Paget’s Disease
THE FACTS

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Introduction

If you have been newly diagnosed with Paget’s disease of bone you will probably have many questions. This booklet has been produced by the Paget’s Association with the aim of providing up-to-date information which will enable you to participate in relevant discussions with your medical team. It has been reviewed by lay and medical trustees of the Association and whilst it is intended to offer you information on Paget’s disease, it is not designed to replace specific guidance you may receive from a health professional, with respect to your individual care. In this booklet you will find information regarding various aspects of Paget’s disease and details of other organisations which you may find useful.

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Healthcare and Education Officer
The Paget’s Association
What is Paget’s disease?

First described by Sir James Paget (figure 1) in 1876, Paget’s disease is a bone disorder that occurs more commonly with advancing age. By the age of 80 years it presents in approximately 8% of men and 5% of women. The UK has the highest prevalence of this disease in the world but it is also common in western and southern Europe, USA, Australia and New Zealand. Over the past 25 years both the prevalence and severity of Paget’s disease has reduced in this country. Many people with Paget’s disease have no symptoms and are unaware that they have the condition.

Figure 1 Sir James Paget
How does Paget’s disease affect bone?

Bone is an active living tissue that is constantly being renewed through a process known as remodelling. Cells called osteoclasts break down old, damaged bone to make way for new bone laid down by cells called osteoblasts (Figure 2). Over time, this bone is mineralised, forming a hard and strong skeleton.

Under normal circumstances the amount of bone removed is balanced by the amount of bone laid down. In Paget’s disease the osteoclasts are bigger than normal and break down bone more rapidly. The osteoblasts respond to this by depositing new bone at an increased rate. As a consequence the structure of this bone is abnormal and more fragile, which may lead to an increase in the actual size of the bone (figures 3, 4 and 5).
Osteoclasts increase in number and size

Increased bone resorption

Increased osteoblast activity to form new bone

Weaker new bone abnormal in shape and structure

Figure 3 - Bone Remodelling - Abnormalities in Paget’s disease

Figure 4 - Transition from normal (lower) to abnormal (upper) bone.

Figure 5 - Zone of bone resorption moving down the shaft of the thigh (femur) bone.
Paget’s disease can affect only one bone when it is known as monostotic or it may affect several different bones when it is known as polyostotic.

Although other bones can be affected, Paget’s disease is most commonly found in the spine, thigh (femur), skull, pelvis and sternum (Figure 6). Whilst the disease can slowly spread in an affected bone, it does not spread from one bone to another.

Figure 6 - Sites affected by Paget’s disease
What causes Paget’s disease?

There are still some uncertainties about the causes of Paget’s disease but there is a general understanding that it is due to a combination of inherited and environmental influences.

Genetic factors must play an important role, since about 15% of people have a positive family history. A number of genes have been identified which predispose to Paget’s disease, and the most important of these is called Sequestosome 1 (SQSTM1). Abnormalities of SQSTM1 are found in about 40% of people with a family history of Paget's disease and about 10% of people who have no family history. Seven other genes have also been identified that predispose to Paget's disease and four of these are known to be involved in regulating production of cells responsible for renewal and repair of bone. It is believed that people who develop Paget's disease have over activity of these genes. Genetic factors are now thought to account for about 86% of the risk of developing Paget's disease. It is also thought that exposure to certain viruses, such as measles, and other environmental factors may also influence the development of Paget’s disease in an individual who is genetically predisposed.

It is unclear why only certain bones are affected. This may be related to mechanical stresses that are placed on the skeleton at specific sites or differences in the blood supply to these bones.
SYMPTOMS AND COMPLICATIONS

What are the symptoms?

In many cases there may be no symptoms and individuals are unaware that they have Paget’s disease. It may be discovered by chance on x-ray or if a blood test is performed for another reason.
Some patients will present with symptoms, of which pain is the most common.
Deformity can sometimes be apparent. For instance, long standing disease over many years, may cause the weight bearing bones of the leg to develop a bowing deformity.

What are the possible complications?

• A predisposition to fracture in affected bones, particularly the long bones of the arm and leg (figure 7)
• Since Paget’s disease starts at the end of long bones, it may accelerate the development of osteoarthritis at adjacent joints
• Enlargement of vertebrae in the spine can produce pressure on the spinal cord or nerve roots causing back pain, leg weakness or sciatica
• Paget’s disease can sometimes cause enlargement of the skull and can affect the hearing mechanism leading to deafness
• An unusual and very rare complication is a type of bone cancer, called sarcoma but this occurs in less than 1:1,000 people with the disease
A fissure / stress fracture (arrowed)

A complete transverse fracture
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<th>If you have Paget’s Disease here:</th>
<th>You may have some of these symptoms and complications</th>
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<tr>
<td>Pelvis</td>
<td>Pain. Arthritis in the hip joint.</td>
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<tr>
<td>Skull</td>
<td>Headaches. Change in shape and / or size of the skull i.e. enlarged head, wide forehead. Hearing loss, ringing in the ears.</td>
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<tr>
<td>Spine</td>
<td>Affected vertebrae may become deformed causing curvature of the spine, pain, pressure on nerve roots with tingling, weakness and numbness in the legs.</td>
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<tr>
<td>Thigh</td>
<td>Local pain at the site of disease or related to arthritis of the hip joint. Fissure (partial) fractures in the bone may lead to a complete fracture.</td>
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<tr>
<td>Shin</td>
<td>Pain, affected bone may feel warm, bowed leg, arthritis in knee joint, fissure fractures in bone, complete fracture.</td>
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HOW IS PAGET’S DISEASE DIAGNOSED?

Paget’s disease may be identified by an x-ray, blood test or bone scan. Pagetic bone has a very distinctive appearance on x-ray and may be found by chance when an area of the body is x-rayed for a different reason; this may also occur with MRI or CT scans.

When Paget’s disease is suspected, an isotope bone scan should be performed because this is the easiest way of identifying all the areas of skeletal involvement. The bone scan involves the use of a small amount of a radioactive tracer, which is injected into a vein in the arm and highlights increased areas of activity in the skeleton.

A common test in general practice is to measure liver function which includes a chemical called alkaline phosphatase (ALP). This is produced by the liver and bone cells (osteoblasts). If there is overactivity of osteoblasts due to Paget’s disease this level will usually be raised. If there is co-existent liver disease, it may be necessary to perform more specific blood tests on the liver and bone to identify the source of the elevated ALP. There are a number of more specific blood tests of bone cell function but these are generally restricted for use in specialist centres.

Very occasionally a biopsy of the bone may be taken if there is a question about the diagnosis.

For a more detailed explanation of tests please see our booklet “Paget’s Disease - Investigations Explained”
Who needs treatment for Paget’s disease?

In many cases, Paget’s disease is found by chance, does not cause any symptoms and does not require any treatment. However treatment may be recommended if the affected bones are painful. Sometimes treatment is given if Paget’s disease affects a site that might be expected to cause complications such as the skull or a weight bearing bone, although it is not yet known if complications can be prevented by treatment.

What are the common treatments?

If the disease is limited and results in occasional mild pain, this can easily be controlled by pain killing drugs, for example paracetamol.

Bisphosphonates are an important group of drugs which work by reducing abnormal osteoclastic bone destruction. Since there is a link between bone destruction and formation this helps to restore the normal structure of bone. In addition, bisphosphonates can help to reduce pain caused by active disease. As these drugs are deposited in the bone, the benefit may last for several months or years and if given in the early stages, may prevent further complications. Bisphosphonates are given as tablets or through a drip directly into the bloodstream (intravenous). Risedronate is the most commonly used oral drug. Zoledronate and pamidronate are intravenous preparations.
### Oral drugs

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<th>Name of Treatment</th>
<th>Mode of Treatment</th>
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| Risedronate (i.e. Actonel) (best oral treatment) | • One 30mg tablet daily for 2 months  
• Taken on an empty stomach with a full glass of water, first thing in the morning  
• Wait at least 30 minutes before having food, drink and other medication  
• Do not lie down after medication  
• Further course may be given after 6 months |
| Etidronate (i.e. Didronel) (rarely used) | • Two 200mg tablets daily for 6 months  
• Taken on an empty stomach with a full glass of water  
• Taken at any time as long as there is a period of 2 hours before and after food, drink and other medication  
• Further course may be given after 6 months |
**Side effects**

Side effects can include heartburn and stomach discomfort. Occasionally these treatments are associated with joint and bone pains. They can give rise to skin rashes and inflammation of the eyes, but these are rare occurrences. Osteonecrosis of the jaw has been reported with risedronate but again, very rarely.*

**Intravenous drugs**

| Zoledronate (i.e. Aclasta) | • Given directly into the bloodstream over 15-30 minutes  
• One dose of 5mg may be effective for several years |
|---------------------------|------------------------------------------------------------------|
| Pamidronate (i.e. Aredia) | • Given directly into the bloodstream over 2-4 hours  
• Dosage (60 – 90 mg) and frequency will depend on severity of symptoms |

**Side effects**

Flu like symptoms can occur 24 - 48 hours after infusion and both treatments can be associated with occasional bone and joint pains. There may be occasional redness and swelling at the site of infusion and rarely inflammation of the eyes. Zoledronate and pamidronate may cause a decrease in calcium levels and as a precaution vitamin D (25-hydroxy vitamin D) levels might be measured. Calcium and vitamin D
supplements may be given prior to treatment. Infusion with Zoledronate can occasionally be associated with atrial fibrillation (irregular heart beat) but a causal link for this has not been established. Osteonecrosis of the jaw has been rarely reported *

It is important to notify your GP should lasting side effects occur.

Do talk to your doctor if you have any concerns at all about your treatment.

*For further information see the section: When should bisphosphonates be avoided?

How do I know if the treatment is working?

All bisphosphonates are usually effective at reducing pain in the pagetic bone, although the amount of pain relief will vary between individuals, particularly if there is significant osteoarthritis. The blood test for Alkaline Phosphatase is an indicator of disease activity and should be measured prior to starting treatment and be repeated 2-3 months later, when it should have decreased. If the level does not fall to within the normal range and symptoms related to active disease are still present, further treatment may be required.
When should bisphosphonates be avoided?

Whilst it is important that treatment is given to control Paget’s disease, this decision may be modified if an individual has other serious medical problems that could be aggravated by bisphosphonates.

On rare occasions bisphosphonates are associated with osteonecrosis of the jaw, a condition which may present after dental surgery, when the gum over the affected area is worn away and the exposed bone fails to heal. The risk of this condition is greater if bisphosphonates are given for cancer and is very rarely seen in those with Paget’s disease. As a precaution however, if you have to undergo extensive dental procedures, it is important to inform your dentist that you are having bisphosphonate treatment and it is probably wise to complete any extensive dental treatment prior to starting this medication.

Bisphosphonates are excreted by the kidneys and they should be avoided if a person has severe kidney disease. Although bisphosphonates are rarely given to younger people they should be avoided during pregnancy as their effects on the foetus are unknown.
Other medication

Calcitonin
Although this was the standard treatment for Paget’s disease in the past, it is now rarely used. Given as a daily injection for 6-18 months it may be less effective than bisphosphonate treatment in controlling the condition, although it may offer good pain relief. Common side effects include nausea and flushing.

Calcium and vitamin D
Many older people may have low vitamin D levels and may therefore require additional supplementation with vitamin D. Additional calcium would also be required if an individual has a low intake of dairy produce.

Analgesics
Although bisphosphonates and calcitonin can help to reduce bone pain, some patients require additional medication (analgesics) for maximum pain relief, particularly if there is significant osteoarthritis in major joints. Analgesics that are commonly used include paracetamol, co-codamol and dihydrocodeine or anti-inflammatory drugs such as ibuprofen.

For additional details see our booklet “Paget’s Disease and Pain”
Is surgery needed to treat Paget’s disease?

There are several situations when surgery may be necessary. If an affected bone breaks it may require either a plaster cast or an operation to stabilise the fracture and this would depend on the site of the break. Paget’s disease can lead to marked damage of the joints (osteoarthritis) and if symptoms and disability from this become severe, joint replacement surgery may be required. Marked bone deformity, usually seen in the lower leg may require an osteotomy which involves the bone being broken and then reset in a more normal shape. Paget’s disease in the spine can press on the spinal cord causing a narrowing that occasionally needs to be corrected surgically if medical treatment is unsuccessful.

DIET AND EXERCISE

Does diet and exercise affect Paget’s disease?

There is currently no evidence that diet influences the risk of developing the disease or its severity. However being excessively overweight can place extra strain on the joints and can exacerbate wear and tear if these are affected by osteoarthritis.

Regular exercise helps to keep the joints more mobile, maintains muscle tone and also helps to control weight. Care must be taken however to avoid excess stress on a pagetic bone and any type of intensive exercise programme should be undertaken with caution.
IS PAGET’S DISEASE ASSOCIATED WITH OTHER MEDICAL CONDITIONS?

**Osteoarthritis**
Paget’s disease is associated with an increased risk of developing osteoarthritis. Deformity or enlargement of a bone can place increased stress on an adjacent joint which can lead to excess wear and tear. For example, if the bone in the lower leg is bowed this could affect either the knee or ankle joint. Osteoarthritis will lead to increased pain and may limit mobility.

**Osteoporosis**
People with Paget’s disease occasionally develop osteoporosis but this is likely to be a coincidence, as both diseases are common in older people. Bisphosphonate drugs are used to treat both Paget’s disease and osteoporosis but they are given in different doses, over different periods of time, for the two conditions.

**Heart disease**
Paget’s disease does not directly affect the heart but if it is widespread the heart may have to work harder to pump extra blood to involved bones. Whilst this is rarely a problem, it could place an extra burden on the heart, particularly if there is pre-existing heart disease.

References on specific sources of information are held by The Paget’s Association and should you wish for further information on these, please feel free to contact us.
We’re here to help

The Paget’s Association was founded by the late Mrs Ann Stansfield MBE, in 1973, after her personal experience of the lack of interest and understanding of Paget’s disease by those caring for her husband. The Association is a registered charity relying almost entirely on voluntary contributions, gifts, legacies and fundraising activities in order to develop and continue its work. The main aims of the charity are to:

• Offer support and information to those with Paget’s disease, their families and carers
• Raise awareness of the condition among health professionals and the general public
• Encourage and sponsor research into the causes, treatment and prevention of Paget’s disease

Information

Information available from the Paget’s Association includes newsletters and booklets. Information is also available via the Association’s website: www.paget.org.uk

Information booklets available:
  Paget’s Disease -The Facts
  Paget’s Disease & Pain
  Paget’s Disease - Investigations Explained

If you require information in large print or any other format please contact the Association.
Tell us what you think of our booklets. Please send your views to helpline@paget.org.uk or write to us at:
The Paget’s Association, Suite 5, Moorfield House, Moorfield Rd, Swinton, Manchester, M28 0EW.
Alternatively if you have received a feedback form please complete and return it.

**The Helpline**
The Paget’s Association has a Helpline managed by an experienced Registered Nurse. The Helpline is available to everyone and can be accessed by telephone, email or letter.

For further support please contact the

**Nurse Helpline**

Call direct: 077 135 681 97
or tel: 0161 799 4646 - ask to speak to the Healthcare and Education Officer

You can also email or write

Email: helpline@paget.org.uk
Write to: Suite 5, Moorfield House, Moorside Rd, Swinton, Manchester, M28 0EW

For General Enquires i.e. membership, please call the office on 0161 799 4646

**Meetings**
Meetings for members are organised in various places throughout the year. The meetings give an opportunity to listen to presentations from experts, raise questions and meet with one another. In some areas there are also local support groups.
**Paget’s Support Network**
The Paget’s Support Network is available free to members of the Paget’s Association, enabling communication by telephone, email or letter, with others who have Paget’s disease.

**Healthcare professionals**
The Association plays an important role in highlighting Paget’s disease to healthcare professionals and providing up-to-date information and advice as required.

**Research**
Each year the Paget’s Association continues to fund high quality projects. Research grants have supported projects on scientific, genetic, social and quality of life issues resulting in advances in the understanding and treatment of Paget’s disease. Further information can be found in the members’ newsletters produced by the Paget’s Association and on the website. www.paget.org.uk

**How can I become a member?**
Patients, family and healthcare professionals can join the Paget’s Association. You can become a member online: www.paget.org.uk or by calling 0161 799 4646.
Which other organisations can provide support?

**Carers UK**
Tel: 020 7378 4999  Website: www.carersuk.org

**AgeUK (formerly Age Concern and Help the Aged)**
Helpline: 0800 00 99 66  Website: www.ageuk.org.uk

**Arthritis Research UK**
Tel: 0300 790 0400  Website: www.arthritisresearchuk.org

**Arthritis Care**
Tel: 020 7380 6500  Website: www.arthritiscare.org.uk

**The British Pain Society**
Tel: 020 7269 7840  Website: www.britishpainsociety.org.uk

**Pain Concern**
Helpline: 0300 123 0789  Website: www.painconcern.org.uk

**Exercise leaflets are available from: Later Life Training**
Tel: 01838 300 310
Website: www.laterlifetraining.co.uk
Their exercise leaflets are also available from the Paget’s Association’s office: 0161 799 4646
Use this space to keep a record of your appointments, tests, results, and also your treatment and its effects

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