ROYAL COLLEGE OF SURGEONS OF ENGLAND

Presentation of College Medal to Mr Norman Capener

At a special ceremony in Exeter on October 28, 1974, the President of the Royal College of Surgeons of England, Sir Rodney Smith, and a Past-President, Sir Thomas Holmes Sellors, presented to Mr Norman Leslie Capener, C.B.E., the Honorary Medal of the College in recognition of his outstanding services to the College, and in particular his care of its artistic possessions, and to the community as a whole through his work for the Medical Commission on Accident Prevention.

UNIVERSITY OF LIVERPOOL

Degree of M.Ch.(Orth.)

The following candidates were successful in gaining this degree in 1974: N. S. Bhat (Madras, India), A. C. Chakravertty (Royal Navy), J. S. Daruwalla (Bombay, India), I. H. Emery (Liverpool), R. Johnson (Formby), S. G. Kale (Nagpur, India), Mrs S. Karat (Kerala, India), R. D. Lownes (Liverpool), K. MacCon (Galway, Ireland), C. V. Ratnam (Hyderabad, India), C. A. Talwalker (Bombay, India).

Mr R. Johnson was awarded the Norman Roberts Prize. The external examiners were Mr Geoffrey R. Fisk (London) and Professor F. R. Tucker (Winnipeg, Canada). The internal examiners were Mr H. G. Almond, Mr F. C. Dwyer, Mr A. G. O'Malley and Professor Robert Roaf.

BRITISH ORTHOPAEDIC RESEARCH SOCIETY

A meeting of the Society was held at the Nuffield Orthopaedic Centre, Headington, Oxford, on November 8, 1974. The president, Professor B. McKibbin, was in the chair.

The histology of loosening between acrylic cement and bone—Professor John Charnley (Wrightington) said that he had been prompted to undertake a histological study after finding cavities invading cortical bone from the endosteal surface in three cases of fatigue fracture of the cemented femoral prosthesis after total hip replacement. The question was whether the caseous debris in these cavities was caused by the movement of acrylic cement against bone or had some other cause. It was fairly generally recognised that the caseous debris or "sludge" encountered when exploring loose total hip replacements was more likely to come from the loose cement-bone interface than from the articulation itself and was frequently seen when cemented metal-to-metal implants became loose. The enquiry was extended to include another three patients in whom localised cavities were found in bone at points in contact with cement; two occurred in the calcar and one in the acetabulum. These latter were without mechanical failure of the implants and exploration had been carried out diagnostically.

Two different histological appearances were found. In the cases of fractured femoral prosthesis the caseous debris showed considerable numbers of giant cells, the general appearance of which was identical with those seen on the surface of cement in long-term post-mortem studies. There seemed therefore no reason to doubt that the caseous debris here was caused by movement of acrylic cement on bone. In the second group of patients giant cells were scanty, but there were accumulations of large histiocytes with foamy cytoplasm similar to those encountered in old cases of the acrylic Judet prosthesis, where the adjacent soft tissue is heavily loaded with acrylic material in submicroscopic size. It was proposed that the difference in appearance was simply that of the difference in particle size.

This study did not support an opinion in the literature that acrylic material was birefringent in histological sections. Many of the sections were sprinkled with strongly birefringent particles which undoubtedly were those of high molecular weight polyethylene. However, it was suggested that these particles were coincidental and that they were well tolerated. There was certainly no relationship between the number of particles and the nature or extent of the tissue reactions.

Thermal aspects of acrylic cement—Dr A. J. C. Lee, Mr R. S. M. Ling and Mr C. D. Jefferiss (Exeter). This paper is in press and will appear in an early issue of this Journal.

Experimental investigation of fat embolism after the use of acrylic cement in orthopaedic surgery—Mr N. H. Harris, Mr A. J. Miller, Dr R. Bourne, Dr S. Wilson and Miss P. Kind (London) stated that acrylic cement had been widely used since 1962 for the fixation of metal implants in bone. Relatively recently, fat embolism had been recognised as a serious complication, apparently as a direct result of inserting the cement into the marrow cavity (Harris (1970) British Medical Journal, 3, 523). It was suggested that fat embolism may occur quite frequently during these operations, but it was not recognised as such because it was unsuspected or subclinical. This paper reported an experimental study designed to test this hypothesis, and to determine the point when embolism occurred. The experimental design used a cannula inserted into the common iliac veins of an anaesthetised dog. One limb was used as a control; the opposite femur was divided, the marrow cavity reamed out and acrylic cement inserted. Eighteen experiments had been undertaken. In the first ten, venous blood samples were taken from each limb simultaneously at intervals before and after insertion of the cement. In the next eight animals blood samples were taken starting at the moment of cement insertion and continuing for about one minute. The following biochemical estimations were made on all blood samples: cholesterol, triglycerides and nephelometry (the latter measures the lipoprotein component of the lipids and the size of the fat particles). The lungs of the animals were examined histologically for evidence of fat embolism. The results in the first ten dogs showed no significant change in the cholesterol or triglyceride levels in any of the blood samples, and the nephelometer readings were unaltered. Histological examination of the lungs was negative. In the next eight dogs there was again no change in the cholesterol or triglyceride levels. However, in specimens taken from the experimental leg at the moment of inserting the cement the light scattering intensity, as measured by nephelometry, was markedly increased. This could be reduced by
filtration (0.10 μ membrane) which allowed the low density and very low density lipoproteins to pass but retained the larger fat particles. Histological examination of the lungs showed unmistakable evidence of fat embolism. The results suggested that it was possible to reproduce fat embolism in the dog under experimental conditions which closely simulate the insertion of acrylic cement into the human femur. Moreover, the effect was specifically the result of inserting cement, and occurred during the first minute of the procedure. It did not follow division of the femur or reaming of the marrow cavity.

Changes in bone marrow pressure on walking with patients with osteoarthritis of the hip—Mr P. M. Aichroth, Mr R. A. P. Scott and Dr M. Nott (London) recalled that it was thought that pain associated with osteoarthritis might be related to intraosseous pressure. Pressure changes were studied in the femoral marrow cavity during walking, standing, sitting and lying prone, to try and determine whether any differences were detectable in subjects with osteoarthritis compared with normals. A pilot study was undertaken to assess the technique for inserting a needle under local anaesthesia, and to determine the range of pressure changes on movement. After establishing that the technique was safe and painless, and that movement was in no way affected, two patients with osteoarthritis of the hip and one control patient were studied. The results showed that repeatable changes in bone marrow pressure did occur on movement, and that these alterations varied in time, sequence and magnitude with different types of movement. In this small number of subjects there was a difference in resting pressure, pulse pressure and response to movement between the two patients with osteoarthritis and the one control. Rapid changes in pressure on both initiating movements and during walking were found in those with osteoarthritis. It was possible that these pressure changes were related to the patients' symptoms, in view of the small change found to produce pain. The recordings lying prone were related to those found under anaesthesia in patients, and in animal experiments. It was concluded that in the osteoarthritic hip the pressure differences observed were caused by an increased blood flow in the diseased bone; and that the rise in pressure associated with movement was produced by a decreased venous outflow from the marrow cavity.

The projectional aspects of scoliosis—Professor R. B. Duthie (Oxford) stated that when a torque and/or eccentrically placed load was placed upon the spine, a helical spiral curve resulted, deforming the logarithmic curve of the normal thoracic spinal structures (Duthie 1971) In Scoliosis and Growth, edited by Zorab. Edinburgh and London: Churchill Livingstone. To determine possible factors (for example, retardation of growth on one side by anchoring structures or by abnormal configuration or function of muscle/ligaments, or even nerve root, which might alter the specific rate of growth of the various articulating masses), he had examined five human macerated scoliotic spines. Anatomical analysis presented considerable difficulties but the actual structural deformity and its mechanism of development still remained obscure because he had studied only the deformity of bones and their articulations without the all-important supporting structures of muscles and ligaments, and in some cases, the thoracic cage and pelvis. Even so, this rare type of material was very important. Five dry macerated but articulated specimens of structural scoliotic curves were selected both by history and by physical examination to exclude such obvious osseous disorders as rickets, congenitally abnormal vertebrae and thoracoplasty, as well as diseases such as poliomyelitis or muscular dystrophy. Even so, the term “idiopathic” had purposely been used. The examination took two general forms: 1) Linear surface measurements of individual anterior vertebral body length from T.1 to L.5 were made by tape and compared with those from three other dry anatomical specimens of normal but articulated spines. 2) Radiographs of the mounted specimens in the standard scoliosis views—antero-posterior (coronal plane) and lateral (sagittal plane). “Non standard” radiographs from above were made to give horizontal or transverse axial sections at various levels of the spinal curves. Vertebral rotation was measured by means of this serial linear tomography. The results showed 1) that the anterior body lengths, either singly or as total length, were almost normal in the scolises, but the posterior lengths were considerably reduced whether the primary curve was kyphotic or lordotic. In the normal spines the linear measurements showed that the thoracic kyphosis was balanced by the lumbar lordosis; 2) that the new transverse axial tomographs demonstrated well the vertebral rotation and this was measurable; and 3) that the axis of rotation occurred near the tips of the spinous processes in scoliotic spines, whereas in the normal thoracic spine it was said to be near the four side vertebrae. The rotation was observed to range from 10 to 60 degrees and there is no appreciable deformity of scoliosis was not an exaggeration of the rotation found in normal spines. These findings suggested that scoliosis resulted from some strong inhibitory force to growth of the posterior vertebral structures, with an asymmetrical stimulus and with normal anterior linear growth. The progression of the typical scoliotic deformity could be satisfactorily explained by the constant longitudinal force of gravity acting on the “prismatic” vertebral column in the presence of local growth inhibition of muscle imbalance.

Computer-assisted clinical orthopaedic research—Mr M. E. Conybeare (Oxford) and Mr J. Rowland Hughes (Oswestry) said that clinical research had always been beset by problems of recording, storing and retrieving information. Although this challenge in some degree was common to all medical disciplines, orthopaedics was particularly concerned with it because so much of its clinical research consisted of long-term studies of patients. The early promise that computer technology might be of help in storage and retrieval of clinical information had not been born out. The retrieval methods then in use offered no improved methods continued. The reasons for failure had usually been due to the amount of extra work involved in designing and filling-in forms and in learning complicated terminology and methods to enable the accumulated data to be entered into the computer. At the Institute of Orthopaedics, Oswestry, a new method of storing and retrieving case record information had been developed termed “MIRPO” (Medical Information Retrieval Project Oswestry), and the authors believed that this overcame most of these problems. The information was typed on an instrument with a standard typewriter keyboard attached to a magnetic tape cassette unit. The accumulated cassettes were transmitted or transported to a computer centre where the data were edited and stored by computer. The retrieval process was carried out by the same means, relevant references being printed out at the keyboard. Any information that was normally typed could be entered into the system but some slight restrictions had to be placed on the way in which it was presented. They believed, however, that the typed copy which resulted was perfectly acceptable to the clinician as his day-to-day case record, or if a letter was being used, to any general practitioner. The editing process filtered out useless words like “the”, “and” and “but” and filed the remainder on a computer tape bank with a reference to site of occurrence in the case records. The reference localised the word in the record down to sentence level. The clinician making a search asked the computer to establish links of words occurring in the same sentence. Thus the computer might be asked to print out a
reference to all records where “deep”, “vein” and “thrombosis” occurred in the same sentence. Further development had allowed them to record numbers (e.g., degrees of joint movement) and dates, and to manipulate these figures, giving a very comprehensive and versatile system widely applicable to different environments and disciplines with a minimum of further development.

HL-A 27 and disease—Dr D. A. Brewerton (London) said that over thirty years ago Gibson and Medawar had studied in detail the fate of skin grafts. They had considered the process of rejection and how the recipient tissues recognised that the grafts were foreign. Subsequent contributions by many workers had established that there were inherited antigens on the surfaces of cells throughout the body. Over thirty such antigens had been recognised, and as most people had four antigens, there were several thousand combinations which characterised different individuals. Because of their importance in tissue rejection they were known as “histocompatibility antigens”. Alternatively, as they were most conveniently determined in blood leucocytes, they were called “human leucocyte antigens” (HL-A antigens). In animals the genetic region which controlled the inheritance of histocompatibility antigens also controlled other functions important in inflammation, including some specific immune responses. In work with Dr David James and a team at the Westminster Hospital, the HL-A antigens had been determined in patients with a series of rheumatic diseases (Brewerton et al. (1973) Lancet, 1, 904; 2, 994 and 996). Blood lymphocytes had been studied, using a two-stage lymphocyte-toxicity micro-method with specific typing sera which determined twenty-six different HL-A antigens. The results showed that the histocompatibility antigen HL-A 27, which was present in 7 per cent of an English population, had been found in 96 per cent of patients with ankylosing spondylitis and 53 per cent of their first-degree relatives. It had also been found in 74 per cent of patients with Reiter’s disease, 58 per cent of patients attending eye departments with acute anterior uveitis, and 80 per cent of patients with spondylitis associated with ulcerative colitis, Crohn’s disease or psoriasis. In conclusion, it was not yet known how HL-A antigens were associated with susceptibility to disease. Recently it had been reported from Helsinki that HL-A 27 was present in a very high proportion of individuals who had developed Reiter’s disease or acute arthropathy after established infection with shigella, yersinia or salmonella.

Colles’s fracture and bone density—Mr H. C. Batra, Dr D. A. Smith, Mr G. F. Waddell and Mr J. B. Anderson (Glasgow) had examined 100 women with fracture of the lower end of the radius to compare the density of the metacarpal on the fractured and sound sides. X-ray density measurements were carried out as previously described (Anderson, Shimmims and Smith (1966) British Journal of Radiology, 39, 443; Shimmims, Anderson, Smith and Aitken (1972) Clinical Radiology, 23, 42). All of the patients had been seen at a special clinic six weeks and six months after the fracture. In order to exclude patients who had suffered from metabolic bone disease, the serum calcium, phosphorus, alkaline phosphatase and urea estimations had been determined. The patients ranged in age from twenty-one to eighty-six years. Of the hundred patients, ninety-seven were right-handed and three were left-handed. The radius on the right was fractured in forty-five and on the left in fifty-five. All three left-handed patients were included in the latter group. It was well known that immobilisation led to a diminution of bone density. However, the concept that greater activity than normal would lead to greater bone density was often unjustifiably assumed. The dominant hand was used to a greater extent than the non-dominant hand, therefore a higher bone density might be expected to occur in the dominant hand. This was tested by comparing hands in the hundred patients irrespective of which side the fracture had occurred. No significant difference between them was demonstrated, the means being virtually identical (680 and 685 milligrams ash per cubic centimetre). Of the fifty-five patients who had fractures of the left forearm thirty-three (60 per cent) had lower whole bone densities in the fractured limb. Thirty-two (71 per cent) of the patients who had fractures on the right had lower bone densities of the right third metacarpal. The mean differences in density were statistically significant (P<0.02 and P<0.005). Six weeks after the fractures had occurred the differences between the fractured and non-fractured limbs were no longer significant, but by six months both groups again showed a significantly lower mean bone density in the fractured limb (P<0.01 and P<0.01).

Bone mass was a function of the diameter of the bone, the cortical width and the cortical density. In the hundred patients with Colles’s fracture it was found that the lower whole bone density on the fractured side was not due to differences in total or cortical widths, but was due to the lower mean cortical density on the fractured side. It was concluded that there was a statistically significant probability that a Colles’s fracture would occur on the side with the lower bone density.

Bone density in ageing Caucasian and African populations—Professor L. Solomon (Johannesburg, South Africa) said that the progressive loss of bone mass after the fifth decade in both sexes and in all races—but especially in Caucasian women—had led to the concept of “senile” or “post-menopausal” osteoporosis as a normal accompaniment of ageing. The frequent occurrence of hip fracture in elderly women was attributed to this phenomenon and their incidence was widely used as a measure of osteoporosis in various populations. By this index senile osteoporosis was much more common and more severe in Caucasians than in Africans, which suggested that Africans either achieved a greater bone density in early life, or lost bone at a slower rate after the menopause. However, this was still conjectural since no direct comparison of bone density, based on random population sampling, had previously been made in Africans and Caucasians living in the same environment.

This paper was based on comparative studies of Caucasian and African populations who lived in the metropolitan area of Johannesburg. Detailed fracture surveys were carried out over a three-year period in each group and metacarpal cortical density was measured on radiographs of the hands of approximately 1,000 randomly selected members of each community. The average annual incidence of femoral neck fracture was ten times greater in the Caucasian population than in the African population. Contrary to all expectation, however, metacarpal bone mass and bone density were very similar throughout the age range in the two groups. This apparent paradox led to a more detailed study of 517 Caucasian patients with hip fractures attributed to “senile” or “post-menopausal” osteoporosis. Metacarpal cortical density in these subjects was markedly less than that of the normal random population in the same age range. Evidence was presented which showed 1) that this group represented an abnormal segment of the general population; 2) that the osteoporosis associated with fractures after minimal trauma in the elderly was not attributable simply to the changes of ageing; 3) that the loss of bone density in old people was often aggravated by metabolic disorders; and 4) that the low fracture-rate in elderly Africans was due largely to the relative absence of such disorders rather than to any inherent advantage in bone formation.

The use of metabolically-active derivatives of vitamin D in rickets and osteomalacia due to renal glomerular failure—Dr R. Smith, Dr R. G. Henderson and Dr R. G. G. Russell (Oxford)
suggested that in chronic renal glomerular failure severe bone disease (renal osteodystrophy) may develop, which was a mixture of osteomalacia (or rickets) and osteitis fibrosa due to parathyroid over-activity. Treatment of the skeletal deformity was both medical and surgical. In the past, medical treatment had been difficult because the large doses of vitamin D required to heal the bones were only partly effective and vitamin D intoxication and soft-tissue calcification were dangers. It was now realised that this vitamin D "resistance" was mainly due to the inability of the diseased kidney to form adequate amounts of the biologically active vitamin D metabolite, 1,25 dihydroxycholecalciferol (1,25 DHCC). Recently they had treated patients with very small (1–2 μg) daily oral doses of 1,25 DHCC (one child), or with a biologically active vitamin D derivative 1α-hydroxycholecalciferol (two children and five adults) for periods of up to four months. In this dose these substances appeared capable of correcting the clinical, biochemical and X-ray manifestations of renal osteodystrophy, and healed the bone sufficiently for operation where necessary. The therapeutic use of vitamin D metabolites and derivatives may be an important advance in the management of crippling bone disease due to renal failure.

Somatomedin and the growth-plate—Dr M. J. O. Francis, Mr D. J. Hill, Dr P. Ash and Dr J. M. Dehnel (Oxford) reported that it had been recognised for many years that growth had no direct effect on the skeletal system in vitro, yet was essential for continued longitudinal growth of the skeleton in vivo. This discrepancy could now be explained by the fact that in vivo growth hormone stimulates the production of another humoral factor, somatomedin. Somatomedin, in contrast to growth hormone, had direct effects on the metabolism of cartilage in vitro. It had been shown that isolated rat liver, when perfused with medium containing bovine growth hormone (BGH), produced somatomedin-like activity (perfusion somatomedin) (McConaghey and Sledge (1970) Nature, 225, 1249). Perfusion somatomedin stimulated H3-thymidine uptake by articular chondrocytes isolated from rabbit cartilage. The graded response of chondrocytes to increasing concentrations of perfusion somatomedin was paralleled with the response to increasing levels of serum somatomedin. The measurement of H3-thymidine uptake by isolated articular chondrocytes had been found to provide an efficient assay for both perfusion and serum somatomedin. Perfusion somatomedin was useful in studies of the hormonal control of the cartilage growth plate, as, unlike serum, it was uncontaminated with other hormones or growth factors (apart from growth hormone). Chondrocytes isolated from different regions of the growth-plate responded differently to perfusion somatomedin. Epiphysial chondrocytes, like those isolated from the articular cartilage, showed increased H3-thymidine uptake in response to perfusion somatomedin. On the other hand, hypertrophic chondrocytes were completely insensitive to somatomedin. It was suggested that there was a reduction in the response to somatomedin by growth-plate chondrocytes as they passed from the proliferative to the hypertrophic state. Throxine, thought to be involved in the processes of hypertrophy and new bone formation, did not directly affect H3-thymidine uptake of epiphyphal chondrocytes, but inhibited the stimulation of their activity by perfusion somatomedin.

The influence of the thymic hormone on osteosarcoma and fibrosarcoma—Mr J. G. Camblin, Dr J. Donaldson and Mr G. W. Oddyng-Smee (Belfast) said that in recent years evidence has been presented of a better survival in patients with osteosarcoma. The role of the thymus has been reviewed. It was evident that there was a relationship between thymic abnormalities and the occurrence of osteosarcoma. The most relevant was that a genetic abnormality exists in the thymus gland, which has the ability to influence lymphocytes. Moreover, observation had shown that lymphocytes so treated could then kill target tumour cells. This cytotoxicity had been assessed using radio-isotope release methods. Several workers had recently demonstrated firstly that purified thymic extract brought about a change in the lymphocyte cytoplasmic membrane; and secondly, that subsequent to this change the lymphocytes were cytotoxic whereas before they were not.

The lymphocytes were obtained from the blood of both normal subjects and from osteosarcoma patients for use against their own tumour, and separated using the Ficoll-Triosol method. The bovine thymus extract was prepared by homogenisation and centrifugation and purified by ammonium sulphate precipitation and passage through a gel column. This was then used to evoke cytotoxicity in the lymphocytes. The tumour cells used were obtained from human osteosarcomata and a rat fibrosarcoma induced by 20-methyl-cholanthrene; these cells were labelled with 131I-desoxyuridine. The cytotoxicity was measured firstly, in vitro, by isotope release when the effector and target cells were incubated together; and secondly, in vivo by noting the tumour incidence in groups of animals given intraperitoneal injections of either liver or thymus extracts on alternate weeks.

In vitro there was minimal natural cytotoxicity of the lymphocytes against both tumour cell types. However, the addition of the thymic extract to the lymphocyte/tumour cell cultures produced marked cytotoxicity, and greater cell death was achieved with the thymic extract than when cyclophosphamide at an equivalent therapeutic serum concentration was added to the medium. The in vivo tests showed not only a delay in tumour presentation but also a 50 per cent reduction in incidence in the test group compared with the control animals.

AUSTRALIA

AUSTRALIAN ORTHOPAEDIC ASSOCIATION

The thirty-fourth annual meeting of the Association was held at Townsville from July 22 to 26, 1974. Mr R. H. Maudsley (Windsor, England) was a guest.

The presidential address was given by Mr Warwick Stenning (Sydney), who discussed selection for tertiary education, the paramedical sciences, and the place of the orthopaedic surgeon in team management when the team contains medical and paramedical members.

Clean air operating enclosures—Mr W. J. Cumming (Sydney) indicated that surgical teams performing joint replacement surgery had achieved a marked diminution in infection rates when the procedures were performed in a clean air environment. Diminution of particle and bacteria counts in the immediate environment correlated with this and were almost certainly a major factor. In providing clean air there were two basic requirements—initial cleaning of the air and clean air at the wound site. A precise unidirectional projected air flow (incorrectly called "laminar flow") of 90 feet per minute provided propulsion of the sterile "first air" from the filter space to the operating environment. This provided class 100 air (U.S. Standard) at a considerable distance from the filter space. The filters were stacked in bands on wall or ceiling and either completely or partly covered that surface. Vertical flow or horizontal flow could be employed to serve an entire operating room or an enclosure within an existing operating room. The unit which had been installed at St George Hospital, Kogarah, was described. This unit was in an existing operating theatre and was a simple open-ended wind tunnel. There were two multiple-panel glass interlocking
side walls which were completely retractable, and allowed the theatre to be returned to its usual state. Instillation was simple and the costs less than for a vertical enclosure of similar size. The anaesthetic team, equipment and other personnel were "down wind" and could not contaminate the operating area. Additional sterile equipment was simply passed down wound and not to contaminate the theatre. A side-walled delivery aperture and vertical separating anaesthetic sheets were unnecessary and undesirable. Personnel isolating suits, of negative pressure type and using low-particle-shedding cloth and moisture-repellent sleeve and body panels, were used for major replacement surgery and added to the quality of the immediate environment. Mr Cumming showed a colour film which demonstrated dramatically how the projected air flow reduced the risk of infection. In reply to Mr Murray Maxwell (Sydney) Mr Cumming stated that the unit had cost some ten thousand Australian dollars.

Deep implant infection in orthopaedics—Mr I. B. Stratton (Sydney) discussed the diagnosis and causation. He defined this infection as one emanating from the prosthesis itself and culturing swabs. The causative bacteria was initially relatively sensitive; later it became definitive if a positive culture was obtained. Failure to culture an organism did not necessarily mean that infection was not present; rather it was probably a failure of a relatively crude bacteriological technique. Histology of a piece of excised tissue was often found to be of greater diagnostic help. The factors causing deep implant infection were discussed, the cleanliness of the air, the penetration of bacteria through gowns and the method of wound closure were considered of importance. The use of heavier gowns of ventile material was advocated. Air-borne bacteria were carried on dust particles of diameter greater than 10 microns; such particles tended to settle rather than remain air-borne. They came from the skin of the whole surface of the bodies of the personnel in the theatre and were principally epithelial scales. Because deep infection was generally due to exogenous factors it was theoretically preventable.

Prophylaxis of deep vein thrombosis after total hip replacement—Mr D. S. Rosengarten and Professor J. Clarke McNeur (Melbourne) described a study designed to compare the effectiveness of prophylactic measures for the prevention of post-operative venous thrombosis. Patients undergoing total hip replacement were allocated at random into six groups—controls, electrical calf stimulation, aspirin, low dosage heparin, aspirin plus calf stimulation, and low dosage heparin plus calf stimulation. All groups were comparable for age, sex, duration of operation, a history of previous deep vein thrombosis, and the presence of varicose veins. Calf stimulation at a rate of twelve to fifteen per minute was commenced immediately after induction of anaesthesia by two electrodes taped to each calf and attached to a battery-operated stimulator. Calcium heparin 5,000 units was administered subcutaneously with the premedication, and then twice daily for ten days; at this dosage coagulation parameters did not change. Aspirin was given orally in a dosage of 600 milligrams eight hours before operation and continued in a dosage of 300 milligrams six-hourly after operation for ten days. The incidence of thrombosis during the period of treatment as diagnosed by radioactive fibrinogen uptake testing was as follows—controls, nine out of twenty (45 per cent); calf stimulation, nine out of twenty-two (41 per cent); aspirin, nine out of twenty (45 per cent); heparin, six out of twenty-one (29 per cent); aspirin plus calf stimulation, ten out of twenty (50 per cent); and heparin plus calf stimulation, none out of twenty-five. No thromboses occurred in a further twenty-five consecutive patients having calf stimulation and heparin. The study also showed that the incidence of thrombosis following total hip replacement was high (approximately 50 per cent). Over 50 per cent of the thromboses occurred either during or soon after operation. Thrombosis was equally common in the operated and opposite legs. The combination of calf stimulation and low dosage heparin was found to give excellent results. Mr Holman commented that calcium heparin was preferable to sodium heparin because it was more constant in its effect and less painful when injected.

Early results of geomedic total knee arthroplasty—Mr P. K. Holman and Mr H. D. D. Tyer (Sydney) reported seventy geomedic replacements performed on fifty-three patients, thirty-two with rheumatoid arthritis, eighteen with osteoarthritis, two with Paget's disease and one with renal osteodystrophy. The ages ranged from twenty-seven to eighty-five years. The range of movement before operation varied from 20 degrees of active flexion in eight cases to a full range. Angular deformities ranged from 0 to 35 degrees. The complications included one death from cerebral haemorrhage, one myocardial infarction, two strokes, ten deaths (one death; one case of pulmonary embolism, two transient lateral popliteal nerve palsies, and one post-operative dislocation. Both cases of infection had settled following debridement and antibiotics and after three months had a good range of pain-free movement. The follow-up ranged from one to eighteen months. The range of movement was from 5 to 85 degrees at one month, and from 5 to 95 degrees at twelve months. Relief of pain had been good in most cases. Fifty-eight knees (83 per cent) were regarded as good (pain-free and a range of movement of 80 degrees or more). Seven knees (10 per cent) were fair (pain-free but less than 80 degrees of movement). Five knees (7 per cent) were regarded as poor. The poor results included one death and four patients with continuing pain (one with a loose tibial prosthesis, two with loose cement in the joint, and one probably infected). The results were regarded as satisfactory and superior to those of the McIntosh prosthesis and high tibial osteotomy. It was also felt that the procedure was worthwhile to salvage those knees which had previously required a hinge type of prosthesis or fusion.

Mr J. A. L. Hart (Melbourne) asked if instability was a contraindication. Mr Holman replied that this was not so as instability could be corrected by the operation.

Induction of skeletal muscle regeneration—Dr N. J. Batalin (Newcastle) described a study of the regeneration-inducing effect of fragmented muscle tissue on recently cut skeletal muscle. He postulated the release of a locally active substance capable of passing through an 0.45μ millipore filter. In ten inbred male white rats the distal part of the left tibialis anterior muscle was excised after marking out and measuring the proximal stump. The excised muscle was then fragmented and enclosed in a millipore chamber which was placed over the cut end of the muscle stump in each animal. On the right side a similar stump with an empty millipore chamber over the cut end was used as a control. The length, the macroscopic appearance, and the histological and electron-microscopic structure of the stumps were compared after killing the animals at varying periods. With one exception the regeneration of the left muscle stump was the greater. It was concluded that the autografts of fragmented muscle, enclosed in a millipore chamber to exclude the cellular contribution stimulated the regeneration of the recently cut muscle stump. This effect occurred mostly within the first two weeks, and it was postulated that it is due to a substance released by the damaged muscle and capable of passing through the filter. Mr S. M. Nade (Sydney) queried whether there might be cell to cell contact through the pores of the chamber and suggested that
smaller pores might be appropriate in a further study. Professor T. K. F. Taylor (Sydney) asked whether arteriography had been performed to establish whether vascular penetration had occurred into the chambers. In reply Dr Batalin said that he had carried out the experiment using finer pore chambers and with similar results. He had not performed arteriography but serial sections taken through the walls of the chambers showed that they were intact.

** Destruction of articular cartilage in the rheumatoid joint—Mr K. W. Mills (Melbourne) described the processes by which articular cartilage was damaged in rheumatoid arthritis. Chronic synovitis initiated these processes. Cellular changes produced cartilage and bony invasion by rheumatoid granulation tissue. The nutrition and the metabolism of articular cartilage cells was severely affected by chronic rheumatoid involvement. The loss of proteoglycans had important effects on the physical properties of articular cartilage and its resistance to wear. Beyond a certain point cartilage damage was irreversible; the difficulty was in defining this point. It had not yet been defined in either pathological or clinical terms, and until it could be defined the choice of various surgical procedures remained empirical.

The rationale of meniscectomy in osteoarthritis and rheumatoid arthritis of the knee joint—Dr A. M. Ingman, Dr P. Ghosh and Professor P. F. Taylor (Sydney) indicated that although the role of the meniscus in knee joint function remained somewhat enigmatic, evidence had accumulated which suggested that by virtue of a "thrust pad action" the meniscus increased joint congruence and assisted in the distribution of loads on the joint. Attention was also drawn to the increasing number of reports which indicated that the long term results of meniscectomy for traumatic ruptures were not entirely satisfactory. The authors had studied eight menisci from osteoarthritic knee joints and fourteen from rheumatoid joints. Tissue was analysed for collagen, hexosamine and non-collagenous protein content. Degenerate areas were sampled separately from macroscopically normal tissue. A previous study on ageing in the human meniscus provided rigid control data. In the osteoarthritic menisci, the observed changes were the same type as that seen in normal ageing—a fall in collagen content and a rise in non-collagenous protein—but to a greater degree. The findings had led the authors to question the role of meniscectomy for degenerative lesions in the older age groups, when the incidence was obviously of a high order in asymptomatic subjects. In rheumatoid menisci, there was a reduction in the level of collagen and hexosamine in areas of localised degeneration, but these parameters were also reduced in apparently non-degenerate areas of the same meniscus, when compared with normal tissue from the same age range. These findings strongly suggest that compositional alterations were the result of enzymic degradation as part of the inflammatory rheumatoid process. It was deduced that meniscus should not be removed at the time of synovectomy unless obviously degraded and invaded by pannus. Unwarranted removal might in some way have a deleterious effect on joint function in the long term.

The indication for innominate osteotomy in the treatment of congenital dislocation of the hip—Mr W. H. Huffam (Melbourne) had reviewed 102 osteotomies. When a Salter type of osteotomy had been performed on a hip which was concentrically reduced but which had a sloping acetabulum and a poorly covered femoral head, the results were very good; the coverage of the femoral head thus obtained was maintained with growth. The few cases of failure were attributed either to insufficient initial displacement, or to collapse of the graft secondary to inadequate internal fixation, or to osteoporosis secondary to immobilisation of the hip before operation. A Salter osteotomy at the time of open reduction had not been as successful as when the procedure had been performed on a hip which had been previously reduced. It was therefore recommended that the dislocated hip should be reduced without innominate osteotomy. If after the completion of immobilisation it was noted that the hip was dysplastic and that the dysplasia was deteriorating or not improving, then a Salter type of osteotomy should be performed before any subluxation occurred. Mr K. R. Daymond (Sydney) reaffirmed the problems which could occur when open reduction was combined with innominate osteotomy but felt that there was a place for the combined procedure in the five to eight year age group. He also advocated the use of threaded Kirschner wires to prevent migration. Mr W. N. Gilmour (Perth) advocated the use of a bone hook rather than a towel clip to obtain displacement of the lower quadrant of the pelvis.

** Chiari osteotomy—Mr W. B. Law (Hobart) presented a small series of eight osteotomies performed in the second and third decades for acetabular dysplasia associated with congenital and spastic dislocation of the hip. The technique was described in detail. The ideal osteotomy commenced immediately above the joint capsule and was angled 10 degrees upwards and inwards and displaced by approximately 50 per cent of the width of the pelvis at that level. Over-displacement should be prevented as this impaired the result. Internal fixation was recommended. The results suggested that the operation has a valuable place in the management of the dysplastic hip over the age of ten years. It increased stability of the hip, prevented progressive subluxation, reduced pain and presumably delayed the onset of arthritic change.

** A simple osteotomy of the calcaneum—Mr B. D. Shepherd and Mr E. H. Bates (Sydney) described a simple technique which involved displacement of the heel without angulation. The osteotomy did not involve excision of a wedge, minimised soft-tissue trauma, avoided the need for a bone graft and was readily combined with elongation of the calcaneal tendon. First developed for the management of children with cerebral palsy, this operation had been performed on more than 100 such cases with satisfactory results. This had led to the technique being applied to the correction of severe flat foot and of valgus deformities of the ankle and subtalar joint in rheumatoid arthritis. Mr J. G. Allman (Sydney) commented that he had used this technique in the management of congenital talipes equinovarus. There was considerable discussion, most of the comments suggesting that the procedure had its best indication in cerebral palsy and otherwise should seldom be performed.

Osteoid osteoma—Mr R. J. Simm (Melbourne) had studied twenty consecutive cases. Because most patients underwent surgery the natural history of osteoid osteoma was poorly documented. In this series three cases did not undergo surgery and were available for follow-up as many as twenty-four years later. Only eight similar cases had been reported in the literature. All three cases were pain-free and radiographs showed some resolution, but the nidus was still visible after twenty-four years. Another three patients had recurrence of the lesion after operation. This was considered to be due to incomplete excision. It was concluded that osteoid osteoma had two phases in its life history—1) an active phase, characterised by pain and tenderness, during which the nidus might increase in size, excite the surrounding sclerosis and overgrowth of bone, and recur after local excision; and 2) the inactive phase or phase of resolution, during which the lesion became painless. Sclerosis of bone could decrease or disappear and the nidus could ossify or remain visible radiologically.
The behaviour of osteoid osteoma defied categorisation into tumour or infection. Mr P. M. Marnie (Sydney) said that he had three cases of untreated osteoid osteoma in his practice, and a show of hands disclosed seven further cases. Several discussors recommended block excision under radiographic control with adequate markers, and radiographs of the excised fragment.

The Bryan Keon-Cohen Memorial Lecture “Ago quad agere” was delivered by Mr J. M. Jens (Ballarat).

Post-operative gas gangrene managed by hyperbaric oxygen—Mr R. H. Maudslay (Windsor, England) reviewed twenty patients who had been managed in a small chamber of hyperbaric oxygen for two-hourly periods. Of all the conditions for which hyperbaric oxygen had been used, in gas gangrene its effects were most dramatic. It arrested toxin production and the spread of tissue changes; it thereby delayed operation to a time when the patient was fit for it and restricts the procedure to the ablation of tissue already necrotic when treatment commenced. Mr F. J. Harvey (Sydney) commented that the incidence of gas gangrene was higher in Australia than in England. He advocated high dosage of penicillin in patients at risk and stressed the importance of wound debridement in prophylaxis. Mr Maudslay agreed with the dosage of penicillin but urged that antiserum should not be used because of the high risk of anaphylaxis.

Why graft bone?—Mr S. M. L. Nade (Sydney) stated that the major objective in bone graft surgery was the stimulation of bone formation. As surgical techniques and metallic implants had been developed, the requirement for a bone graft to serve both mechanical and osteogenic functions had lessened and there had been a change in emphasis from cortical to cancellous autografts. The bone cells of autografts died when detached from their blood supply, and the principal antigenic component of a bone graft was contained in the nucleated cells of the bone marrow. Cancellous allogenic bone, when implanted free from bone marrow and blood cells, appeared to be not more than slightly antigenic and could be stored without complex preparative and sterilisation procedures. Cells derived from the bone marrow were known to be osteogenic. Experiments in rabbits were reported using allografts of selectively decalcified cancellous bone and autografts of bone marrow cells, alone and in recombinant form, for extraskeletal implantation. The results suggested that cells of bone marrow had the competence to form bone when placed in an “inductive” environment. The role of the treated osseous material might be purely supportive and not a prerequisite of osteogenesis. The theory was advanced that the essential ingredients were the pluripotential mesenchymal cells, derived from the bone marrow, which interacted with graft material. This hypothesis had practical implications in terms of fracture healing, bone graft surgery and bone growth. It was suggested that bone itself, as a graft material, might not always be necessary.

Some experiences of a battery stimulator in fractures with established non-union—Mr C. A. Cass (Sydney) described the use of direct current stimulation in seven cases. In three the position was acceptable and the only procedure necessary was the insertion of electrodes and the reapplication of a plaster cast; in two of the cases there appeared to be accelerated union which was ascribed to the use of the electrodes. In three other cases there was malalignment so that open reduction and internal fixation was employed in addition. Mr K. R. Daymond (Sydney) reported a child who suffered from pseudarthrosis of the tibia which had failed to unite despite several operations but which did unite rapidly after the insertion of an electrical stimulator. Professor T. K. F. Taylor (Sydney) thought that this tool should be properly investigated to establish whether an electrical current promotes osteogenesis.

Instructional course lecture—Mr C. Hudson (Sydney) discussed the investigation and management of low back pain.

Stenotic syndrome in the lower lumbar spine—Dr G. R. V. Mutton, Professor T. K. F. Taylor and Dr S. M. L. Nade (Sydney) had reviewed thirty-one patients seen over a period of four years. They noted that although stenosis of both the canal and its related foramina may result from a wide variety of causes, precise classification of the clinical syndromes had not been clearly documented. Stenotic syndromes fell into one of two major groups, claudicant and entrapment. In the former the symptoms were primarily related to activity, but not so in the latter. In both, posture could affect the response profoundly. The various clinical syndromes did not appear to be constantly related to any one pathological state, though spondylosis was the most common. The precise contribution of congenital narrowing of the canal could not be accurately assessed. The clinical syndromes defined were (1) ankylosed, (2) osteoarthritic, (3) postural pain and paraesthesia, (4) postural pain and paraesthesia, and progressive paraparesis. The clinical picture could move from one syndrome to another. Attention was drawn to the occasional spontaneous remission of severe symptoms; this was attributed to the resolution of inflammatory changes in the periarticular tissues of the apophyseal joints. Three patients had mono-radicular claudication; in these patients the neurological deficit either appeared or increased, as did the pain, on exercise. Myelography was considered an essential step in assessment. When indicated, wide surgical decompression had given very satisfactory results. However, progression of pain and disability was not inevitable, and not infrequently the patients remained at a constant but low level of discomfort over long periods of time. Mr A. McNenzie (Christchurch) commented that this was not a new syndrome but rather a minor variant of the established syndrome of spinal canal stenosis. Mr K. W. Mills (Melbourne) commented that instability of the lumbar spine did sometimes occur following removal of the facet joints.

The role of fat in the “fat embolism syndrome”—Mr J. C. McMichan, Mr D. S. Rosengarten and Professor J. C. McNeur (Melbourne) pointed out that mounting evidence suggested that circulating fat might play only a minor role, if any at all, in the development of the syndrome after major trauma. They had evaluated, and were continuing to do so, the interrelationship between lipid metabolism, blood coagulation and respiratory function and their correlation with observed clinical data. A filtration and staining technique was used to detect large circulating fat globules in the serum. The preliminary findings presented referred only to the incidence and significance of fat globulaemia in peripheral venous blood; fat macroglobules were found in thirty-one (77 per cent) of the first forty patients. This incidence decreased with time. The classical “fat embolism syndrome” developed in only three patients, all of whom had fat globulaemia. There was no statistically significant relationship between the occurrence of fat macroglobules and the level of hypotension and the degree of hypoxia. The technique of detecting this fat, as well as the estimation of triglyceride levels before and after filtration of the serum, did not allow quantitative measurement of embolic fat. It was concluded 1) that fat globulaemia in peripheral venous blood was common after major trauma with shock and did not necessarily indicate a pathological state; and 2) that neither the presence nor the amount of circulating fat appeared to be of importance in the early diagnosis and
management of the “fat embolism syndrome”. Mr J. McNicol Smith (Melbourne) pointed out that Mr McMichan had not disproved that circulating fat was harmful. Mr McMichan agreed.

The effect of compulsory seat belt wearing on the mortality and pattern of injury to car occupants—Mr B. J. Dooley (Melbourne) pointed out that compulsory wearing of seat belts was first introduced to the world in the State of Victoria in 1970. This measure had reduced the number of deaths and injuries from motor vehicle crashes, while those for the unprotected pedestrian and motorcyclist had continued to rise. This legislation did not apply to children under eight, only 5-5 per cent of whom were restrained in motor cars, and their death and injury pattern remained unchanged. These figures were based on coroners’ statistics and on an analysis of a series of 1,026 patients. Seat belts offer the most remarkable protection in frontal impact collisions; 79 per cent of the admitted patients not wearing belts received serious head and/or facial injuries, compared with only 23 per cent of those wearing seat belts. However, a side impact in a collision led to a high percentage of serious multiple injuries, particularly of the chest and pelvis, and seat belts offered little protection except that head injuries were fewer. Compulsory lateral strengthening of motor vehicles should be introduced in Australia. Ten per cent of car occupants admitted after frontal impact collisions showed injuries directly attributable to the wearing of seat belts. These included fractured clavicles, bruised and fractured sternum, one cardiac tamponade, abdominal contusions and bowel lacerations. Seat belts to be fully effective must be fitted correctly, and there was room for improvement in design.

Seat belt fractures of the spine—Dr J. Bannister, Professor T. K. F. Taylor and Dr S. M. L. Nade (Sydney) said that the compulsory wearing of seat belts had seen a significant reduction in both morbidity and mortality from road traffic accidents in those Australian states where the legislation had been implemented. Further, the pattern of spinal cord injuries had changed; this was most likely related to the effects of the various restraining devices which were, as yet, by no means standardised. The best recognised spinal injury was fracture of the upper lumbar spine, usually a variant of a Chance fracture; the mechanism was primarily one of flexion without a major rotary component, the lower part of the spine being held by the lap component. Intra-abdominal injuries often tended to dominate the clinical picture and the spinal fracture could be overlooked. A Chance fracture was readily recognisable in an antero-posterior plain radiograph of the abdomen by the wide gap between the separated posterior elements. Immediate open reduction and internal fixation were recommended, because the fractures were often inherently unstable and if not stabilised, then loss of neurological function could occur. Late deformity was also seen in one of the six cases reported. Three cervical spine fractures of unusual pattern were also reported; the mechanism of injury was related to the sash component of the belt which produced diagonal bruising across the anterior cervical region. The importance of the placing of the anchorage of the sash was discussed. Mr D. C. Burke (Melbourne) commented on the lower incidence of complete cord lesions since the introduction of seat belts. Mr W. R. Beetham (Ballarat) commented that there was a high incidence of lap belt fractures of the lumbar spine in women. Professor R. L. Huckstep (Sydney) commented that head restraints should also be made compulsory.

Precipitance of the knee joint—Mr F. R. Wilson (Brisbane) described the anatomical factors concerned with knee joint stability. Failure to recognise early ligamentous laxity and rotary instability led to risk of further injury. The pes anserinus transfer had a high priority amongst techniques for control of rotary instability.

The complexity of football injuries of the knee joint—Mr M. G. Maguire (Adelaide) analysed 600 cases from a personal series of over 1,000. Diagnosis was facilitated by seeing the patient early, attention to detail in the history, accurate localisation of ligamentous and capsular tenderness, and aseptic aspiration of haemarthrosis. Most commonly a complex of injuries was present. With the vigorous tackling involved in Australian Rules football, which could cause extremely hard blows on the front and outer side of the knee while the player was weight-bearing and twisting, it was not surprising that the combined strain on the knee joint caused so many injuries. The major cause of bleeding into the joint was tearing of one or both cruciate ligaments. This caused rapid bleeding and distension of the capsule, with severe pain due to great pressure demonstrated by manometric studies and opening at arthroscopy. By contrast, where the cruciate ligament was torn and there was a posterior capsular tear, leakage of blood into the posterior tissues and down the calf relieved the pressure in the joint and was responsible for external bruising, usually within forty-eight hours. This was of diagnostic value. The only other significant cause of a large haemarthrosis was a fracture of some magnitude. The “pseudo-locked knee” was one in which there was inability to move the knee fully because of the interposition of a long end of torn cruciate ligament. Almost invariably the tear of a cruciate ligament was so fibrated as to defy a worthwhile repair. There were forty different complexities of injury, those of the meniscal (30 per cent) followed surprisingly closely by the anterior cruciate (24 per cent) and the medial ligament (22 per cent). Osteochondral fracture and chondral fissuring occurred in 18 per cent of knees operated upon. The most serious injury seen was a hemircumferential tear involving the postero-medial capsule and the medial ligament, with extension to the ligamentum patellae and tibial tuberosity. In addition there was damage to the postero-lateral capsule and lateral meniscus in this injury.

A correlated analysis of anterior cruciate ligament pathology in athletes—Mr M. J. Cross, Mr P. C. Casperson and Mr L. A. Norwood (Sydney) analysed 230 consecutive arthrotomies following athletic injury; forty-four revealed a torn anterior cruciate ligament. The age range was from fifteen to thirty-one years, mean eighteen. Cruciate pathology was divided into acute and chronic tears. All the eight acute ruptures were in football players and were diagnosed at operation for repair of medial compartment rupture. There were thirty-six cases of chronic anterior cruciate ligament tear. The associated pathology and findings demonstrated the association of rotary instability with anterior cruciate ligament pathology, and also the presence of rotary instability with an intact cruciate ligament. There were seven cases in the series where the anterior cruciate ligament was ruptured but the knee completely stable. This paradox of having a stable knee in the presence of a ruptured anterior cruciate ligament and an unstable knee in the presence of an intact ligament can only be explained if one considers that the ligament acts as a second line of defence against antero-medial, antero-lateral and postero-lateral rotary instability. The primary lesion in each of these instabilities is one of capsular disruption.

Early ligament repair in acute knee injuries—Mr R. M. Tooth (Sydney) analysed thirty-five acute ligament injuries treated surgically. The majority occurred at sport. In two-thirds of the cases the medial ligament was involved, and in over half the cases the anterior cruciate was involved, either as an
isolated injury or more commonly in association with other ligaments. In most cases the diagnosis was made by careful clinical examination without anaesthetic. It was emphasised that a completely torn ligament might be almost painless and present with no effusion. The importance of accurate assessment and of the surgical technique of repair of all damaged structures was stressed. Analysis of the results revealed that 86 per cent were in the subjectively normal or mild disability groups, while only 71 per cent were in the objectively normal or mild instability groups; 83 per cent returned to sporting activities. These results were significantly better than sixty-four late reconstructions on knees which initially had been treated conservatively or not at all. It was concluded that in active patients early repair of acute ligament injuries lessened the incidence of disabling instability.

Cruciate ligament reconstruction—Mr J. M. Grant (Melbourne) described the technique and results of 200 anterior cruciate reconstructions by the Jones technique. The majority of the patients had been injured at Australian Rules football. Seventy-five per cent of cases had suffered a complicated knee injury and only 25 per cent had damaged the anterior cruciate ligament alone. In these circumstances failure to provide a stable knee prevented the patient from playing many sports and appeared to lead to the development of osteoarthritis. The success or failure of the operation was assessed largely on the patient's ability to return to vigorous sporting activity and on this assessment the results were excellent.

The previous five papers were discussed together. Mr J. L. C. Lahz (Brisbane) commented that the ligaments about the knee had an important proprioceptor function. Whilst reconstruction might restore mechanical stability it did not necessarily give good results because of failure of the reflex arc to return to normal. Mr R. Blunden (Christchurch) stressed that fat globules should be sought when a haemarthrosis was aspirated; they indicated an osteochondral fracture. Mr O. W. Deacon (Melbourne) felt that far too little was done for injuries of the knee; many orthopaedic surgeons limited their surgery to the removal of torn menisci and loose bodies and did not allow themselves time to perform intricate ligamentous repairs.

An intramedullary nail for rigid fixation and compression of fractures of the femur—Professor R. L. Huckstep (Sydney) described a solid four-sided intramedullary nail, under development since 1967, with 4-millimetre screw holes which allowed screw fixation of both cortices and the nail. The screws were inserted with the aid of a special jig. Extensive femoral reaming, with destruction of the medullary blood supply, was therefore minimised. A removable compression device could be placed over the greater trochanter to allow compression of the fracture. The advantages over Kuntscher and similar nails included apparently earlier union, rigidity of fixation, much greater strength particularly against torsion, and the ability to hold comminuted, oblique and pathological fractures rigidly. The nail could also be used for fractures in the lower third and upper quarter of the femur as well as in fractures with non-union, and only one length and one diameter of nail was required in most cases. The main disadvantage was the increased time of operation. In discussion, members felt that the solid nail described had a very limited application, a Kuntscher nail having the advantage of easier insertion and removal. Mr J. H. Cloke (Melbourne) expressed concern that the use of such a nail would result in a return to open intramedullary nailing of the femur when closed nailing was clearly preferable. Professor Huckstep replied that his nail was advocated for difficult fractures and not for routine use.

Intramedullary nailing in the treatment of compound fractures of the tibia—Mr F. J. Harvey, Mr A. H. T. Hodgkinson and Dr Patricia M. Harvey (Sydney) reviewed thirty displaced, compound fractures of the tibia treated by two of the authors over the period 1960 to 1975. Tibial nailing was performed in twenty cases, while in ten cases where the fracture was close to the ankle joint, stability was achieved by intramedullary nailing of the fibula. Tibial nailing was considered ideal in fractures of the middle third provided gross comminution was not present. All fractures were caused by high energy trauma and in twenty-four cases moderate to severe soft-tissue wounds were present. Nailing was performed with the curved, malleable Hodgkinson nail which required no reaming. If required, blind insertion was not difficult, and in this way it was possible to avoid disturbance of devitalised skin over the fracture site. The stabilisation provided by the nailing greatly facilitated care of the soft tissues, allowing easy access without loss of position. The results were analysed and compared with other methods of treatment. There was no instance of deep infection which delayed convalescence, and a single case of superficial infection responded to antibiotics. Only four cases required grafting. Shortening of 1 to 2 centimetres occurred in three cases. Over the same period a number of compound fractures were treated by other methods. In some stable fractures internal fixation was considered unnecessary; in other cases special features were deemed to be contraindications to nailing. It was concluded that tibial or fibular nailing was a simple, safe and efficient method of treating most unstable compound fractures of the tibia. In the discussion of this paper there was general agreement that intramedullary nailing had a useful place in the management of compound fractures of the tibia.

The sequential pathological changes in experimental contusion injury of the spinal cord—Dr J. D. Yeo, Dr W. Payne, Dr B. Hinwood and Dr A. D. Kidman (Sydney) questioned the validity of the use of experimental animals in the reproduction of controlled contusion injury of the spinal cord. Light microscopy revealed swelling of axons and disruption of myelin sheaths in most areas of white matter of the sheep's spinal cord within 15 to 30 minutes. After four hours microsysts had formed in the columns of white matter and were evidence of irreversible damage. Swelling of the cord resulted from congestion and intracellular swelling of neurons, rather than from any demonstrable increase in extracellular fluid. Oedema was only demonstrated with perfusion fixation. When compared with contrast myelography, isotope myelography was found more accurate in identification of the degree and extent of cord swelling. Significant improvement in motor power was found in a group of paraplegic sheep treated with alpha-methyl paratyrosine, 100 milligrams/kilogram dosage, administered intravenously within 75 minutes of the crush injury. There was no significant improvement in motor power or sensibility in animals treated with intrathecal methyl prednisolone 40 milligrams injected at the lumbo-sacral level. In untreated animals the histopathology showed progressive central cystic necrosis from two to thirteen weeks. There was no significant difference in sheep treated with methyl prednisolone. There appeared to be less central cystic change in sheep treated with alpha-methyl paratyrosine. Further investigations were needed to explain the different patterns of recovery and histopathology in the treated animals.

The mechanism of forward dislocation in the human cervical spine—Mr R. J. Bause and Mr G. M. Ardran (Adelaide) pointed out that traumatic forward dislocation in the cervical spine usually occurred in situations where a person landed on the cranial vault from a height. The mechanism of dislocation was not established. Experimentally the lesion had in the
past been duplicated only by axial rotation, and most authors had concluded that rotation was the common mechanism. In order to determine the mechanism of injury an experiment had been performed which resembled the clinical situation. Fourteen complete cervical spines and a ring of bony oppetus were removed from human cadavers and stored at −20 degrees Celsius. After thawing, the specimens were placed in a compression apparatus. The lower three or four vertebrae were fixed and the upper end allowed to travel forward during compression. This produced a combination of flexion, vertical compression and anterior shear forces at the disc level closest to the junction of free and fixed parts of the specimen, and hyperextension at the upper segments. Cineradiographs were taken during compression and the movements were analysed using still views from the cineradiographs. The vertical load was measured by a potentiometric transmitter which had a written recording of load synchronised with each frame of the cineradiograph. This apparatus could produce a forward, bilateral facet dislocation without fracture. If lateral tilt or rotation occurred, a unilateral facet dislocation was produced. The maximal vertical load at the time of forward bilateral dislocation was surprisingly low at approximately 150 kilograms. It was suggested that the attitude of upper cervical hyperextension, mid-hyperflexion and lower fixation, associated with vertical compression and anterior shear as produced in this apparatus, was similar to the clinical situation which produced forward dislocation in the cervical spine when a patient landed on the cranial vault. The low vertical load measured suggested a peculiar vulnerability of the cervical spine in this position and correlated well with the minor trauma often observed in association with dislocated necks.

Mr B. L. Cornish (Adelaide) asked whether the facets were ever tightly locked when dislocation occurred. Mr Bauze said that this was the case if the machine stopped quickly; manipulation was then necessary to free the facets.

The management of thoracic and thoraco-lumbar injuries of the spine with neurological involvement—Dr D. C. Burke and Dr D. D. Murray (Melbourne) described how closed injuries of the spinal cord, conus and cauda equina due to fractures and fracture-dislocations of the thoracic and thoraco-lumbar spine had been treated by a conservative regime of postural reduction. Operation had been restricted mainly to open reduction and internal fixation for irreducible dislocation in patients with incomplete neurological lesions. Of 115 patients treated between 1965 and 1970 and studied retrospectively, eighty-nine were managed conservatively and twenty-six by a variety of operative procedures, mainly open reduction and internal fixation with Meurig Williams plates. The patients were comparable to other reported series as regards age, sex, cause of injury, type of skeletal injury, level of injury and proportion of complete neurological lesions. Only three patients, all treated conservatively, had required delayed spinal fusion for suspected instability, which was not demonstrated at operation. Ten of the surgically treated patients required subsequent removal of spinal plates. Chronic spinal pain was reported by ten patients, eight treated surgically. Only 10 per cent of the seventy-four patients with complete neurological lesions on admission demonstrated significant recovery, compared with 80 per cent of those with incomplete lesions. Of the patients treated conservatively, 35 per cent showed significant neurological recovery compared with 38 per cent of those treated by operation. There was, however, a much higher proportion of initially incomplete lesions in the surgically treated group. It could be concluded that the low incidence of spinal instability and pain with the regime of postural reduction had justified a conservative approach to most cases. The value of open reduction for an incomplete lesion with irreducible dislocation was difficult to evaluate because the numbers were small and the patients selected. Overall, the patients treated conservatively fared neurologically as well as, if not better than, those subjected to operation. 

Mr D. R. Griffiths (Perth) agreed that there was no place for laminectomy but felt that there was a place for internal fixation using Knodt rods or Harrington compression rods. Professor R. L. Huckstep (Sydney) felt that there was a place for decompression when there was a partial cauda-equina lesion and radiographs showed a bony fragment which might be responsible for compression. He considered that patients with complete lesions could be supported in a light cast and nursed out of bed after three weeks. Dr Burke replied that there was no evidence that the decompression helped in any circumstances. He felt that there was no advantage in getting the patient out of bed so early.

NEW ZEALAND

NEW ZEALAND ORTHOPAEDIC ASSOCIATION

The twenty-fifth annual meeting was held in New Plymouth from September 29 to October 3, 1974. The Association Guest Speaker and Norwood Lecturer was Dr Paul R. Lipscomb, President of the American Orthopaedic Association. Also present as Guest Speakers were Mr David L. Evans and Mr W. H. Tuck (London, England), Mr W. J. Betts, President of the Australian Orthopaedic Association, and Dr Andrea Crazzolari (Los Angeles, United States of America). Gillies Medals for papers on crippling disorders in children were awarded to Mr Coates Wilson and Mr S. M. Cameron.

Terminal digit amputations—Mr C. J. Bossley (Lower Hutt) described a conservative method of treatment for finger and thumb amputations beyond the distal joint. The stump was gently cleaned under local anaesthetic, no attempt was made to secure bleeding points and protruding bone was trimmed back only in adults. A Vaseline gauze dressing was then applied, the hand elevated and a course of antibiotics prescribed. The results were given in fifty-four patients. Mr David L. Evans (London, England) mentioned that the procedure had first been described by G. Fisk. He attributed the excellent recovery of sensibility to scar contraction bringing normally innervated pulp skin over the end of the stump.

The role of cortical bone grafts—Dr Paul R. Lipscomb (Davis, California) pointed out that during the last thirty years the place of cortical grafts in the role of bone repair had been forgotten. The tendency now was to use large metal plates and iliac cancellous bone, but for some patients, especially children, cortical grafts might be superior. He traced the historical developments which led to an about-face and abandonment of cortical grafts about the time of the second world war. Dr Lipscomb stated that for more than thirty years he had used cortical and cancellous grafts and considered that cortical grafts still had a place. The indications were given as dual bone grafts, tubular bone grafts, sliding bone grafts and peg grafts. In considering the use of cortical grafts in children, Dr Lipscomb felt that the cancellous graft produced quicker union, but that revascularisation and remodelling was usually so rapid that the time factor was probably not of great importance. In using segmental fibular grafts he had not encountered valgus deformity at the ankle; it was important to leave the periosteum intact and to avoid the removal of bone from the lower third.
Gunshot wounds—Mr R. V. Jackson (Hamilton) reviewed 131 cases of gunshot wound admitted to the Waikato Hospital from 1953 to 1970. The majority involved the limbs and were divided into major, moderate and minor categories. The .22 calibre rifle was most frequently involved and there was a large incidence of self-inflicted injury due to accident. In management, prompt surgical treatment with meticulous debridement and widespread use of antibiotics was considered important. Shotgun pellets could often be safely left. There were only three serious infections. Three major injuries required amputation but overall the results were good. Any gunshot wound was potentially a medico-legal case so that very careful documentation was necessary. The importance of education in the care of use and firearms was stressed. Dr A. Cracchiolo (Los Angeles, California) stated that a large calibre weapon was responsible for most civilian injuries in his area. In Vietnam it had been found that the high-velocity small-bore bullets caused small wounds of entry and exit but extensive damage in the limb which required wide debridement. Mr W. J. Betts (Adelaide, Australia) said experience in Vietnam had shown that no wound should be closed primarily. He advocated delayed primary closure and with this policy had not experienced any instance of gas gangrene.

The aetiology and prevention of cubitus varus from supracondylar fractures in children—Mr S. M. Cameron (Christchurch) reviewed ninety-six displaced fractures treated in Christchurch Hospital over a period of four years. These were classified as postero-medial twenty-one, anterior nine and postero-lateral sixty-six. Ninety per cent of the postero-medial group united in a varus position and 25 per cent of the anterior group, but in the postero-lateral group 86 per cent had united without significant loss of carrying angle. Neurovascular complications were confined to the postero-lateral group, ten out of sixty-six giving vascular concern of varying degree but no instance of Volkmann's ischaemia. There were four cases of neurapraxia. With regard to varus malunion it was necessary to look closely at the postero-medial group where the lower fragment could displace in ten different directions. In eight out of twelve in this group the varus result could have been predicted from the initial radiograph. Thirty per cent of the severe varus unites had inward rotation of the lower fragment. In prevention the following features were stressed: prediction from the initial radiographs, the need for high-quality radiography, and skill in manipulation aimed at slight lateral obliquity and tilt. The degree of carrying angle in the opposite elbow should be noted; 9 per cent of the children in the series had none.

The treatment of fractures of the shaft of the femur by closed intramedullary nailing—Mr C. B. Fitzpatrick and Mr A. G. Rotheil (Dunedin) reported thirty-six patients treated by this method at Dunedin Hospital since July 1972. With the aid of a portable image intensifier and an efficient fracture table many of the technical problems had been overcome. Most of the fractures were transverse and only two were compound. Whenever possible the operation was carried out on the day of admission. The technique was described. Operative complications included one instance of broken reamer and one of jammed nail requiring open reduction; one fracture was irreducible due to interposition of muscle and splitting of the distal cortex had been noted. Post-operative complications included low-grade pyrexia for a week or more (sixteen), fat embolism (two), pulmonary embolism (one) and broncho-pneumonia (three). Three patients had died, two elderly and frail and one with extensive metastases. Sixty per cent of patients were discharged from hospital in four weeks or less and 87 per cent by six weeks. A cast brace was used in mobilisation of two patients. At review it was found that 70 per cent had regained full knee movement. Five patients had measurable shortening not exceeding half an inch, and there was only one instance of significant rotational deformity.

Dr Paul R. Lipscomb (Davis, California) spoke strongly in favour of the cast brace method for femoral shaft fractures at all levels.

Chondromalacia and Crook's ridge—Mr A. W. Beasley (Wellington) described three cases which had failed to respond to standard conservative measures. The patients were girls aged fourteen, sixteen and seventeen. The ridge described by Crooks was found and removed. In each case there was involvement of the medial facet of the patella suggesting direct friction on the upper margin of the ridge. In reply to Mr H. Stevens (Christchurch) Mr Beasley said the ridge was more easily seen in lateral than on skyline views.

Perthes' disease—Mr Coates Milsom (Tauranga) reported a survey of Perthes' disease in three hospital districts in the Bay of Plenty from 1954 to 1972. Forty-nine cases had been diagnosed during the period of the survey, twelve in girls and thirty-seven in boys. Of these, thirty had occurred in the Rotorua district, eleven in Whakatane and eight in Tauranga. There were no Maori children involved, whereas if the incidence had been comparable with that in Europeans there should have been twenty-two cases. In view of this finding a separate survey of slipped epiphysis and transient synovitis was undertaken. The incidence of slipped epiphysis was in fact higher in Maori children than European; of eighty-five, fifty-seven were Maori. The incidence of transient synovitis corresponded to the racial distribution. However, an inverse relationship was found between the incidence of transient synovitis and sporadic Perthes with a much higher ratio of Perthes to transient synovitis in Rotorua than Tauranga, which has twice as many medical practitioners, suggesting that the diagnosis of transient synovitis is related to the availability of medical care. In the family survey the radiographs of eighty-six siblings revealed two asymptomatic cases of Perthes' disease. Two families had three affected siblings while three families showed two. In a study of fifty-eight parents a retrospective diagnosis of Perthes' disease could be made in three.

It was noted that while transient synovitis has been thought by many to be a prodromal phase of Perthes' disease, no direct transition had been observed during this survey. In conclusion, it was felt that children with a family history and children who lived in areas remote from early medical diagnosis might be more susceptible to Perthes' disease.

In discussion Mr C. Hooker (Hamilton) described a previous survey in the Waikato area in which the racial incidences of Perthes' disease and of slipped epiphysis were found to be very similar. He also noted that congenital dislocation was very rare in the Maori.

The Sir Charles Norwood Lecture on "Juvenile Rheumatoid Arthritis and Other Arthropathies in Children" was delivered by Dr Paul R. Lipscomb (Davis, California).

Immuno logical and synovial fluid—Dr A. Cracchiolo (Los Angeles, California) said that the number of investigations available for analysis of synovial fluid had increased in recent years and provided useful information over and above the standard microscopy, chemistry including crystals, and bacteriology. These tests related to the presence of abnormal protein. Electron microscopy had shown that the A cells of the synovial lining are phagocytic whereas the B cells can synthesise protein. Reiter's disease was associated with an increase in immunoglobulins in the synovial fluid. The differential agglutination was more specific and therefore of greater value than the
Intertrochanteric osteotomy with an intramedullary screw. Resurfacing of the denuded femoral head with fibrocartilage was extensive following intertrochanteric osteotomy combined with transarticular drilling. The extent of repair was proportional to the severity of the papain arthritis, suggesting that widespread cartilage loss was a prerequisite for effective repair. Further investigation was required into the resurfacing of constantly moving joints, reconstitution of the subchondral plate and the adequacy of fibrocartilage as an articular surface.

Total hip replacement—a radiological review—Mr O. R. Nicholson (Auckland) said that in a long-term follow-up radiological changes may be apparent, some of which are significant. A review of 250 consecutive Charlmley arthroplasties showed resorption of the femoral neck of five to eight millimetres in 22.8 per cent. There was demarcation at the junction of the socket with cement and at the cement-bone junction in 10.8 per cent. Increased cortical thickness of the femoral shaft and external hypertrophy of the cortex occurred in 10.8 per cent and in some cases was associated with the presence of pain which subsequently settled. A gap above the femoral component developed in 3.6 per cent of cases and was associated with slight displacement of the prosthesis in a varus position. In addition the radiological changes seen in the femoral shaft in patients with juvenile rheumatoid arthritis were discussed; extensive subperiosteal new bone could simulate infection.

Condylectomy, the preferred treatment for forefoot deformities in the rheumatoid patient—Dr Paul R. Lipscomb (Davis, California) reviewed the many surgical procedures available for severe claw toes, metatarsal-phalangeal deformities and painful planter callosities which were frequently seen in patients with rheumatoid arthritis. He noted that in some patients the forefoot deformity was so great and the callosities so painful that it was difficult to make their condition worse. Painful callosities could be eradicated by excising the condyles of the metatarsals. The technique was described. The operation had been performed on sixty-nine patients over a period of ten years with satisfactory results.

A retrospective survey of eighty-one patients with hemiarthroplasty for subcapital fracture of the femoral neck—Dr R. Coates (Christchurch) said that it had been found that fixation with a Smith-Petersen nail was followed by complications in 40 to 50 per cent of cases. The alternative was primary replacement with a Thompson or Austin Moore prosthesis. The hospital records of eighty-one patients treated between 1967 and 1971 were analysed. The mean age was seventy-eight. Of twenty-one patients still alive, nineteen were interviewed. Ten complained of pain of some degree. With regard to mobility and stability, ten were satisfactory and five unsatisfactory, requiring two sticks or a quadraped. The range of movements was classified as good in seven, fair in four and poor in four. Radiographs showed no loosening of cemented prostheses but some evidence of looseness in all uncemented prostheses. It was considered that the procedure had a limited application for the primary treatment of displaced subcapital fracture in the elderly. In the discussion Mr J. Lester (Christchurch) said the study arose out of dissatisfaction with the results in Christchurch, where serious consideration was being given to primary total replacement. Dr Paul R. Lipscomb (Davis, California) said that age was an important factor and he was not in favour of extensive procedures for aged and non-ambulatory patients.

Replacement surgery—Dr A. Cracchiolo (Los Angeles, California) remarked on the large number of prostheses currently available for knee replacement. He reported twenty-five cases
in which a modified Gunston prosthesis had been used, with tibial units of varying size and powered instruments including a double-bladed Stryker saw for cutting slots in the tibial plateau. Most of the patients had rheumatoid arthritis, and he gave as the main indications moderate instability, angular deformity and a sloping tibial plateau. In thirteen valgus knees the deformity was reduced on average from 25 to less than 10 degrees. Less success was achieved with varus. The results were satisfactory with regard to pain relief, walking and mobility. Flexion contracture had been reduced from 16 to 6 degrees on average and the arc of flexion increased from 61 to 88 degrees. Two medial units became loose requiring revision and two patients had persistent pain without obvious cause. A prospective study using the Herbert prosthesis was described. This was limited to elderly non-obese patients as a salvage procedure when surface replacement was not advisable. An advantage was retention of the collateral ligaments. To date the procedure had been carried out in fifteen patients (eighteen knees) but the follow-up was still short. The known breakage rate for this prosthesis was sixteen in 790 replacements. In reply to Mr I. Brown (Wellington) Dr Cracchiolo said that upper tibial osteotomy was still being carried out and was excellent for the younger patient with medial compartment disease. He did not favour unicompartamental polycentric knee arthroplasty.

Scoliosis summary—Mr L. Mirkin (Dunedin) discussed the management based on experience with 130 cases treated over the past nine years in the Dunedin Unit. There were eighty-three females and forty-six males. Curves were classified as idiopathic 65 per cent, vertebral anomalies 12 per cent, miscellaneous 18 per cent and paralytic 6 per cent. There was one set of identical twins. Forty-seven per cent of curves were thoracic, 32 per cent were thoraco-lumbar and 21 per cent lumbar. Thirty-eight patients underwent surgical treatment. The pre-operative investigations were described and the surgical technique using Harrington instrumentation. After three months the patients were allowed up wearing a brace and this was continued for twelve months. The maximum correction achieved was 77 per cent and the average 57-3 per cent. Early complications included transient paraparesis two, transient leak of cerebrospinal fluid one, pulmonary atelectasis two, superficial discharge from wound two. Late complications included rod breakage three, major loss of correction one, pain over the upper end of the rod three, pseudarthrosis two, and loss of correction without breakage of the rod two.

Management of fracture of the hand—Dr Paul R. Lipscomb (Davis, California) described the principles—protection from further injury, reduction, retention and restoration of function. He stressed the importance of avoiding repeated inspection of the wound. Too often, fractures of the small bones of the hand were treated as minor injuries and major disability resulted. He emphasised that perfect reduction with particular attention to correct alignment and rotation was necessary if normal function were to be restored.

Thoracic outlet syndrome—Mr P. Grayson (Palmerston North) described the historical aspects, the anatomy of the posterior triangle, and the numerous alternative terms. He noted a preponderance in females in whom the thoracic outlet was smaller and also that the syndrome was rare in adolescence. An enlarged transverse process of C.7 with an abnormal band was a more frequent finding than a cervical rib. Associated anomalies could involve the brachial plexus (post-fixed), the subclavian artery (which might pierce or lie in front of scalenus anterior with a post-stenotic aneurysm) and the muscles, particularly scalenus medius. He reported twenty patients treated over a period of eighteen years at the Palmerston North Hospital. There were eighteen females and two males. The age range was eighteen to forty-three years. Nine patients underwent excision of cervical ribs, nine excision of scalenus medius bands and two scalenectomy. In the discussion Dr Paul R. Lipscomb (Davis, California) said that this operation had been carried out frequently at the Mayo Clinic before the carpal tunnel syndrome was recognised. He would not accept a diagnosis of thoracic outlet syndrome unless an angiogram was positive. He also felt that electromyography was important in the differential diagnosis of carpal tunnel syndrome, pronator teres compression and lesions of the brachial plexus and cervical spine. In reply, Mr Grayson said that it was important to adhere to strict diagnostic criteria and that there were probably more patients with this condition than was realised.

The new look in orthotics—Mr W. H. Tuck (London, England) gave a well-illustrated lecture on developments since research in the use of lighter materials began in 1967. Examples of appliances were also demonstrated. Ortholene was used extensively in making a drop-foot appliance to fit in the shoe. Cosmetic calipers were also constructed of this material and ugly straps avoided. The use of a “set back” knee hinge to control hyperextension was described. Plastazote was used for the ischial-bearing socket of above-knee appliances. Styfelene, a more rigid material, was used for patella bearing appliances in cases of congenital pseudarthrosis. Plastazote had also been found useful in the making of negative casts for the Milwaukee brace. Mr Tuck emphasised that pressure on the chin was avoided as this led to problems with malocclusion. Plastazote was found to be a particularly useful material for patients with severe deformities of the feet, usually associated with rheumatoid arthritis. It was available in three grades of density and a vacuum moulding method was used.

Research and education in road safety—Mr A. W. Beasley (Wellington) said the problem had to be considered in relation to roads, cars and people. The motorway was in fact the safest type of road due to separation of sharp differences in velocity and direction. Improvement in design and road engineering could reduce the incidence of accidents. Clear marking was important and a balance must be struck between inadequate and over-marking leading to confusion. Cars could not have infinite safety built in. Active safety features consisted of such factors as the steering, road-holding, acceleration and braking. Passive safety protected the occupants and was more important because of the human factor. He said that production vehicles must incorporate the design features of safety cars. Restraint devices included seat belts, which are compulsory in New Zealand, and airbags, which require actual deformation to inflate. Psychological testing of applicants for car licences had been advocated and was carried out in certain European centres. Another aspect was education; it was believed that this should concentrate on children and adolescents.


SOUTH AFRICA

SOUTH AFRICAN ORTHOPAEDIC ASSOCIATION

The Twentieth Congress was held at Pretoria from August 27 to 30, 1974.

Postero-medial release in club foot—Professor I. S. de Wet (Pretoria) said that it was often possible to recognise a
"malignant" club foot at six to twelve weeks of age, based on the degree of deformity and rigidity, a familial incidence, and calf atrophy. Early surgery was advantageous. After four years soft-tissue surgery alone would not suffice. He aimed at one-stage operation to relieve soft-tissue contractures completely and to achieve suppleness and balanced muscle action. Moderate adduction of the forefoot only was sometimes accepted. He operated on one foot at a time, dissected atraumatically under a tourniquet, and used a bipolar cautery. Soft tissues showing the greatest shortening, including tendons, were released or lengthened first. Thereafter tightness in remaining soft tissues was tested for repeatedly as the release went on. Thus, in the sole, release might embrace the complete horseshoe-shaped attachment of muscle and fascia to the medial and lateral aspects of the calcaneus, as well as the capsules of the talo-navicular and naviculo-cuneiform joints and the inferior capsule of the calcaneo-cuboid joint. The spring ligament was detached from the navicular bone, and posteriorly the calcaneal tendon, the capsule of the ankle and the medial portion of the capsule of the subtalar joint were released. The interosseous ligament might require section, but the subtalar joint should not be opened so completely that it subluxed. Dissection ceased when over-correction without force was possible. As a last step the talus might be released from the medial malleolus by cutting the deltoid ligament and extending the capsulotomy to the front of the ankle joint. Before closure, manual compression was maintained for four minutes. A corrected position which avoided skin blanching was held in a cast with the knee flexed to 90 degrees. Seventy-seven children under the age of four were evaluated for release surgery. Thirty-two (forty-four feet) underwent operation. The results were good in twenty-five feet, satisfactory in seventeen and poor in two. The average follow-up was twenty-six months (range five months to six and a half years).

**Late results of ligamentous injuries of the knee—Dr E. H. Simmons** (Toronto, Canada) reported a retrospective study in which contact had been made with 189 patients (206 knees) out of a possible 333, treated in six Toronto hospitals. Only cases with definite findings of operative ligamentous injury or with abnormal laxity found under anaesthesia were admitted to the study. Satisfaction of the patient's requirements of daily living was the criterion of assessment. Although the variables were several, conclusions could be ventured: 1) Repair within ten days of injury of the medial ligaments, or of the anterior cruciate ligament, or of combined tears of the cruciate and medial ligaments, led to good results in over 70 per cent in each group. 2) When repair was delayed from two weeks to three months, only 50 per cent of the cases did well, as against 62 per cent after late reconstruction procedures. 3) In eight cases of isolated anterior cruciate ligament rupture conservative treatment only gave poor results in five. 4) The Heidelberg semitendinosus transposition for a torn anterior cruciate was successful in five cases out of seven. 5) Pes anserinus transpositions were satisfactory in only ten cases out of twenty-one. 6) In anterior cruciate ruptures, one-third of the poor results were related to the presence of a symptomatic lateral pivot shift with abnormal medial rotation of the tibia, irrespective of whether a reparative or reconstructive procedure had been done or not. The Mackintosh transplantation of a strip from the ilio-tibial band could be successful in such cases. 7) Two-thirds of complete tears of the anterior cruciate occurred in the proximal third of the ligament. This was also the finding in two of the five posterior cruciate tears. 8) The b tallo-lateral ligament tended to tear at its tallo insertion. The deep medial (capsular) ligament was injured more evenly throughout its course. 9) Results were best in the twenty to thirty years age group and worst in the thirty to forty years group. Workmen's Compensation cases showed 65 per cent of poor results. 10) Resuture of the medial meniscus when there was marginal separation from the capsule gave good results.

**Osteoarthritis of the hip: pathological changes and their implications for treatment—Professor L. Solomon** (Johannesburg) correlated the clinical and radiographic findings with the morbid anatomy and histology. The study covered 307 cases and 231 femoral head specimens. Four patterns of disease were found: 1) Degeneration following major disfigurement of the joint as from slipped epiphysis, Perthes' disease, post-acetabuli, etc. 2) More gradual damage from minor incongruity, including minor slip, antversion, a valgus configuration, or an inadequate acetabulum. Tallow, heavy body weight and functional stress could play a part. "Primary" osteoarthritis was thought to fall into this group. In South Africa, whites had a 15 per cent incidence of osteoarthritis and blacks only 1 per cent except in the Transkei where protrusio was common. 3) Cartilage degeneration associated with inflammatory polyarthrits. 4) Collapse due to underlying osteonecrosis.

Two broad categories of change occurred: a) destructive phenomena, such as fibrillation of cartilage, fragmentation of the joint, and cyst formation; and b) reparative phenomena such as osteocyte formation and sclerosis. Joint failure occurred when a balance could no longer be maintained. An osteotomy might correct imbalance between the processes by displacing the loaded pathological area. Therefore osteotomy should not be done when the damaged portion was such that it could not be unloaded. When it is anticipated that only slow deterioration would occur, total replacement should be delayed in favour of conservative measures. Prophylactic surgery in childhood should not usually be done, unless there was subluxation.

**Arthroscopy: its place in the diagnosis of knee lesions—Dr E. Krelf** (Windhoek) discussed the technique, and the findings in 120 personal arthroscopies. Lesions which could be seen, but which might elude clinical evaluation, included chondral fractures of the femur, tags from the anterior cruciate ligament causing obstruction, chondromalacia of femur or patella, osteochondritis dissecans, rough edges on the posterior horns of the menisci, fresh anterior cruciate ruptures, and early rheumatoid arthritis. Deep posterior meniscal tears and most lesions of the posterior cruciate ligament could not be diagnosed by arthroscopy.

**Brachial plexus lesions—Professor T. L. Sarkin** (Durban) reported the results of treatment in 188 cases of traumatic brachial plexus lesion, ninety-nine of which were explored. Clinically the lesions fell into three groups: 1) An upper arm type resembling Klumpke's paralysis (about half the cases). It was inferred, or concluded from the operative findings, that these had been due to either root traction lesions at the levels C4, 5 and 6, or to lesions of the upper trunk or of the lateral cord. 2) A lower arm type, resembling Erb's palsy (about one-third of the cases), due to lesions of the C7, 8 and T.1 roots, or of the lower trunk, or of the medial cord. 3) A whole arm type.

Traction injuries had occurred in 40 per cent of cases, local nerve injury was associated with an open wound in 38 per cent, and 2 per cent had closed fractures of the clavicle. The recovery of useful motor function at any one joint, or of protective sensation was regarded as a worthwhile result. In traction injuries fifteen of forty-three patients gained success with operation, twelve of thirty-six without operation—an identical result. Three closed injuries recovered, one after exploration. No open injury that remained unexplored gained
recovery (fifty-one cases), but of fifty-five explored open cases, five gained recovery. One of these (out of thirty-five) was due to a trunk injury, four (out of ten) were due to cord injuries. No case with root injuries recovered, and in these, extensive areas of nerve were usually found. He concluded that surgery should only be undertaken in brachial plexus lesions when there was an open wound.

Cemented femoral prosthesis: fracture of cement—

Dr. F. A. Weber (Johannesburg) and Professor John Charney (Wrightington, England) had found that the use of radio-opaque acrylic cement rendered visible a transverse fracture, usually with minor separation, at the level of the lower lip of the prosthesis, in 1·5 per cent of 6,649 hip radiographs scrutinised. In ten out of ninety-nine cases, slight pain, muscle wasting, and an atrophic fracture, was present at the time of evaluation more than one year after operation. Seven other cases had had persistent discomfort during the first six post-operative months. No case required re-operation. It was speculated that the fractures were caused by slight sinking of the prosthesis which was not always demonstrable radiologically.

Charney hip replacements: early results—

Dr. D. M. Dall (Cape Town) said that a prospective study had been made of 100 replacements with a follow-up of six months to three years. The success rate was 95 per cent. Pain was fully relieved in 80 per cent and was minimal in 20 per cent. The range of movement totalled 160 degrees in 96 per cent. No hip lost movement. Walking function was improved to normal or near normal. The true incidence of deep-vein thrombosis is unknown; eight cases were clinically detectable. There were four cases of pulmonary embolism, one of which was fatal, in a patient with polycythemia. Two other deaths were due respectively to recurrent intestinal obstruction with iliac vein thrombosis and to acute infective cholecystitis. Prophylactic antibiotics were used and were not anticoagulant. Most of the operations were done in a standard theatre reserved for clean orthopaedic procedures. Two cases presented some months after operation with sepsis which appeared to be superficial and soon responded to antibiotics. The total risk of sepsis could not be judged because of the short follow-up. Fibrous union of the greater trochanter occurred in 3 per cent, without affecting the functional result. Three cases of dislocation occurred; technical precision in placement of the cup and in taking up the slack by shifting the trochanter was important. There were two transient popliteal palsies and six cases of ectopic ossification in which the ultimate joint mobility was below average. No case developed loose components. In conclusion, Charney replacement was an excellent procedure in all cases with significant disability due to degenerative hip pathology, or when a previous operation had failed.

Hip replacement: frozen section as an additional method of detecting latent infection—

Dr. C. J. Grobbelaar (Pretoria) said that deep infection had occurred in 0·55 per cent of 181 operations done in a laminating flow theatre, compared with 0.7 per cent of 105 cases done in a conventional theatre. In view of the extreme importance of diagnosing latent infection before proceeding with replacement he had recently taken tissue sections for immediate examination in twenty-three cases suspected of sepsis on the basis of the history, clinical picture, biochemical tests, and macroscopic appearances at exposure; four had been positive. The presence of polymorphonuclear leucocytes in appreciable numbers was a definite sign of infection. The presence of plasma cells showed a tissue response to chronic infection. Isolated polymorphonuclears indicated only a traumatic response. Granulomatous giant cells, focal perivascular lymphocytes and histiocytes occurred in response to foreign materials such as cement.

Chronic osteomyelitis: irrigation and suction after surgery—

Dr. E. Lautenbach (Johannesburg) described his technique of debridement and irrigation in cases of chronic bone infection and said that during seven years and on long-term follow-up of several hundred cases, 80 per cent had been successful in that there was disappearance of local signs of infection, a return to normal haematological and immunological parameters, absence of further radiological signs of activity, and no relapse.

Spinal surgery: minimising blood loss—

Dr. R. Molteno and Dr. G. F. Domnisse (Pretoria) reported 118 consecutive operations for scoliosis where pre-operative assessments of haemodynamic, pulmonary and renal functions were done. During the anaesthetic period the systolic blood pressure was lowered to not less than 85 millimetres of Hg. and all functions were monitored. The cautery was used meticulously and the blood pressure was allowed to rise before closure. Harrington procedures lost an average of 490 millilitres of blood, Dwyer procedures 835 millilitres. Much of the loss came from exposure of the pelvis for donor bone.

Predicting the success of low back surgery by the use of pre-operative psychological tests—

Dr. Leon L. Wilte (Long Beach, California, United States of America) described how psychological test scores, Physician's ratings and independent data had been evaluated as predictors of post-operative success among a group of 130 candidates for chymopapain injection therapy. Three psychological tests were administered to each patient: the Minnesota Multiphasic Personality Inventory (MMPI), the Cornell Medical Index and the Quick Test (a measure of intelligence). All ratings were done before operation and a year later; the results were calculated independently. Until the computations had been submitted, all the data were kept secret. Of the tests used, the MMPI hysteria and hypochondriac scales were found to demonstrate substantial promise as differentiators of patients reporting good symptom relief from those reporting little or no relief. Patients with very low scores (54 and below) were 90 per cent certain of showing good or excellent functional improvement, while only 10 per cent of patients whose scores were extremely high (85 and above) showed this degree of improvement. Pre-operative ratings by the physician, reflecting the degree to which the patient's symptoms were judged as functional in origin, also proved to have considerable value in the prediction of success. When these ratings were combined with the Hs and Hy scores from the MMPI, using the least squares regression technique, it was possible to develop a powerful but easily applied formula to indicate the probable degree of pain relief. On the other hand, physician ratings of the desirability of surgical intervention, judged strictly from an organic point of view, surprisingly bore no significant relation to symptom improvement. Patient biographical data on age, sex, education, occupation, marital status and duration and cause of disability, were likewise not related to the operative outcome, with the exception of the circumstances of disablement (industrial versus private), and the occupational level, which showed a modest relationship to improvement. There were no significant complications which might have confused the conclusions. A retrospective study was made using the same test battery, but with lumbar laminectomy instead of chemonucleolysis. In a small sample of patients the results were similar.

Multiple back operations—

Dr. N. Nakano (Chuko, Japan) discussed fifty cases in which salvage had been attempted after failed operation on the low back. Thirty-seven patients had undergone one previous operation, eight two, and five three. In nine cases the first operation had been anterior discectomy.
and fusion. In the other primary operation had been posterior discectomy either alone or in combination with posterior fusion. In this group he had found salvage from the front best, because adequate disc excision could be done at the level usually explored or at a new level, while stabilisation of the spine could be done simultaneously. If pain due to root fibrosis persisted, a wide laminectomy could be done. In the group of thirty-seven, twenty-eight had excellent results; after three previous operations, one out of five was excellent. The results were better when the final operation was anterior.

Dik Kop disease: a variety of osteopetrosis—Professor P. Beighton (Cape Town) described the orthopaedic complications of osteopetrosis, which included bone fragility and osteomyelitis, particularly of the jaw. Overgrowth of the skull led to entrapment and palsy of the cranial nerves. However, osteopetrosis was a very heterogeneous disorder and it was likely that these complications occurred only in specific forms of the condition. Forty South African patients with a radiological diagnosis of osteopetrosis had been personally investigated. These individuals had a variety of conditions, including cromiometaphysial dysplasia, pycnodysostosis, van Bucum's disease and sclerosteosis. In view of the massive thickening of the cranium, sclerosteosis has been termed Dik Kop disease. Sixteen individuals with this condition were members of eleven families in the Afrikaner group. The pattern of inheritance was autosomal recessive with a minimum gene frequency of approximately 1:150 in this population. The problem of identification of the asymptomatic heterozygote was under investigation.

Total knee replacement: a simple spheric prosthesis—Professor R. Blietz (Bremen, Germany) and his co-workers had developed a two-piece self-locking ball and socket prosthesis which avoided the disadvantages of loosening as in stemmed prostheses and of instability as in gliding prostheses. Technically it was easy to adjust the level of implantation to compensate for ligamentous laxity. Because some rotary movement was possible after implantation, knee function simulated normal action. No resection of the condyles was required, and the implant lay deeply. Twenty knees had been operated upon.

Management of the rheumatoid hindfoot—Dr A. W. B. Heywood (Cape Town) said that rheumatoid arthritis in its early stages could present as peroneal or posterior tibial tenosynovitis. Rupture could occur, resulting in varus or valgus. Ankle and the level previously explored, with pain from inflammation of or from joint destruction, and ultimately from deformity. Early pain could be controlled by medical means and by steroid injections. Simple bracing for instability, which might be ignored by the patient, was preferred. Pain from joint destruction should be localised if possible to the ankle, or the talo-navicular or the posterior talo-calcaneal joint, and a trial of steroid injections given. If arthrodesis were necessary, only an affected joint should be fused. When ankle and tarsal joints had reduced movement which was not painful and there was varus deformity, movement could be spared by correction of the deformity by supramalleolar osteotomy.

Traction in the treatment of vertebral deformity—Professor Y. Cotrel (Berc Plage, France) said that traction by means of the Cotrel apparatus had been used to lessen deformity in idiopathic scoliosis before operation, or in milder cases before bracing. Traction via the head component should be directed 40 degrees forward. Traction could be used, day and night for fifteen to twenty days, with about 6 kilograms at the head. With active kickdown 30 to 40 kilograms could be engendered. Improvement of the curve by 35 to 50 per cent could be obtained, as well as improvement of vital capacity. In vertebral epiphysis not severe enough as to require Milwaukee bracing, home traction for ten hours at night had been used with success. With a more severe kyphos the prone position was helpful.

Scoliosis: modern concepts in treatment—Professor J. I. P. James (Edinburgh, Scotland) said there were some fifty known causal diseases of scoliosis, but basically treatment was the same. Important aetiologies were idiopathic, congenital, and in some countries, paralytic. There was an important familial effect in idiopathic scoliosis; congenital scoliosis was sporadic and non-familial. Modern methods, including halo-pelvic traction, and Harrington and Dwyer instrumentation, offered powerful ways of correcting severe curves. However, these demanded major surgery and there were many potential complications. Vertical rotation and rib humpiness might be little changed, and evidence that we improve the prognosis of seriously limited pulmonary and cardiac function is lacking. Good management therefore demanded early establishment of the diagnosis and aetiology, and from this, the prognosis. If the child was old enough for fusion this should be done when the curve was 35 to 50 degrees, before it became severe. In early cases the results of simple, safe correction were excellent. If the child was too young for operation the Milwaukee brace was invaluable.

Neuromuscular scoliosis—Dr J. H. Hardy (Hartford, United States of America) said that eighty-eight children with "amytonia congenita" had been observed in whom a fairly uniform pattern of symmetrical neuromuscular weakness not associated with any acute illness appeared within the first twenty-four months of life. The cases fell into two groups. In one group the patients had rather marked involvement frequently involving the respiratory musculature, were often diaphragmatic breathers, and usually died of pulmonary complications within a few years. In the other group, approximately half, the patients survived the first few years of life; the neurological involvement did not progress and occasionally improved over a long period. Enzyme studies were normal. Electromyographic findings were equivocal and sometimes changed over a number of years. Muscle biopsies usually showed areas of atrophic muscle fibres distributed among normal or occasionally hypertrophic fibres. There was a significant familial relationship, with boys more severely affected than girls. Scoliosis was almost universal in patients who reached seven to nine years. The curvature was usually lumbar and of a paralytic contour. If untreated, the curve progressed and further compromised respiratory function. Early treatment was mandatory, and successful Milwaukee bracing was possible. Spine fusion, usually from mid-thorax to sacrum, was performed when the curve was too severe or when the brace would not control the curve. Special precautions were necessary because of the marked decrease in pulmonary function.

Anatomy of the lumbar spine—Dr G. F. Dommisse (Pretoria) presented basic anatomical features of the lumbar spine of practical significance in the diagnosis, pathogenesis and treatment of local lesions.

Intrinsic paralysis: muscle transfer—Dr A. C. Boonzaier (Johannesburg) described a reconstructive procedure for intrinsic paralysis resulting from leprosy or from traumatic lesions of the ulnar nerve. The operation sought to restore, as precisely as possible, the major contribution which the intrinsic muscles acting in coordination with the extrinsics, give to precision, balance and power. Three slips, formed from the sublimis tendon of the middle finger, were implanted into the extensor hood of the thumb and into the dorsal interosseous expansions of the index and middle fingers. Two
slips constructed from the sublimis of the ring finger were inserted into the second and third volar interosseous expansions somewhat more distally. Distal placement favoured projection of the ring and small fingers; more proximal placement favoured strong apposition between the thumb and the combination of index and middle fingers. The excellent return of function was demonstrated by a film.

**Discography: localisation of symptomatic levels—Dr E. H. Simmons (Toronto, Canada) said that 361 patients out of 418 who had undergone discography and subsequent operation were assessed. If operation was successful it was assumed that the localisation had been accurate. Consistent reproduction of the pattern of pain was the criterion of localisation in the cervical and in the thoracic spine. Sometimes two discs were implicated. Cervical discography was accurate in 91 per cent of cases. In the lumbar spine the assessment was both anatomical and functional, and the accuracy was 82 per cent. The advantages of discography included the following: 1) normal discs could be demonstrated; 2) asymptomatic degenerative discs, for example in an area adjacent to a proposed fusion area, could be demonstrated; 3) a painful pseudarthrosis could be diagnosed; 4) disc protrusions which escaped demonstration by myelography because they were situated either laterally or forward of the dural sac at the lumbo-sacral level, might be demonstrated; 5) discograms might eliminate the need for extensive search at operation; and 6) discograms might help in distinguishing between organic and psychogenic pain.

**Lumbar spine: postero-lateral fusion—Dr L. Wilse (Long Beach, California, United States of America) said that for postero-lateral fusion he used a bilateral muscle-splitting approach. If there had been a previous midline incision, the skin was opened through the midline, then pulled laterally to split the muscles. The midline blood supply and posterior ligaments were thus preserved and progressive slip did not occur in spondylolisthesis. The fusion bed extended from the base of the spinous processes to the tips of the transverse processes. In adults two-joint fusions failed in 16 per cent of cases and one-joint fusions in 6 per cent, but in children with spondylolisthesis no failure had occurred.

**Lumbo-sacral fusions: a comparison of the results of postero-lateral and posterior fusion—Dr I. M. Zaaiman (Pretoria) said that he had reviewed 225 fusions in the lumbo-sacral area personally performed. A questionnaire had been answered by 112 patients. The experience extended over sixteen years. Posterior fusions numbered 125, but during the last five years only postero-lateral fusions had been done. Postero-lateral fusion was preferable because failure was less frequent, iatrogenic stenosis did not occur, and in spondylolisthesis, fusion at the lumbo-sacral level alone could be done, if elected. Bilateral postero-lateral fusion was performed through a single midline incision. The muscles were levered away to expose the transverse processes. The apophyseal joints were excised and packed with cancellous bone. If a laminotomy was required it could be done at the same time. Operative time was less than with posterior fusion.

**Paraplegia in congenital kyphoscoliosis—Professor J. I. P. James (Edinburgh, Scotland) said that if a congenital kyphoscoliosis was permitted to progress there was a great risk of paraplegia. An angle of 90 degrees with a progressive kyphos was critical. In a case with deficient or absent vertebral bodies, bracing might be used in childhood as a holding measure. Adequate posterior fusion done before deformity became severe would prevent paraplegia, although there might be some subsequent increase of deformity. When several vertebral bodies were congenitally fused and deformed, fusion from the front was generally necessary. The use of strong corrective force, with the halo-pelvic apparatus, was dangerous.

**The urinary bladder in spinal cord injuries—Dr A. J. M. Retief (Cape Town) said that in cases of injury to the spinal cord in the dorso-lumbar area, the prognosis of bladder function was related to the degree and level of damage. Damage above S2, 3 and 4 resulted in an upper motor neurone bladder. A positive bulbocavernous reflex at an early stage indicated viability of the sacral segments, but usually a complete cord lesion above. Neurological examination should be careful and repeated. Neural tissue damage might be maximal centrally, tapering up and down in a cone-shaped manner. Any escape, for example sacral sparing of sensibility, augured well, but in most cases the neurological deficit remained complete at forty-eight hours, which indicated permanent functional transection. Bladder rehabilitation was better with incomplete lesions.

At the Conradi Spinal Cord Injury Centre in Cape Town urinary retention was treated initially by intermittent catheterisation. This was abandoned for indwelling catheterisation if it became apparent that the cord lesion was complete. After about twelve weeks it was possible to assess whether ability to empty the bladder would become sufficient. Rehabilitation of bladder function could not be completed until the upright position again became possible in conservatively treated spinal fractures. Urosurgery, such as section of a tight external sphincter in an upper motor neurone bladder, or resection of the bladder neck and prostate in a lower motor neurone bladder, was necessary in about one-third of cases with complete lesions, but was always postponed for at least six months.

**The Klippel-Feil syndrome—Dr D. MacEwen (Wilmington, United States of America) said that congenital fusion of cervical vertebrae might be associated with a number of hidden abnormalities. A short neck and a low hairline might be the only presenting symptoms. In a series of fifty cases the average age at diagnosis had been 164 years. The radiographs could be confusing and epiphysial spaces could be falsely interpreted as disc spaces. Renal abnormalities were present in one-third of cases and should be routinely investigated. Cardiac abnormalities occurred, and synkinesia (mirror motions). In a late case severe instability could occur at the atlanto-axial joint or at a single mobile cervical joint; either could lead to paraplegia.

**Spinal caries: surgical debridement versus radical resection and bonegrafting—Dr R. N. L. Rauch (Pretoria) said that surgical debridement alone, or complete resection plus autogenous interbody grafting, had been applied by blind selection to 100 cases of thoracic or lumbar tuberculosis. Cases with extensive lesions not suitable for debridement because this would have left too large a defect, were not admitted to the study. The follow-up was from three to five years. All patients received streptomycin for three months after operation, and oral chemotherapy for eighteen months. The debridement group was allowed up as soon as able to do so, the bonegraft group was kept in bed for three months. Pain disappeared rather sooner in the bonegraft group, probably because they were recumbent, but all surviving cases were pain-free at four months. The kyphos increased in half of the debridement group; in the bonegraft group nine were worse, twenty-seven unchanged and thirteen better. Paraplegia or paresis was present before operation in forty-five cases, and all except two of the surviving cases with neurological lesions improved very substantially, often completely, after surgery. In this respect there was no difference between the two types of surgery. Dr A. C. Boonzaier (Johannesburg) said that in
spinal caries avascularity played an important part, as did local obstruction when there was paraplegia. Operation should deal effectively with both these elements. Prophylactically there was some advantage in striving for local fusion by inserting a solid bone block, but not rib struts. The kyphos was not important and it was futile to attempt substantial correction.

Treatment of low back pain: a critical look at current methods—Professor A. L. Nachemson (Goteborg, Sweden) said that the pathogenesis of back pain was ill understood, except in a small minority of cases where herniation of disc material caused sciatica with backache. Intravital telemetry had shown that high intradiscal pressures were brought about by the adoption of certain positions, including sitting. Chemical changes including a higher local acidity, a decrease of proteoglycans and an increase of collagen occurred in degenerative states of the disc. Many supposed causative factors such as congenital bony abnormalities and a narrowed disc space did not have a proven relation to back pain. Similarly, several popular treatments, including manipulation of the spine, various forms of physical treatment, medicinal treatment, and spinal fusion, might not have more than arbitrary motivation. Of patients with episodal backache, 60 per cent recovered in three weeks and 90 per cent in two months, irrespective of management. We would be fair to our patients and to ourselves if we used simple, inexpensive and less dangerous programmes such as bed-rest, salicylates, and effective ergonomical instruction.

Aetiology of club foot—Dr J. E. Handelsman and Dr H. Isaacs (Johannesburg) stated that diminution of the bulk of calf muscle was constant, and resembled that seen in arthrogyrosis and lumbo-sacral agenesis, where an equinovarus foot was usual and a neuromuscular abnormality existed. Biopsies from tibialis posterior, the triceps surae, and the long toe flexor were taken from thirty-seven children less than five years of age with club feet. Electron microscopy and histochemical studies showed pathological changes suggestive of neuropathic disease in seventeen instances. Common findings were grouping of individual fibre types, atrophy and angularity of fibres, and in particular complete atrophy of type I fibres. Scattered degeneration of single fibres was also seen. In some areas of almost every specimen individual muscle fibre direction was disturbed, sometimes profoundly. All these deviations were evidence of neurogenic disease. An increase in the absolute number of one or other fibre type, fibre angularity, and fibre fragmentation were present in a further five sections. These changes again suggested neurogenic disturbance. Less marked but similar changes were present in six of ten peroneal muscles also examined. Evidence of intrinsic muscle disease was seen in only two specimens, in which cell nuclei were increased in number and had migrated towards a central position. Fibrosis was not a feature of the muscle biopsies examined and the blood vessels were normal. The study suggested that the extrinsic musculature in the common club foot was abnormal and that a neurogenic aetiology might be dominant.

ITALY
ITALIAN SOCIETY OF ORTHOPAEDICS AND TRAUMATOLOGY

The fifty-ninth Congress was held in Cagliari from September 29 to October 3, 1974, when the principal subjects were joint prostheses and the surgical treatment of infantile cerebral palsy.

The first topic was dealt with in several sections. First came the biomechanical aspects, of which the report by G. L. Lorenzi and P. L. Calderale (Turin), based on measurements of mechanical models, was especially up-to-date and original. The clinical section was considered according to the different articulations replaced; thus the hip was dealt with mainly by the school of Milan, with the report of L. Parrini and his colleagues, and by the school of Bologna, with a report from L. Ranieri. All these contributions were given added interest by the large number of cases studied, especially with regard to the prostheses designed by Charnley, Ring and McKee. An informed paper given by Professor M. Paltrinieri from the Rizzoli Institute expressed a preference for ceramic materials. After the knee and the upper limb had been discussed, a number of original contributions were made by distinguished guests of the Society.

The second subject, cerebral palsy, was treated by discussions on electromyography, the surgery of the lower and of the upper limbs, psychiatry and neurosurgery, and finally the Florentine experience of a combination of physical treatment and surgery. This discussion was also enriched by numerous original papers and both of the principal subjects were illuminated by a series of notable scientific films.

ANNOUNCEMENTS

BRITISH ORTHOPAEDIC ASSOCIATION
SPRING MEETING 1976
The Spring Meeting of the British Orthopaedic Association will be held in Newcastle upon Tyne from April 8 to 10, 1976. Those wishing to submit papers for presentation should send eight copies of a short abstract (about 400 words) to the Honorary Secretary, British Orthopaedic Association, at the Royal College of Surgeons, 35-43 Lincoln's Inn Fields, London WC2A 3PN, not later than August 8, 1975.

THE SIXTH COMBINED MEETING OF THE ENGLISH-SPEAKING ORTHOPAEDIC ASSOCIATIONS 1976
An exhibition of clinical and laboratory science representing British orthopaedics will be held throughout the above meeting at the Royal Festival Hall. Those wishing to present an exhibit are asked to contact Mr G. Bentley, Nuffield Orthopaedic Centre, Oxford, by September 1, 1975.

TRAVELLING FELLOWSHIPS TO NORTH AMERICA 1976
Applications are invited from Fellows, Members and Associates of the British Orthopaedic Association, normally resident in Great Britain, for election as Travelling Fellows to visit orthopaedic centres in the United States and Canada during a tour of approximately eight weeks, including the time of transatlantic travel. The Travelling Fellows will be appointed by the President of the British Orthopaedic Association on the recommendation of the Executive Committee. These Fellowships are designed for orthopaedic surgeons or senior registrars below the age of forty years. The party will probably leave this country in April to May 1976. Twenty typewritten copies of the application should be sent to the Honorary Secretary, British Orthopaedic Association, at the Royal College of Surgeons, 35-43 Lincoln's Inn Fields, London WC2A 3PN. The application should state name, address, telephone number, age, qualifications, medical