

Understanding

Hip and Knee Arthritis Surgery

Mr Richard Villar

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IMPORTANT

This book is intended not as a substitute for personal medical advice but as a supplement to that advice for the patient who wishes to understand more about his or her condition.

Before taking any form of treatment
YOU SHOULD ALWAYS CONSULT YOUR MEDICAL PRACTITIONER.

In particular (without limit) you should note that advances in medical science occur rapidly and some information about drugs and treatment contained in this booklet may very soon be out of date.

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About the author



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Introduction

Arthritis

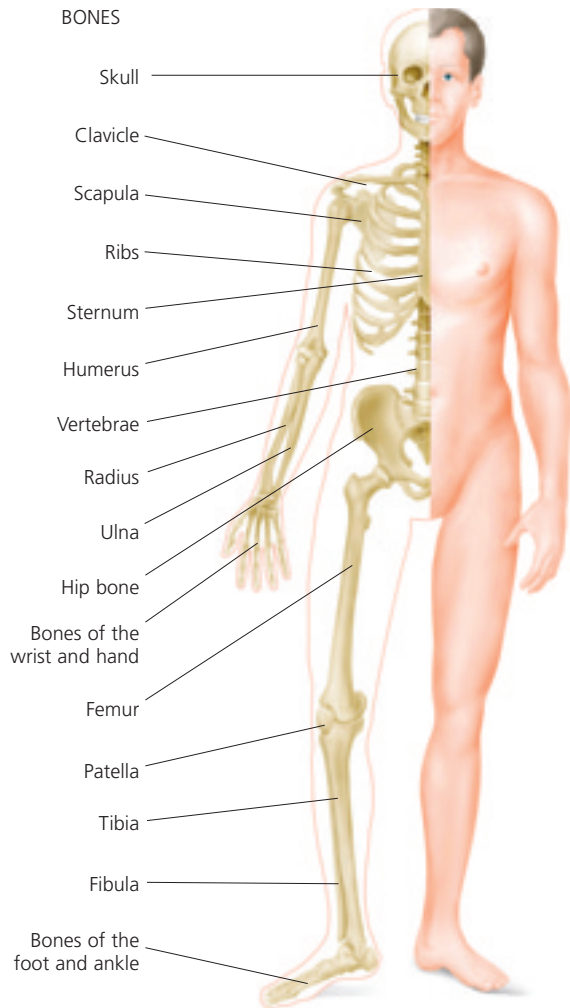
Arthritis has existed for thousands of years. There are about 200 types that can affect all ages, although the most common are osteoarthritis and rheumatoid arthritis. It was only in the twentieth century that the two were recognised as different. Indeed, as recently as the eighteenth century all forms of arthritis were thought to be caused by gout.

Human beings are not alone in developing arthritis. Animals can also suffer from it, and ancient humans also developed it. Over 50 per cent of the population have arthritis in one or more of their joints. By the time you are 75 years old, there is an 85 per cent chance that you will have developed arthritis somewhere, particularly in the larger joints such as the hip or knee.

As arthritis is so common it is a major concern to the whole population. Not only does it affect the individual who has developed the disease, but it also affects relatives, friends, work colleagues and others, who must provide support for those who have it. Quality of life plummets, income can fall and treatment is regularly needed.

The human skeleton

The human skeleton is able to articulate so well because it has many joints. These tend to degenerate over time and can cause pain and discomfort.



Treating arthritis

Treatment can be either medical, with the provision of drugs and other non-invasive therapies, or surgical. The purpose of this book is to look at the various surgical solutions. Much of an orthopaedic surgeon's work in the modern era concerns the surgery of arthritis.

The two most common joints affected are the hip and the knee, both being major weight-bearing joints which for a long period take the knocks and thumps of everyday life. Surgical solutions can take many forms. Some are widely performed, whereas others are to be found only in specialist centres.

Despite the frequency of surgery, there are few places a patient may learn about the relative merits and disadvantages of surgery. This book aims to fill that gap.

KEY POINTS

- Over 50 per cent of the population have arthritis in one or more of their joints
- By the age of 75, there is an 85 per cent chance that you will have developed arthritis somewhere
- Treatment of arthritis can be either medical or surgical
- The two most common joints affected are the hip and the knee

Hips and knees – what they look like and how they work

The hip and knee joints

At each end of the long thigh bone (femur) there is a large weight-bearing joint. At the bottom is the knee and at the top is the hip. Although both joints are essential for walking, each looks totally different.

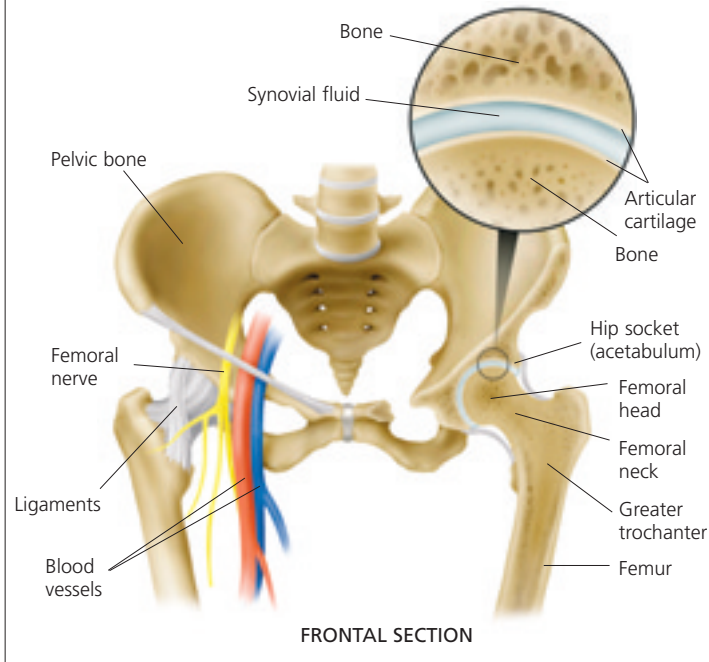
Hips

Each hip is a ball-and-socket joint. At the top end of the femur is the rounded femoral head that lies in the spherical hip socket (acetabulum).

To enable the joint to move with limited friction, the surfaces that lie against each other (articulating surfaces) are covered with gristle (articular cartilage). The gristle is lubricated by a tiny quantity of a yellowish fluid (synovial fluid), allowing the joint to move with less friction than even a skate on ice.

Hip and pelvis

Each hip is a ball-and-socket joint; the femoral head (the ball) is held within the acetabulum (the socket) by strong ligaments.



The femoral head is connected to the main shaft of the femur by a firm bridge of bone called the femoral neck. When elderly people fracture their hip joints, it is actually the femoral neck that is damaged.

At the junction of the femoral neck and the femoral shaft is a large bony protrusion called the greater trochanter. This is the hard lump of bone that can be felt on the outside of the hip and to which most people point when asked to indicate their own hip joint. In fact, the greater trochanter is not the hip joint at all, but it

is connected to the hip joint by the femoral head and neck.

The femoral head is kept within the acetabulum by strong ligaments. If these ligaments are divided (for example, at surgery) or ruptured (for example, in a car accident) then the hip can dislocate.

Dislocation can damage the blood supply to the femoral head by tearing the blood vessels, and the poor blood flow that results can, in turn, lead to the development of arthritis in later years.

Surrounding the hip joint are three major nerves: the femoral nerve, the sciatic nerve and the obturator nerve. These nerves transport nerve impulses back and forth from the hip, groin and lower limbs to the brain through the spinal cord, so that movement can be controlled and sensations felt. These nerves are, in turn, surrounded by blood vessels and major muscles.

The most powerful muscles supporting the hip joint are the three muscles known as glutei (gluteus maximus, gluteus medius and gluteus minimus) behind and the rectus femoris and iliopsoas muscles in front. If the glutei weaken, as happens when arthritis progresses, then a patient begins to limp.

The hip joint develops in the embryo after only eight weeks in the womb. Bones do not initially appear in bony form at all, but start as cartilage (firm, jelly-like substance) and then gradually turn into bone (hard substance filled with calcium). This process is known as ossification, and involves the removal of cartilage, which is replaced by calcium-rich bone, laid down by special bone-producing cells.

The centres of most bones become ossified in childhood, but the ends remain undeveloped till puberty to leave room for growth. At some stage between the

ages of 15 and 25 years the hip joint becomes fully developed and growth in that area ceases.

As people grow older, so their bones can become thinner, and in certain circumstances smaller. This is known as osteoporosis, a form of bone weakening that can lead to fractures, particularly of the hip, wrist and spine. Osteoporosis is different to osteoarthritis, though the two terms are often confused.

Knees

The knee is a very complex joint, formed by three bones: the shin bone (tibia), thigh bone (femur) and kneecap (patella). The fibula is near to the knee joint but does not specifically form part of it.

The knee is a hinge joint, that is, it mostly allows movement in a single plane, like the hinge of a door, although some rotation is possible.

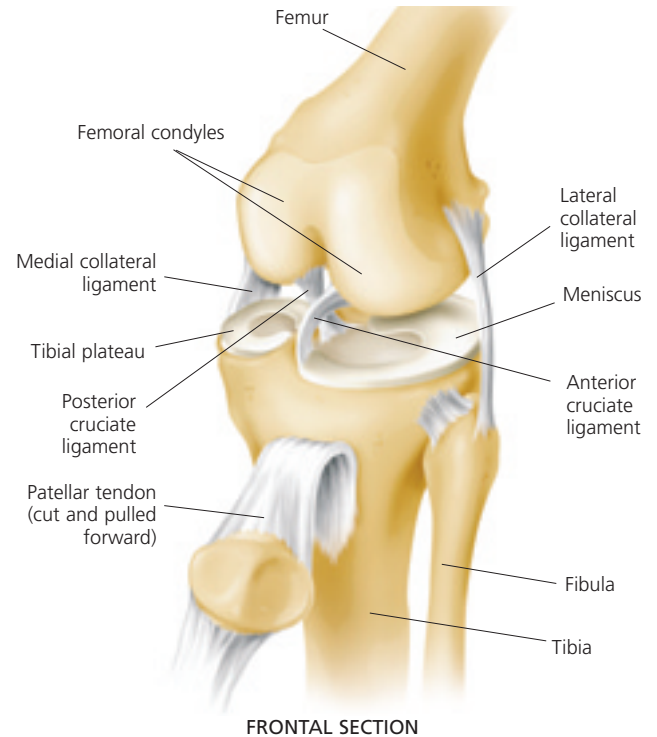
The lower end of the femur (thigh bone) is rounded to form the femoral condyles. The upper end of the tibia (shin bone) is flattened to form the tibial plateau. Logically, it seems a wonder that a joint of this shape can provide balance at all, but it does do so with the support of strong ligaments, which connect the lower femur to the upper tibia.

The ligaments of the knee include the collateral ligaments at each side and the cruciate ligaments in the centre of the joint. The cruciates, particularly the anterior cruciate ligament, are the structures so frequently relied upon, and damaged, by athletes.

On the front of the knee lies the patella (kneecap). This lies on the front of the lower femur, forming a joint called the patellofemoral joint. Injuries and diseases of this joint are a frequent cause of pain.

Knee joint

The knee is a hinge joint that mostly allows movement in one plane, like the hinge of a door, although some rotation is possible.



At the top end of the kneecap is attached the quadriceps muscle (the large bulky muscle in front of the thigh) and at the lower end is a tendon that inserts into the upper tibia. The patella helps reinforce the muscles responsible for knee straightening, which happens when the quadriceps contracts and pulls on the patella, which pulls on the tibia or shin.

Any activity that involves forcible straightening of the knee under pressure, for example, running up and down stairs two at a time, puts a great deal of strain on the patella.

As with the hip joint, much of the joint surface of the knee is lined with articular cartilage. Synovial fluid is also found within the joint.

There are many arteries around the knee, which bring blood from the heart to the structures of the leg. The largest is the popliteal artery, found directly behind the joint, and is a continuation of the femoral artery that has passed by the hip higher up.

Two major nerves are also found near the knee joint. These are the tibial nerve behind and the common peroneal nerve to the outside. These blood vessels and nerves are important because any trauma to the knee joint may also disrupt the blood or nerve supply to the leg.

The common peroneal nerve is particularly important because damage to this results in a drop foot deformity, that is, the patient is unable to lift the toes or ankle upwards. It can sometimes be seen after fracture, or occasionally as a complication of surgery.

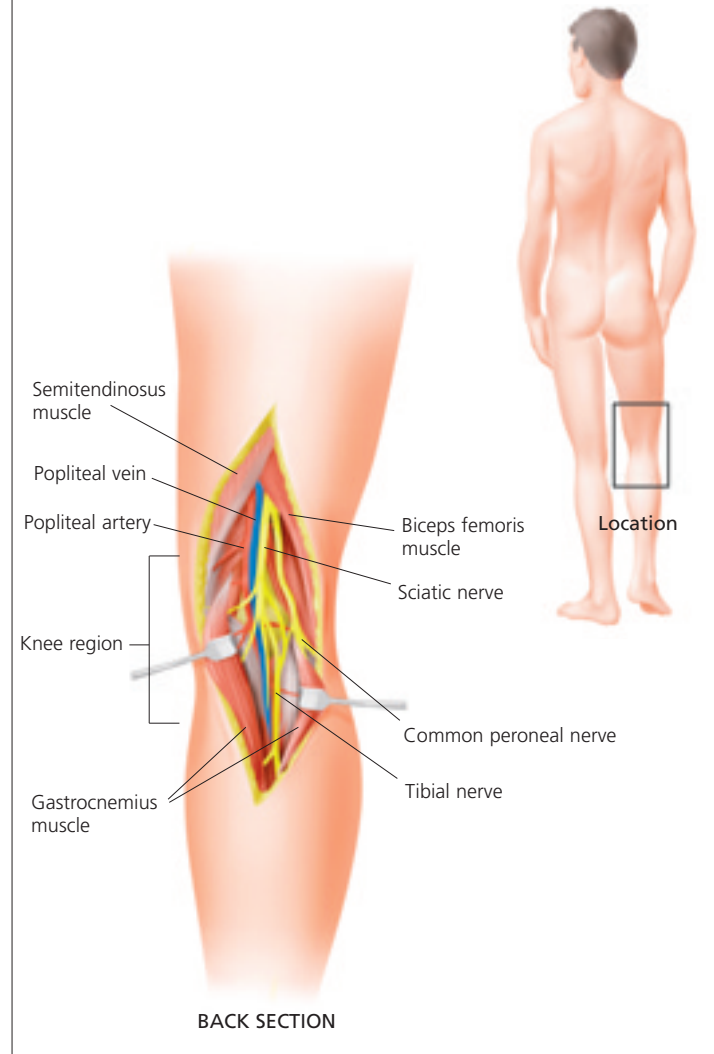
As with the hip, the knee first appears as a cartilaginous structure, later ossifying. The cartilaginous femur can first be seen in the womb eight weeks after conception, the tibia appearing a little later.

The kneecap does not appear in bony form until at least the age of three years in girls, even later in boys. The knee joint as a whole ceases growth between the ages of 17 and 20 years.

In early years bones tend to be softer and more pliable than later in life. They are harder to fracture

Arteries and nerves of the knee

There are many arteries, veins and nerves around the knee, and extreme care is exercised during surgery to prevent damage.



and heal faster if they do break. Sometimes childhood injuries can lead to arthritis in future years.

There are also certain types of arthritis that are specific to children which, in turn, can lead to major surgery being required at a young age.

KEY POINTS

- The hip is a ball-and-socket joint kept within the acetabulum by strong ligaments
- The hip joint stops growing between the ages of 15 and 25
- The knee is a hinge joint, although some rotation is possible
- The knee joint stops growing between the ages of 17 and 20

Arthritis

What is arthritis?

Arthritis can take many forms. The addition of '-itis' to the end of a word usually means inflammation. Here, however, it describes a gradual damage to the joint surface.

The two most common forms of arthritis are osteoarthritis and rheumatoid arthritis, but other conditions, such as ankylosing spondylitis, systemic lupus erythematosus ('lupus') or psoriasis can cause arthritis-type damage and are known as arthropathies.

Infection can also cause problems (septic arthritis). The common feature for all forms of arthritis is a loss of the smoothness of the articular surface so that low-friction movement is replaced by irregular, gritty, high-friction agony. The joint changes can then, in turn, cause changes to the muscles and ligaments surrounding the joint.

Osteoarthritis

Osteoarthritis is often referred to as wear and tear; others may call it degeneration, but they mean the

same thing. The first change that occurs in osteoarthritis is the wearing away of the cartilage which lines and protects the bony surface of a joint.

As the smooth surface of the joint disappears, so the now irregular joint surfaces creak and groan (a sound known as 'crepitus'). Small pieces of articular cartilage break off, giving rise to debris within the joint.

Sometimes these debris particles can enlarge to become loose bodies, by gathering other particles to them like snowballs rolling down a hillside. Entrapment of loose bodies may result in jamming or locking of the joint.

The gradual loss of articular cartilage is also associated with changes in the bone underneath. This bone, which used to be protected by the cartilage, starts to change shape markedly, often becoming flattened and mushroom shaped – similar to the ends of a wooden mallet that has been overused.

Various other bone changes can take place, including the formation of cysts within the bone. They are called subchondral cysts, and can occasionally reach an enormous size – five centimetres is not unknown. Also, within the osteoarthritic joint, bony protrusions start to appear at the edges, caused by new bone formation which is now deranged. These protrusions are called osteophytes and can be painful in their own right.

Eventually the articular cartilage wears down so much that the bone underneath it is exposed. Pain increases as movement against the exposed bone results in more friction. The synovial membrane which produces synovial fluid (which 'oils' the joint) also changes, becoming inflamed as a result of friction. In some cases, a synovial effusion results – this means that the joint becomes swollen and painful as too much synovial fluid is produced.

Osteoarthritis

Osteoarthritis is often referred to as wear and tear of the joints.

