

# British Orthopaedic Foot Surgery Society

Liverpool, UK—November 23, 1990

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## SCIENTIFIC PAPERS

### **KELLER'S PROCEDURE FOR HALLUX RIGIDUS: A RETROSPECTIVE AND PEDOBAROGRAPHIC REVIEW - J. G. Andrew (Manchester).**

This study reviewed the results of Keller's procedure for hallux rigidus, without valgus deformity, in 18 patients having a total of 23 operations. The mean follow-up period was 50 months (range 14 to 84). The principal pre-operative complaint in all patients was pain and 12 had difficulty with shoe fitting.

Fifteen patients (20 feet) thought their feet were cured or improved by the operation and only three patients felt that their feet were unimproved. Eight patients (10 feet) had postoperative metatarsalgia, although in only one was this severe enough to need treatment.

Examination revealed that the range of active movement of the operated toe generally was poor (mean dorsiflexion 20° and plantar-flexion 3°) and passive dorsiflexion averaged 38°.

Pedobarographic studies showed that the great toe had been markedly defunctioned, with a decrease (often to nil) of the pressure under the toe during walking. Compared with the normal foot in unilateral cases, there was a significant increase in the first, second and third metatarsal head pressures of the operated foot during walking ( $p < 0.05$ ). Analysis of the centre of pressure during walking indicated that this was more laterally placed under the forefoot after Keller's procedure.

These results suggest that, while patients were pleased by this procedure, it was not really satisfactory due to the poor function of the great toe and the high incidence of lesser

ray metatarsalgia, with confirmed high pressures on pedobarography. Other operations may be preferable, especially in younger patients.

### **THE RELATIONSHIP BETWEEN HINDFOOT POSTURE AND CENTRE OF PRESSURE IN PATIENTS WHO HAD UNDERGONE HALLUX FUSION - S. Oyelayo and D. I. Rowley (Dundee).**

Previous studies by Rowley and Stockley had shown a clear relationship between high medial plantar pressure and hindfoot valgus in patients with rheumatoid arthritis undergoing forefoot arthroplasty. This prospective study investigated a group of otherwise healthy patients with hallux rigidus but no overt hindfoot disease or symptomatic postural deformity.

Twenty-four patients (40 feet) with hallux rigidus and a control group of 20 normals underwent pedobarographic assessment of forefoot pressure, centre of pressure and contact time. All patients had their hindfoot posture measured radiographically, using Cobey's view. The hallux rigidus group had fusion by a standard technique and was reassessed three months after surgery.

In the controls and the pre-operative group there was no clear relationship between hindfoot angle and the position of the centre of pressure at the forefoot. In this relatively small group of subjects the hindfoot angle was between 8 and 12° valgus relative to the tibia.

In the operative group after surgery there were marked changes in the distribution of plantar pressures and in contact time. Also there was a clear relation between the degree of hindfoot valgus and the medial shift of the centre of pressure at the forefoot.

It is proposed that in normal and in mobile feet there is capacity for the foot to compensate for postural abnormalities in the hindfoot. However, when the foot is disturbed by surgery such as hallux fusion or disease such as rheumatoid arthritis, this capacity is significantly impaired. Therefore, undue hindfoot valgus should be seen as a potential problem and a possible predictor of an unfavourable outcome in such cases.

**CONCENTRIC ARTHRODESIS OF THE FIRST METATARSOPHALANGEAL JOINT** - K.C. Kong, M.J. LeF. Porteous and M. A. S. Mowbray (Mayday Hospital).

When indicated and performed correctly, arthrodesis of the first metatarsophalangeal joint gives good results. Use of the available reamers to fashion a peg or cone and a socket has drawbacks as the angle of fusion cannot easily be adjusted once the peg and socket is formed and internal fixation is often difficult.

Since 1986 they had used specially designed reamers which can be mounted on a drill and which produce hemispherical surfaces, giving excellent bone contact, allowing easy adjustment of the angle of fusion without loss of bone contact, needing minimal bone excision and allowing screw fixation if desired.

They had reviewed 15 patients (17 feet) at a mean follow-up of 27 months (range 6 to 38). All had solid clinical fusion with no residual joint pain. Subjectively, 13 patients were satisfied with the result but two were not because of a painful hallux on one side following bilateral fusion (one had excessive dorsiflexion, the other had a malrotated toe). They felt that their technique was reliable, simple to perform and gave good results.

**SHORT-TERM REVIEW OF THE HELAL SILICONE ELASTOMER PROSTHESIS FOR OSTEOARTHRITIS OF THE FIRST METATARSOPHALANGEAL JOINT** - F. P. Monsell and B. G. Bolton-Maggs (Whiston Hospital).

The Helal silicone elastomer prosthesis has been used for the treatment of osteoarthritis of the first metatarsophalangeal joint. They reported the results of 20 implantations in 16 patients with a mean age of 57 years and after a mean follow-up of 1.5 years. All operations were performed by the senior author and the independent assessment by the second author.

Pre-operative complaints (pain in all 20 feet, stiffness in 16, bunion formation in 13 and footwear problems in 11) and cosmetic acceptability after operation were graded using a standard scoring system (best to worst as 0 to 3 respectively). Power, range of movement and orientation of the great toe were measured, as were changes in toe length from radiographs.

The postoperative range of motion averaged 26° actively and 46° passively. On the basis of the symptomatic scoring and the functional assessment, results were graded as excellent (score 0) in five, good (score 1 or 2) in seven and poor (score 3) in eight (40%).

It was felt that the short-term results were comparable with other current treatment options

and long-term follow-up recommended. The impression was that, when good, the operation was very good, but when bad, was very disappointing, with nothing prognostic to be identified.

**A NEW TECHNIQUE FOR LATERAL DISPLACEMENT OSTEOTOMY OF THE FIRST METATARSAL NECK** - D. S. Elliott, F. Kashif and M. A. S. Mowbray (Mayday Hospital).

The authors presented a modification of the Mygind-Thomassen peg and socket first metatarsal osteotomy.

Through a dorsomedial incision and avoiding the joint itself, the metatarsal neck and distal shaft was exposed subperiosteally. An oblique osteotomy was made from the distal shaft medially, proceeding distally and laterally at 45°, to the junction of head and neck laterally. On the pointed lateral and distal end of the shaft fragment, a cylindrical peg was fashioned using a crown drill of 6mm internal diameter. Small triangles of bone remaining on the dorsal and plantar surfaces were trimmed with nibblers. A 5mm drill hole was made in the medial side of the cancellous bone of the head fragment, centred midway between dorsal and plantar aspects. The head was then impacted on to the spike. No other internal fixation was needed, but the foot was protected for six weeks with a clog type plaster cast.

The operation was suitable for the younger patient, giving about 50% lateral displacement of the head, stability and no shortening of the first metatarsal.

**RESULTS AFTER DOUBLE OSTEOTOMY FOR TREATMENT OF HALLUX VALGUS** - M. Nakhostine, G. Blatter and F. Magerl (St Gallen, Switzerland).

The authors presented a procedure combining a subcapital metatarsal osteotomy, tilting the head, and a phalangeal wedge osteotomy for the treatment of symptomatic hallux valgus. Both osteotomies were fixed internally with screws.

The results of the operation were reviewed retrospectively in 35 patients with 54 feet causing symptoms. The average follow-up was seven years (range two to 11 years). Pre-operatively the average intermetatarsal angle was 13° (range 7° to 21°) and the hallux valgus angle was 32° (range 20° to 53°). At follow-up the angles were respectively 5° (0° to 18°) and 14° (2° to 28°). Postoperatively all patients but one were pain free. In one the deformity recurred and in another, the screws loosened.

The double osteotomy technique allows correction of the deformity not only in the horizontal, but also in the sagittal and frontal planes and the length of the first metatarsal can be adapted to that of neighbouring metatarsals. Rigid internal fixation permits immediate active motion and partial weight-bearing. Their results compared favourably with other reported series.

**HALLUX VALGUS: AN ALTERNATIVE APPROACH TO THE SURGICAL MANAGEMENT** - D. I. Wise (Bradford).

The speaker had been impressed by the procedure

of distal osteodesis of the medial two metatarsals, described by Botteri and Castellana in 1961. The operation proved simple and did not interfere with the bones or the joint, allowing rapid convalescence. Should it fail, all other surgical options remained open.

Under tourniquet and through an incision in the first intermetatarsal space, the dorsal aponeurosis was incised, exposing the interosseous muscle, which was freed from the first metatarsal. The tendon of adductor hallucis was incised adjacent to the lateral sesamoid, which was then excised. At this stage squeezing the metatarsals together demonstrated the ease of correction. The interosseous muscle was cleared from the second metatarsal and the adjacent bone surfaces roughened with gouges. Two holes were made in the neck of the first metatarsal and a thread of No. 1 Dexon passed through each hole and around the neck of the second metatarsal. Each thread was tied tightly, approximating the bones. The wound was closed and a light plaster boot applied for six weeks. The patient was allowed to mobilise, fully weight-bearing, the day following the operation.

Thirty cases were reviewed, 2 to 4 years postoperatively (mean 40 months). In no case was complete bony union seen, but fibro-osseous union prevented recurrent deformity. Pre-operative mean intermetatarsal angle was  $16^\circ$  and was reduced to  $8^\circ$  postoperatively. Similarly the hallux valgus angle decreased from  $29^\circ$  to  $12^\circ$ .

All patients were pleased with the cosmetic and general result. All except one (who had marked degenerative changes on pre-operative X-rays) had satisfactory pain relief.

The operation deserves to be better known and, apart from its excellent results, its merits are ease of performance, rapid convalescence and the possibility of unhindered salvage surgery.

#### **SURGICAL TECHNIQUE AND PRELIMINARY RESULTS OF SUBCUTANEOUS NECK OSTEOTOMY OF THE FIRST METATARSAL FOR HALLUX VALGUS - H. P. Markowski, P. Bosch and V. Rannicher (Austria).**

Through a small skin incision and without any soft-tissue dissection, an osteotomy of the distal first metatarsal was performed with a motorised milling cutter. The head fragment was displaced laterally and the position fixed with a single Kirschner wire laid longitudinally beside the periosteum along the medial side of the great toe and metatarsal head into the medial aspect of the metatarsal medullary cavity and retained for four weeks. Plaster immobilisation was not necessary.

After 16 months, 63 feet in 44 patients were assessed. The average hallux valgus angle of  $36^\circ$  was corrected to  $19^\circ$  and the mean intermetatarsal angle from  $13^\circ$  to  $8^\circ$ . The average shortening of the first metatarsal amounted to 3mm. Postoperative complaints settled by nine weeks.

Postoperatively 92% of the patients were free of pain, wearing normal shoes and considered the result excellent or good. Four infections forced premature removal of the wire, but healed quickly. One nonunion was seen at eight months, but was completely pain free.

The results of this subcutaneous technique

are comparable with those of open procedures. Its advantages are the short operating time, no need for a tourniquet, an assistant or general anaesthesia, the insignificant scar and the quick postoperative rehabilitation.

#### **3-D MOTION ANALYSIS INTEGRATED WITH FOOT PRESSURE MEASUREMENTS - I. J. Alexander, A. Romeo and G. De Lozier (Akron, Ohio, USA).**

The speakers described a 3-dimensional method of recording movements of the foot and leg using 16 surface markers on the limb, four video cameras and recorders and a computer. The computer integrated data to produce three 3-dimensional views of the foot in sagittal (lateral), overhead and anteroposterior planes. The system could be combined with a pedobarograph.

#### **THE USE OF ULTRASOUND AND BONE SCAN IN THE DIAGNOSIS OF TIBIALIS POSTERIOR TENDINITIS - M. Nyska, C. B. Howard and A. Sasson (Beer-Sheva, Israel).**

The diagnosis of tibialis posterior tendinitis usually is based on clinical examination. Imaging techniques such as nuclear magnetic resonance can show tendon discontinuity, but this test is expensive and not readily available.

These workers had used technetium 99 bone scan and ultrasound in 12 patients with suspected tendinitis. In 8 patients the bone scan showed increased uptake in the early phase, around the medial aspect of the ankle joint and persisting to the late phase (2 h) in 5 patients.

The ultrasound test was abnormal in all 12 cases, with signs of soft-tissue swelling, increased echogenicity of the tendon itself and areas of decreased echogenicity (effusion) around the tendon. There were some difficulties in distinguishing tibialis posterior from the long toe flexor and occasionally a false hypo-echogenic (fluid) area from an artery overlying the tendon.

They had found the combination of the two tests of value in the diagnosis of inflammation of the tibialis posterior.

#### **CLINICAL RELEVANCE OF MEASUREMENTS OF GAIT PARAMETERS OBTAINED USING THE "GAIWAY" SYSTEM - H. T. Law (Edinburgh).**

The Gaitway system was described. Perforated tapes were attached to each heel and, during walking, were pulled through an optical scanner, which was connected to a microcomputer. The output was presented as diagrams and tables of stride and step lengths, stride times (contralateral single support times), double support times after left and right strides, cadence, walking velocity and maximum foot velocity. All were measured over four steps of each foot.

In normals: The stride movement was symmetrical, the velocity diagrams for each foot were accurately identical and the average step lengths and stride times were the same for the two limbs. Each stride pair (except for the

first and last, during which the subject was either accelerating or slowing down) matched closely the others of the test walk. The ratio of the peak velocity of the foot at mid-swing was about 3.5 x the forward walking speed.

Variations from normality which might be seen included: Asymmetry (e.g., after hemiplegia), loss of the identity of stride to stride, reduction in the peak velocity at mid-swing and of its ratio to the walking speed, an increase in the duration of double support (both absolute and relative to the gait cycle time), a reduction in stride length and a decrease in cadence.

These changes had been seen in patients with neurological motor disorder, with degenerative joint disease and those with low back pain.

#### **IN-SHOE PRESSURE MEASUREMENTS IN ROCKER BOTTOM SHOES - P. R. Cavanagh (Manchester) and P. S. Schaff (Munich).**

A report on research on the effect of a rocker sole with a 30° anterior slope on the pressure under the foot measured by the EMED system was presented.

The authors found that both peak pressure and impulse were reduced under the great toe and the metatarsals, but increased under the midfoot and the heel. Usually the pressure under the medial heel was greater than under the lateral heel; the rocker reversed this.

Across the width of the forefoot, the effect of the rocker was to reduce load on the hallux (by 32%) and lateral toes (by 25%), but to increase it under the fifth metatarsal (by +12%). The stride length was reduced by 7% in the rocker sole shoe.

These results suggested that the rocker sole shoe was not useful for ulcers under the fifth metatarsal or under the heel.

#### **DIAGNOSING ALGODYSTROPHY IN THE LOWER LIMB - A. S. Bryan and L. Klenerman (Liverpool).**

Early treatment is the key to preventing the maturation of algodystrophy into a chronic pain syndrome. A recent study confirmed that there was frequently a significant delay in making the diagnosis among those who have sustained an injury to the lower limb. The relative value of various investigations was reported.

A prospective study of 21 patients, referred with a suspected diagnosis of algodystrophy, from clinics in the Mersey Region was undertaken. Most patients (19 of 21) had been symptomatic for less than six months. Each patient was assessed with skin temperature, an algometer, isotope bone scans and a plain X-ray.

An isotope scan proved to be the most useful test and showed characteristic changes (massive general uptake, including along the shaft of the tibia) in 95% of patients. Characteristic radiographic changes (osteoporosis, metaphyseal bands) were seen in 86%. There was a lowering of the pressure pain threshold (to one-third) as measured with an algometer in 65%. Skin temperature was the least helpful measurement; in 65% of patients the affected side was warmer.

The most important factor in the making of the diagnosis was clinical suspicion. In those patients without all the clinical features, an isotope bone scan would usually be positive and a plain X-ray would show characteristic changes.

#### **THE CHIROPODY-ORTHOPAEDIC INTERFACE - C. Dagnall (Cheshire).**

The author traced the history of Chiropody from the corn cutters of the 16th Century to the present day, highlighting some dates.

In 1762 Rousselot, a surgeon, wrote on corns and in 1781 Laforest on the Art of Caring for the Feet. Camper, a Dutch anatomist, discussed the effects of the shoe on the foot.

In 1865 Durlacher advocated training and licensing and sought association with the Royal College of Surgeons, a plan of which nothing came.

In 1912, 35 chiropodists formed the Society and in 1919 the London Foot Hospital was established. The 1960 Act established the profession as auxiliary to medicine, but in vague terms. Since 1972 the profession have been using excisional techniques under local anaesthetic.

#### **CLINICAL APPLICATION OF INSHOE PRESSURE MEASUREMENT - A. J. Neville, D. I. Rowley, M. G. Pepper and M. Whiting (Dundee).**

Using insoles containing eight thick transducers to lie under areas of interest, the authors had found the system to be robust, absolutely calibratable, accurate to within  $\pm 10\%$ , clinically usable and a basis for further development.

#### **POSTEROLATERAL RELEASE IN THE MANAGEMENT OF PERSISTENT INTERNAL ROTATION AFTER SURGERY IN CONGENITAL TALIPES EQUINOVARUS - M. J. Abberton (Leeds).**

Persistent internal rotation of the foot is a major cause of dissatisfaction after soft-tissue corrective surgery in clubfoot. The site of residual deformity may be in the hindfoot, the midfoot, the forefoot or in any combination. The foot with rotational deformity and a significant failure of correction of talocalcaneal rotation requires total revision. This is difficult and success is rare, even if the decision to offer it can be made early.

There is some scope for a limited procedure for feet in which there is a partial failure of correction, but such operations are contraindicated if there is inadequate subtalar or talonavicular correction, in an inflexible foot and with neurological abnormality.

Posterolateral release is indicated as a restricted procedure in feet with internal rotation deformity in which the subtalar joints are acceptably corrected. Such feet will have a reasonable appearance, with good medial and lateral borders, but when viewed critically are seen to be internally rotated with respect to the shin.

The essence of the operation is the release

of all tether of fascia, retinaculum and fibulocalcaneal ligament between the lower fibula and the posterior half of the calcaneum, combined with surgical shortening of the lax peroneal tendons. Restricted extension of the talocrural joint will need revision of the elongation of the tendo Achillis and the posterior release of the ankle capsule.

Such a procedure is opportunistic and seeks to correct a greater or lesser failure of the initial surgery. No two operations are exactly the same. Compromises have to be accepted when restricted procedures are offered and salvage operations have limited aims. Under these circumstances no series of objective results can be offered, but there has been a measure of parental acceptance of the results and a reduction in the need for specialised footwear.

**IDIOPATHIC CONGENITAL TALIPES EQUINOVARUS: A CLINICOPATHOLOGICAL STUDY** - R. W. Paton and A. J. Freemont (Manchester).

The only accepted pathological abnormality in idiopathic CTEV is the increase in the proportion of Type 1 compared to Type 2 muscle fibres. There has been no study undertaken in which this pathological abnormality has been compared with clinical data.

A prospective study was undertaken. Histological distinction of biopsies from identical areas of the triceps surae into Type 1 and Type 2 muscle using the ATP-ase technique was made, with accurate assessment by an image analyser (VIDS software on Apple II computer).

This histological result was compared with clinical pre-operative deformity, operative release and functional postoperative result.

The functional result had no correlation with the percentage of Type 1 fibres, Type 1 or Type 2 fibre area, side of foot, number of structures released or severity of the pre-operative deformity. However, a Type 1 to Type 2 area ratio of 0.9 produced the only excellent clinical results, independent of the above factors. This may be of prognostic value.

**ANKLE STABILITY IN BIMALLEOLAR FRACTURES: A DYNAMIC CONTACT AREA ANALYSIS** - H. J. Clarke, J. D. Michelson and R. H. Jinnah (Baltimore, USA).

Predicting the development of osteoarthritis from clinical studies of structural changes after bimalleolar ankle fractures has been difficult in view of the long follow-up periods involved.

This group had developed a dynamic, weight-bearing model in the cadaveric foot, assessing talar shift and tibiotalar contact, and using computer analysis in an attempt to predict the outcome of various types of fracture.

Fracture of the fibula was mimicked by osteotomy and varying degrees of displacement held by plates with and without displacing shims. Tibiotalar contact was assessed by carbon black staining of the joint surfaces. Talar rotation was measured with a rod in the neck of the bone. Loading up to approximately 45 kg was applied through a jig in the medial tibia and the ankle was cycled in dorsiflexion and plantar flexion.

There was no significant change in the ankle contact area after a surgical transverse fibular osteotomy with increasing displacement, but section of the deltoid ligament as well produced marked changes in contact area ( $p < 0.001$ ). Anterior translation of the talus was important in compounding the reduction in contact area.

They considered this dynamic model an advance on previous fixed models in better defining the clinical situation. They deduced that the medial complex was important in maintaining ankle stability, by preventing anterior rotatory and lateral translational shift of the talus from the mortise.

**THE ROLE OF LIGAMENTS IN LATERAL ANKLE AND SUBTALAR STABILITY** - M. M. Stephens (Dublin) and G. J. Sammarco (Cincinnati, USA).

Ligamentous structures impart terminal stability to any joint. Those on the lateral side of the hindfoot are commonly injured by inversion stress. Some cross both ankle and subtalar joints and their orientation varies with ankle joint position.

Ten fresh amputated lower limbs were subjected to a constant inversion stress with the ankle in dorsiflexion, neutral position and plantar flexion to study the role of each ligament in stability.

Twelve ligaments or subdivisions of them were divided individually and sequentially and the increase in movement at the two joints was noted. The specimens were mounted in a jig which allowed a constant force to be applied to each in the intermalleolar plane. Pins in this plane were inserted at consistent points to give reproducible deflections on a goniometer after each ligament was divided.

The results were summarised: The anterior talofibular ligament contributed to ankle stability in plantar flexion; the calcaneofibular, the fibulotalocalcaneal and the posterior talofibular in all positions. The lateral root of the inferior extensor retinaculum contributed to subtalar stability in neutral and dorsiflexion; the calcaneofibular, fibulotalocalcaneal, cervical, the ligament of the anterior capsule of the posterior talocalcaneal joint and the interosseous ligament in all positions.

Subtalar movement could account for over 50% of inversion in the intermalleolar plane after ligament division. These findings illustrate that subtalar hypermobility can be a feature in clinical instability of the hindfoot, with or without ankle instability.

**RUPTURE OF THE TENDO ACHILLIS: A NEW TECHNIQUE OF REPAIR** - R. A. Mann, G. B. Holmes, K. S. Seale and D. N. Collins (Philadelphia, USA).

A report of the results of a new technique for the repair of chronic ruptures of the Achilles' tendon in seven patients of average age 55 years with 3 to 36 months of symptoms.

The technique, developed by the senior author, bridged the gap in the tendo Achillis with that of flexor digitorum longus as a graft.

The calf was explored through a medial reverse-L incision and flexor digitorum longus was released in the foot through an incision at the medial edge of the first metatarsal. The distal stump of the flexor was sutured to flexor hallucis longus. The tendon of flexor digitorum longus was withdrawn into the calf, passed through a hole in the calcaneum distally and sutured to the proximal stump of the triceps surae proximally. The repair is vascular and strong, provides tendon for tendon replacement and leaves no residual dysfunction in the foot.

Postoperatively, patients were assessed for relief of pain, ankle motion and return of function. Results were excellent or good in six and fair in one, who had a persistent limp and some discomfort. Two patients required adjuvant procedures; one a local rotation flap and one a split skin graft. Both these patients had excellent painless restoration of function. With an average follow-up of 39 months there were no reruptures.

#### EXTERNAL FIXATION IN FOOT SURGERY WITH THE EBI MINI-FIXATOR - R. M. Jay (Philadelphia, USA).

The use of external fixators has become useful in the management of operations requiring compression or distraction of bone. Design improvements have allowed miniaturisation of fixators to appropriate size for the foot, a decrease in complications and built-in compression or distraction abilities.

The presentation included a step by step review of methods to stabilise and control osteotomies, unstable fractures, bone grafts and use in fusions of various bones in the foot.

The fixator comprised a single bar with mono- or bi-planar devices and a universal ball joint device to fix to bone with self-tapping tapered screws. The speaker demonstrated use of the apparatus for compression of a first metatarsal osteotomy and for distraction in Keller's arthroplasty. Other uses included nonunions of the fifth metatarsal and of a talonavicular arthrodesis, first tarsometatarsal fusion, arthrodesis of the first metatarsophalangeal joint after previous resection and metatarsal fracture stabilisation.

#### CORRECTION OF BUNIONETTE DEFORMITY BY OBLIQUE FIFTH METATARSAL OSTEOTOMY - N. I. Garlick and S. C. Chen (Enfield).

A review of 14 patients undergoing 22 operations for bunionette deformity by an oblique fifth metatarsal osteotomy was undertaken by assessment of the notes and X-rays.

Simple oblique division of the metatarsal was performed, proximal to the neck and incorporating plantar tilt. The line of section pointed toward the navicular. No internal fixation and only soft dressings were used. Patients bore weight when comfortable.

Results were graded according to symptoms. Eighteen good results (including one pseudarthrosis), three fair and one poor (due to fourth ray metatarsalgia) were obtained.

Review of the X-rays showed that the medial

displacement measured as decrease in the intermetatarsal angle and the intermetatarsal distance had no correlation with the clinical result. The postoperative X-ray appearance did not reflect the quality of the clinical outcome.

Oblique osteotomy was recommended as a good procedure for correction of bunionette, perhaps avoiding any case with pre-existing fourth ray pressure problems.

#### THE EFFECT OF LEG ALIGNMENT ON FOOT CENTRE OF PRESSURE - G. McLeod, C. Chauchan and D. I. Rowley (Dundee).

Preliminary results of study of the effect of leg realignment at knee replacement on the centre of pressure of the foot were given.

Alignment was measured from long leg radiographs. The line of the centre of pressure from the pedobarograph was assessed by a standardised method, recording the ratio of its distance from the midline of the foot to the width of the foot.

Sixty-eight limbs had been studied, 20 of these being controls. Thirty-one patients with osteoarthritis and a varus alignment at the knee appeared to have a wide distribution of the centre of pressure, suggesting that a normal foot can compensate for the deformity. With rheumatoid arthritis (17 patients) and a valgus deformity, the centre of pressure was consistently displaced into the medial side of the foot, supporting the findings of previous investigations which have shown increased medial forefoot pressure when there was a fixed supination deformity.

#### ARE SURGICAL SHOES PROVIDING VALUE FOR MONEY? - P. S. Costigan, G. Miller, C. Elliott and W. A. Wallace (Nottingham).

This paper reported on the actual use of shoes prescribed during a two year period, two or three years before.

Of 82 patients (59 women and 23 men), 74 had been issued with bespoke shoes (at an average cost of £263 per pair) and eight with comfort shoes (at £113, including modifications); 75 of the patients (91%) were mobile and almost two-thirds wore their shoes regularly.

Twenty-six percent of patients had some difficulty in putting on their shoes and this was a cause of discontinuing their use; the other was unsatisfactory appearance (see Table I).

The survey suggested that more attention should be given to prescribing Velcro fasteners and to showing patients the full range of shoes available, before asking for a pair to be made specially to order.

Table I. Cosmetic satisfaction

	Satisfied	Not satisfied
Bespoke	67%	33%
Comfort	87%	13%