

The background of the lower half of the page is a gradient from green at the top to blue at the bottom. Overlaid on this gradient is a faint, semi-transparent image of a human pelvis and the lower portion of a spine, rendered in a light blue/green color.

# Paget's Disease

# INVESTIGATIONS EXPLAINED

Version 3, 2021

# Paget’s Disease – Investigations Explained

This booklet provides information regarding investigations, which may be carried out for Paget’s Disease of Bone.

If you require this information in another format, such as larger text, please get in touch.

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## What is Paget's Disease of Bone?

- Normal bone is renewed and repaired through a process called bone remodelling. Paget's disease is characterised by abnormalities in this process.
- The affected bone (known as 'pagetic' bone) is renewed and repaired at an increased rate, causing abnormalities in the bone's structure.
- Pagetic bone can appear enlarged and misshapen and can occur in one or several bones.

A more detailed explanation of this process can be found on our website and in our booklet, '*Paget's Disease – The Facts*'.



## What investigations are used to diagnose Paget's disease?

In many cases, Paget's disease is found by chance when tests are carried out for another reason.

Paget's disease may be identified by:

- Blood tests
- X-ray
- Isotope bone scan

## What blood tests might be carried out?

Blood tests alone cannot diagnose Paget's disease, but when used in conjunction with scans, x-rays and medical examination, they help to confirm the diagnosis. They are also helpful in measuring response to treatment.

### **Alkaline Phosphatase**

A common blood test in general practice is to measure liver function. Included in this test is an enzyme called alkaline phosphatase (ALP). This is present in many cells within the body, but particularly in liver and bone cells (osteoblasts). If there is overactivity of the osteoblasts due to Paget's disease, alkaline phosphatase is released into the bloodstream and can be measured. The test for ALP cannot be used in isolation for the diagnosis of Paget's disease, however, it is recommended as the first-line investigation, in combination with liver function tests.

The blood test to measure the ALP can be carried out at a GP's surgery or a hospital clinic. Due to a variety of measuring techniques, reference ranges may vary slightly between different laboratories. This is something to be aware of if your blood is taken in different hospitals/surgeries as it may be sent to different laboratories. This should not, however, cause any difficulties in assessment of the disease. You can ask what your level of ALP is and what the normal range is.

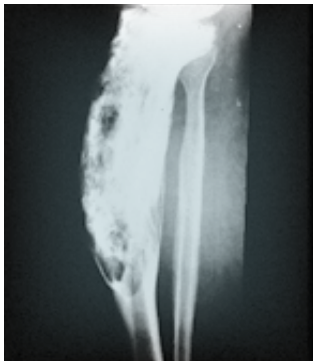
When Paget's disease is active, the ALP level will often, but not always, be raised. A raised ALP can stand out as being the only abnormal result. If there is co-existent liver disease, it may be necessary to perform further blood tests to identify the source of the elevated ALP.

### **Additional Blood Tests**

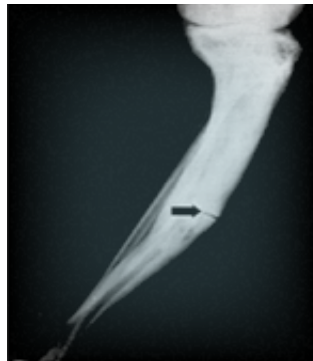
Frequently, blood tests for vitamin D and calcium levels, as well as kidney function, will be carried out, particularly if treatment is being considered.

## What does an x-ray show?

- If Paget's disease is suspected, an x-ray of the affected bone may be performed, but Paget's is often seen by chance when an x-ray has been undertaken for another reason.
- An x-ray will show the presence of Paget's disease in a specific bone (*Figure 1*) only. It will not give any information about other sites in the skeleton that may be affected.
- What can be seen on an x-ray image will vary, depending on the severity of the disease, but it is usually possible to see increased density and sometimes changes in the shape of bone.
- Fissure fractures (cracks) may be seen on an x-ray and can occur along the edge of deformed bone (*Figure 2*).
- Complete fracture through an affected bone will be obvious on an x-ray.
- An x-ray can also show wear and tear in joints (osteoarthritis) adjacent to the bone.



*Figure 1.*  
X-ray of advanced Paget's disease in the shin



*Figure 2.*  
X-ray of a fissure fracture in the shin

- Research has shown that plain x-rays targeted to several sites, the abdomen, skull and facial bones, and both tibiae (shins), are likely to detect 93% of bones affected by Paget's disease, compared with a single x-ray of the abdomen, which detected less (79%).
- Most people will have a single x-ray, which will only show Paget's disease within the field of the image, whereas a radionuclide bone scan, as described on page 7, gives a picture of the whole skeleton and can, therefore, show whether the disease is present in several bones. A radionuclide bone scan is the best way of determining the extent of Paget's disease.

## Is it necessary to repeat x-rays?

- X-rays may be repeated occasionally to assess whether the disease has progressed.
- A further x-ray would be performed if there were a marked increase in pain at the site of the disease. This could be associated with a fracture or, extremely rarely, with a type of bone cancer called osteosarcoma.
- An additional x-ray may be carried out if there is increasing pain in associated joints, to determine the severity of any osteoarthritis, particularly if joint replacement surgery is to be considered (Figure 3).

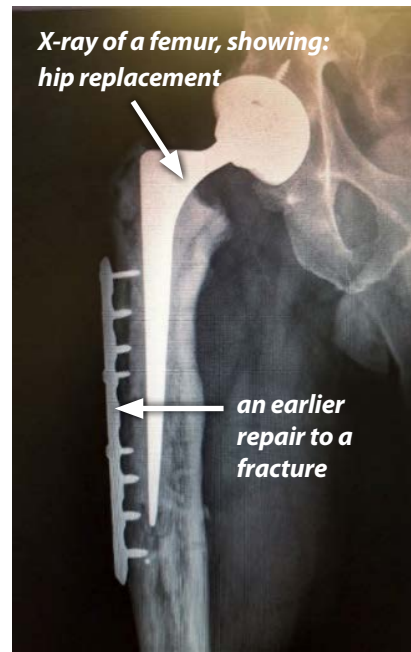


Figure 3.

## What is a bone scan and what information does it provide?

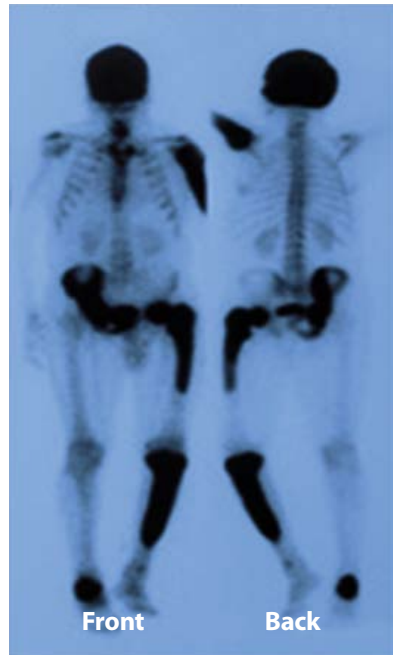
A radionuclide bone scan (Figure 4) is also known as a scintigram, isotope bone scan or nuclear medicine bone scan. It is more sensitive than x-ray at detecting bone affected by Paget's disease.

A radionuclide bone scan is recommended to determine which bones have Paget's disease and how active the disease is.

The radionuclide scan involves an injection into a vein of a small and safe amount of a mildly radioactive chemical called an isotope. This travels to the bones via the bloodstream and after around 3 hours a 'gamma' camera scans the skeleton to produce an image.

Abnormal bone absorbs more radioactivity than normal bone, so these areas are highlighted and picked up by the scanner.

There is usually no need to repeat the bone scan unless your specialist recommends it.



*Figure 4. Front view and back views of a radionuclide bone scan, showing Paget's disease in several bones (indicated by the black areas), including the skull, right pelvis, right ankle, left thighbone (femur), and left shinbone (tibia).*

## Are other types of imaging used?

The following are not routinely carried out but may be performed when there is doubt about diagnosis or to access complications.

### Magnetic Resonance Imaging (MRI)

- Uses a strong magnetic field and radio waves
- Produces detailed pictures of soft tissue such as ligaments and muscles
- Can identify fractures
- Does not involve exposure to ionising radiation

### Computed Tomography (CT) Scan

- Uses several beams of x-rays at the same time
- Produces detailed pictures, particularly of bone, and provides information about fractures
- Uses higher doses of radiation than normal x-rays and would only be used if there was a good medical reason to do so

### Bone Density (DXA) Scan

- Used to diagnose osteoporosis and not Paget's disease
- Measures bone density in the lower spine and hip

## Will a bone biopsy be required?

A bone biopsy is a procedure in which a small sample of bone is taken and examined under a microscope. This is seldom required but can be useful if there is uncertainty about the diagnosis.



## Monitoring

Disease activity can be monitored by repeating the alkaline phosphatase blood test on an annual basis and should be checked sooner if pain recurs at the site of Paget's disease.

## The Paget's Association

The Paget's Association is the only UK charity to focus solely on Paget's Disease of Bone in adults.

The Association:

- acts as a resource for patients, carers and professionals
- offers high-quality information and support
- raises awareness of the condition
- funds and encourages Paget's research projects
- provides educational awards
- promotes excellence in care and research, through the Paget's Association Centre of Excellence (PACE) Award

## Further Information

Information is available on the Paget's Association's website. Other information booklets, written for those affected by Paget's disease, are available and include:

- *Paget's Disease – The Facts*
- *Paget's Disease & Pain*

Information is also available for health professionals and researchers.

## Membership of the Paget's Association

Become a member to receive a detailed Paget's Information Pack, and our quarterly, informative Paget's News magazine. For full details and a complete list of current membership benefits, please visit our website.

Join online at [paget.org.uk](https://www.paget.org.uk)

Alternatively, contact us using the details on page 11.



## References

### Paget's Guideline

Ralston, S. H. et al, (2019), Diagnosis and Management of Paget's Disease of Bone in Adults: A Clinical Guideline. Journal of Bone Mineral Research. Vol. 34, p 579-604.

References regarding other sources of information used for this booklet are held by the Paget's Association. Should you require further information on these, please contact us.

# Get in Touch

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# Paget's Association

[paget.org.uk](https://www.paget.org.uk)

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