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PASIG MONTHLY CITATION BLAST: No.42 **July 2009**

Dear PASIG members:

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Performing Arts continuing education, courses, and related conferences that you may be interested in attending.

Orthopaedic Section Independent Study Course
Dance Medicine: Strategies for the Prevention and Care of Injuries to Dancers. This is a 6-monograph course and includes many PASIG members as authors. This home study course can be purchased at http://www.orthopt.org/independent2.php.

International Association for Dance Medicine and Science (IADMS) 19th Annual Meeting
October 29- November 1, 2009
The Hague, The Netherlands
Contact: www.iadms.org

Combined Sections Meeting San Diego
February 17 – 20, 2010
PASIG Programming to be announced.
Contact: www.apta.org

If you know of other courses of interest to our membership, please send the information to: Amy Humphrey PT, DPT, OCS, MTC
e-mail: ahumphrey@bodydynamicsinc.com

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For this June Citation BLAST, I've selected the topic: *Osteochondritis Dissecans (OCD) of the Talus.* The format is an annotated bibliography of articles on the selected topic from 1998 – 2008. The BLASTS and updated libraries are posted on the PASIG webpage for our members to access and download. (Information about EndNote referencing software can be found at http://www.endnote.com, including a 30-day free trial).

If you are interested in contributing a special topic citation blast, please step up! As always, your comments and suggestions are welcome. Please drop me an e-mail anytime.

Regards,
Shaw

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Osteochondritis Dissecans (OCD) of the Talus

Lateral ankle sprains are the most common sports-related injury. Differential diagnosis of unresolved ankle pain includes osteochondral lesions of the talus. While talar osteochondral lesions are relatively rare joint disorders, the talus is the third most common location of this disorder, following the knee and elbow joints.

Conservative treatment should be the first treatment option. The indication for surgical treatment is persistent symptoms following conservative treatment for at least six months. Surgical options include excision and curettage, microfracture, bone grafting, or allographic or autogenous osteochondral transplantation.

We evaluated a professional modern dancer who had unresolved diffuse ankle pain, no history of trauma, and no swelling. She was diagnosed with osteochondritis dissecans of the talar dome and treated conservatively. This included progression from initial non-weight bearing status, and modification of her footwear and dance activities. On initial return to rehearsal she wore dance sneakers and progressed to jazz shoes with shock reduction inserts. Working with the artistic staff, jumping activities were minimized: none in technique class and minimal in rehearsal, to enable her to dance fully in performance. She was extremely compliant with this protocol, returned to full pain-free performance, and danced professionally for another two years.

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Agung M, Ochi M, et al. (2004). Osteochondritis dissecans of the talus treated by the transplantation of tissue-engineered cartilage. Arthroscopy **20**(10): 1075-80.
Management of osteochondral lesions of the joint has been difficult, because articular cartilage has a poor healing capacity as a result of its lack of vessels, nerve supply, and its isolation of systemic regulation. Although a lot of basic research and surgical treatments for cartilage repair have focused on osteochondral lesions in the knee joint, orthopedic surgeons have recently diverted their attention to osteochondral lesions in the ankle joint, partly because of the widespread introduction of arthroscopy in ankle surgery. There have been many attempts to treat articular cartilage defects in the ankle joint as well as in the

knee joint. However, no treatment has achieved efficient healing with hyaline cartilage. Recently, tissue engineering technique for cartilage repair has been gaining much attention in the orthopedic field. In this study, we reported on a patient with osteochondritis dissecans of the talar dome, successfully treated by transplantation of tissue-engineered cartilage made ex vivo using atelocollagen gel and low tibial osteotomy.

Al-Shaikh RA, Chou LB, et al. (2002). Autologous osteochondral grafting for talar cartilage defects. Foot Ankle Int **23**(5): 381-9.

The purpose of this study was to evaluate the clinical results of Osteochondral Autograft Transfer System (OATS) for the treatment of symptomatic osteochondral defects of the talus using standardized outcome analysis. Nineteen patients with symptomatic osteochondral defect (OCD) of the talus were treated with autologous osteochondral grafting. There were six men and 13 women. The average age was 32 years (range, 18 to 48 years). The average duration of symptoms prior to surgery was 4.2 years (range, three months to 12 years). All patients had failed nonoperative treatment, and 13 (68%) patients had failed prior excision, curettage and/or drilling of the lesion. The average size of the lesion prior to autografting was 12 mm x 10 mm (range, 10 x 5 mm to 20 x 20 mm). Donor plugs were harvested from the trochlear border of the ipsilateral femoral condyle. Ankle exposure was obtained with a medial malleolar osteotomy in 13 patients, arthrotomy in five patients and lateral malleolar osteotomy in one patient. Clinical evaluations were performed for both the recipient ankle and donor knee using the AOFAS Ankle/Hindfoot Scale and Lysholm knee scale, respectively. The average follow-up time was 16 months (range, 12 to 30 months). The average postoperative AOFAS ankle score was 88 (range, 60 to 100). Most patients had occasional mild pain, but excellent function, range of motion, stability and alignment. The average postoperative ankle score for the 13 patients who failed prior surgery was 91 (range, 84 to 100). The average postoperative Lysholm knee score was 97 (range, 87 to 100). Only two patients had mild knee pain. Postoperative radiographs were available for 13 patients. There was no evidence of graft subsidence and all grafts healed. All malleolar osteotomies united. Seventeen (89%) patients said that they would undergo the procedure again. The results of osteochondral autograft transplant for OCD lesions of the talus demonstrate excellent postoperative ankle scores including improvement of pain and function with minimal knee donor site morbidity. Also, our results indicate that this is an effective salvage procedure following failed previous procedures and for patients with longstanding symptoms.

Amendola A, Panarella L (2009). Osteochondral lesions: medial versus lateral, persistent pain, cartilage restoration options and indications. Foot Ankle Clin **14**(2): 215-27.

Chronic giving way and ankle dysfunction are common after ankle sprains. In our approach to chronic ankle pain and giving way, one must consider the differential diagnosis before treatment can be directed appropriately. One of the common diagnoses associated with ankle injury is osteochondral lesions of the talus. The advent of MRI has allowed us to make the diagnosis of occult lesions more readily. Arthroscopic and open management of these lesions continues to evolve. This article discusses osteochondral lesions of the talus, treatment options, and resurfacing techniques.

Assenmacher JA, Kelikian AS, et al. (2001). Arthroscopically assisted autologous osteochondral transplantation for osteochondral lesions of the talar dome: an MRI and clinical follow-up study. Foot Ankle Int **22**(7): 544-51.

Osteochondral Lesions of the Talar Dome (OLT) are common problems encountered in orthopedics. Although the etiology remains uncertain, a myriad of treatment options exists. The authors describe arthroscopically assisted autologous osteochondral graft (OCG)

transplantation procedures in the treatment of unstable OLTs in nine patients. The patients underwent standard preoperative MRI examination to assess fragment stability (using De Smet criteria for stability). Intraoperative arthroscopy was used to correlate the preoperative MRI assessment (using Cheng/Ferkel grading). After transplantation procedures, MRI (using De Smet criteria for stability) assessed graft incorporation for stability at an average of 9.3 months after the procedure. Preoperative MRI correlated highly with arthroscopic findings of OLT instability (sensitivity = 1.0). This has been demonstrated in the current orthopedic literature. The post transplantation MRI demonstrated stable graft osteointegration by De Smet criteria in all patients. Postoperative visual analogue pain scales showed significant improvement from preoperative assessment. Postoperative AOFAS Ankle-Hindfoot scores averaged 80.2 (S.D. +/- 18.9). Our favorable early results and those of other authors using similar techniques may validate OCG transplantation as a viable alternative for treating unstable osteochondral defects in the talus that are refractive to more commonly used surgical techniques.

Baltzer AW, Arnold JP (2005). Bone-cartilage transplantation from the ipsilateral knee for chondral lesions of the talus. Arthroscopy **21**(2): 159-66.

PURPOSE: We present a prospective analysis to review talus dome chondral and osteochondral lesions treated with autogenous bone-cartilage transplantation harvested from the ipsilateral knee since 1998. The clinical outcome of osteochondral defects is investigated by using a method for resurfacing that supplies hyaline cartilage. The outcome analysis also considers defect size and the number of transplanted osteochondral cylinders. TYPE OF STUDY: Prospective analysis of a case series. METHODS: Included in the study were 43 patients with ankle joint pain resulting from osteochondritis dissecans stage III-IV (n = 22), post-traumatic cartilage defects (n = 16), and focal osteoarthritis (n = 5). The mean age of this group was 31.2 years; there were 30 male and 13 female patients. To carry out the osteochondral resurfacing procedure, anteromedial or anterolateral arthrotomy (23 cases) or medial malleolar osteotomy (20 cases) of the distal tibia was performed. The osteochondral autograft transfer system (OATS; Arthrex, Naples, FL) was used for transplantation. The follow-up examinations were performed after 3 months (clinical, radiological), after 6 months (clinical, radiological), after 9 months (clinical, radiological, hardware removal, and second-look arthroscopy), after 12 months, and every following year (clinical, radiological, magnetic resonance imaging). The follow-up of 11 patients was greater than 2 years (maximum, 4.5 years), for 8 patients 1 to 2 years, for 12 patients 6 to 12 months, and for another 12 patients 0 to 6 months. The results have been validated by the scores of Evanski and Waugh score and Mazur et al. RESULTS: The mean pain intensity measured by visual analogue scale (0 to 10, with 10 representing the worst imaginable pain) reduced from 4.4 to 2.3 after 6 months (n = 34), to 1.6 after 1 year (n = 23), and after 2 years to 1.1 (n = 14). Patients reported a significantly improved range of motion of the ankle compared with their preoperative status. The smaller the diameter of the transplants and the smaller the number of transplants used, the better were the results in pain reduction and postoperative range of motion. The Evanski and Waugh score improved from 52 to 88 points and the score described by Mazur et al. from 53 to 90 of 100 possible points. All medial osteotomies were healed clinically and radiographically. All grafts showed bony integration in the talus as seen in the radiographs and by magnetic resonance imaging. Second-look arthroscopy found integration of the osteocartilaginous graft with surrounding cartilage within the first year. A series of needle biopsies showed hyaline structure. CONCLUSIONS: Autogenous osteochondral transplantation of the talus using ipsilateral knee osteochondral grafts is a very promising surgical procedure to treat local cartilage lesions of the ankle joint. LEVEL OF EVIDENCE: Level IV.

Barnes CJ, Ferkel RD (2003). Arthroscopic debridement and drilling of osteochondral lesions of the talus. Foot Ankle Clin **8**(2): 243-57.

Diagnosis of OLTs requires a high index of suspicion because these lesions are rare and the symptoms can be falsely attributed to acute or chronic ankle sprains. When no abnormality is present on plain radiographs, a bone scan or MRI can reliably identify the presence of an OLT. CT scanning can provide even better detail of the location and size of the fragment and help stage these lesions and guide treatment. Arthroscopic staging is believed to be the best method to determine treatment. In a patient without an obvious loose body, initial nonoperative treatment is warranted. When nonoperative therapy fails or when a high stage lesion is present, operative options should be explored. Arthroscopic techniques provide results that are equal to or better than management by arthrotomy and have the advantages of lower morbidity and quicker overall rehabilitation time. In most cases, arthroscopic treatment involves loose body removal and debridement and drilling of the underlying bone or drilling alone for intact lesions. Although it is unknown whether such treatment can reduce the incidence of late arthrosis in a patient who has an OLT, a recent study suggested that healing occurs and the MRI appearance of the talar dome normalizes in many patients postoperatively.

Becher C, Thermann H (2005). Results of microfracture in the treatment of articular cartilage defects of the talus. Foot Ankle Int **26**(8): 583-9.

BACKGROUND: The microfracture technique has been used successfully for the treatment of cartilage defects in the knee. The purpose of this study was to evaluate the microfracture technique in the treatment of osteochondral and degenerative chondral defects of the talus. METHODS: In a prospective study, 30 ankles in 30 consecutive patients (17 men and 13 women; average age, 41 years; range 20 to 74 years were treated with arthroscopic microfracture. Twenty patients had osteochondral defects and 10 had degenerative chondral defects. Patients were evaluated with clinical examination and MRI preoperatively and at 3, 6, 12, and 24 months postoperatively. RESULTS: At a mean followup of 2 years (range 22 to 27 months), 29 patients were available for follow-up. The results for all ankles according to the Hannover Scoring System were 45% excellent, 38% good, and 17% satisfactory. Results in patients older than 50 years were not inferior to those in younger patients. Visual Analog Score revealed an average of 8 +/- 2 for pain (preoperatively 3 +/- 2; p < or = 0.001), 8 +/- 2 for function (preoperatively 3 +/- 2; p < or = 0.001) and 8 +/- 2 for satisfaction (preoperatively 2 +/- 2; p < or = 0.001). MRI and arthroscopic assessment suggested the presence of cartilage in the microfractured area. CONCLUSIONS: At short-term followup, the microfracture technique appeared to repair severe cartilage damage with a good functional outcome. Age was not shown to be a limiting factor.

Boraiah S, Paul O, et al. (2009). Osteochondral lesions of talus associated with ankle fractures. Foot Ankle Int **30**(6): 481-5.

BACKGROUND: Residual ankle pain and stiffness is not uncommon after ankle fractures. Proposed etiologies include ligamentous instability, joint arthrosis and osteochondral injuries. We studied the incidence of osteochondral lesions of the talus (OCLT) with various ankle fracture patterns and assessed their impact on functional outcome. MATERIALS AND METHODS: Preoperative MRI of 153 patients with ankle fractures who underwent operative fixation was studied. Ligamentous structures around the ankle and OCLT were assessed by MRI. The OCLT was graded as follows: 0, normal; 1, hyperintense but morphologically intact cartilage; 2, fibrillations or fissures not extending into the bone; 3, cartilage flap or bone exposed; 4, loose undisplaced fragment; 5, displaced fragments. Functional outcome was assessed using Foot and Ankle Outcome Scoring (FAOS) at a minimum of 6 months. Outcome between the OCLT and non OCLT group with similar fracture pattern was

compared using Fischer's exact test. RESULTS: There were 26 (17%) associated OCLT; four grade I, five grade II, one grade III, eight grade IV, and eight grade V lesions. Three were associated with supination adduction, 21 with supination external rotation injuries and two with pronation external rotation injuries. In the OCLT and the non OCLT group, the average symptom score, pain score, activities of daily living score, sports/recreation score and quality of life score was 80, 72, 79, 45, 50 and 73, 73, 79, 60, 45, respectively. There was no statistically significant difference between the two groups ($p > 0.1$). CONCLUSION: Osteochondral lesions were frequently associated with ankle fractures; however they had no significant impact on the functional outcome when associated with ankle fractures.

Draper SD, Fallat LM (2000). Autogenous bone grafting for the treatment of talar dome lesions. J Foot Ankle Surg **39**(1): 15-23.

This study evaluated a surgical bone grafting technique, which restores the talar dome weightbearing articular surface for the repair of a transchondral lesion. An autogenous bone graft combined with viable cartilage is used to recreate a normal talar articular surface. In a retrospective analysis of talar dome lesions, 14 patients surgically treated with bone grafts were compared to 17 patients treated with curettage and subchondral drilling. Post surgical follow-up was collected at 71.5 +/- 21.1 months (mean +/- SD). Age, lesion stage, and gender did not differ between the groups, but the mean fracture area was selectively smaller in the curettage and drilling group (85.2 +/- 58.7 mm2 vs. 156.4 +/- 69.4 mm2). Clinical evaluation consisted of an 8-point scale which took into account range of motion, the presence of pain and crepitus, and radiographic assessment. Significantly better overall clinical scores were observed for the bone graft group (graft, 6.9 +/- 1.6, curettage plus drilling, 4.5 +/- 1.9; $p = .001$), due to better results for range of motion (1.6 degrees +/- 0.5 degrees; 1.1 degrees +/- 0.4 degrees), less pain (2.7 +/- 0.50; 2.0 +/- 0.7), and presence of subchondral bone on x-ray (0.9 +/- 0.4; 0.2 +/- 0.4). Patients were also asked their perception of their own surgical outcome (considering pain frequency and ability to participate in sporting activities or walk at a similar level compared to before the surgery), and if they would have the surgery again. No differences in the patients' preoperative symptoms or their subjective assessment post surgery were detected between the groups. While curettage plus drilling is the most common surgical procedure for chronic symptomatic talar dome lesion, our results suggest that bone grafting of the lesion yields better long-term clinical results.

Elias I, Jung JW, et al. (2006). Osteochondral lesions of the talus: change in MRI findings over time in talar lesions without operative intervention and implications for staging systems. Foot Ankle Int **27**(3): 157-66.

BACKGROUND: MRI findings are used in several staging systems to help determine appropriate treatment. The purposes of this study were to evaluate longitudinal changes in MRI characteristics of osteochondral lesions of the talus (OLT) and to evaluate published staging systems in a cohort of nonoperatively treated patients. METHODS: Twenty-nine patients were identified; MR images were reviewed for location, size, and interface signal of OLT as well as cysts, marrow edema and osteoarthritis. Lesions were classified as unchanged, progressed, or improved based on changes in size or interface signal. Each lesion was assigned a stage based on four different staging systems. RESULTS: Of the 29 lesions, 13 progressed, seven improved, and nine were unchanged over an average followup of 13.7 months. In the 13 that progressed, marrow edema remained present in ten and developed in two. Four had persistent cysts and four developed new cysts. Two had progression of osteoarthritis and two developed it anew. In the seven that improved, six had some degree of marrow edema that persisted and one had a persistent cyst. Initial staging changed for at least one classification system in 16 (55%) of the 29 lesions at followup.

Change in stage was primarily due to development (four of 16) or disappearance of cysts or progression of the lesion in the extent of bone marrow edema (five of 16). CONCLUSIONS: OLT did not invariably progress over the short-term without operative intervention. Because some cysts and bone marrow edema resolved on MRI, they may not be reliable signs of lesion severity nor show progression of degenerative changes. Since these findings determine the stage and severity of OLT in some staging systems, they may require reconsideration and adjustment of the current staging systems.

Elias I, Zoga AC, et al. (2007). Osteochondral lesions of the talus: localization and morphologic data from 424 patients using a novel anatomical grid scheme. Foot Ankle Int **28**(2): 154-61.
BACKGROUND: The primary aim of this study was to evaluate the true incidence of osteochondral lesions on the talar dome by location and by morphologic characteristics on MRI. Because no universally accepted localization system for talar dome osteochondral lesions currently exists, we established a novel, nine-zone anatomical grid system on the talar dome for an accurate depiction of lesion location. METHODS: We assigned nine zones to the talar dome articular surface in an equal 3 x 3 grid configuration. Zone 1 was the most anterior and medial, zone 3 was anterior and lateral, zone 7 was most posterior and medial, and zone 9 was the most posterior and lateral. The grid was designed with all nine zones being equal in surface area. Two observers reviewed MRI examinations of 428 ankles in 424 patients (211 males and 213 females; mean age 43 years; age range 6 to 85 years) with reported osteochondral talar lesions. We recorded the frequency of involvement and size of lesion for each zone. Statistical analyses were performed using ANOVA and Scheffe tests. RESULTS: Four hundred and twenty-eight lesions were identified on MRI. The medial talar dome was more frequently involved (n = 269, 62%) than the lateral talar dome (n = 143, 34%). In the AP direction, the mid talar dome (equator) was much more frequently involved (n = 345, 80%) than the anterior (n = 25, 6%) or posterior (n = 58, 14%) thirds of the talar dome. Zone 4 (medial and mid) was most frequently involved (n = 227, 53%), and zone 6 (lateral and mid) was second most frequently involved (n=110, 26%). Lesions in the medial third of the talar dome were significantly larger in surface area involvement and deeper than those at the lateral talar dome. CONCLUSIONS: Our established nine-grid scheme is a useful tool for localizing and characterizing osteochondral talar lesions, which are most frequently located in zone 4 at the medial talar dome, and second most in zone 6 at the lateral talar dome near its equator. Medial talar dome lesions are not only more common but are larger in surface area and in depth than lateral lesions. Posteromedial and anterolateral lesions rarely were found.

Ferkel RD, Zanotti RM, et al. (2008). Arthroscopic treatment of chronic osteochondral lesions of the talus: long-term results. Am J Sports Med **36**(9): 1750-62.
BACKGROUND: Osteochondral lesions of the talus are relatively uncommon but may be a cause of significant pain and disability in symptomatic patients. HYPOTHESIS: Arthroscopic treatment of osteochondral lesions of the talus will result in good long-term clinical outcomes in the majority of patients. STUDY DESIGN: Case series; Level of evidence, 4. METHODS: Fifty patients with chronic osteochondral lesions of the talus underwent arthroscopic treatment. Average age was 32 years (range, 12-72 years). Average follow-up was 71 months (range, 24-152 months). Treatment consisted of either drilling of the osteochondral lesions of the talus in situ (n = 4), excision of the osteochondral lesions of the talus and abrasion arthroplasty (n = 6), or excision of the osteochondral lesions of the talus and drilling (n = 40). Preoperative and intraoperative staging of the osteochondral lesions of the talus was performed. Follow-up evaluation included 3 clinical rating systems: Alexander, modified Weber, and American Orthopaedic Foot and Ankle Society Ankle/Hindfoot scores. RESULTS: There were 72% excellent/good, 20% fair, and 8% poor results on the Alexander

scale. According to the modified Weber scale, there were 64% excellent/good, 30% fair, and 6% poor results. The average American Orthopaedic Foot and Ankle Society Ankle/Hindfoot score was 84 (range, 34-100). We found no correlation between plain radiographs, computed tomography, or magnetic resonance imaging staging and clinical results. However, there was significant correlation between arthroscopic stage and clinical outcome. Seventeen patients had been seen 5 years previously and evaluated using the same criteria; 35% demonstrated deterioration in their result over time. CONCLUSION: Arthroscopic treatment of chronic symptomatic osteochondral lesions of the talus results in good clinical outcomes in the majority of patients. However, pain and functional limitation may persist in some patients, especially those noted to have unstable osteochondral defects at the time of arthroscopy.

Geerling J, Zech S, et al. (2009). Initial Outcomes of 3-Dimensional Imaging-Based Computer-Assisted Retrograde Drilling of Talar Osteochondral Lesions. Am J Sports Med.

BACKGROUND: In operative treatment of Berndt and Harty stage 1 and stage 2 osteochondral lesions of the talus, the goal is revascularization. The use of computer-assisted guided retrograde drilling of osteochondral lesions has been described as a new technique with promising results. PURPOSE: This study reports the follow-up assessment of patients treated with Iso-C-3D-navigated retrograde drilling. Its aim was to establish whether the greater precision of computer-assisted drilling results in satisfactory clinical outcomes. STUDY DESIGN: Case series; Level of evidence, 4. METHODS: Patients who underwent navigated Iso-C-3D-based retrograde drilling between June 1, 2003, and July 31, 2005, were included in the follow-up study. Clinical outcomes were measured using (1) the Ankle-Hindfoot Scale of the American Orthopaedic Foot and Ankle Society and (2) the Visual Analogue Scale-Foot and Ankle. Radiological outcomes were assessed via radiographs and magnetic resonance imaging. Surgeon satisfaction was assessed using a simple 0 to 10 rating scheme for feasibility, accuracy, and clinical benefit. RESULTS: Average follow-up time was 25 months (range, 20-34). Twenty patients satisfied the inclusion criteria: 12 men and 8 women; mean age, 35 years (range, 19-58). One patient was excluded because he required a cartilage restoration procedure. All scores improved at the time of follow-up-Ankle-Hindfoot Scale, from 76 to 90 ($P < .001$); Visual Analogue Scale-Foot and Ankle, from 79 to 92 ($P < .001$). The average ratings of the operating surgeons ($n = 3$) were as follows: feasibility 9.0 (range, 7.3-10.0); accuracy, 8.5 (range, 5.8-10.0); and clinical benefit, 8.5 (5.7-10.0). At follow-up, magnetic resonance imaging revealed an improvement of the Hepple score in 80% of patients. CONCLUSION: Arthroscopic treatment of osteochondral lesions of the talus is well established. A retrograde approach does not breach the overlying intact talar cartilage. The results of this follow-up study of 3-dimensional computer navigated drilling are promising.

Gehrmann RM, Rajan S, et al. (2005). Athletes' ankle injuries: diagnosis and management. Am J Orthop **34**(11): 551-61.

Ankle injuries are common in the general and athletic populations. These injuries constitute 21% of all sports-related injuries. The wide spectrum of sports-related ankle injuries includes ligamentous injuries, soft-tissue and osseous impingement, osteochondral lesions of the talus, tendon injuries, and fractures. Occult lesions (eg, fractures of the lateral process of the talus, fractures of the anterior process of the calcaneus, fractures of the base of the fifth metatarsal, os trigonum, stress fractures) may be missed on initial physical examination, and patients with such injuries often present to a sports clinic with persistent pain around the ankle. Because of increasing participation in sporting events, health care professionals involved in the care of athletes at all levels must have a thorough understanding of the anatomy, pathophysiology, and initial management of ankle injuries. In this review, we

describe the pertinent anatomy, pathology, diagnosis, and treatment of sports-related injuries of the ankle.

Giannini S, Vannini F, et al. (2002). Osteoarticular grafts in the treatment of OCD of the talus: mosaicplasty versus autologous chondrocyte transplantation. Foot Ankle Clin **7**(3): 621-33.
Further advancements in articular cartilage transplantation require an understanding of the anatomy, physiology, biomaterials, biology, and cartilage engineering that are fundamental for better results in joint arthroplasty and cartilage repair. Currently, efforts to induce healing and regeneration of cartilage are being directed toward enhancing the natural potential of cartilage to replace the damaged tissue with cells that can generate cartilage. Mosaicplasty and ACT are carried out in the same way, have similar therapeutic indications, and have been demonstrated capable of reconstructing hyaline cartilage with similar clinical results. ACT is the most recent technique and, in the authors' opinion, is preferable in that it is less invasive at the donor site and gives better histologic results because of the reconstruction of a continuous cartilage sheath compared with that achieved by mosaicplasty. Furthermore, with this technique, it is possible to forecast the possibility of improvement owing to further technical and biologic advancements. The authors are currently experimenting with the use of adhesive patches with substitution of the periosteum, resulting in less morbidity. The use of growth factors and new tissue engineering techniques in the future would simplify the methodology, rendering it less invasive and more effective.

Gortz S, Bugbee WD (2007). Allografts in articular cartilage repair. Instr Course Lect **56**: 469-80.
Hyaline articular cartilage is an avascular and insensate tissue with a distinct structural organization, which provides a low-friction and wear-resistant interface for weight-bearing surface articulation in diarthrodial joints. Ideally, articular cartilage is maintained in homeostasis over the lifetime of an individual, with its biomechanical properties inherently suited to transmit a variety of physiologic loads through a functional range of motion. However, in the skeletally mature individual, articular cartilage does not heal effectively when injured. Although several restorative options for biomimetic replacement in acquired articular cartilage defects do exist, fresh osteochondral allografting currently remains the only technique that restores anatomically appropriate, mature hyaline cartilage in large articular defects. The fundamental paradigm of fresh osteochondral allografting is the transplantation of mature orthotopic hyaline cartilage, with viable chondrocytes that survive hypothermic storage and subsequent transplantation while maintaining their metabolic activity and sustaining the surrounding collagen matrix. Fresh osteochondral allografts have application in the treatment of a wide spectrum of articular pathology, particularly conditions that include both an osseous and a chondral component. The surgical procedure for femoral condyle lesions is straightforward but demands precision to achieve reproducible results and to minimize early graft failures related to surgical technique. As with other cartilage-restorative procedures, the indications for use of fresh osteochondral allografts are still being expanded. Many clinical and basic scientific studies support the theoretical foundation and efficacy of small fragment allografting, although more scientific validation of empirical clinical practice is still needed.

Haasper C, Zelle BA, et al. (2008). No mid-term difference in mosaicplasty in previously treated versus previously untreated patients with osteochondral lesions of the talus. Arch Orthop Trauma Surg **128**(5): 499-504.
INTRODUCTION: Osteochondral transplantations, albeit technically challenging, appear promising not only in knee joint lesions, but also in the treatment of talus lesions. We hypothesized that in patients suffering osteochondral lesions of the talus, favorable outcomes are obtained in patients undergoing primary mosaicplasty as compared to

patients undergoing secondary mosaicplasty. MATERIALS AND METHODS: Over a 3-year period (1998-2001), 14 patients (six male, eight female, median age 22 years) were treated with an autologous osteochondral transplantation of the talus. Eight patients were previously untreated (group I). Six patients had previous ankle procedures, such as microfracturing (group II). The median follow-up was 24 months and 100% complete at 12 months. The functional outcome was evaluated at least at 6 weeks, 12 weeks, and 1 year after surgery using pain on a visual analog scale (VAS) and sports activity was recorded at 1 year after surgery. In ten patients, magnetic resonance imaging (MRI) of the ankle was performed at 1 year after surgery (group I/II: 7/3). RESULTS: Overall ankle pain was decreased from 6.9 +/- 2.1 to 4.0 +/- 2.8 postoperatively. The mean knee pain for the donor knee was 2.6 +/- 2.4. We found no significant difference between the primary mosaicplasty group and the secondary mosaicplasty group with regard to pain. MRI scans of ten patients showed a complete incorporation of the osteochondral cylinders at 1 year after surgery. CONCLUSION: Favorable outcomes were obtained in patients undergoing primary mosaicplasty as compared to patients undergoing secondary mosaicplasty. We found no significant difference among patients with previous ankle surgery in contrast to those without, with a median 24-months follow-up.

Han SH, Lee JW, et al. (2006). Radiographic changes and clinical results of osteochondral defects of the talus with and without subchondral cysts. Foot Ankle Int **27**(12): 1109-14.

BACKGROUND: Subchondral cysts are a type of osteochondral defect of the talus and can be a source of chronic ankle pain. The treatment modality of this cystic lesion is similar to that of other osteochondral defects, but results from previous reports are controversial. Therefore, we compared the clinical results and radiographic changes in small subchondral talar cystic lesions (less than 1.5 cm2) to other noncystic defects after arthroscopic operations without bone grafting. METHODS: The review covered about 2 years (January, 2001 to April, 2003) and included 38 patients with an average age of 36.9 years. Followup ranged from 24 to 36 months. Arthroscopic microfracture or abrasion arthroplasty was performed on 20 defects with subchondral cysts and 18 defects without cysts. Clinical results were assessed by the ankle-hindfoot scale of the American Orthopaedic Foot and Ankle Society (AOFAS); radiographic changes were assessed by the transverse long diameter and the area (mm2) of the cyst on digital radiographs using a PACS (Picture Archiving Communication System). RESULTS: At the last followup, AOFAS clinical scores improved similarly in cystic and noncystic defects. The average diameter of the cysts decreased from 8 +/- 2 mm to 6 +/- 2 mm ($p < 0.01$). The area attributed to the cyst also decreased, from 49 +/- 17 mm2 (24 to 84 mm2) to 23 +/- 8 mm2 (4 to 34 mm2) ($p < 0.01$). There were no differences in the clinical results between the cystic and noncystic defects. CONCLUSIONS: Good clinical and radiographic results were obtained after arthroscopic treatment of osteochondral defects with a small subchondral cyst. Our results suggest that a small cystic lesion can be treated by arthroscopic microfracture or abrasion arthroplasty and that the existence of a small cyst in an osteochondral defect lesion may not affect the postoperative prognosis.

Hangody L (2003). The mosaicplasty technique for osteochondral lesions of the talus. Foot Ankle Clin **8**(2): 259-73.

For years, OCD of the talus has been known as a symptomatic lesion that causes pain, recurrent synovitis, altered joint mechanism, and obstruction from loose bodies. It is a probable precursor of ankle osteoarthritis because of altered joint mechanics and recurrent synovitis. With the notable advance of diagnostic imaging and the advent of ankle arthroscopy, classification of the lesion has become standardized, which allowed for the comparison of treatment options. Arthroscopic procedures (eg, debridement, retrograde

drilling, bone grafting, by nature of their minimally invasive approach, have a great advantage in treating small defects and stable OCD lesions compared with open methods. For larger osteochondral defects and unstable OCD lesions, the optimal treatment is the long-term replacement and integration of type-specific hyaline cartilage. In principle, mosaicplasty autogenous osteochondral transplantation fills these criteria. The early- and medium-term results are encouraging, complete with confirmatory radiographs and histology, and hold promise for this procedure to provide lasting relief of symptoms and the prevention of ankle arthrosis. Under the current dichotomy of nonoperative and operative treatments giving satisfactory results, and few comparative studies, there is a need for a randomized, prospective study in the treatment of talar OCD to define a reproducible treatment algorithm.

Kadakia AP, Sarkar J (2007). Osteochondritis dissecans of the talus involving the subtalar joint: a case report. J Foot Ankle Surg **46**(6): 488-92.

Osteochondritis dissecans can affect any joint, although the ankle is the third most common location after the knee and elbow. When the ankle is involved, the lesion usually affects the talar dome. The authors report a case of osteochondritis of the subtalar joint affecting the talus in a 14-year-old girl without any history of trauma. Plain radiographs did not show any bony pathology, and the diagnosis was made with computerized tomography. The patient was treated initially in a non-weight bearing plaster cast with anti-inflammatory medication and subsequent physiotherapy. The conservative treatment failed to relieve her symptoms, and she underwent subtalar arthroscopy followed by surgical excision, curettage, and drilling through a mini-arthrotomy. Postoperatively, the patient was managed with protected weight bearing and physiotherapy. A year after surgery, she had returned to her routine activities, including sports, with no further complaints related to the affected foot.

Kennedy JG, Suero EM, et al. (2008). Clinical tips: retrograde drilling of talar osteochondral defects. Foot Ankle Int **29**(6): 616-9.

Contemporary methods of bone grafting osteochondral defects, in which the remaining overlying cartilage is relatively well preserved, have inherent problems. The bony defects are often saucer-shaped and the cylindrical graft may not fill the void, leaving areas of cartilage with no underlying scaffold and obviating early weight bearing. Furthermore, to obtain a proper fill of the defect, tamping of the graft can cause excessive pressure and disruption of the overlying cartilage. In an effort to address these concerns, the authors propose the use of a biological viscous paste of calcium sulfate that hardens within 5 minutes when injected in a retrograde fashion into the talus. This confers a mechanical advantage of complete cystic fill of the cyst, which allows early weight bearing. Calcium sulfate acts as an osteoconductive material that incorporates into host bone within 8 weeks. Donor site morbidity is eliminated using this system.

Koulalis D, Schultz W, et al. (2002). Autologous chondrocyte transplantation for osteochondritis dissecans of the talus. Clin Orthop Relat Res(395): 186-92.

Eight patients with osteochondritis dissecans of the talus were reviewed. The average followup was 17.6 months (range, 8-26 months). The mean age of the patients was 31.8 years (range, 22-42 years). All patients had a preoperative examination, magnetic resonance imaging, and radiologic classification of the lesion through regular anteroposterior and lateral radiographs. Diagnostic arthroscopy and biopsies of healthy cartilage were done, which then had chondrocyte extraction and culture. After an average of 2.5 weeks, an arthrotomy, malleolar osteotomy, subchondral bone sclerosis debridement, and autologous chondrocyte transplantation were done. The postoperative treatment included nonweightbearing for 6 to 7 weeks, physiotherapy, and continuous passive motion.

According to the postoperative evaluation score, all results were excellent to good with an average score of 0.6. No complications occurred. The arthroscopic reexamination of three patients at the sixth postoperative month and the radiologic evaluation of all patients showed the existence of cartilagelike tissue with complete coverage of the chondral defect. This method enables reconstructive intervention for unicompartmental defects of articular cartilage through implantation of new chondrocytes, establishment of a subchondral blood supply, and reconstruction of the articular surface.

Nakagawa Y, Suzuki T, et al. (2005). Bony lesion recurrence after mosaicplasty for osteochondritis dissecans of the talus. Arthroscopy **21**(5): 630.

Autogenous osteochondral grafts have recently become popular for use in small, isolated, contained articular cartilage defects. We treated a 26-year-old man who had a cartilage defect measuring 10 x 20 mm in the anteromedial area of the right talus. We performed multiple osteochondral grafting of the lesion with medial malleolar osteotomy from a donor site in the ipsilateral knee joint. Two years after the operation, the patient's ankle pain recurred and the bony lesion in the talus also became osteolytic. Because we believed that only the cartilaginous portions of the osteochondral plugs grafted 2 years previously were fully fixed and viable, and that recurrence had occurred at the bony portions, at reoperation we performed curettage of the bony lesions and grafted iliac bone into the lesions with fenestration of the inferomedial ankle joint cartilage, not grafted plug cartilage. Therefore, probably because of overuse, the bony lesion in the talus had recurred 2 years after the first operation, but the grafted hyaline cartilage had survived. Autogenous osteochondral grafting into the talus, unlike the knee joint, should be done with care to ensure there is no sclerotic bone surrounding the lesion in patients with long-standing symptoms and recurrence of bony lesions.

Navid DO, Myerson MS (2002). Approach alternatives for treatment of osteochondral lesions of the talus. Foot Ankle Clin **7**(3): 635-49.

Osteochondral lesions of the talus are common injuries, especially in the athletic population. Although multiple etiologies exist, lateral lesions have a higher incidence of association with a specific traumatic event. It has been postulated that lateral lesions are produced when the anterolateral aspect of the talar dome impacts the fibula on application of an inversion or dorsiflexion stress to the ankle [2]. There is general agreement that surgery should be performed only in symptomatic cases, as osteochondral lesions of the talar dome show little tendency to progression and do not seem to lead to osteoarthritis [10,42]. Appropriate preoperative imaging is extremely important. Standard radiographs of the ankle supplemented with lateral plantar flexion and dorsiflexion views and CT or Mr imaging can be helpful in evaluating the size, depth, and exact location of the lesion. This information is essential in planning the appropriate surgical procedure. Although many stage I and II lesions respond well to conservative therapy and a period of immobilization, some higher-grade lesions (stage III and IV) eventually require surgical intervention. Most lesions can be approached arthroscopically. Many arthroscopic procedures have been shown to be successful, including debridement with abrasion chondroplasty, subchondral drilling, and microfracture [18-20]. But certain larger or refractory lesions may require an open approach to the ankle joint to restore the articular cartilage. Most lateral lesions have an anterior location and are easily accessible through a standard anterolateral approach. Most medial lesions are located on the posterior talar dome, and a medial malleolar osteotomy is usually required. Osteotomies, in particular of the medial malleolus, should be approached carefully. The possible complications of nonunion and malunion can lead to progressive arthritis of the ankle joint.

Perumal V, Wal El, et al. (2007). Juvenile osteochondritis dissecans of the talus. J Pediatr Orthop **27**(7): 821-5.

BACKGROUND: The literature on the best treatment of osteochondritis dissecans of the talus (OCDT) in children is scarce because of rarity of the condition. In addition, patients with this condition typically become asymptomatic long before radiographic healing is complete that might give a false perception of clinical success. We determined the healing rate after 6 months of nonoperative treatment of OCDT in skeletally immature patients. STUDY DESIGN: Retrospective review. METHODS: After institutional review board approval, a retrospective review of clinical and radiographic records of children treated nonoperatively for OCDT between 1994 and 2005 at our hospital was performed. Subjects who had open growth plate at the time of presentation and no multiple trauma-associated OCDT lesions were included. Thirty-two subjects had open growth plates and completed at least 6 months of follow-up; 31 patients were initially treated nonoperatively, whereas one had stage 4 lesion and was treated surgically from the start. RESULTS: After 6 months of nonoperative treatment of juvenile OCDT in 31 skeletally immature subjects with a mean age of 11.9 years, 77% continued to have persistent lesions on radiograph, 16% had complete clinical and radiographic healing, and 6% had severe pain after cast removal that required surgery. In those with radiographic persistent lesions and after an extra 6 months of nonoperative treatment, 42% had to undergo surgery for unhealed lesions and pain, whereas 46% had no symptoms despite persistent lesions on radiographs. CONCLUSIONS: In skeletally immature patients, few juvenile OCDT lesions respond to 6 months of nonoperative treatment. This study demonstrated a higher rate of nonoperative failure than is generally reported in the literature. Prolonged conservative treatment, if opted after 6 months of nonoperative management, should include activity modification and out of sports until complete radiographic healing. Surgery should be adopted if pain persists and if the patient is not willing to modify activities. LEVEL OF EVIDENCE: Therapeutic level IV.

Rodriguez EG, Hall JP, et al. (2006). Treatment of osteochondral lesions of the talus with cryopreserved talar allograft and ankle distraction with external fixation. Surg Technol Int **15**: 282-8.

This article presents the results of a retrospective review of six osteochondral lesions on six patients (five men and one woman) treated with transplantation of cryopreserved talar allograft and ankle joint distraction. All patients complained of ankle pain existing for a long time secondary to a traumatic episode confirmed through MRI. Lesions ranged in measurement from 0.8 cm x 0.8 cm to 3.2 cm x 1.8 cm with an average size of 2.1 cm x 1.5 cm. Each patient underwent talar dome transplantation using fresh frozen talar allograft followed by ankle distraction. Distraction was obtained using a three-ring multiplanar external fixation device. All surgeries were performed between 2002 and 2004. All external fixators were removed at 8 weeks and patients remained partial-weight bearing in a removable cast boot for an additional 8 weeks. Serial postoperative radiographs showed complete consolidation of the allograft within 16 weeks. The average follow up time was 24 months, and all patients related a subjective decrease in symptoms and increase in activity levels. Patients were also evaluated utilizing the Maryland Foot Score both pre- and postoperatively. Preoperatively, four patients were graded as fair and two were graded as poor. Postoperatively, two patients related excellent results, three patients related good results, and one patient related fair results. Several patients experienced minor complications such as pin site irritation (five patients), painful talar wire (one patient), and periostitis (one patient). No patients experienced any major complications and none have required additional surgery. We feel that these initial results warrant further investigation of this treatment.

Rosenberger RE, Fink C, et al. (2006). Computer-assisted minimally invasive treatment of osteochondrosis dissecans of the talus. Oper Orthop Traumatol **18**(4): 300-16.

OBJECTIVE: Revascularization of areas of necrosis in the talus and stimulation of bone regeneration whilst protecting the talar hyaline cartilage using computer-assisted minimally invasive drilling or retrograde cancellous bone relining of the osteochondrotic zone. INDICATIONS: Osteochondrosis dissecans of the talus, Berndt & Harty stages I-III. CONTRAINDICATIONS: Osteochondrosis dissecans of the talus, Berndt & Harty stage IV. General contraindications such as poor skin and soft-tissue conditions or poor general condition. SURGICAL TECHNIQUE: Before the operation: fitting a removable cast for the ankle (ankle fixation cast), then computed tomography of the ankle with the ankle fixation cast fitted. Planning the site of the central Kirschner wire in the talus using a navigation system in the laboratory. Adjusting and locking the aiming device. Intraoperative procedures: fitting the sterilized ankle fixation cast. Retrograde placement of the 2.4-mm Kirschner wire through the locked aiming device. Check on the position of the Kirschner wire using an image intensifier. Arthroscopy of the ankle; further parallel holes may then be drilled depending on the findings or retrograde cancellous bone grafting may be performed by harvesting cancellous bone from the calcaneus. POSTOPERATIVE MANAGEMENT: For retrograde drilling/parallel drilling: 1 week of partial weight bearing at 30 kg. For retrograde cancellous bone grafting: 4 weeks of partial weight bearing at 15 kg, then 2 more weeks of partial weight bearing at 30 kg. Physiotherapy. RESULTS: From December 1999 to January 2005, 41 patients with osteochondrosis dissecans of the talus were selected for computer-assisted treatment by retrograde drilling or retrograde cancellous bone grafting. In 39 of the 41 patients, the osteochondral lesion-as verified by postoperative magnetic resonance imaging (MRI)-was accessed, i.e., the drilled hole led to the lesion. In two cases, irreparable flaws in the materials were discovered intraoperatively, so that the above method was only performed on 39 patients. The 1-year results for the first 15 patients treated with retrograde drilling/parallel drilling and concomitant ankle arthroscopy without retrograde cancellous bone graft are presented here based on the follow-up MRI (position of drill hole, assessment of vitality of the area of osteochondritis) and a clinical score. The four women and eleven men were, on average, 34.1 years old (14-55 years). In the radiologic comparison of the pre- and postoperative stages of the osteochondritis dissecans, 46.7% of patients showed an improvement in the Berndt & Harty stage. 40.0% showed the same osteochondrosis dissecans stage in the postoperative MRI, and in 13.3% it deteriorated by one grade. In the clinical follow-up examination, the AOFAS Score averaged 88.9 points.

Savva N, Jabur M, et al. (2007). Osteochondral lesions of the talus: results of repeat arthroscopic debridement. Foot Ankle Int **28**(6): 669-73.

BACKGROUND: Repeat arthroscopic debridement of osteochondral lesions of the talus has a poor reputation despite a paucity of evidence in the literature. METHODS: We reviewed all patients who had repeat arthroscopic debridement of an osteochondral lesion performed by the senior author. They were scored using the American Orthopaedic Foot and Ankle Society (AOFAS) Ankle-Hindfoot Scale, and lesions were graded using the system described by Berndt and Harty. RESULTS: Between 1993 and 2002, 808 consecutive ankle arthroscopies were performed by the senior author, of which 215 were to treat osteochondral lesions of the talus. Of these, 12 had repeat arthroscopies because of unresolved symptoms. AOFAS scores improved from a mean of 34.8 prior to arthroscopy to 80.5 after repeat arthroscopy at a mean followup of 5.9 years (18 months to 11 years). Two patients returned to professional sports after the second procedure. Six patients returned to their preinjury levels of sporting activity and three returned to the same sports but played to a lesser standard or less frequently. One patient had already had a cartilage transplantation procedure. CONCLUSIONS: This is the first series specifically assessing patients who have

had repeat arthroscopic debridement of osteochondral lesions of the talus, using the same debridement technique by a single surgeon. Our results question the assumption that repeat arthroscopic debridement yields poor results. They also provide a baseline for the newer chondral and osteochondral transplantation techniques to compare to at the medium term.

Schuman L, Struijs PA, et al. (2002). Arthroscopic treatment for osteochondral defects of the talus. Results at follow-up at 2 to 11 years. J Bone Joint Surg Br **84**(3): 364-8.
We reviewed 38 patients who had been treated for an osteochondral defect of the talus by arthroscopic curettage and drilling. The indication for surgical treatment was persistent symptoms after conservative treatment for at least six months. A total of 22 patients had received primary surgical treatment (primary group) and 16 had had failed previous surgery (revision group). The mean follow-up was 4.8 years (2 to 11). Good or excellent results, as assessed by the Ogilvie-Harris score, were found in 86% in the primary group and in 75% in the revision group. Two further procedures were required, one in each group. Radiological degenerative changes were seen in one ankle in the revision group after ten years. Arthroscopic curettage and drilling are recommended for both primary and revision treatment of an osteochondral defect of the talus.

Shearer C, Loomer R, et al. (2002). Nonoperatively managed stage 5 osteochondral talar lesions. Foot Ankle Int **23**(7): 651-4.
Thirty-five ankles in 34 subjects with non-surgically managed stage 5 (chronic) osteochondral lesions of the talus (OLT) were reassessed an average of 38 months post diagnosis--88 months post symptom onset. The overall clinical result was rated good or excellent in 54%, fair in 17% and poor in 29%. Six patients opted for surgery--arthroscopic drilling--after a trial of one year of nonsurgical treatment and were therefore rated as poor. Tomogram or CT scans at the time of diagnosis and follow-up were compared in 25 patients. We found no significant change in lesion size and there was a poor correlation between change in lesion size and clinical outcome. X-rays performed at follow-up on 20 patients showed mild degenerative changes in 13 of 20 ankles with OLT. No correlation was found between the presence of degenerative changes and the clinical outcome. We conclude that: 1. Non-surgical management of stage 5 OLT is a viable option with little or no risk of developing significant osteoarthritis. 2. Most lesions remain radiographically stable. 3. There is a poor correlation between changes in lesion size and clinical outcome. However, the few patients with lesions which decrease significantly in size tend to do well and those with lesions which increase significantly in size do poorly. 4. The development of mild radiographic changes of OA does not correlate with clinical outcome. 5. The general course of stage 5 OLT is benign with over half of the patients improving to good or excellent results with non-surgical management. 6. Lateral lesions tend to do better than medial ones. 7. Adult onset lesions tend to do better than juvenile onset lesions.

Tanaka Y, Omokawa S, et al. (2006). Vascularized bone graft from the medial calcaneus for treatment of large osteochondral lesions of the medial talus. Foot Ankle Int **27**(12): 1143-7.
BACKGROUND: Operative treatment of large osteochondral lesions of the talus is difficult because the blood supply is poor in the talar dome. The purpose of this study was to evaluate the results of a vascularized bone graft transfer from the medial calcaneus to the large osteochondral lesion. METHODS: Four ankles in four patients with medial osteochondral lesions were treated through a medial transmalleolar approach. Vascularized bone graft was harvested from the medial calcaneus using the calcaneal branch of the posterior tibial artery and was placed through a fenestration of the medial aspect of the talar dome. The mean duration of postoperative followup was 34 (range 24 to 48) months. Clinical and radiographic evaluations were made before surgery and at final followup.

RESULTS: According to the AOFAS ankle-hindfoot scale, mean pain and function scores improved from 20 to 33 points and 30 to 43 points, respectively. The mean total score improved from 60 to 83 points. Plain radiography at followup showed slight osteosclerosis in all patients, but joint space narrowing was not seen in any patient. Cysts seen preoperatively on MRI or CT resolved after 12 months postoperatively, and MRI or CT did not reveal any findings indicative of osteonecrosis. CONCLUSIONS: Clinical and radiographic results were satisfactory. Vascularized bone grafts harvested from the calcaneus were successful for the treatment of large osteochondral lesions of the medial talus.

Verhagen RA, Struijs PA, et al. (2003). Systematic review of treatment strategies for osteochondral defects of the talar dome. Foot Ankle Clin **8**(2): 233-42, viii-ix.

The aim of this study was to summarize all eligible studies to compare the effectiveness of different treatment strategies for osteochondral defects (OCD) of the talus. Electronic databases from January 1966 to June 2000 were systematically screened. Based on our inclusion criteria, 39 studies describing the results of treatment strategies for OCD of the talus were included. No randomized clinical trials (RCT) were identified. Fourteen studies described the results of nonoperative treatment (NT); 4: the results of excision alone; 10: the results of excision and curettage (EC); 21: the results of excision, curettage, and drilling (ECD); 2: the results of cancellous bone grafting after EC; 1: the results of osteorchondral transplantation; 3: the results of fixation; and 1: the results of retrograde drilling. The average success rate of NT was 45%. Comparison of different surgical procedures showed that the highest average success rate is reached by excision, curettage, and drilling (ECD; 86%), followed by excision and curettage (EC; 78%) and excision alone (38%). On the basis of this systematic review, we conclude that NT and excision alone are not to be recommended in treating talar OCD. Both EC and ECD have been shown to lead to a high percentage good/excellent results. At the present time, ECD seems to be the most effective treatment strategy for osteochondral defect of the talus. Due to great diversity in the articles and variability in treatment results, however, no definitive conclusions can be drawn. Sufficiently powered randomized clinical trials with uniform methodology and validated outcome measures should be initiated to compare the outcome of surgical strategies for OCD of the talus.

Vertullo C. (2002). Unresolved lateral ankle pain. It's not always 'just a sprain'. Aust Fam Physician **31**(3): 247-53.

BACKGROUND: Lateral ankle sprains are the most common sports related injury. Unfortunately a number of other lateral ankle injuries are often misdiagnosed as a sprain, resulting in misdirected therapy, delayed functional return and unresolved ankle pain. OBJECTIVE: This review focuses on the differential diagnosis and management of unresolved lateral ankle pain, with an emphasis on methods to correctly identify the injury. DISCUSSION: A surprisingly long list of conditions can mimic a lateral ankle sprain, including syndesmosis sprains, subtalar sprains with or without instability, impingement lesions, chronic ankle instability, osteochondral lesions of the talus, peroneal tendon injury, tarsal coalition and fractures of the hindfoot. A careful history, anatomically accurate palpation and plain erect X-rays are the cornerstone of diagnosis. The key is to remember that it's not always just an ankle sprain. Bone scintigraphy, CT and MRI are valuable investigational adjuncts. Arthroscopy is an excellent method of intra-articular visualisation to diagnose and treat unresolved lateral ankle pain.