

PROCEEDINGS AND REPORTS OF UNIVERSITIES, COLLEGES, COUNCILS, ASSOCIATIONS AND SOCIETIES

GREAT BRITAIN

BRITISH ORTHOPAEDIC FOOT SURGERY SOCIETY

A meeting of the British Orthopaedic Foot Surgery Society was held at The London Hospital on December 2, 1983, with the President, Mr B. Helal, in the Chair.

SCIENTIFIC PAPERS

Implant arthroplasty of the metatarsophalangeal joints—*D. L. Grace* (London) reviewed the results of 385 Silastic implants inserted into the joints of 166 feet of 121 patients at the University of California. Sixty-two patients had suffered from rheumatoid arthritis and the others from hallux rigidus, hallux valgus, or bunions (for which previous operative treatment had been unsuccessful). The main indications for operation were pain and deformity.

Implants were inserted only into damaged joints. Operations were performed through dorsal longitudinal incisions, resecting bone from the metatarsal head. Treatment of the great toe included lateral capsular release, medial capsulorrhaphy, and elongation of the extensor hallucis.

Double-stemmed implants were most frequently used in the great toe (150 implants); Dacron-coated stems proved unsatisfactory. In the lesser joints 137 double-stemmed and 85 condylar implants were used, but the latter were abandoned because of complications.

After operation 94% of patients felt that their condition had been improved; they had little pain, walked well and wore ordinary shoes. Objectively, strength and movement of the hallux were unchanged; average flexion after operation was 18°, and average extension 20°. The average valgus angle was improved from 36° to 14° at early follow-up, with some loss of correction later.

Complications included delayed healing (9%), loosening (8%), ankylosis (7%), and recurrent deformity (6%). Deep sepsis (4%) always necessitated implant removal. Radiographically, marginal bone spicules (45%), peri-articular ossification (10%), and implant intra-osseous subsidence (19%) were noted. The revision rate was 6%. In the lesser joints 72% proved satisfactory; the revision rate was 8%.

A comparison of osteotomy of the first metatarsal and Keller's operation—*T. J. Turnbull* and *W. J. Grange* (London) compared the results of operations in 33 patients aged 32 to 79 years; younger patients were excluded. Patients were allocated randomly to two groups which, pre-operatively, were similar in respect of age, symptoms, signs and radiographic assessment (including joint subluxation and degenerative changes).

Twenty Keller's arthroplasties were performed; the medial metatarsal prominence and half of the proximal phalanx were excised and the extensor hallucis lengthened. After operation the toes were bandaged into plantarflexion, and mobilisation was begun immediately with plantarflexion exercises over the edge of a thick board.

Twenty-four metatarsal osteotomies were performed using the Mygind-Thomassen peg-and-socket technique, combined with medial capsulorrhaphy. Plaster fixation was maintained for four to six weeks.

The subjective results were similar in the two groups, with 75% of the patients in each group satisfied. Complete pain relief was good (85% in the arthroplasty group and 80% in the osteotomy group). Active extension was improved in 56% of the arthroplasties and in 89% of the osteotomies, but active plantarflexion was reduced in 72% and in 50% respectively.

Radiographically, the average valgus before operation measured 38° in each group; three years after operation it was 21° in the arthroplasty group and 12° in the osteotomy group. Similarly, the average intermetatarsal angle was reduced by 2° in the arthroplasty group and by 7° in the osteotomy group; the first ray was shortened by an average of 1.2 cm and 1 cm respectively.

After arthroplasty patients recovered more quickly: they returned to work at 7 weeks, compared with 8 weeks after osteotomy, and they wore shoes again at 10 weeks instead of at 17 weeks. However, correction of deformity was better maintained and there was a better range of movement after osteotomy.

Techniques of bunionectomy—*C. Freeman Jr* (Augusta, GA, USA) discussed technical aspects of the McBride procedure, including special instruments of his own design. Two techniques were advocated. First, using a dorsolateral incision, the combined adductor tendon was isolated, excising the lateral sesamoid if diseased or displaced, and a lateral capsulotomy was performed. The adductor tendon was sutured to the metatarsal head, not always into a drill hole in the bone, and the wound closed. Secondly, using a medial cut, the capsule was exposed and opened with a Y-incision. The medial prominence of the metatarsal was removed and the bone smoothed. After inserting an external corrective spacer of sterilised foam-sponge between the great and second toes, the medial capsule was repaired, leaving a few degrees of joint valgus. No plaster fixation was used, and weight-bearing was permitted in a shoe with a wooden sole and a canvas top.

If the intermetatarsal angle exceeded 20°, a metatarsal osteotomy was added to the above procedure. A basal open-wedge osteotomy was preferred, inserting the excised bone from the metatarsal head as a graft. A special sprung staple made from a Kirschner wire was described; this staple was inserted across the osteotomy to apply compression.

The deforming mechanism—*D. N. Condie* (Dundee) described a biomechanical basis for the analysis of foot deformities. Three factors contributing to the initial deformity were identified: *muscle imbalance* (weakness or spasticity) resulting in an abnormal attitude of the foot leading to excessive loading; *structural inadequacy* (for example in ligaments) impairing the normal load-bearing mechanism; and *malalignment* of the foot components causing excessive loading and excessive muscular and structural demands.

One or more of these factors established a primary deformity, which then caused secondary changes: lines of muscle action were altered, muscles were stretched or allowed to contract, producing additional imbalance; ligaments became stretched producing further structural inadequacy; and the malalignment of the initial deformity increased load-bearing. Voluntary compensation, designed to relieve discomfort, added further muscle strain and further altered the load-bearing pattern of the foot.

An analysis of the primary and secondary factors producing the deformity was essential in planning treatment. Muscle imbalance was managed with orthoses, tendon transfers, or drugs to reduce spasticity. Structural integrity was improved by orthoses, by joint function, by ligament reconstruction or by joint replacement. Malalignment was corrected by osteotomy, by soft-tissue release, by passive exercises, or with an orthosis.

The ICLH ankle replacement: a follow-up study—*B. G. Bolton-Maggs* and *R. A. Sudlow* (London) maintained that ankle arthroplasty was not indicated in any form of osteoarthritis; arthrodesis was better. The role of arthroplasty in rheumatoid arthritis was unclear. While the complication of talar collapse and the problems of revision surgery raised doubts as to whether the operation should be performed at all, it might be indicated in a few selected patients with bilateral, stiff, painful ankles without fixed valgus of the heel.

The development of the ankle prosthesis was described and the results in 62 operations performed between 1972 and 1983 were reported; 33 were for rheumatoid disease and 29 for osteoarthritis. Perioperative complications included three cases of deep infection, two malleolar fractures, and 15 incidents of delayed healing (10 in those with rheumatoid disease).

Twenty-nine per cent of the arthroplasties had needed revision for sepsis, loosening, or malleolar impingement. Of the others, 40 had been reviewed after an average of five years. The true range of ankle movement could be assessed only radiographically and averaged 13° (range 3° to 28°); 31 patients had tolerable pain relief. Walking distance was improved in 16 and remained the same as before in 13 patients. The ability to cover rough ground and inclines was usefully improved only in those with rheumatoid disease.

Mummies' feet—*V. Valenti* (Rome, Italy) said that mummies' feet were the only examples in palaeomorphology in which preservation of soft-tissue permitted accurate reconstruction of shape.

Egyptian paintings and sculptures were unreliable guides because of artistic conventions. Although the foot was depicted

in correct proportion to body size (its length being set at 15% of the individual's height), *both* feet were shown from the medial side. Only for a short time around the reigns of Akhenaton and Tutankhamun was the little toe to be seen, and then the great toe was depicted overlong.

During bandaging the forefoot became supinated, but it was usually possible to obtain true dorsiplantar and lateral radiographs.

The metatarsals and their heads were stouter than in modern feet; the first metatarsal was usually 4 mm shorter than the second; the first ray was always at 90° to the distal surface of the medial cuneiform, and metatarsus primus varus was never seen.

The angle between the first metatarsal and its proximal phalanx varied from 0° to 8°; hallux valgus was not seen and the sesamoids were properly centred beneath the metatarsal head.

The "digital indices" were divided equally between the so-called Greek formula (second toe longer) and the Egyptian formula (great toe longer). The size of the foot and its arch were usually normal.

Pathological changes due to poliomyelitis were seen (Menepthah Siptah) and also flat foot (Rameses II). Rameses VI had a cyst in the proximal phalanx of a great toe and Amenhotep III had a hammer toe. One predynastic mummy showed a pes cavus. No examples of club foot, hallux valgus, osteochondritis, osteomyelitis, or tuberculosis were seen, nor any callosities.

Where are feet going?—*C. Bulstrode* (London) reviewed the evolutionary trends of the human foot. For 25 million years the foot of the arboreal primate was used for grasping; for only 2½ million years has it been adapted for bipedal running.

Theoretically the foot was a high-speed, minimum friction, reciprocating propulsion system, driven by serial sprung torque multipliers, individually powered, but centrally controlled. To achieve this, natural selection should, and seemed to be achieving, a reduction in the size and contact area of the foot, stiffening its joints and lengthening the leg and the metatarsals.

A comparison of the human foot with the non-human, revealed similar adaptive changes in both: reduction in the size of phalanges and of the lesser toes, lengthening of the metatarsals, and movement of the axis of the foot away from the centre towards the first ray.

Injuries to the foot may be correlated with and caused by lack of adaptation to evolving functions. Thus stress fractures of the second metatarsal may reflect changes in the axis of the foot, and hyperextension of the toes imposed by bipedal running may contribute to joint injury causing hallux valgus, hallux rigidus and claw toes.

AUSTRALIA

AUSTRALIAN ORTHOPAEDIC ASSOCIATION

The forty-third annual scientific meeting of the Australian Orthopaedic Association was held in Brisbane from September 25 to 29, 1983, with the President, Dr T. J. Claffey, in the Chair. The guest professor was Dr H. J. Mankin (Boston, USA) who delivered an Instructional Course Lecture entitled *Osteopenia: an approach to metabolic bone disease*, and two papers entitled *Allograft replacement for malignant tumours* and *The healing of articular cartilage*.

The guest lecturer was Dr Robert W. Jackson (Toronto, Canada) who presented an Instructional Course Lecture entitled *Arthroscopy in perspective*; other distinguished visitors included Dr K. E. DeHaven (Rochester, USA), Dr Nils Oretorp

(Jönköping, Sweden), Professor R. B. Duthie (Oxford, England), Dr J. W. Fielding (New York, USA), Dr J. W. Hazlett (Kingston, Canada), Dr O. R. Nicholson (Auckland, New Zealand).

A section of the programme on sporting injuries was arranged by invitation and included papers from Dr R. W. Jackson (Toronto, Canada), Dr K. E. DeHaven (Rochester, USA), Dr Nils Oretorp (Jönköping, Sweden), Dr M. G. Maguire (Adelaide), Dr F. R. Wilson (Brisbane) and Dr P. T. Keenan (Perth).

The L. O. Bett's Memorial Medal for 1983 was awarded to Professor R. L. Huckstep for his contribution to Australian orthopaedics and his services to World Orthopaedic Concern.