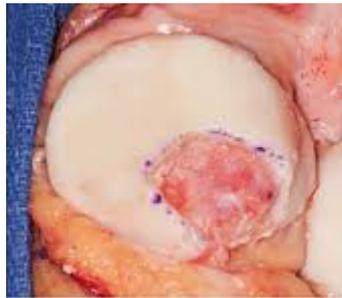


Information and opinions supplied by the staff at **UP and RUNNING (Sports Injury Clinics) Ltd**

Article 8: Chondral (Bone) defects of the knee

What is a Chondral Defect?

The articulating surfaces of the knee joint have a hard, shiny coating called the Articular Cartilage. This Articular Cartilage is incredibly durable and prevents much wear and tear of the bones as the surfaces are repeatedly rubbed together during everyday actions such as walking, running, squatting etc. Damage to the articular cartilage is called a **Chondral Defect**. 3. 6. 8.

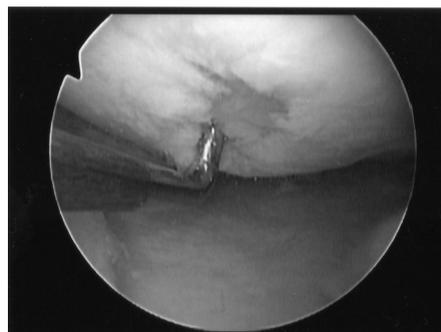


What causes these defects?

Damage can occur over time with wear and tear or may be as a result of a sudden trauma. 2. 4. 6. In the case of wear and tear this degeneration is called Osteoarthritis. 10. 14. Painful osteoarthritis develops when this smooth, gliding surface on the end of the bone has lost its coating, deformity develops, and bone rubs on bone. This can result in very painful knees. This kind of damage tends to be more common in later life but, for many reasons may appear in the relatively young. 7. 8. 9. 12.

More often, there is no clear history of a single injury. The patient's condition may, in fact, result from a series of minor injuries that have occurred over time. Contributing factors to this wear and tear could be mal-tracking Patellae (see Patello-Femoral Pain Syndrome); repetitive movements such as in long-distance runners; excessive kneeling; squatting using heavy weights and similar excessive activities. 9. 10. 11.

Sudden trauma is also a common cause of a Chondral Defect especially in certain sports and activities. A chondral injury may occur as a result of a pivot or twist on a bent knee, similar to the motion that can cause a meniscus tear. Damage may also occur as a result of a direct blow to the knee such as in a fall or collision. Chondral injuries may accompany an injury to a ligament, such as the anterior cruciate ligament. Small pieces of the articular cartilage can actually break off and float around in the knee as loose bodies, causing locking, catching, and/or swelling. 1. 5. 13.



What else could it be (Differential diagnosis)?

As previously mentioned, the knee joint is extremely complex and diagnosis of injury is quite difficult. The more common signs of a Chondral Defect are also common signs of a number of other conditions:

- Pain - can be caused by many different factors in the knee, too many to mention here;
- Swelling – again, the result of several knee conditions;
- Locking - usually associated with Meniscal tears but may be the result of a fragment of articular cartilage floating around;
- Aching - may be as a result of a neuromuscular problem.

Given the caveat above there are many other injuries that could give similar symptoms to a Chondral Defect but working through each possibility is time consuming and often inconclusive. 5. 9. A Graduate Sports Therapist or Physiotherapist with appropriate training may be able to provide a more accurate assessment of other possible injuries however the only way to diagnose a Chondral Defect is by some form of imaging such as an X-Ray, an MRI or ultrasound scan, or by an arthroscopy (Key-hole surgery whereby a mini camera is inserted into the knee joint). 7. 12.

What can be done about bone defects?

This depends on exactly what has caused the Chondral Defect and how severe the defect is.

If there is a large surface area of defect the likelihood is that rest alone may not be enough and surgery is often prescribed. 2. 3. 4. 6. 8. Large, full thickness defects rarely repair spontaneously. There are several methods of surgical repair for large Chondral Defects these include abrasion, drilling, autografts, allografts, and cell transplantation. 1. 2. 3. 4. If you are unfortunate enough to suffer from this injury the consultant will usually discuss the preferred method.

Where the injury is not full thickness or of a small surface area it may be possible to rehabilitate the knee conservatively. 15. In the case of Patello-Femoral type wear re-tracking is required either by eliminating the cause of the mal-tracking (preferable) or by taping the knee in such a way as to prevent mal-tracking whilst undertaking activity. 1. 3. 11. 15. In other cases, and also with Patello-Femoral Pain Syndrome, rest from activity may be required until such time as the symptoms resolve.



The Authors View

Obtaining the correct diagnosis is obviously the key to appropriate treatment. The best methods for determining Chondral Defects require imaging or surgery however, as previously mentioned there are many other injuries which produce similar symptoms to Chondral Defects. These other injuries require the expertise of someone with appropriate training, such as a Graduate Sports Therapist or a Physiotherapist with sports injury training, to more accurately ascertain the cause.

Reference List:

1. Gobbi, A., Kon, E., Berruto, M., Francisco, R., Filardo, G. & Marcacci, M. (2006). Patellofemoral full-thickness chondral defects treated with Hyalograft-C. A clinical, arthroscopic and histologic review. *The American Journal of Sports Medicine*. 34(11), 1763-1773.
2. Gobbi, A., Kon, E., Berruto, M., Filardo, G., Delcogliano, M., Boldrini, L., Bathan, L. & Maracci, M. (2009). Patellofemoral full-thickness chondral defects treated with second-generation autologous chondrocyte implantation. Results at 5 years' follow up. *The American Journal of Sports Medicine*. 37(6), 1083-1092.
3. Steadman, R. J., Rodkey, W. G., Singleton, S. B. & Briggs, K. K. (1997). Microfracture technique for full-thickness chondral defects: Technique and clinical results. *Operative Techniques in Orthopaedics*. 7(4), 300-304.
4. Henderson, I. J. P. & Lavigne, P. (2006). Periosteal autologous chondrocyte implantation for patellar chondral defects in patients with normal and abnormal patellar tracking. *The Knee*. 13(4), 274-279.
5. Steadman, J. R., Briggs, K. K., Rodrigo, J. J., Kocher, M. S., Gill, T. J. & Rodkey, W. G. (2003). Outcomes of microfracture for traumatic chondral defects of the knee: average 11 year follow-up. *The Journal of Arthroscopy and Related Surgery*. 19(5), 477-484.
6. Gomoll, A. H., Minas, T., Farr, J. & Cole, B. J. (2006). Treatment of chondral defects in the patellofemoral joint. *The Journal of Knee Surgery*. 19(4), 285-295.
7. Aroen, A., Loken, S., Heir, S. (2004). Articular cartilage lesions in 993 consecutive knee arthroscopies. *The American Journal Sports Medicine*. 32(1), 211-215.
8. Blevins, F. T., Steadman, J. R., Rodrigo, J. J. & Silliman, J. (1998). Treatment of articular cartilage defects in athletes: an analysis of functional outcome and lesion appearance. *Orthopaedics*. 21(7), 761-767.
9. Curl, W. W., Krome, J., Gordon, E. S., Rushing, J., Smith, B. P. & Poehling, G. G. (1997). Cartilage injuries: a review of 31,516 knee arthroscopies. *The Journal of Arthroscopic and Related Surgery*. 13(4), 456-460.
10. Slemenda, C., Brandt, K. D., Heilman, D. K., Mazzuca, S., Braunstein, E. M., Katz, B. P. & Wolinsky, F. D. (1997). Quadriceps weakness and osteoarthritis of the knee. *Annals of Internal Medicine*. 127(2), 97-104.
11. Dalury, D. F. (2005). Total knee replacement for patellofemoral disease. *The Journal of Knee Surgery*. 18(4), 274-277.
12. Kaplan, L. D., Schurhoff, M. R., Selesnick, H., Thorpe, M. & Uribe, J. W. (2005). Magnetic resonance imaging of the knee in asymptomatic professional basketball players. *Arthroscopy*. 21(5), 557-561.

13. Leadbetter, W. B., Ragland, P. S. & Mont, M. A. (2005). The appropriate use of patellofemoral arthroplasty: an analysis of reported indications, contraindications and failures. *Clinical Orthopaedics*. 436, 91-99.
14. Felson, D. T. (2006). Osteoarthritis of the knee. *The New England Journal of Medicine*. 354, 841-848.
15. Farmer, J. M., Martin, D. F., Boles, C. A. & Curl, W. W. (2001). Chondral and osteochondral injuries: diagnosis and management. *Clinics in Sports Management*. 20(2), 299-320.