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SURGICAL TREATMENT OF GANGLIA OF THE FOOT AND ANKLE

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Ganglia of the foot and ankle represent about 9% of all ganglia, but very few studies have reported on the outcome of their treatment. We have reviewed 24 patients who underwent an excision of those lesions as day cases between 1988 and 1995.

The average age of the patients was 44 (range 24 to 70). There were 18 females and 6 males. There were 10 recurrences (41.6%); 2 patients (8.3%) had a cutaneous nerve injury and 3 patients (12.3%) developed wound complications which settled with conservative treatment.

The recurrence rate varied according to the seniority of the surgeon: Consultant/Staff Grade - 28.5%, Registrar - 60% and SHO - 28.5%.

In view of the high recurrence rate and the morbidity related to surgery, other treatment options should be considered in the management of this group of ganglia.

HINDFOOT ALIGNMENT: NORMAL VALUES AND THEIR RELEVANT TO TIBIAL-CALCANEAL ARTHRODESIS

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Aim: To identify a normal range of hindfoot alignment by radiological techniques and thereby provide accurate geometric data on which to base the design of a new intramedullary device specifically indicated for combined ankle and subtalar fusion.

Method & Results: A normal population of hindfeet was obtained from a routine orthopaedic clinic. Patients without hindfoot symptoms, normal hindfoot examination and normal radiological findings were included. These patients underwent routine AP and lateral standing views of the ankle and foot together with hindfoot alignment views as described by Saltzman. Radiographs showing abnormal architecture or indices (e.g. Bohlers angle and calcaneal pitch) outside the accepted ranges were discarded. From the remaining films the following were measured. (Negative values = varus, Positive values = valgus). On Hindfoot Alignment view. Tibio-talar (ankle alignment)

Mean - 1.4° (-5.5 to 6) Tibio-calcaneal (hindfoot) alignment

Mean 3.0° (-4 to 6) On Lateral ankle view. Height to lower surface of talus from inferior surface of calcaneum.

Mean 27.5 mm (21 to 45) Height to upper surface of talus from inferior surface of calcaneum.

Mean 54.8 mm (49 to 79)

Anatomical studies in this and other departments has shown that the technique of retrograde transcaneal hindfoot arthrodesis conveys significant risks to the plantar structures (esp. lateral plantar nerve) if a midline insertion is used with a straight nail. Subsequently we have calculated that the insertion point needs to be lateralised by at least 0.75 cm to avoid these risks. This lateral insertion point and the physiological valgus of the normal hindfoot demonstrated above justifies the requirement of a curved

custom made prosthesis for this technique. Using the same hindfoot alignment views a point 0.75 cm lateral to the weight bearing portion of the calcaneus was used to create an artificial hindfoot alignment simulating the ideal passage of a device used to achieve combined hindfoot arthrodesis in an average ankle. The mean value of this was 8° (range 3 - 16).

We propose the construction of an intramedullary nailing device with a curved centred around the average midpoint of the talus (ie 40.6 mm from distal end) which achieves an overall deviation of 8°.

Conclusion: The relatively new but very useful technique of retrograde intramedullary nailing for combined ankle and subtalar arthrodesis has found a small but definite indication in complex hindfoot problems. To date the procedure has been performed with a variety of implants designed for other use. The physiological valgus of the normal heel together with the evidence for a lateralised insertion point to avoid plantar neurovascular damage indicate the need for a curved nail. By establishing these normal values for hindfoot alignment a suitable prosthesis for these needs can be designed.

THE USE OF MODIFIED COBEY VIEW IN THE ASSESSMENT OF HINDFOOT DEFORMITY

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We have performed this special radiographic projection as a pre-operative planning tool in those patients who may need a corrective arthrodesis or calcaneal osteotomy for hindfoot deformity. It is particularly useful in tibialis posterior tendon dysfunction, calcaneal fracture, and deformity due to neurological imbalance.

The radiographic view involves having the patient facing away from the Radiographic beam, standing with the knees slightly flexed and the ankles dorsiflexed, on a raised platform, so that the beam can point 20° downwards. This view gives an excellent projection of the relationship between the tibia and the weight bearing heel and can aid in planning the correction of hindfoot varus or valgus deformity. Limitations are gross obesity and the inability to dorsiflex the ankle 10°. Various fixed measurements can be taken. In our study, the ankle joint and calcaneal width were measured. From this were calculated the angle from the mid-ankle to mid-calcaneus, and also the translation from mid-ankle to mid-calcaneus. We also measured the distance from the medial calcaneal wall to a vertical line dropped from the medial malleolus.

In a series of 15 patients with proven unilateral tibialis posterior tendon dysfunction, we consistently found marked increases in the translation and angle from mid-ankle to mid-calcaneus, and also in the distance between medial malleolus and medial calcaneal wall. This information helps plan the amount of displacement needed when performing a medial displacement osteotomy.

ADULT PAINFUL PLANO-VALGUS FOOT: A STUDY OF PATIENTS PRESENTING BETWEEN 1991 AND 1997 TO A RURAL DISTRICT GENERAL HOSPITAL

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110 patients with 113 cases of Pes Plano-valgus presented to a single surgeon clinic between 1991 and 1997. 91 medical records were available for review along with all Magnetic Resonance Imaging reports. 2 patients had been lost to follow-up and were therefore excluded. Using Myerson's modification of the Johnson and Strom2 staging system for Tibialis Posterior (TP) tendon dysfunction we found of our 91 cases 26 had stage 1 deformity; 52 had stage 2; 10 had stage 3 and 3 had stage 4 disease.

Treatment was initially by physiotherapy and orthotics, with surgery being reserved for those patients who were either resistant to, or deteriorated on, conservative management.

Surgery included limited or triple fusion, as well as soft tissue procedures such as simple decompression, Flexor Digitorum Longus (FDL) transfers or Split Tibialis Anterior transfers (Sp1ATT). Patients were then classified to good, intermediate or poor outcome from either their one year, or final, outpatient consultation.

7 (25%) of the grade 1 patients required surgery, with only soft tissue procedures being undertaken. Of these 5 had excellent results and 2 intermediate results.

26 (52%) of the grade 2 group of patients underwent surgery with 3 presently on the waiting list. The majority of these (92%) were ligament reconstructions. The results from isolated FDS transfer were disappointing with 50% having poor results, although good in 25% of cases. The Sp1ATT results are encouraging, for this early stage, with 66% of the patients having a good outcome.

The grade 3 patients were mostly (90%) treated surgically with either triple (80%) or limited (10%) fusion. These showed 60% good outcome with only 20% poor.

We found that not all patients, even with clearly dysfunctional TP tendons, required surgical intervention. In addition, stage 1 patients, resistant to conservative management, did well with soft tissue surgery. The results of isolated FDL transfers were disappointing, with the poorest results coming in rheumatoid feet. Although early in our series we feel that Sp1ATT, especially if combined with spring ligament or talo-navicular capsular reefing, gives a superior outcome.

WHEN HEEL PAIN DOES NOT HEAL

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Inferior heel pain constitutes a sizeable proportion of referrals to ordinary and specialist Orthopaedic and Foot Clinics.

The majority of patients referred do suffer from chronic disorders of the plantar fascia, i.e. plantar fasciitis. However, increased awareness of other causes of IHP must be encouraged.

Two cases of patients with chronic IHP were discussed; both turned out to be neoplasms of the os calcis, the first, a

vascular malformation only diagnosed after a TC bone scan was followed by a CT scan. The second case proved to be an osteoid osteoma infero-lateral to the subtalar joint, also confirmed by CT scanning. Minimal interference surgery (CT assisted) was successful in eradicating the nidus on the latter case, but open excision was necessary to remove the former malformation.

Various causes of Inferior Heel Pain were discussed. Radiological guidelines issued by Radiologists to clinicians in painful heels were criticised.

INSOLES IN THE TREATMENT OF LESSER METATARSALGIA

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Aim: The aim of this study was to compare these two insoles for primary lesser metatarsalgia in terms of their effect on plantar pressures and the subjective symptom relief.

Methods: Prospective single blind randomised trial of eight weeks treatment in 46 feet in 33 patients. Subjective outcome measures were visual analogue pain scores and estimated compliance. Objective outcome measures were dynamic plantar pressures using the Musgrave Footprint((AE)) System.

Results: In group 1 (Viscoped), 6 of 18 patients rated themselves much improved or somewhat improved and in group 2 (Langer) the proportion was 12 of 15 ($p = 0.02$). Reported mean compliance was 16% higher in the Langer group. Plantar forefoot pressure was lowered by the insoles in all cases. The reduction was significantly greater ($p < 0.001$) in group 2, both in absolute pressure and as a percentage of initial pressure.

Conclusion: The Langer BlueLine was significantly better in terms of reduction of peak metatarsal pressure. All the subjective outcome measures favoured the Langer BlueLine insole. We continue to use the Langer BlueLine insole because it is more efficacious (both subjectively and objectively), more economical and better tolerated by patients. This policy will yield a recurrent saving of £10,000 per annum in this Department.

ORTHOPAEDIC FOOT AND ANKLE SURGERY. AN AUDIT OF WORKLOAD

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Subspecialisation within Orthopaedics is ever advancing. A report of a recent Council meeting of the British Orthopaedic Foot Surgical Society indicates that a number of points have been agreed as to how subspecialisation in foot and ankle surgery should progress. In January this year I made the decision to devote my elective orthopaedic practice to disorders of the foot and ankle.

I have kept details of my referrals, outpatient practice and theatre activity, and I felt it appropriate that I present a review of the first six months of my workload. My base hospital serves a resident population of 300,000 but offers regional and supraregional services. I am one of ten consultants each with their own subspecialist practice.

In the first six months I received 679 referral letters, all related to problems with the foot or ankle. This was the largest number of referrals for a single subspecialty within orthopaedics, and also within all medical specialties per consultant. 82% of referrals came from GPs, the remainder being equally from other orthopaedic surgeons and rheumatologists. 40% of patients seen presented disorders of the hallux, lesser toes or metatarsalgia, 23% arthritic disorders and 14% complex foot deformities. 39% of new patients were placed directly on the surgical waiting list. 48% of new patients were reviewed, 40% of these following provision of orthoses or surgical footwear.

Continued audit will be helpful in developing local services for patients with foot and ankle problems. The information may also be of interest to those considering declaring a clinical interest in disorders of the foot and ankle. Given that only 2% of us in this country have a primary interest in foot and ankle surgery, I question whether the points agreed by the Council regarding consultant subspecialty practice are achievable.

OSTEOCHONDRAL LESIONS OF THE TALUS, INCIDENCE OF MORPHOMETRY WITH RELATION TO POSSIBLE DIFFERENCES IN TREATMENT

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Aim: To identify the incident of osteochondral lesions on MRI in a large tertiary referral foot practice and correlate the morphology of these lesions with possible treatment modalities.

Method: A consecutive series of more than 400 MRI scans of the ankle from the last six years has been reviewed in detail. The investigations were universally derived from a single consultants practice comprising a tertiary referral service and have been reported by a single radiologist with considerable experience in imaging of the foot.

Results and Discussion: Amongst a wide spectrum of pathology we have demonstrated 42 (10%) cases of peroneal tendon injury, 52 (12.5%) reports of tibialis posterior abnormalities and 18 (4.5%) cases of osteochondral pathology in the talus. Of these talar lesions eight were of a less severe nature showing changes predominantly in the subchondral bone with relative preservation of the overlying cartilage. The remaining 10 lesions showed large ((93))cystic((94)) type lesions with evidence of extensive overlying cartilage loss confirmed on arthroscopy. We believe there is a spectrum of osteochondral disease represented at one end by minor chondral flaps and at the other by the large cystic type defects in bone and cartilage. Left untreated, an initially mild lesion can progress along the spectrum. The treatment of any individual lesion must take account of the fact that different modalities may be required for different stages in the same disease process. We suggest that the treatment of large osteochondral defects with bone volume loss, cystic change and deficient overlying cartilage will require formal osteochondral auto-grafting and are unlikely to respond to conventional methods of simple abrasion or drilling suitable for the less severe lesions. The use of cancellous autografts without addressing the overlying cartilage defect is illogical as the pathology which generates the cyst remains unaltered. The MRI scans from the ten severe patients were further reviewed in detail to precisely measure the cylindrical volume of osteochondral graft that would be required to fill the defect at surgery. This may prove to be a useful technique in pre-operative planning.

Conclusions: We have identified two distinct forms of osteochondral lesion; those in which the lesion is large and cystic in appearance with an apparent loss of bone volume, and those where the bone structure is abnormal but volume appears maintained. The cartilage overlying these lesions is characteristically preserved in the latter group but damaged or absent in the former group. The optimum treatment in these two groups may differ.

DICTIONARY ARTHROSCOPY OF THE ANKLE FOR SEVERE ARTHRITIS

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Severe ankle arthritis may be treated by arthrodesis or arthroplasty but both have substantial risks of failure and prolonged recovery times.

Ankle arthroscopy and anterior cheilectomy is a successful in early arthritis. We have combined arthroscopy, cheilectomy and debridement with rigid distraction of the ankle, in severely arthritic ankles with the objective of avoiding major surgery.

Twelve patients scheduled for ankle arthrodesis with $<10^\circ$ varus/valgus tilt were studied.

Under anaesthetic, an Ilizarov distractor was applied. 10-15 mm of external distraction was applied and maintained for >45 mins. During this time, arthroscopic debridement and cheilectomy was performed. The distractor was then removed.

Patients were taught passive dorsiflexion stretching exercises, and mobilised early.

In two cases arthroscopic osteophyte removal was impossible. Both proceeded to arthrodesis early.

Of the remaining ten, all have been followed up for eighteen months or to failure.

All retained dorsiflexion post-operatively.

Two requested arthrodesis within six months, and one within one year.

The remaining 7 had improvement in function, range of movement and pain.

Distraction arthroscopy of the ankle is useful in some cases of severe ankle arthritis to delay or avoid major surgical treatment.

OSTEOCHONDRAL LESIONS OF THE TALUS, INCIDENCE OF MORPHOMETRY WITH RELATION TO POSSIBLE DIFFERENCES IN TREATMENT

S. Hepple, I. Finlay, I.G. Winson, D. Glew
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BUECHEL-PAPPAS LCS TOTAL ANKLE REPLACEMENT: AVOIDING PERI-OPERATIVE AND EARLY POST-OPERATIVE COMPLICATIONS

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Ankle joint replacement surgery has acquired a poor reputation.

We report the results of a single surgeon series of 18 Buechel-Pappas ankle joint replacements over six years. The early complications are emphasised with recommendations on how they may be avoided.

Patient selection should be rigorous, avoiding the young, active individual, single joint disease or those with peripheral vascular disease or diabetes mellitus. Total ankle replacement is best indicated for those patients with multiple joint disease, especially bilateral ankle degeneration and those with stiff hindfoot joints.

The ankle joint should not have more than 10° or varus or valgus, and the skin quality should be reasonable. The size of the prosthesis should be chosen with care to avoid skin tension and fracture of the medial malleolus. Wound breakdown can be avoided by the careful approach to the ankle, selection of the prosthesis and adequate immobilisation after surgery.

A COMPARISON OF WEDGE OSTEOTOMY AND TENDON TRANSFER FOR THE TREATMENT OF CURLY TOES

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Fourteen patients were reviewed after surgery to correct varus flexion and medial rotation deformities of their lesser toes (curly toes). Seven had had flexor to extensor tendon transfer in 24 toes, 7 had had an osteotomy of the middle phalanx in 13 toes.

Flexion deformity was corrected in all toes but varus persisted in 9 of the 24 toes after tendon transfer. Varus was not seen after osteotomy. Weakness of plantar flexion was seen on the walking footprints in 11 of the 24 toes after tendon transfer but in none of the toes after osteotomy. Three patients with bilateral tendon transfer in several toes noted slight difficulties with running. Stiffness of the toe joints was noted after both operations. In conclusion, tendon transfer proved unreliable in correcting the varus deformity, and weakened the power of the toe to push off. Osteotomy gave better function despite causing some stiffness of the toe joints.

SELECTIVE TENDON LENGTHENING IN THE MANAGEMENT OF POST TRAUMATIC TOE CLAWING

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We report on the management of claw toe deformity in six young adults who had previously suffered a tibial fracture which had been managed operatively. In one patient, and acute compartment syndrome necessitated fasciotomy. The others had no early evidence of compartment syndrome. Each patient developed a variable number of claw toes, at a mean interval of five months post-injury.

These deformities were managed by retromalleolar tendon lengthening of flexor hallucis longus and flexor digitor-

um longus alone or in combination, performed at a mean interval of three months following onset of clawing. In some cases the release of FHL alone resulted in the correction of clawing of both the hallux and lesser toes. There were no complications. All patients were satisfied with relief of pain and cosmetic improvement although objectively there was only moderate improvement in gait pattern and push-off.

The anatomical presence of intertendinous digitations from FHL to a varying number of FDL tendons allows the release of clawing of lesser toes by lengthening FHL alone. Previous anatomical studies have confirmed these connections, with the commonest connection being from FHL to the second and third FDL tendon.

DORSAL BUNIONS - THE AETIOLOGICAL SIGNIFICANCE OF THE RIGID HINDFOOT

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The dorsal bunion is characterised by elevation of the first metatarsal and flexion of the first MTP joint. The deformity has several potential deformities including tibialis anterior vs peroneus longus imbalance, paralysis of all the muscles except triceps surae and the long toe flexors, and proximal transfer of EHL. In some cases elevation of the metatarsal is the primary deformity and flexion of the MTP joint is secondary, and in other cases the reverse is true. We describe 11 cases over a six year period in a specialist foot clinic, in which inflexibility of the hindfoot was an important aetiological factor in the development of a dorsal bunion deformity in the present of a supinated forefoot. The causes of the hindfoot rigidity were, old CTEV (5), Myelomeningocele (1), polio (1), triple fusion (1), and juvenile chronic arthritis (3). The causes of the forefoot supination included malposition of the midtarsal fusion at the time of surgery, late displacement of an unfixed midtarsal fusion, and muscle imbalance between tibialis anterior and peroneus longus. We believe that, in most cases, fixed forefoot supination can be compensated for by hindfoot pronation bringing the medial forefoot into ground contact. In the presence of a hindfoot unable to pronate, for whatever reason, such compensation cannot occur and ground contact of the great toe can only be achieved by flexion of the first MTP joint, producing the dorsal bunion deformity.

The association of the dorsal bunion deformity with a supinated forefoot and a hindfoot unable to pronate has some relevance to clinical practice in the following circumstances.

1. When performing a triple arthrodesis care should be taken to avoid fusing the midtarsal joint in a supinated position. Also it is probably wise to use midtarsal fixation of the midtarsal joint during a triple arthrodesis, in order to avoid late slippage into supination (as occurred in one of our cases).

2. When planning an isolated subtalar arthrodesis, preoperative assessment should include evaluation of any fixed forefoot supination and any tibialis anterior vs peroneus longus imbalance. If either of these conditions is present then consideration should be given to extending the fusion to include the midtarsal joint and correcting the forefoot supination intraoperatively.

THE ANATOMICAL BASIS OF MULDER'S SIGN

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Purpose: To describe a new method of dynamic MR imaging in digital neuritis and identify the movement of the forefoot structures associated with a positive Mulder's sign.

Background: Interdigital neuritis (Morton's neuroma) is characterised by sharp pain on weightbearing radiating from the forefoot into the interdigital cleft. Mulder described a diagnostic test involving alternating plantar and lateral compression of the forefoot. A positive test is a palpable click associated with reproduction of the patient's pain.

Methods: Patients with a clinical diagnosis of interdigital neuritis were investigated using axial and coronal T1 and coronal T2 MRI scans. Mulder's sign was then elicited in a standardised fashion by inflating a sphygmomanometer cuff wrapped around the forefoot and inflated until the patient's symptoms were reproduced. A second scan was then performed with the cuff inflated.

Results: The scans performed with the cuff all showed plantar displacement of the digital nerves which improved the definition of the images in all cases. Small intermetatarsal bursae were seen in only two cases.

Conclusion: A positive Mulder's sign or click test is caused by plantar subluxation of the digital nerve by lateral pressure on the metatarsal heads and not by intermetatarsal bursitis, although the latter condition can co-exist. This technique improves the definition of the MR images and facilitates preoperative planning.