

BRITISH ORTHOPAEDIC FOOT SURGERY SOCIETY

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A meeting of the British Orthopaedic Foot Surgery Society was held at the Royal Orthopaedic Hospital, Birmingham on November 25, 1988, with Mr C. P. Cotterill, President, in the chair.

SCIENTIFIC PAPERS

Routine use of local anaesthetic techniques in forefoot surgery

— *B. M. Flood, M. V. Shah and M. J. Abberton* (Leeds) described the anatomy, indications, contra-indications and technique of ankle block, anaesthetising five main nerves (posterior tibial, deep and superficial peroneal, sural and saphenous) with a total of 30 ml of 1% lignocaine with 1 in 200 000 adrenaline. Supplementary diazepam (10 mg two hours before) and fentanyl (50 µg immediately before) were given. An ankle tourniquet at 250 mmHg was used. Patients were monitored as for general anaesthesia. The time needed to insert the block averaged seven minutes and surgery could start 15 minutes later. Anaesthesia lasted 3 to 4 hours; only four patients required other than oral analgesics.

Of 50 patients aged 16 to 83 years, 48 declared the technique satisfactory; 34 patients who had had a previous general anaesthetic preferred the local technique. The tourniquet caused moderate discomfort in two cases and severe problems in two more, the other 46 patients suffering no more than mild symptoms.

Forefoot arthroplasty — *O. da Costa and P. Misra* (Worcester)

reviewed techniques of forefoot arthroplasty and described their own, based on that of Clayton. Generous excision from the phalanges ensured adequate bony resection; the first metatarsal was not shortened, although the lesser ones were; the undersides of the metatarsal heads were trimmed.

They reported their results in 186 feet of 109 patients, 99 of whom had seropositive rheumatoid arthritis. All toes were dealt with in 88 patients (151 feet) and the lesser rays only in 21 patients (35 feet). Pain relief was good: of 172 feet which had caused severe pain pre-operatively, only four were not relieved, and 156 feet were painless.

After the procedure 69 feet showed no callosities and of the 117 feet (63%) where callosities remained, only 30 (16% of the whole) were painful. In all, 92 patients (84%) had worn special shoes before operation, but only 23 (21%) did so postoperatively.

Tibialis posterior tendon pathology in the rheumatoid and non-rheumatoid planovalgus foot — *S. W. Parsons, I. G. Winson, R. Nakielny and T. Duckworth* (Sheffield)

had investigated 76 painful planovalgus feet by computerised tomography. They commented on the action of tibialis posterior in locking the hindfoot during gait and on the collapse into abduction at talonavicular level which followed its rupture. Coronal and axial hindfoot scans revealed 23

lesions of tibialis posterior, 13 in feet affected by rheumatoid arthritis and 10 in non-rheumatoid feet.

In the non-rheumatoid group, only unilateral tendon pathology was demonstrated. In 8 of the 10, acute deformation of the foot was reported. On the scans, the tendons appeared discretely thickened and compatible with the fibrosis and scarring reported in degenerate tears. No severe subtalar arthritis was seen. In contrast, in the rheumatoid feet, there were two patients with bilateral lesions. In 9 of the 13 abnormal tendons, the appearance was of a severe, irregular, ill-defined swelling compatible with inflammation; in three, thickened lesions were seen and one was atrophic. In 10 of these 13 feet, there was significant subtalar joint disease. CT scans improved diagnostic accuracy and pre-operative planning. The lack of joint destruction and positive clinical and radiological evidence of tendon tears in the non-rheumatoid group were indications for tendon reconstruction or corrective hindfoot osteotomy, whereas the appearance of tendon inflammation and joint disease indicated decompression and arthrodesis for the rheumatoid group.

Compression of the posterior tibial nerve — *W. A. Hammerschlag, J. L. Goldner and F. H. Bassett* (Durham, USA)

had reviewed 120 feet of 94 patients after operative relief of compression of the nerve. The commonest age was in the sixth decade and the classical symptoms were: burning pain with paraesthesia (57 feet) and altered sensation (74). Symptoms were worse on walking (27) and at night (10). On examination, 97 feet showed a positive percussion test, 82 some tenderness and 57 a diminution of two-point discrimination. Motor changes were not seen.

In the 12 patients tested, all had relief from local anaesthetic block of the nerve. Electrical conduction studies and electromyography were abandoned as unhelpful. In 49 feet onset seemed spontaneous and 43 (88%) had an excellent result from decompression. Thirty-five cases had followed trauma (with or without calcaneal fracture) and 17 previous surgery. In these groups, 29 (59%) had excellent results. A smaller number of feet showed some specific local lesion, such as tendinitis or a plantar mass; these did well after operation.

The Lisfranc enigma — *C. Freeman* (Augusta, USA) reviewed the literature about the uncommon injury of tarsometatarsal fracture-dislocation and discussed the anatomy of the region,

especially in respect of Lisfranc's ligament from the medial cuneiform to the base of the second metatarsal.

The mechanism of injury was with the foot in plantarflexion; it could be classified into divergent and medial or lateral homolateral dislocations. The need for anatomical reduction was stressed, as was the importance of re-establishing the integrity of the second metatarsal. Closed reduction and cast fixation, percutaneous pinning, and open reduction with screw fixation were discussed.

Hohmann's osteotomy: Trying to improve the tread pattern - *L. G. D'Souza, R. P. Betts and T. R. Allen* (Chesterfield) had studied the results of the peg-and-socket modification of the osteotomy, with plantarflexion of the head on the shaft of the first metatarsal, in 23 feet of 14 women. Clinical results were satisfactory, with only two recurrent deformities and with relief of metatarsalgia in the three feet which showed it pre-operatively.

The tread pattern on the pedobarograph in 13 feet of 10 patients did not correlate with the clinical result. About equal numbers of feet showed loading under the first metatarsal (4 cases) as under the second or third (5 cases). There was no evidence that depression of the head of the first metatarsal at operation increased weight-bearing under this head afterwards.

A retrospective study of the management of fractures of the fifth metatarsal - *M. J. Clancy* (Leeds) reviewed the treatment of 69 patients with fracture at the base of the fifth metatarsal, of which only one was at the distal end of the intermetatarsal joint. Of these, 35 were treated by early walking in a crêpe bandage, with crutches as needed, and 34 in a walking cast.

Of the former group, three-quarters were walking comfortably and were discharged from care at 20 days, whereas in the group treated in a cast only half had recovered at this stage. At 30 days, only one patient from the first group, but a quarter of the plaster group, were still attending the clinic. Recovery was quicker without a cast; if a cast is used, it should be retained for only 2 to 3 weeks.

Modelling weight-bearing patterns through anatomical parameters in feet with hallux valgus - *G. Vlatis and C. P. Kitsos* (Athens, Greece) compared the radiological, anatomical, and clinical assessment of 39 feet of 33 patients with hallux valgus with the functional assessment of weight-bearing, using the Harris and Beath mat. Four areas of interest from the footprint studies were correlated statistically with six measurements from radiographs and two clinical factors.

Weight-bearing under the great toe itself was related to the hallux valgus angle and to the relative lengths of the first and second metatarsals, while that under the first metatarsal head was influenced mainly by hallux valgus alone. Load under the lesser metatarsal heads correlated with displacement of the sesamoids, degenerative changes in the first metatarsophalangeal joint and clinical metatarsalgia, while load under the lesser toes correlated with hallux valgus, displacement of the sesamoids and subluxation of the great toe joint. The studies emphasised that the hallux valgus deformity and the sesamoid position were more important than the intermetatarsal angle in assessing forefoot function.

Medicolegal problems involving the foot - *T. G. Thomas* (Dover) recounted statistical findings from the records of one of the medical defence organisations.

Claims relating to orthopaedic cases paralleled general ones, with huge increases since 1984. Of 1 200 orthopaedic cases, 110 concerned feet (9%), but claims over 352 operations included 80 feet (23%).

For foot cases, claims were made in relation to operation on the wrong digit (6%) and infection (9%), but surgery to the toes, including osteotomy of the metatarsals, accounted for 64% of cases, while surgery to other parts yielded 21%. The lessons were obvious.

Proper diagnosis must precede surgical treatment, there must be clear objectives and adequate indications for operation. Technical faults are difficult to defend. Good written notes and good communication with the patient are essential, not allowing unrealistic expectations. It is unwise to follow one unsuccessful operation with another and unwise to operate on depressed patients.

Analysis of ankle movements during the gait of flat-foot patients - *S. Khodadeh, A. Welton and J. H. Patrick* (Oswestry) described the toe extension test of Hicks, in relation to the plantar fascia, and its function in reducing bending moments on the arch and reducing the shock of impact. In normal gait the fascia acts twice - at toe off and in the swing phase.

Fifteen symptomatic flat-footed patients, who had negative great toe tests and abnormal pressure at the medial border of the foot, were compared with 20 symptomless subjects, who had normal tests and pedobarographic findings. Markers were placed on the knee and the lateral malleolus and the subjects walked over a force plate connected to a video system. Ankle moments could then be computed. It was found that, at heel strike, the ankle moment was greater in flat feet because of the 'flatter' contact and reduction in the normal rolling action of the heel. As the heel left the ground, moments were greater in the normal feet, while in the swing phase they were equal in both groups.

Comments on the patterns of motion of the human ankle-foot complex - *A. Lundberg and I. Goldie* (Stockholm, Sweden) reported on further kinematic studies of ankle movements in the intact human volunteer. Radio-opaque markers in tibia, talus and other bones appeared on paired radiographs taken with the foot in various positions of flexion-extension, pronation-supination and leg rotation, while the subject stood on a tiltable platform.

The axis of the talocrural joint changed with the position of the ankle. In extension (dorsiflexion) it runs 20° downward and laterally, while in plantarflexion it lies 20° downward and medially. The axes for internal rotation of the leg varied greatly. Those for external rotation and pronation-supination also were variable, but were never anteroposterior.

In any one subject all axes passed through one point in the talus and in the supero-inferior projection all axes ran through the tips of the malleoli.

Hindfoot arthrodesis in adults - *A. Cracchiolo, S. W. Pearson, H. B. Kitaoka and D. L. Grace* (Los Angeles, USA) reviewed hindfoot arthrodeses in 33 feet of 29 patients, 23 of whom had inflammatory arthropathies with pain or deformity. Several techniques were used: for deformity they used a dowel method through two incisions. The posterior talocalcaneal joint was opened with a lamina spreader and secured with a dowel of iliac bone. The talonavicular and calcaneocuboid joints could be fixed by rotating dowels through 90° and with a staple. If there was no deformity, then excision of joint surfaces and fixation with AO cancellous screws could be used.

Delayed healing occurred in five cases, especially in those on methotrexate. The fusion was successful in 30 feet. Of the 17 cases in which evidence was sought, ankle valgus was seen postoperatively in eight. On lateral radiographs the talometatarsal angle (normally 0°) was a useful index of correction.

Their current methods of fusion for these three joints were: talocalcaneal joint, dowel with or without internal fixation; talonavicular, excision and staple, occasionally a screw; calcaneocuboid, excision and staple fixation.

Disorders of the flexor hallucis longus at the ankle - *M. H. Jahss* (New York, USA) listed 12 causes of rupture, tendinitis or tenosynovitis of the flexor hallucis longus, including the os trigonum syndrome. The tendon lies over the posterior facet of the talocalcaneal joint at the os trigonum; tenograms show the sheath to be tight at this point. Clinically, with the fingertip behind the medial malleolus, passive movements of the great toe move the muscle up and down; this may be palpable and may be painful. The os trigonum can be seen on CT scans and there may be arthritic changes. Excision of the bone relieves the syndrome.

A check-rein deformity is associated with shortening of the flexor hallucis longus after fractures of the tibia or due to peritendinous fibrosis after leakage of blood into the tarsal tunnel. The great toe plantarflexes as the ankle is dorsiflexed.

Assessing fibular length using bimalleolar angle measurements

- *B. Rolfe, W. Nordt and J. G. Sallis* (New York, USA) said that recent attention had been directed to the lateral malleolus in ankle fractures. Loss of fibular length was common, but difficult to appreciate.

They reported two angular measurements on antero-posterior radiographs to assess length. First, the medial angle between a line perpendicular to the tibial plafond and a line joining the tips of the malleoli. Normal values in 25 healthy volunteers averaged 78.5° (range 75° to 86°). The side-to-side difference averaged 1.3° and the errors in reproducing the measurement were 1.1° or less. Secondly, the medial angle between the axis of the fibular shaft and the line through the tips of the malleoli. This bimalleolar angle averaged 77.8° (range 72° to 86°), with similar small errors. A change in angle of one degree corresponded to a length change of 1.3 mm in cadaver studies and 1.2 mm in theoretical models. The minimum significant difference in the angles was 2.5° to 3.0° and the bimalleolar angle was slightly the more accurate and convenient.

Salvage in intractable diabetic neuropathy - *M. Myerson*

(Baltimore, USA) presented preliminary results of salvage operations for neuropathic hindfoot deformities in 22 patients. Conservative management and braces were always attempted first. The feet showed varus or valgus hindfoot deformities, with or without ulceration, and most (18 cases) were in Wagner grades 1 or 2 pre-operatively. Various fusion procedures were undertaken: intertarsal and tarsometatarsal (7), triple fusion (2), tibiotalar (6). After the first of these the hindfoot commonly subluxated. The best procedure, especially for cases in which the talus appeared to extrude posteriorly, was talectomy and tibiocalcaneal fusion (7). In principle it was essential to have the foot centralised beneath the tibia.

Operation covered by antibiotics, but without a tourniquet was preferred. Incisions were planned and sharp bone cuts were made. Bone grafts from local or iliac bone were used.

Internal fixation should be rigid and large 7 mm cannulated screws were best. Casts were needed for 4 to 12 months (mean 5 months).

Dorsal closing wedge osteotomy for Freiberg's disease - *P. Kanse and S. C. Chen* (Enfield) reviewed various operations

described for Freiberg's disease and described their technique in five feet of four women, with dorsal forefoot pain, worse on activity and on passive extension of the metatarsophalangeal joints. Through a longitudinal incision the edges of the metatarsal head were trimmed and a dorsally based wedge excised from the metatarsal neck and closed. The osteotomy was fixed with a proximodistal Kirschner wire for four weeks. The patient was mobilised, walking on the heel, on the second day. As only the dorsal articular cartilage was involved and impingement was dorsal, the procedure brought normal volar cartilage to the distal end of the bone. All patients lost pain, and could walk and run. Only one had any stiffness.

End results of the treatment of club feet: A radiological analysis - *A. N. Johari* (Liverpool) and *K. Kameshita*

(Yokohama, Japan) reported that of 81 patients, 73 with 111 club feet of the idiopathic variety were analysed clinically and radiologically, after subdivision into three grades on the basis of initial clinical severity.

The radiological parameters used were: the lateral talocalcaneal angle; the tibiotalar angle in both dorsiflexion and plantarflexion and its difference - the talar range; similar paired values for the tibiocalcaneal angle and their difference - the calcaneal range; and the calcaneo-first metatarsal angle in dorsiflexion. Also measured were the talo-first metatarsal angle and the talonavicular angle. Aberrations like flat-topped talus, horizontal deformed talus and flattening of the talar head were noted.

The inferences drawn from the radiological study were: there was a marked difference in all parameters between a normal foot and a treated club-foot of any grade (a treated club-foot could be distinguished from a normal foot even after successful treatment).

The average post-treatment radiological scores of grade 2 and 3 club feet were similar, with grade 1 feet behaving better. Clinically all grades behaved similarly. The average talocalcaneal angles after treatment were similar in all grades of club-foot; this is therefore an insensitive index of the result of treatment. More sensitive were the talar and calcaneal ranges of movement.

The pneumatic staple gun in the treatment of hallux valgus: early results - *J. K. Dowell, T. McAuliffe and J. C. Angel*

(Stanmore), showed a video recording and discussed points of technique for this operation, laying emphasis on the predrilling of at least one cortical bone end for the staple. They reported the early results of a consecutive series of patients treated for hallux valgus by a Mitchell's osteotomy secured using staples.

The 10 mm titanium (Ti318) staples were inserted using a 3-M powered metaphyseal stapler. Thirty osteotomies had been performed in 25 patients, aged 17 to 70 years. The advantages of the staples were that firm fixation allowed early weight-bearing without plaster support, and that the inpatient stay had been halved, when compared with conventional treatment. There had been no major complications and all patients were in the excellent and good groups of the Bonney and MacNab classification. All osteotomies had united radiologically by 10 weeks.