.
- Walking is useful, but strength and balance training add important protection.
- Food-first calcium, adequate vitamin D and sufficient protein support treatment.
- Bisphosphonate complications are rare; for high-risk patients the fracture-prevention benefit usually dominates.
- Denosumab must not be delayed or stopped without a follow-on plan.
- Preventing the next fracture is always easier than treating it.

Further information and contact details



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Medical disclaimer

This booklet provides general educational information. It cannot take account of your full medical history and does not replace assessment by your GP, menopause clinician, rheumatologist, endocrinologist or osteoporosis specialist. Do not start, stop or delay prescribed treatment without advice from the clinician responsible for it.

Selected authoritative sources

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12. National Hip Fracture Database. Annual reports and patient resources. [Open source](#)