Paget’s Disease and Osteoarthritis

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Introduction

Paget’s disease of bone is a chronic disorder of accelerated bone break down (resorption) and subsequent bone formation. This occurs in an uncoordinated and unregulated fashion resulting in expanded, misshapen bones. These bones are thickened, but fragile. Active Paget’s can cause pain in the affected bones, but the pain can also be due to other complications of the condition. These include tiny cracks (micro fractures), complete breaks (fractures), mechanical problems related to the deformity putting stress on joints and soft tissues and also nerve entrapment by expanded bone. Another possible cause of pain is the development of wear and tear in the neighbouring joints. This is called osteoarthritis (OA).

What is osteoarthritis?

OA is the commonest condition to affect joints in humans. It can affect any joint which has cartilage, but has a predilection for joints which suffer a lot of use such as thumb bases, fingers, big toes, our spines, hips and knees. It is most commonly referred to as wear and tear. The surfaces of the bone at our joints are usually covered with a nice, soft, squidgy material called cartilage. This cartilage helps to absorb impact and, along with some lubricating fluid, allows our joints to move smoothly and painlessly. It is not very good at repairing itself and as we get older it wears out. Indeed pretty much anyone over 40 years old will have some OA on x-rays of their joints. As the cartilage wears it becomes roughened and thins. As it thins the protection of the bones is lessened and they start to grate against each other. We can both hear and feel this on examination of an affected joint. The underlying bone reacts to this and forms new bits of bone which stick out. These bony spurs are known as osteophytes. Osteophytes can sometimes be felt for example at the ends of the fingers. The underlying bone becomes denser (sclerosed, which appears white on x-rays) and cysts can form beneath the bone surface. The bone can sometimes collapse and bits can break off and get into the joint. Occasionally the joint will swell. The figures below illustrate the progression of the joint damage over time.
A number of factors increase the risk of development of osteoarthritis. These include: advancing age, previous trauma to a joint or nearby fracture, overuse and mechanical problems such as limb shortening or deformity. Obesity is certainly a risk factor, particularly for weight bearing joints such as the knee. There would appear to be a genetic predisposition with family history being important especially if a lot of bony spurs develop (nodal osteoarthritis). Other rheumatic conditions can also predispose to OA including hypermobility, inflammatory arthritis like rheumatoid arthritis and conditions of high bone density such as osteopetrosis and Paget’s disease.

The presence of OA causes pain, joint stiffness, loss of function and change in appearance. The stiffness is worst at rest, but also after activity and towards the end of the day. The stiffness generally lasts for less than half an hour in the morning. The pain tends to be worst after activity. On examining the joint there may well be some swelling, bony enlargement and deformity, crepitus (creaking), restricted movement, joint instability and pain on movement. There may well be tenderness along the joint line, as well as muscle weakness and wasting. The loss of muscle worsens pain and reduces stability.
Figure 2. Hands affected by osteoarthritis. The bony spurs or nodes at the end of the fingers can be clearly seen.

Figure 3. X-rays of the same hand as above. There is loss of joint space, bony spur formation and sclerosis around the joint.
How does Paget’s disease cause osteoarthritis?

Paget’s disease has long been associated with the development of osteoarthritis with references to this being one of the common skeletal manifestations of the disease dating back to the early 1960’s and 1970’s. It has been suggested that the presence of Paget’s disease in adjacent bone can accelerate the development and severity of OA in a joint. The pain from OA can be greater than that from the Paget’s. OA is well worth considering as a cause of ongoing pain when the Paget’s itself has been treated.

The development of OA could be related to the altered cellular activity in the adjacent bone. However, it is likely that altered mechanical loading of the joint is a major factor, which will accelerate wear and hence cartilage loss. The expansion and bowing of bones such as the thigh bone (femur) and shin bone (tibia) will alter the normal alignment of the bones with the joint and put extra stress on joints; in this case the hip and knee respectively. The bowing can also cause limb shortening, which will once again alter the stresses on the joint for example when standing or walking. The net result will be accelerated cartilage loss and osteoarthritis. Figures 4 and 5 show joint damage as a result of Paget’s.

Figure 4. X-ray of pelvis showing Paget’s of pelvis and femur. Note that the right hip has lost joint space compared with the left indicating the presence of osteoarthritis.
Management of osteoarthritis

Although there is no cure for OA there are many things that can be done to help. This can start simply with education so that the sufferer understands the process. Pain killers are important and paracetamol if taken regularly can be very helpful, but the strength of pain relief may need to be stepped as necessary. Topical anti-inflammatory gels rubbed onto the affected joint sometimes help and occasional anti-inflammatory tablets, although they may not be the most effective means of pain control for OA. Sometimes joint injections can be undertaken with steroids, although their effects tend to be short-lived.

The individual can help themselves by reducing the stress on the affected joints. Weight loss is advisable. Non-weight bearing exercise such as swimming or cycling, e.g. an exercise bike can help to maintain muscle strength and fitness which becomes more important for joint stability. Physiotherapy can be of help here and the therapist can try various treatments including specific muscle strengthening exercises. Correct footwear is helpful to reduce stress. Shoes should be flat, with good arch support, cushioned soles, broad fit and good ankle support. Trainers can be surprisingly comfortable. Sometimes special insoles, shoes or
splints and supports may be needed. The stress on joints can also be relieved by a walking stick and the physiotherapists can provide these along with a variety of other types of walking aid. Occupational therapists can help find ways to alter the home or have aides and appliances which may make it easier to cope with the loss of function and mobility. In Paget’s disease splints and supports may be particularly useful as the altered shape of bones will alter the mechanics of the limb. Attempts to adjust for this can be helpful in relieving pain.

Ultimately, the joint may become so severely affected that surgery is considered necessary to relieve the pain. The simplest approach would be a look inside the knee using key hole surgery. This is termed an arthroscopy and can be useful to tidy up broken bits of cartilage, remove debris and wash a knee out. If a limb is deformed or bowed then attempts to straighten it could be undertaken. This might involve the removal of a section of bone (osteotomy). The ultimate solution may be joint replacement, i.e. a new joint. These are highly successful procedures especially at the knee and hip. They can last for many years and relieve pain as well as improving mobility. They are large operations and as with any procedure the pros and cons need to be weighed up carefully. It is worth noting that prior to operating on bone affected by Paget’s disease it is important that the Paget’s is well controlled. Active Pagetic bone has an increased blood flow, which will result in excess blood loss. Good treatment of Paget’s disease prior to surgery will reduce the blood flow and minimise any bleeding.

**Conclusion**

Paget’s disease of bone is associated with OA. OA is a very common condition and is due to the joint wearing out. Although there is no cure there is much that can be done to alleviate the symptoms and loss of function. This includes pain killers, physiotherapy and occupational therapy and where necessary, surgery.

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