Knee osteoarthritis is a common condition which, like hip osteoarthritis, causes a great degree of morbidity to those affected. The condition can be primary or secondary, with common causes of secondary arthritis being trauma. Bony trauma causes the secondary process by directly affecting the articular surface. However, more commonly it is damage to ligamentous or meniscal structures which imbalance the knee, leading to accelerated wear.

**Etiology**

The underlying process for knee osteoarthritis is similar to that of hip arthritis with the ultimate consequence being degeneration and loss of the articular cartilage.

In the knee there are three compartments which must be considered. They may develop arthritis individually or all at the same time. These are the medial and lateral tibiofemoral joints and the patellofemoral joint.

Disease in the medial and lateral joints commonly leads to the varus and valgus knee developing as discussed below.

**Epidemiology**

Knee osteoarthritis occurs more commonly in women and tends to present in the fifth or sixth decade of life. The condition appears to be especially prevalent in women of African American descent.

Risk factors for the condition, especially secondary arthritis include; trauma, meniscal pathology, recurrent patella dislocation, ligamentous instability and obesity.

**History and Examination**

Patients with the condition usually present with pain in the affected joint. There is often morning stiffness which eases as the patient mobilises. A decreased range of motion with limited extension and flexion is common. Patients also complain of crepitus and instability in the joint, especially with tibiofemoral disease.

Examination usually reveals a quiescent knee without warmth or erythema, but a moderate knee effusion is often present. On standing patients with tibiofemoral disease may demonstrate varus or valgus knees where the medial or lateral compartments are disproportionately affected. Looking from the side may show a fixed flexion deformity.

Feeling the knee as the patient flexes it often reveals crepitus throughout the range in tibiofemoral disease and in the final arc of extension in patellofemoral disease.

X-rays will show some or all the classical features of OA including joint space narrowing, subchondral sclerosis, osteophytes and bone cysts.
On the left is an AP x-ray of a varus right knee. The dotted line shows the midline which is the axis on which the knee should lie. Medial compartment disease has caused the tibia to drift towards the midline. On the right is a valgus right knee. Lateral compartment disease has caused the tibia to drift away from the midline.

Non Surgical Management

The initial management of knee OA is typically non-surgical. The mainstay is with oral analgesia, physiotherapy and joint injection. For details on how to perform a knee injection please see the earlier chapter. Patients who are obese should be encouraged to lose weight which will slow the development of the disease and may reduce pain. Patients with OA who wish to remain active should be encouraged to follow low impact exercise regimes such as cycling and swimming.

Patients with medial or lateral tibiofemoral disease may benefit from offset bracing. These are braces which are worn when mobilising, over the knee joint, with the aim to offset the weight passing through the joint to the less or unaffected side.

Perhaps more so than in hip osteoarthritis it is important to try and delay arthroplasty until the patient is quite symptomatic and has failed all other interventions. The main reason for this is that outcomes from arthroplasty tend to be more guarded than with total hip replacement. Especially in younger patients who's satisfaction scores tend to be lower.
Surgical Management

There are a number of commonly used surgical interventions for patients with knee OA. Many patients will gain temporary benefit from having knee arthroscopy, debridement and washout. While this is by no means curative, it may reduce symptoms enough to delay arthroplasty for months or years. It also has the added benefit of directly visualising the articular cartilage to confirm the diagnosis and to rule in or out the possibility of a partial arthroplasty option.

Young patients with medial or lateral tibiofemoral disease may benefit from a femoral osteotomy or a tibial osteotomy. The primary aim of the procedure is to offload the body weight to the less affected side in the same way as an external brace. In general this is not a common procedure.

Apart from arthroscopy and osteotomy, the only interventions left involve arthroplasty. These fall into two main groups, partial and total knee replacement. Partial replacements can be used for patients with disease affecting only one of the three compartments. It is preferable to confirm this at time of surgery with a pre-operative arthroscopy in case more advanced disease is present necessitating total joint replacement.

This x-ray shows a unicompartmental knee replacement on the medial side of the knee. As can be seen on this weight bearing view the lateral compartment is well preserved with a good joint space present.
This x-ray shows a lateral x-ray of a patient who has undergone patellofemoral joint replacement.

This x-ray is of a total knee replacement. In some cases the patella is resurfaced and in others it is left. This depends on a degree to the thickness of the remaining patella, the degree of arthritis it demonstrates and surgeon preference.
Follow-up and Outcomes

The follow up for patients in the initial stages of the disease process depends on the severity of the symptoms and the intervention performed.

Patients who are being managed with oral analgesia and physiotherapy are usually managed by the general practitioner. Referral to secondary care is usually made once these interventions are becoming inadequate.

The authors recommend that patients receiving intra-articular injection be given an open appointment. This allows the patient to return at their discretion, once symptoms have returned, at which point further injection or surgery can be considered. Response to injections varies significantly. Some patients will derive benefit for months after the injection whereas others may deteriorate quickly back to their baseline over days to weeks.

Followup after arthroplasty is similar to any other joint replacement. The patient usually returns for a checkup at six weeks and one year. After this, provided no issues are identified, follow up can usually be at five and ten years and so on. Some surgeons do prefer more frequent follow up, especially with partial joint replacements, as OA may progress in the other compartments necessitating revision surgery.

Outcomes from total knee replacement are generally excellent and most prostheses last at least 15 - 20 years. Patients may sometimes feel that they still get aches and pains in the joint and may also have problems with activities requiring them to kneel. Partial knee replacements more often fail because other compartments in the knee succumb to OA causing pain and restriction. However, revision for these patients is almost always to a primary total knee prosthesis and after this is performed they mostly do as well as patients in whom this was the first operation.