ROUNDUP360

Knee

Autologous chondrocytes and chondromalacia patellae

If there was ever a condition that *360* has found hard to treat it is chondromalacia patellae, so a paper from **Stanmore (UK)** immediately caught our eye. The authors acknowledge that the aetiology of the condition is still unclear but the process is thought to be created by trauma to superficial chondrocytes resulting in a proteolytic enzymic breakdown of the matrix. The researchers' aim was to assess the effectiveness of autologous chondrocyte implantation on patients with a proven symptomatic retropatellar lesion who had at least one failed conventional marrow-stimulating therapy. To do this, they performed chondrocyte implantation on 48 patients: 25 received autologous chondrocyte implantation with a type I/III membrane (ACI-C) method, and 23 received the matrix-assisted chondrocyte implantation (MACI) technique. Over a mean follow-up period of 40.3 months, there was a significant improvement in both a subjective pain scoring using a visual analogue scale and objective functional scores using the Modified Cincinnati Rating System for both groups. Could this be the way forward, we ask at *360*? Chondromalacia patellae lesions responded well to chondrocyte implantation, although better results occurred with MACI than with ACI-C. Excellent and good results were achieved in 40% of ACI-C patients and 57% of MACI patients. However, and as the authors state, given that the MACI procedure is technically easier and less time-consuming, it appears that they consider it to be most useful for treating patients with symptomatic chondral defects secondary to chondromalacia patellae.[1]

Drilling the femoral tunnel at ACL reconstruction

360 notes that for ACL surgery we are continually being reminded of the importance of placing the femoral tunnel in the right place. So how does one best find the spot? Surgeons from **Jinan (China)** have looked at this with a prospective study in order to compare the therapeutic effect of femoral tunnel preparation through the tibial tunnel or the anteromedial (AM) portal in single-bundle ACL reconstruction. Between June 2008 and October 2010, the team studied 76 patients who underwent single-bundle ACL reconstruction by autogenous grafting with the semitendinosus and gracilis tendon. The patients were randomly divided into two groups according to the method of femoral tunnel preparation: a transtibial (TT) group (n = 38) and an anteromedial (AM) group (n = 38). The Lysholm knee score and the KT-1000 anterior laxity at 30° of flexion before and after surgery were assessed for two groups. Of the 76 patients, 65 (TT group, 34; AM group, 31) were followed up for more than 12 months, with a follow-up rate of 86%. The Lysholm knee score and the KT-1000 anterior laxity 12 months after operation were significantly better than before reconstruction for both groups and there was no significant difference between the two.[2] The conclusion seems clear to *360*. Do what you find simplest and best.

Should we repair the radially torn lateral meniscus?

The debate as to whether or not meniscal tears should be repaired seems to continue, so *360* was intrigued to read a paper from **Chicago (USA)** that investigated whether repair of complete radial tears of the lateral meniscus might recreate normal load transmission across the joint. This was a controlled laboratory study that used five matched pairs of fresh-frozen human cadaver knees and tested them in axial compression (800 N) at two knee flexion angles of 0° and 60°. There were six meniscal conditions that were sequentially tested: 1) intact lateral meniscus; radial width tears of 2) 50% 3) 75%, and 4) 100%; 5) meniscal repair; and 6) total meniscectomy. Repairs were pair matched and used either an inside-out or all-inside technique. Tekscan sensors measured tibiofemoral contact pressure, peak contact force, and contact area in the lateral and medial menisci. The authors found that complete radial tears of the lateral meniscus produced significant increases in mean contact pressure and decreased contact area compared with the intact state. This effect was significantly less than that of total meniscectomy. Lesser degrees of radial tears were not significantly different from the intact state. In addition, the mean contact pressure after either repair technique was not significantly different from the intact state or from each other. Meniscal repair produced an increase in contact area compared with a complete tear but was still significantly less than that of the intact meniscus. The medial compartment showed no significant difference between all testing conditions for 0° and 60° of flexion. So it seems clear. A complete radial meniscal tear of the lateral meniscus has a detrimental effect on load transmission, and repair improves contact area and pressure. Contact pressures for repaired menisci were no different from the intact state, but the contact area certainly was different. Meanwhile, the biomechanical performance of repair constructs was equivalent.[3] So it is true after all, we think at *360*. Meniscal repair is worthwhile. Repair of complete radial tears improves joint mechanics, potentially decreasing the likelihood of cartilage degeneration.

Factors associated with patellofemoral pain – a view from General Practice

360 feels that patellofemoral pain is still not completely understood, so was pleased to read a paper from a Department of General Practice in **Rotterdam (The Netherlands)** that systematically summarised the factors associated with patellofemoral pain syndrome (PFPS). A thorough literature search was conducted. Studies including ≥ 20 patients with PFPS that examined one or more possible factors associated with the condition were

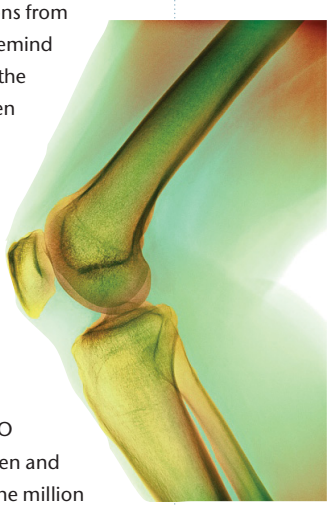
included. A meta-analysis was performed and clinical heterogeneous data were analysed descriptively. The team managed to find 47 studies that together examined 523 variables; eight were pooled. Pooled data showed PFPS to be associated with a larger Q-angle, sulcus angle and patellar tilt angle, less hip abduction strength, lower knee extension peak torque and less hip external rotation strength. Meanwhile the foot arch height index and congruence angle were not associated with PFPS.[4] *360* agrees with the authors, however interesting their findings to date may be, that further research is required.

Mechanoreceptors and the allografted ACL

■ *360* notes that there seem to be multitudinous ways of reconstructing the ACL. One of these is with an Achilles tendon allograft. Yet what happens to the allograft after surgery? Does it fully incorporate and become, in essence, entirely normal? Well, surgeons from **Iksan (South Korea)** have looked at this with a Level IV study, starting with the hypothesis that mechanoreceptors would not grow into Achilles tendon allografts after ACL reconstruction. They took tissue samples from 11 patients who underwent ACL reconstruction using Achilles tendon allografts. Biopsies were then taken during second-look arthroscopies. The mean period from ACL reconstruction to harvesting tissue was 26.6 months. There was a control group of two normal ACLs procured from 42- and 45-year-old men who had undergone an above-knee amputation for trauma. Ruffini corpuscles and free nerve endings were shown to be present in the specimens of the control group by processing haematoxylin and eosin and immunohistochemical stains with monoclonal antibodies against S-100. Sadly, however, in the Achilles allografts, mechanoreceptors were not observed. All the same, fibroblasts, collagen fibres, and vessels that were not present in fresh-frozen Achilles allografts before surgery were seen.[5] So, we think at *360*, it is sort of true but not quite. Allograft tendon does undergo some change after implantation but, in terms of the appearance of mechanoreceptors, does not become totally normal.

High tibial osteotomy can delay the need for knee replacement

■ High tibial osteotomy (HTO) is still a widely performed operation. However, as surgeons from **Lund (Sweden)** remind us, most studies of the procedure have been hospital-based and have included a limited number of patients. They thus assessed the use and outcome, expressed as rate of revision to knee replacement, of HTO performed in Sweden and its population of nine million inhabitants for the years 1998 to 2007. To do this, they identified 3161 HTO procedures on patients 30 years or older (69% men) who underwent surgery for OA knee by inspecting the inpatient and outpatient care registers of the Swedish National Board of Health and Welfare. Pertinent data were verified through surgical records. Conversions of HTO to knee arthroplasty before 2010 were then identified through the Swedish Knee Arthroplasty Register (SKAR). The ten-year survival of the HTO was then determined using revision to a knee replacement as the endpoint. The number of HTOs decreased by one third between 1998 and 2007, from 388 operations a year to 257. Technically, most of the HTOs were performed with an open-wedge osteotomy using external fixation. The cumulative revision rate to knee replacement at ten years was 30%, a risk that increased with advancing age and was higher in women than in men. So it appears that if being without an artificial joint is regarded as beneficial, then HTO is an excellent alternative to knee replacement in younger and/or physically active patients with OA knee.[6] One further thing about this paper: it is open access and free.



Return to sport after ACL reconstruction

■ After an ACL reconstruction it is sometimes difficult to know quite when a sportsperson can return to play. A paper from **L'Aquila (Italy)** has tried to make sense of this with a longitudinal observational study to investigate the rate of force development (RFD) to 30%, 50%, and 90% (RFD30, RFD50, RFD90) of maximum voluntary isometric contraction (MVIC) as an outcome measure for determining return-to-sport after an ACL reconstruction. One criterion used to define full recovery after an ACL reconstruction is to be able to achieve 85% or 90% of the maximum strength of the contralateral limb. However, the time required to develop muscular strength in many types of daily and sports activities is considerably less than that required to achieve maximum strength. Consequently, say the authors, in addition to maximum strength, neuromuscular functions, such as RFD should also be considered in the definition of recovery. The researchers looked at 45 male professional soccer players who underwent an ACL reconstruction. International Knee Documentation Committee (IKDC) form, Tegner, KT-1000, MVIC, and RFD assessments were performed post-injury and pre-reconstruction, and at six and 12 months after ACL reconstruction. MVIC, RFD30, RFD50 and RFD90 testing was also performed pre-injury, as part of standard pre-season assessment. The mean MVIC six months after reconstruction was 97% of the pre-injury value. In contrast, the RFD30, RFD50, and RFD90 values were 80%, 77%, and 63%, respectively, of the pre-injury levels. The mean RFD values for the reconstructed knee attained or exceeded 90% of the pre-injury mean values only by 12 months after surgery. Despite recovery of MVIC strength to very near its pre-injury level, significant deficits in RFD still existed at six months after ACL reconstruction. Pre-injury levels for RFD were achieved at 12 months after ACL reconstruction following a rehabilitation programme that focused on muscle power.[7] So it appears to us at *360*, as it does to the authors, that the use of RFD criteria might be very helpful when assessing the timing of a return to play after ACL reconstruction. One thing appears certain. Recovery takes longer than we think.

Tissue-engineered cartilage – what you see at one year you also see at six

■ We are most definitely in a biological age, with units around the world trying hard to heal damaged articular cartilage. To *360* this is almost a Holy Grail. Surgeons from **Hiroshima (Japan)** have looked at this in detail by reporting patients' clinical scores and MRI findings before and after tissue-engineered cartilage implantation, and compared the data obtained at one year and approximately six years after implantation. They studied 14 patients who underwent implantation of tissue-engineered cartilage to repair cartilage defects of the knee. Culturing autologous chondrocytes three-dimensionally in atelocollagen gel produced tissue-engineered cartilage. The patients were assessed clinically using the Lysholm score and an earlier, original knee-function score before implantation and at one year and approximately six years afterwards. MRI scans were obtained at the same time. A modified magnetic resonance observation of cartilage repair tissue (MOCART) system was used to quantify clinical

efficacy based on the MRI findings. To 360 the results were fascinating. After approximately six years of follow-up, none of the 14 patients reported any subjective symptoms of concern. The mean Lysholm score and the original knee-function score significantly improved at one year after implantation and were maintained until six years. Some patients showed a deterioration of their Lysholm and original knee scores between one year after implantation and their final follow-up. The mean MOCART score was 13.2 before implantation, 62.5 at one year and 70.7 at approximately six years. There was no significant difference between the scores at one and six years, indicating that the MRI results at one year after implantation were maintained for the next five years.[8] That is good to know. This article is also open access.

Yoga rules OK

Recovery after total knee replacement (TKR) can often take longer than one thinks. At least, that is the view of 360. Consequently anything that can simplify and/or speed up the process must be welcomed. An interesting paper has appeared from **Pune (India)** that has focused on the effect of additional yoga therapy on the functional outcome of patients after TKR. The authors undertook a comparative study to compare the effects of conventional physiotherapy and additional yoga asanas (positions), on 56 patients undergoing TKR for OA. The patients were alternately assigned to one of two groups, conventional or experimental. Baseline WOMAC scores for pain and stiffness were taken on the third post-operative day. The patients in the conventional group received a standardised physiotherapy rehabilitation programme established by the institution in which the study was conducted. Meanwhile, the experimental group received additional modified yoga asanas once daily by their therapist. After discharge from the hospital, patients were provided with written instructions and photographs of the asanas, two sets of WOMAC questionnaires with stamped and addressed envelopes, and were instructed to perform yoga asanas three days each week. Subjects completed a questionnaire six weeks and three months after surgery and posted it back to the researchers. The results suggested that there was a significant change within both groups for the pain, stiffness and function subscales of the WOMAC scale. However, pain and stiffness were found to be less in the experimental group that had received additional yoga therapy than in the conventional group at all the follow-up time points.[9] Well done, we think at 360. Yoga clearly rules OK, even if, as the authors say, a larger and blinded study is required. Once again this text is free.

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