Cartilage (Chondral) Defects

The anatomy

The knee joint consists of your thighbone (femur) joining with the main leg bone (tibia). The kneecap (patella) also joins with the femur at the front. These bones are lined with a smooth joint cartilage (articular or hyaline cartilage) that allows pain free, and easy gliding, movements.

The shape of the joining bones does not completely match, as this allows some side-to-side and rotational motion. The spaces between the joint cartilage are filled with a cushioning cartilage (meniscus). The meniscus is C shaped when viewed from above and triangular when viewed in cross section. The main function of the meniscus is to protect the important smooth joint lining cartilage.

There is a small amount of joint fluid that lubricates the joint and provides nutrition to the cartilage in the joint.

Other structures in the knee include the ligaments (that provide stability to the knee throughout its range of motion), and tendons (that connect the muscles to the bones to power the joint movement).

The disease process

Some injuries lead to a direct injury to the cartilaginous surface. Other knee injuries lead to instability of the knee, which can cause cartilage injury directly or indirectly. If a joint is dislocated, the cartilage can be crushed or sheared off during the injury. Instability in the knee allows abnormal movements and puts undue stresses on the cartilages of the knee. The menisci in the knee can compensate for this as a secondary stabiliser, however eventually they fail. This can then lead to cartilage wear.

If a discrete cartilage injury occurs in one area of the knee, this can in time lead to further cartilage wear and tear throughout the knee. If cartilage destruction is diffuse, we call this arthritis.

Non-operative treatment

There are specific sets of treatments that can be utilized in the attempt to avoid cartilage injury from progressing, and settle down local symptoms (pain and swelling).

Non-operative managements include physiotherapy, optimizing muscle patterning, strength, proprioception and core musculature. Pain relievers, anti-inflammatory medications and compressive braces can help with symptoms.

Surgical treatments

Ideally we would like to restore normal cartilage to heal the defect. Unfortunately this is not possible with current technology. However there are some surgical treatments that can be beneficial.

Symptomatic lesions smaller than 2cm can be best treated with micro-abrasion techniques to stimulate a scar cartilage (fibrocartilage) to form and fill the defect.

BALLARAT
ORTHOPAEDICS
707 Mair Street, Ballarat, VIC 3350 | 03 5332 2969
www.ballaratorthopaedics.com.au

Similarly, creating small holes through the exposed bone surface can stimulate stem cells in the bone (micro-fracture), and induce a fibrocartilage to form. This technique is only recommended for lesions 2cm in size or smaller. A stable knee (with an intact meniscus) is required for this technique to be successfully undertaken. Failures can include bony overgrowth, leading to a bony lump (osteophyte) within the weight bearing compartments of the knee. The patella contains few stem cells and micro-fracture of the patella has been shown to have poorer outcomes.

For larger defects we consider other biological solutions. These can include,

- cartilage product replacements (bio-cartilage)
- juvenile morcellised cartilage implantation (neo-cartilage)
- implanting the patients own cartilage cells grown in a lab (autologous-cartilage implantation)
- bone and cartilage transplant from elsewhere in the patients own knee (osteochondral autograft transplantation system - OATS)
- fresh bone and cartilage transplant from an organ donor (osteochondral allograft).

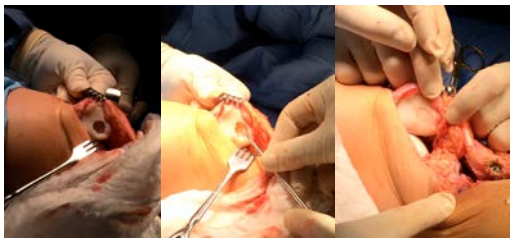
Again, all these more advanced treatments require a stable ligament, a well aligned and meniscal intact knee.

Some of these treatments are readily available in Australia and your surgeon will discuss the options with you.

Complications of cartilage restorative procedures include arthritic progression of the defect. Knee stiffness, infection and numbness of the skin beside the knee can occur after any arthroscopic knee procedure.

Rehabilitation / Recovery

After cartilage regenerative procedures crutches are used for 6 weeks.
This assists the regenerative process to its optimum.
Physiotherapy is again required to optimize muscle patterning, strength, proprioception, and core musculature. Range of motion activities help to avoid knee stiffness.



BALLARAT
ORTHOPAEDICS
707 Mair Street, Ballarat, VIC 3350 | 03 5332 2969
www.ballaratorthopaedics.com.au