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THE ROLE OF THE ARTICULAR CARTILAGE IN THE AETIOLOGY
OF OSTEOARTHRITIS

Rudolf Lemperg

Metabolic disturbances of the chondrocytes and alterations in the chemical properties of articular cartilage matrix are sometimes demonstrable in the early stages of degeneration. Loss of keratan sulphate may occur before morphological alterations become visible and this is followed by loss of chondroitin sulphate. Superficial articular cartilage defects induce an early reaction in the subchondral bone, consisting initially of loss of perivascular mineral and followed by accelerated formation of new bone. In avascular articular cartilage of calves a factor is present which when injected into the cornea of rabbits consistently evoked ingrowth of vessels. It is suggested that in diseased articular cartilage a similar factor is produced or activated and is responsible for the vascular reaction in the subchondral bone.

VASCULAR EXPERIMENTS RELATED TO OSTEOARTHRITIS

Murray Brookes

A vascular approach to osteoarthrosis encourages the development of useful diagnostic and prognostic measurements of intramedullary pressures, $P.O_2$, $P.CO_2$ and pH.

Experimental femoral vein ligation suggests that osteoarthrotic bone sclerosis can be caused by a raised $P.CO_2$ and $P.O_2$ in the osseous circulation, together with a fall in pH. Bone cysts occur when the pH is below 7.2 because of continuing bone removal with suspended bone formation.

As for treatment, acrylic cement caused a sustained fall (25 per cent) in the blood flow rate and blood volume of the tibia, with 16 per cent incidence of sepsis against 2 per cent in controls. After femoro-popliteal venous excision, vitallium screws provoked an increased flow rate in otherwise ischaemic bone. Titanium and stainless steel were in this respect inert.

LONG TERM EFFECT OF INTERTROCHANTERIC OSTEOTOMY ON THE
INTRAOSSEOUS PRESSURE OF THE FEMORAL HEAD AND GREATER
TROCHANTER IN PATIENTS WITH OSTEOARTHRITIS OF THE HIP JOINT

N. B. Termansen & K. Okholm

In 16 patients with osteoarthritis of the hip joint, intraosseous pressure was measured before and a year after intertrochanteric osteotomy. The mean pressure of the femoral head was higher than that of the greater trochanter. After healing of the osteotomy the mean pressure of the femoral head was reduced significantly. A fall in pressure was shown in the greater trochanter, but it was not significant. The clinical effect of the operation was good, and none of the patients suffered from pain at rest at the re-examination. Disappearance of pain at rest may be explained by a long lasting reduction of intraosseous hypertension.

LATE INFECTIONS AFTER TOTAL HIP ARTHROPLASTY

Lars Lidgren

Today total hip arthroplasty according to the Charnley method presents few technical complications. The most serious problem remaining concerns the deep infections which appear with a frequency of 1 to 12 per cent in several series. Such infections often necessitate the removal of the prosthesis with permanent invalidism as the result.

In two separate hospitals, Malmö and Lund, it was shown in a double blind study of 171 hip operations that prophylactic treatment with cloxacillin significantly reduced the frequency of early post-operative infections. The first group, receiving prophylactic cloxacillin, had no post-operative infection while the second, placebo group, had 12 (out of 88 patients). All of the patients had major surgery to the hip and 10 of the 12 infections were caused by staphylococcus aureus. We also observed a significant reduction in the same material of "late reactions" following total hip arthroplasties according to Charnley.

The radiographic signs of infection in 14 patients with Charnley total hip arthroplasties were compared with a non-infected control group. It was found that half of the non-infected hips developed a radiolucent zone around the femoral component. However, this zone never increased in width beyond 6 months post-operatively and was always less than 2 mm in width. In comparison with the control hips, 6 of the infected hips developed a zone wider than 2 mm as early as 12 weeks post-operatively, and 2 of these had scalloping of the cortical bone. By 52 weeks, all infected hips had clear radiographic signs of infection. Radiographic prediction of looseness of the components was found to be correct at re-operation for all femoral components but false for 3 acetabular sockets in 7 re-operated cases.

At re-operation of 7 patients with late infection following total hip arthroplasty according to Charnley, obligate anaerobic bacteria were isolated from 4 of the patients. Staph. epidermidis (albus) was isolated in one additional patient. Two of the patients from whom no bacteria were isolated were on antibiotic therapy at the time of re-operation. In 3 of the 4 patients from whom anaerobic bacteria were isolated, a significant decrease in the titre of agglutinating antibodies against the patient's own strain was observed 6 months after re-operation and antibiotic treatment.

Whether a post-operative infection after total hip arthroplasties occurs early (without wound healing per primam) or late (with wound healing per primam) would seem to depend on which bacteria are contaminating the surgical site and whether this bacteria can establish an infection there. *Staphylococcus aureus* produces early infections whereas anaerobes and aerobic bacteria with a low virulence can have a long period of latency before symptoms appear. No sterile culture should be accepted unless isolation of strictly anaerobic species has been performed.

THE PRELIMINARY RESULTS OF 316 HIPS OPERATED WITH LOW FRICTION ARTHROPLASTY A. M. CHARNLEY

S. Pilgaard

An account is given of the results of 316 hips operated a. m. Charnley. The main indication for operation was osteoarthritis (237 hips). 123 hips were operated on before the use of the "clean air operation room". In both periods the result concerning pain and joint movement was excellent. Before the use of the sterile enclosure the rate of secondary infection with positive culture was 12 per cent (mean follow-up—3 years). After the use of the sterile enclosure it was 1 per cent (mean follow-up—1½ year). 9 prostheses were removed in the first period, only one in the second.

A special complication, never described before, was noticed viz, fracture of the tip of the cement around the stem. In a total of 20 hips the X-ray showed, from 3–12 months after the operation, a fine fracture line at a distance of a few mm to 2 cm from the tip of the metallic stem.

TOTAL KNEE PROSTHESIS

M. A. R. Freemann

A prosthesis and an operative procedure have been developed for the total replacement of the tibio-femoral joint. This procedure has now been in continuous clinical use at the London Hospital for three and a half years and in numerous other centres for shorter periods.

The results in the first 69 patients with a follow-up of not less than one year are presented. With the procedure as it is now carried out, pain on level walking has been eliminated in 91 per cent of patients, valgus and varus instability or deformity of up to 35° have been corrected, and flexion deformities of up to 100° have been eliminated. The range of movement in knees having a pre-operative range of 0–60° has on average been increased by 30°. The maximum increase in the range of movement has been 75°.

Two new versions of the prosthesis, one to permit retention of the cruciate ligaments and one to permit replacement of the patello-femoral joint in addition to the tibio-femoral joint are described.

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RESULTS AFTER FRACTURE OF THE NECK OF THE FEMUR IN CHILDREN

H. Kristensen & K. Okholm

A follow-up of 25 fractures of the neck of the femur in children below 15 years of age has been carried out. Complications such as no primary healing, avascular necrosis or healing in a varus position in a third of the cases.

Thirteen patients had no symptoms and X-ray showed normal conditions. Four answered by letter that they were symptom-free. Five patients had pain, limitation of movement and/or pathological X-rays. Mean observation period 13.7 years.

We cannot conclude that any special method of treatment is to be preferred, but other authors have recommended osteosynthesis with screws.

TREATMENT OF FRACTURES OF THE FEMORAL NECK IN CHILDREN

Søren Pilgaard

The earliest report of fracture of the femoral neck in children appears to have been made in 1885 by Cromwell. Næraae in 1938 found that fractures of the neck of the femur in children were so unusual and rare that it was reasonable to call attention to them. As Kristensen & Okholm (1974) point out the condition is uncommon but not rare. Ratcliff (1970) found, out of 132 cases of these fractures in children, 61 per cent with complications.

In the last 6 months, we have had 4 cases of fractures involving the neck of the femur transferred to the Orthopaedic Hospital in Aarhus. The complications have been necrosis of the proximal fragment, delayed union and varus position.

We recommend the subtrochanteric osteotomy as used by Thomasen. The purpose of the treatment is to transform a vertical fracture line to a horizontal fracture line. The changing of the power lines introduces healing in a few weeks.

References:

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TREATMENT OF FEMORAL NECK FRACTURES BY FOUR COMPRESSING
AO CANCELLOUS SCREWS

H. Paaby

A preliminary statement regarding 27 cases of medial collum femoris fracture, treated with 4-5 compressing AO-cancellous screws with a short thread. The method is simple and non-traumatic and is expected to reduce the frequency of avascular necrosis of the femoral head.

UNSTABLE PERTROCHANTERIC FRACTURES OF THE HIP

M. Michaelsen & J. S. Jensen

Out of 317 patients with pertrochanteric femoral fractures 305 were treated with McLaughlin osteosynthesis. The primary mortality rate was 14.5 per cent. The postoperative complication frequency (35.8 per cent) was dominated by cardiopulmonary (12.5 per cent) and thromboembolic (12.6 per cent) diseases. Wound infection was found in 3.7 per cent and ostitis in 0.9 per cent.

106 patients had stable fractures. Among these, four had to be reoperated due to penetration or a loose bolt.

211 patients (66.5 per cent) had unstable fractures according to Evans' classification. At the follow-up of 166 patients, $\frac{2}{3}$ were found to be healed in an unchanged position. Only 14.8 per cent of the 166 patients had significant fracture complications, mostly varus angulation of more than 20° (9 patients) or penetration of the nail (8 patients). 10 patients (5.9 per cent) had to be reoperated because of varus angulation, penetration, broken plate or pseudarthrosis after removal of the osteosynthesis material.

McLAUGHLIN FAILURE

P. Østergaard

In Frederiksberg Hospital, Surgical Department A, we have investigated 222 patients who were operated a. m. McLaughlin for pertrochanter and subtrochanter fractures of the femur. In 4 of these 222 patients (2 per cent) the top screw had worked loose.

Our opinion is that too high a temperature and repeated sterilization can damage the nylon bush of the top screw. If the top screw is screwed in, it must be loosened and then screwed in again.

The nail supports on the edge of the bow by the splint.

We think that a material with a fixed connection between nail and splint could prevent these 2 per cent failures.

MOORE ARTHROPLASTY IN FRACTURED FEMORAL NECK. A SURVEY

J. S. Jensen & P. Holstein

In 169 Moore hip arthroplasties 48.9 per cent of postoperative complications were dominated by cardiopulmonary and thromboembolic diseases.

The three-month mortality rate was 21.6 per cent, but there were 140 serious preoperative complications in 107 patients. The life-table showed good prognosis on survival after the first year, but 30.5 per cent had to be placed in nursing homes most often for other reasons.

Follow-up of 52 patients (observation period 2.5–10 years, mean 4.7 years) showed significantly reduced mobility in the case of osteolysis and sinking more than 20 mm, while osteosclerosis in the fenestres resulted in significantly better movement and less pain.

15 hips were classified as excellent, 13 as good, 21 as fair and 3 as poor. In 69.4 per cent the hips were painless, 76.8 per cent had satisfactory hip mobility and 40.4 per cent could walk more than 500 meters.

FOLLOW-UP OF RESULTS FROM 11 ORTHOPAEDIC-SURGICAL DEPARTMENTS OF ABOUT 400 CASES OF HIP ARTHROSIS, TREATED WITH RING'S TOTAL PLASTY

H. Paaby

Presentation is made of a material of 400 complete replacement arthroplasties of the hip, operated a. m. Ring, from 11 orthopaedic departments during the period 1968-1974.

The pre- and postoperative condition has been estimated using the scale of Merle d'Aubigné.

There were improvements as regards pain (1.3 to 5.1 points), mobility (2.5 to 4.6 points) and walking capacity (2.2 to 3.9 points).

Two patients died as a consequence of the operation, one died 12 days after the operation from apoplexia cerebri. Deep, late infection was seen in 3 cases (0.7 per cent) and led to the removal of the prosthesis. Two of these cases went over subsequently, without complications, to a Girdlestone hip. In 6 hips the prosthesis was removed because of loosening. The patient's own estimation was: excellent 61 per cent, good 34 per cent, unchanged 4 per cent, aggravated 1 per cent.

THE MONK TOTAL HIP PROSTHESIS

K. Rechnagel

The recently developed Monk total hip prosthesis is now in use in the Orthopaedic Department in Hillerød, Denmark.

The first 17 cases confirm that the *primary* results are comparable to the results in other more complicated total hips. In patients suffering from subcapital fractures or avascular necrosis of the femoral head the recovery and rehabilitation periods are greatly reduced as compared with Moore's prosthesis.

The operative technique is so simple that bilateral operation is possible, and even old patients in a poor medical condition may be operated.

It seems to be a real improvement as compared to Moore's prosthesis and so far it is a valuable supplement to the many total hip constructions in the treatment of osteoarthritis of the hip.

SCINTIGRAPHY IN FEMORAL HEAD NECROSIS FOLLOWING RENAL TRANSPLANTATION. A PRELIMINARY REPORT SUGGESTING A SURGICALLY INDUCED VASCULAR TRIGGER FACTOR

C. J. Edeling, J. Heerfordt & K. Ølgaard

Necrosis of the femoral head following renal transplantation occurs in about 10-20 per cent of cases; at Rigshospitalet in 18 hips of 15 patients (8 per cent). In 11 out of 12 patients a unilateral necrosis was located ipsilateral to the graft. In transplantation the hypogastric artery is sacrificed. It is suggested that the seizure of the hypogastric supply to the femoral head is the trigger in the development of ipsilateral necrosis. Until now we have made 84 posttransplant scintigraphies, preceded by a pilot examination of 13 patients with hip pain; 5 of these 13 had necrosis as seen radiologically versus 10 by the more sensitive method of scintigraphy.

POSTTRAUMATIC FERROKINETICS

D. Zdrankovic

We found a constant and marked decrease in serum iron after trauma on a selected group of orthopaedic patients, at the Orthopaedic Department, Odense University Hospital.

To investigate the problem, dogs were used as experimental animals. They were found to be a good experimental model for ferrokinetic investigations (iron 59) because their iron metabolism is similar to man's. Iron distribution was followed, after injection of isotope, for a 14-day period with plasma, red blood cells and organ activity measurements.

From our results it can be concluded that the reticulo-endothelial system plays a very important role in posttraumatic iron metabolism. The reticulo-endothelial system has an increased affinity for iron and the iron becomes firmly bound intracellularly for about a 10-14 day period. This means that a new distribution of iron in the organism after trauma is tending towards an iron deficient state where bone marrow has to work under a markedly decreased quantity of available iron.

CONGENITAL CLUBFOOT

K. Jørring & L. Christiansen

A series of 58 children with 75 idiopathic congenital clubfeet is presented. Early soft tissue release was performed in 77 per cent. The results were poor in 12 feet, 11 (19 per cent) were reoperated upon. On reevaluation of the poor cases we found severe social problems involved, including neglectful parents.

SURGICAL TREATMENT OF 100 ACHILLES TENDON RUPTURES

P. Jessing & E. Hansen

102 subcutaneous achilles tendon ruptures were treated by operation over a period of 28 years; 54 with simple suture, 48 with tenodoplastic a. m. Silfverskjöld. The two methods are compared with each other and with recent information about satisfactory results of non-operative treatment. Operative treatment must still be advised. Complications were few, not affecting time of treatment or final results. There was no mortality. The functional results showed no statistically significant differences, yet there was a tendency for more complaints following plastic procedures.

Taking up full sporting activities after achilles tendon rupture can lead to rupture of the opposite tendon in up to approx. 25 per cent of cases.

GONYLAXOMETRY. A RADIOLOGIC METHOD FOR MEASUREMENT OF MEDIAL, LATERAL AND DRAWER LOOSENESS IN THE KNEE JOINT

K. Jacobsen

An account is given of an apparatus, the gonylaxometer, for measurement of medial, lateral and drawer looseness by means of a hydraulic action of the knee joint by well-defined forces. The measurements are based on radiographs. The

advantage of the radiologic method over "external" measurements is the elimination of inaccuracies caused by displacements in the soft tissues.

The accuracy of the method was evaluated by a test-retest examination of 50 healthy subjects. The radiographs were coded and measured at random after cessation of examinations in the gonylaxometer. The accuracy is ± 1 mm (SD' 0.55) for medial/lateral looseness, ± 2 mm for drawer looseness.

A FOLLOW-UP STUDY OF 23 PATIENTS AFTER OPERATIO PLASTICA
LIGAMENTI CRUCIATI ANTERIORIS GENUS A. M. JONES, BASED ON
CLINICAL EVALUATION AND GONYLAXOMETRY

K. Jacobsen & P. Rosenkilde

During the period from 1. 3. 1971-1. 9. 1973, 27 operations have been carried out on patients with knee instability caused by the lack (non-acute) of the anterior cruciate ligament. The method described by Kennet G. Jones (1963) was used.

23 patients have been followed up until now. At the clinical examination we found considerable improvement in the stability of the knee joints. In the patients' opinion 70 per cent of the results were very good, 20 per cent better. Estimated by gonylaxometry, a radiographic measuring method, 50 per cent were normal and a further 30 per cent good.

FRACTURE OF THE TALUS

O. Sneppen & O. Buhl

In a material of 2456 ankle fractures there were 25 cases of associated ankle fracture and talar fracture or subtalar dislocation. On the basis of a genetic classification of the ankle fracture, it could be concluded that the position of the foot at the moment of the accident was of decisive importance in the frequency of occurrence of talar fractures, supination in particular predisposing to fracture of the neck as well as the trochlea of the talus.