Acta orthop. scand. *53*, 701–703, 1982

PROCEEDINGS OF THE DANISH ORTHOPAEDIC SOCIETY

Glostrup, October 30, 1981

EDITOR: NIELS J. HOLM

THE RESONANCE OF THE HUMAN TIBIA

A. BORGWARDT CHRISTENSEN

Department of Orthopaedic Surgery T-2,
Gentofte Hospital

A steady state vibration technique was evaluated as a method of determination of the tibial resonance frequency. A shaker was placed on the anterior tibial margin and the resonance was measured through an impedance head by scanning the frequency from 30–1000 Hz. The day to day reproducibility was 4.7 per cent.

The method has been used in the determination of fracture healing in a few cases. It was found that a few weeks after the reduction of a fracture a low frequency of resonance could be produced. The frequency increased as the stiffness increased until it reached the values of the other leg. This corresponded to the clinical stability estimated by hand.

INTRAOSSEOUS PRESSURE AND REGIONAL BLOOD FLOW OF THE JUVENILE KNEE JOINT

C. BÜNGER, J. HJERMIND & J. BÜLOW

The Orthopaedic Hospital, Århus

In an experimental investigation comprising seven immature mongrel dogs simultaneous regional blood flow and intraosseous pressure measurements were performed in relation to different intraarticular pressures in the right knee, while in the left knee the relationship between intraarticular pressure and regional blood flow was described. Regional blood flow was estimated using radioactive labeled 15 μ microspheres (Cerium-141, Tin-113, Scandium-56, Chromium-51). It was concluded that the intraosseous pressure does not significantly influence the regional blood flow measured within the same area. The hemodynamics of the patella, juxtaarticular epiphyses and knee joint capsule are influenced by both local and regional autoregulatory mechanisms maintaining a significantly elevated regional blood flow during an elevation of the intraarticular pressure above the mean arterial blood pressure.

INTRAOSSEOUS PRESSURE OF THE PATELLA

C. BÜNGER, S. HARVING, E. H. BÜNGER & J. ÅGAARD

The Orthopaedic Hospital, Århus

In an experimental study using six mongrel puppies simultaneous pressure measurements were taken from the patella, the juxtaarticular epiphyses and the knee joint cavity in 12 knee joints. During intraarticular pressure elevation an increase in both the patellar and the femoral epiphyseal pressures was observed, but the increase in the patellar pressure was most pronounced. Maximal extension of the empty joint resulted in a significant rise in the patellar and tibial epiphyseal pressures while during maximal flexion a significant rise in the patellar and femoral epiphyseal pressures was observed.

The introduction of a joint effusion resulted in a further increase in the intraosseous pressures observed during movement of the empty joint, but the pressures followed a similar pattern.

CARPAL TUNNEL SYNDROME. THE RESULTS IN 153 OPERATED HANDS

J. OVESEN, E. JANZEN & J. HAASE

Department of Orthopaedic Surgery,
Aalborg Hospital

A total of 153 hands in 125 patients with carpal tunnel syndrome, 102 women and 23 men, were operated on during the period 1977–79. In all patients the initial symptoms were numbness and tingling sensations.

Almost half of the patients complained of pain proximal to the carpus. The sensory conduction velocity from the 1st or 3rd finger to a point just proximal to the transverse carpal ligament was increased in 93 per cent of the cases. At the operation an impression in the nerve was found in 78 cases, a pseudoneuroma in 23 cases, thickening of the tendon sheath in 4 cases and tumours in 2 cases. The average observation time was 27 months.

Postoperatively, 125 hands were free of symptoms,

0001-6470/82/040701-03 $02.50/0

19 were improved and 6 were unchanged. In 3 cases cervical root affection was suspected.

RECONSTRUCTION OF ARTICULAR CARTILAGE DEFECTS WITH FREE PERIOSTEAL GRAFTS

J. M. Rubak

The Orthopaedic Hospital, Århus

Experimental studies with transplantation of periosteum to various chondrotrophic environments have shown that environmental factors are able to guide the differentiation of the osteochondrogenic cells into chondrogenesis instead of osteogenesis. With a view to clinical application, the possibility of using free periosteal grafts in the reconstruction of articular cartilage defects was studied in rabbits. The grafts were taken from the tibia and transplanted to artificial defects in the femoral articular cartilage. Histological examination revealed that the defect became filled with hyaline-like cartilage, generated from the graft. The tissue maintained this morphology after 1 year of observation.

EVANS' REPAIR FOR INSTABILITY OF THE ANKLE IN ATHLETES

B. Kristiansen

Department of Orthopaedic Surgery, Frederiksborg County Hospital, Hillerød

Eighteen athletes with a history of recurrent sprains and instability of the ankle during activity were treated by reconstruction of the lateral ligaments by the Evans technique.

Before the operation 55 per cent had given up all athletic activities because of instability and 17 per cent had restricted their activities. The average age at operation was 24.6 years and the follow-up period 3.1 years.

Normal or improved stability was achieved in 78 per cent of cases, but only 33 per cent had no complaints regarding the ankle. These results are similar to those obtained with other methods of surgical repair of the ankle ligaments.

THE HEALING PROGNOSIS OF ABOVE-KNEE AND BELOW-KNEE AMPUTATIONS BASED ON THE SKIN PERFUSION PRESSURE MEASURED BY THE PHOTOELECTRIC TECHNIQUE

J. Ovesen, M. Støckel & J. Brøchner-Mortensen

Department of Orthopaedic Surgery, Aalborg Hospital

The healing prognosis in 31 below-knee amputations and 14 above-knee amputations was evaluated on the basis of the skin perfusion pressure measured by a photoelectric technique.

There was no difference in the healing prognosis determined by this method and that determined by the isotope clearance technique for measuring skin perfusion pressure. Photoelectric determination of skin perfusion pressure is technically easier and less demanding from the patient's point of view and is therefore preferred.

CHONDROMALACIA PATELLAE. AN ETIOLOGICAL CLASSIFICATION AND THE THERAPEUTIC POSSIBILITIES

N. Heigaard

Department of Orthopaedic Surgery T-3, Gentofte Hospital

In a series of 172 consecutive patients, with retropatellar pain, attempts were made to undertake an etiological classification preoperatively. The patients were subdivided into six characteristic groups: 1 & 2) Femoropatellar instability with subluxation or dislocation of the patella, 3) iatrogenic cases following other operations on the knee, 4) post-traumatic, 5) the lateral hyperpressure syndrome and 6) idiopathic chondromalacia. The indications for operation were either obvious mechanical abnormalities or unsatisfactory results of conservative treatment for at least 6 months. The aim of the operations was to correct the mechanical abnormalities and in the majority of the groups the therapeutic result was better than would have been achieved with only one standard procedure.

FRACTURES OF THE SHAFT OF THE HUMERUS TREATED WITH THE SARMIENTO BANDAGE

B. Niedermann, E. Møller, N. S. Andersen

Department of Orthopaedic Surgery, Aalborg County Hospital

Twenty-three patients with uncomplicated fractures of the shaft of the humerus were treated with the Sarmiento bandage during the period from April 1979–December 1980. Seventeen patients, 5 children and 12 adults, were re-examined after half a year. All types of fractures of the humeral shaft were represented.

The average period of treatment was 8 weeks. At the follow-up examination there was one pseudarthrosis. Sixteen fractures had healed in a good position. Only minor and functionally insignificant losses of movement of the shoulder and the elbow were found.

AN EVALUATION OF THE CHANGES IN BONE TURNOVER IN AN IN VITRO SYSTEM: THE DIRECT EFFECT ON BONE TURNOVER OF DIPHENYLHYDANTOIN

J. G. PEDERSEN

Department of Orthopaedic Surgery, University Hospital, Copenhagen

An *in vitro* system using paired calvaria halves from 3- to 4-day-old mice, cultured for 2 days was established as a means of evaluating the changes in bone turnover. The indicaters used were histological examination, radioactive calcium release, radioactive Proline release, and alkaline phosphatase activity measured by semiquantitative histochemistry.

The results concerning Diphenylhydantoin showed an increasing inhibition of calcium release with increasing Diphenylhydantoin concentrations, an inhibition of Proline release, and a decreasing alkaline phosphatase activity with increasing Diphenylhydantoin concentrations. Histological examination gave no significant information. This suggests that Diphenylhydantoin *in vitro* suppresses both bone resorption and formation causing a decreased bone turnover.

RADIOLOGY OF THE KNEE BEFORE AND AFTER MEDIAL MENISCECTOMY

B. MATHIESEN

Departments of Orthopaedics and Radiology, Hillerød Hospital

In 19 patients undergoing medial meniscectomy the radiographic joint space was recorded in the standing and lying positions before and 5 weeks after operation. In the standing position the joint space was reduced in six, unchanged in seven and increased in six cases. Joint space measurements of the nonoperated knee showed great variations and poor reproducibility.

The radiographic method is therefore considered unreliable and it is concluded that the joint space narrowing seen several years after meniscectomy must be caused by degenerative changes in the joint and not by an immediate narrowing of the joint because of loss of the weight-bearing function of the excised meniscus.

THE USE OF GENTAMYCIN PMMA BEADS IN POSTTRAUMATIC OSTEOMYELITIS

B. LUND, P. ØSTERGAARD JENSEN & K. NIELSEN

Department of Orthopaedic Surgery, Århus County Hospital

Twenty patients suffering from acute or chronic posttraumatic osteomyelitis were treated by sequestrectomy and implantation of Gentamicin PMMA beads. In four cases the infection started within 3 weeks after an osteosynthesis, whereas 16 cases represented chronic osteomyelitis. *Staph. aureus* was cultured in 15 cases. *P. aeroginosa* was found in two cases, *E-coli* in two and *S-marsescens* was found in one case. Bone transplants were done in 10 cases at the time of removal of the Gentamicin PMMA beads.

Sixteen patients healed during the observation period of 10.7 months. In two cases a fistula persisted after removal of the beads and in one case the beads were left *in situ* in the tibia resulting in recurrent fistulation 3 months later. In one case a below-knee amputation was necessary because of diabetic angiopathy.

We consider the Gentamicin PMMA beads to be a more attractive therapeutic alternative than the use of perfusion systems or Dextran gel.

BONE BLOOD FLOW IN CONSCIOUS DOGS AT REST AND DURING EXERCISE

E. TØNDEVOLD & J. BÜLOW

Department of Orthopaedic Surgery O, Hillerød Hospital

To be published in Acta Orthopaedica Scandinavica.

PATELLA INFIMA

B. LUND & J. HØGH

Department of Orthopaedic Surgery, Århus County Hospital

In four adult patients with persisting symptoms of Osgood-Schlatter's disease the X-ray examination demonstrated a small bony fragment (patella infima) in the distal part of the patellar ligament. At the operation a hyaline cartilage coated facet was found articulating with the facet on the proximal part of the tibial tuberosity.

In two cases only the bony fragment was removed. Both patients, however, had persisting symptoms until the facet on the tibial tuberosity was removed during a second procedure. Two of the four patients were completely cured and two patients were improved by the operation.