

Leg re-alignment - A means to avoid knee replacement surgery



Patients with early arthritis often present to the clinician with a subtle bow-leg (varus) or knock-knee (valgus) deformity. This is due to the fact that in these cases some of the cartilage structures in weight bearing areas between thigh bone (femur) and shin bone (tibia) have worn. This in turn reduces the height of the affected knee compartment, causing it to be lop-sided. Such patients frequently complain of activity related pain or discomfort located across the inner joint space.

The traditional treatment of patients with subtle knee deformities associated with localised osteoarthritis has been a knee replacement. It is generally well understood that a joint replacement has a limited life expectancy and that a revision is likely at some point. Additionally, a replaced knee joint may impose limitations upon the patient's activity level, which is an important factor when considering the patients ability to continue with certain sporting activities or a specific occupation. For patients in their 40's and 50's a total knee replacement usually requires lifestyle changes, which may be unacceptable for some.

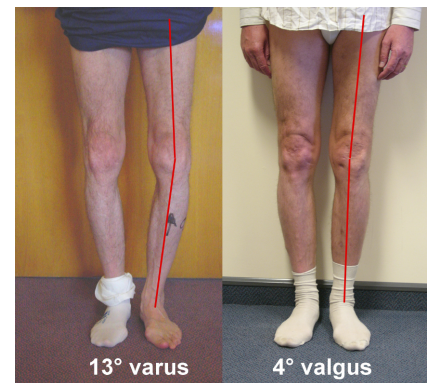
An established line of treatment adopted and developed by Droitwich Knee Clinic surgeons has given hope to this group of patients, allowing the knee joint to

be preserved rather than replaced. It is based on the principle of transferring load to the unaffected compartment of the knee in order to relieve symptoms and slow disease progression.

The idea is that when wear and tear (osteoarthritis) develops only on one side of the joint, the cartilage loss causes the leg to bow. Gradually the mechanical axis of the lower limb shifts until a point where excessive weight is going through the inside part of the knee (medial compartment). This will lead at some point to sudden severe deterioration. An established technique described to deal with this in the younger more active patient (up to the age of 65) involves realigning the lower limb, (high tibial osteotomy (HTO)). The conventional technique for this involves open surgery with plates and screws and bone grafting from the hip, a fairly invasive technique with potential complications including infection.

At the Droitwich Knee Clinic we have adopted the De Bastiani technique using an **external** fixator with a very minimally invasive approach leaving no metal behind at the end of the procedure. The procedure usually starts with keyhole surgery in order to deal with any abnormalities inside the knee, followed by application of an external fixator, and then through a tiny incision very carefully dividing the bone 2/3 of the way across, carefully preserving the covering of the bone and therefore allowing quick healing. The patient only stays in hospital for one or two nights and within 10 days is given an Allen key to start gradually stretching the new bone formation that has formed there. This process is called callus distraction. Fixators are very strong and allow up to full

weight bearing, the deformity is usually fully corrected within 3 weeks. At this point the fixator is locked and the patient is eventually encouraged to fully weight bear as this in fact encourages healing. The gap that has been created in the bone gradually fills with the patient's own bone. This is therefore a very biological process avoiding the need for internal fixation with old bone graft. The fixator usually stays on for a total of 3 months and after removal there is no metal left behind. Patient selection is essential. The clinician has to reassure himself that the opposite compartment is well preserved.



Before and after correction of a bow-leg deformity.

The other appealing factor with this technique is the absolute accuracy. The patient gets a long leg x-ray (scanogram) of the hip right down to the ankle and as this is digital the computer actually draws all the angles allowing thorough and accurate pre-operative planning. However, the clinician and the patient have full control over the final position of the leg and when a further scanogram shows that the target has been achieved accurately the fixator is locked. This is of course far more accurate than the open technique where full correction has to be achieved on the operating table.

Patients of course have to have realistic expectations for such a procedure. The diseased compartment is offloaded rather than cured by this procedure. There may be a degree of discomfort but it is usually far less than the situation before the surgery. If the disease is caught early enough this gives an 85% chance of delaying the knee replacement by 10 years. During this period of time the patient would be encouraged to remain as active as possible, although there may still be limitations. Of course if the option of a replacement was selected at a younger age it is likely that the knee replacement would wear out sooner than usual and need to be revised. Also, sports involving impact, twisting and turning or contact are of course discouraged with any kind of replacement.

The Knee Clinic also specialises in a number of cartilage repair procedures, the simplest being

bone marrow stimulation. As cartilage itself does not heal on its own, and this includes the cartilage covering of the bone, and as long as the arthritic compartment is being offloaded by the osteotomy described above, any of these simple cartilage procedures can then be applied in an attempt to grow new cartilage in that compartment. This is generally called microfracturing and involves drilling tiny holes into the bone in order to bring some blood supply to the surface. This forms a clot which is rich in stem cells from the bone marrow and provided the patient is protecting this (i.e. crutches usually for 6 weeks), these stem cells will gradually change into cartilage cells. While this simple technique only produces fibrocartilage which is not high quality cartilage, we have found the combination of this with the HTO described above is very successful. In a study of 27 patients with advanced medial compartment osteoarthritis

we presented our results at an international congress in Bologna and demonstrated the efficacy of this technique.

In carefully selected patients with localised arthritis to one compartment, patients can delay a knee replacement by 10 years in up to 85% of cases.



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