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Retrospective study of the results of acetabuloplasty

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Reconstruction of the lateral anterior rim of the acetabulum was first described in 1891. This operation for prevention or treatment of dysplasia-arthrosis was relegated to the background by the development of total arthroplasty of the hip. In Groningen University Hospital between 1967 and 1987, 28 patients underwent this operation, two of them on both sides.

The severity of the pain, the gait and hip function were assessed. In the radiographic evaluation attention was given to increase of the CE angle in relation to the preoperative situation, the position of the implanted hip and the increase, if any, of subluxation and/or degenerative phenomena.

In 25 cases the indication had been congenital dysplasia or dysplasia-arthrosis. The mean follow-up period was 7 years.

Of the 30 hips, 22 were classified as good on clinical and 19 on radiographic grounds. At follow-up, 24 of the 28 patients had no complaints. The mean increase of the CE angle amounted to 44° (from an average of −11° before operation to +33° at follow-up). The radiographs showed resorption of the chip in five cases, four of them in the adolescent group. These adolescent patients were reoperated.

In seven cases, radiographic deterioration was seen in spite of good clinical result.

Conclusion: It is concluded that acetabuloplasty doubtless has its place in the treatment of dysplasia and dysplasia-arthrosis of the hip. The stability of the hip is improved by the operation, and pain is alleviated. The method is safe, technically relatively simple and in a dysplastic acetabulum it improves the conditions fora future total hip arthroplasty.

Fracture stiffness as a measure of healing in tibial fractures

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One hundred and sixty-seven consecutive patients with tibial fractures were treated with external fixation. Fracture stiffness was measured either directly or indirectly using a removable strain gauge. Analysis of the curves of the increasing stiffness in 55 patients with multiple readings indicated that the curves were generally logarithmic during the period of treatment. The measurement of stiffness enabled prediction of the rate of healing. When this was slow surgical intervention was indicated. Six patients suffered refracture following fixator removal at stiffness less than 15 Nm/deg.

It is proposed that the time to reach 15 Nm/deg could be regarded as a measure of fracture healing.

Poor results with uncemented polyethylene acetabular screw cup

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In the Slotervaart Hospital of Amsterdam in the period 1982–1987, 281 uncemented screw cups of the Endler type were implanted for total hip prostheses. The main indications were primary coxarthrosis and secondary coxarthrosis in rheumatoid arthritis.

At that time it was expected on biomechanical grounds that with this cup good long-term results might be achieved because of the good primary stability and the favorable elasticity modulus.

Until January 1991 (4–9 years' follow-up), 34 cups were revised because of aseptic loosening while two were found to display distinct signs of loosening (13%).

At revision surgery, osteolytic lesions of the acetabulum and damage to the outside of the cup were observed frequently. Histological examination of the intermediate layer, between bone and cup revealed a foreign-body inflammatory reaction with enclosed polyethylene particles. Sometimes this was also found round a loose femoral component.

In our opinion the foreign-body reaction was the cause of the osteolysis and the loosening of the cup.

Conclusion: Polyethylene is insufficiently biocompatible to be applied in direct contact with bone.

Immediate functional treatment after reconstruction of the anterior cruciate ligament

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Thirty-five patients were followed in a prospective study after an intra-articular reconstruction of the anterior cruciate ligament with a central patella-tendon graft. A few days postoperatively weightbearing mobilization without a brace was started and complete weightbearing was permitted dependent on hydrops, muscle strength and coordination. The mean duration of follow-up was 27 months. Complete weightbearing was possible after an average of 5 (2–10) weeks.

Running was possible after an average of 10 (4–16) weeks. Nineteen patients resumed their athletic activities after an average of 6 (3–9) months. Thirty-three knees had a good objective stability as measured with KT 1000. The mean postoperative Lysholm score was 85.

The mean Tegner score was 7.8 prior to operation, 3.3 after the initial injury and 6.5 at follow-up.

Conclusion: It may be concluded that immediate functional treatment has no adverse influence on the stability of the knee.

Surgical treatment of idiopathic carpometacarpal arthrosis of the thumb

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In the period 1980–1989, 40 patients were subjected to a total of 47 operations because of idiopathic CMC arthrosis of the thumb. Resection arthroplasty with autologous tendon interposition (Sardellen) was performed in 24 thumbs and arthrodesis of the CMC-1 joint with temporary external fixation in 23 thumbs. The two groups were comparable as to age and sex distribution. The mean follow-up periods were 3 and 7 years, respectively. Three patients from the arthrodesis group underwent a revision arthrodesis because of pseudarthrosis. The follow-up examination consisted of a questionnaire, function studies, measurements of force and radiographic examination.

Subjectively, the patients with a Sardellen plasty scored significantly better than those with an arthrodesis operation. Twelve patients were dissatisfied: three from the Sardellen group and nine from the arthrodesis group.

Objective examination, in the form of a function study and force measurement, revealed no significant differences between the two patient populations. Seven complications occurred: wound infection once, Sudeck dystrophy twice and pseudarthrosis four times.

Conclusion: In view of the better subjective scores and the equivalent function and force in this study, the Sardellen plasty is to be preferred to arthrodesis of the CMC joint of the thumb.

The radiographic results of the uncemented endomedullary prosthesis type Kotz Modular Femoral Tibial Replacement (KMFTR)

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At the Rizzoli Orthopedic Institute in Bologna, 266 KMFTR prostheses were implanted between 1983 and 1988. The prosthesis is used in surgery of primary bone tumors, metastases and systemic diseases and in revision operations. Most of the patients had primary bone tumors. 143 patients were followed up radiographically for 2 to 7 years with the aid of the Enneking evaluation form. The five criteria taken into account in this form are:

1) bone remodelling, in which bone growth round the prosthesis was assessed;
2) interface, with attention paid to the presence, localization and width of radiosclerotic or radiolucent lines;
3) fixation of the prosthesis; anchoring, (in)stability and deformation of the prosthesis are the main relevant issues;
4) articulation of the prosthesis, with much attention paid to wear of the polyethylene bearing bushes;
5) architecture of the implant, paying special attention to fractures of screws (and prosthesis).

Each of these five criteria scores from 0 (bad) to 5 (excellent). Consequently, a patient can maximally score 25 (=100%). The prosthesis was implanted into the proximal femur (31), the distal femur (86) and the proximal tibia (26). In four patients, the prosthesis loosened radiographically and the screws broke. These patients were not reoperated on because the clinical findings did not justify this.

Following loosening, which occurred between 0.5 and 2.5 years after implantation, the prosthesis sank further into the bone and found a new fixation site. The bone hypertrophied and the radiographic results were 60%, 64%, 56% and 88%, respectively, while the clinical results were good. Five prosthesis stems broke off (20–50 months postoperatively), four times at the site of the distal femur and once, in a proximal tibia prosthesis. These implants were revised successfully with the following radiographic results: 100%, 100%, 68%, 100% and 92%. In one of the prostheses, the articulation fulcrum broke, and this, also, was revised successfully with a radiographic result of 92%.

Orthopedic problems in the Dutch Gaucher patients

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Gaucher's disease is a rare autosomal-recessive hereditary lysosomal lipid storage disease and is due to congenital deficiency of the enzyme glucocerebrosidase. The disease is characterized by accumulation of glucocerebroside in cells of the reticuloendothelial system, leading to hepato- and splenomegaly and to infiltration of the bone marrow.

In 1989 and 1990, an enquiry was conducted among the 33 Gaucher patients known in the Netherlands, all members of the Dutch Gaucher Association, and they were asked to give permission for their medical and radiological data to be requested from the treating physicians. Of the 32 patients willing to cooperate, the records, correspondence and radiographs were requested and mostly obtained.

The study group consisted of 12 males and 20 females ranging in age from 12 to 70 years. Hepatosplenomegaly was the most frequent first symptom of the disease. Other first symptoms were unexplained hemorrhagic diathesis, thrombocytopenia and pancytopenia.

Orthopedic problems were present in 28 persons. Spinal abnormalities, aseptic bone necrosis, especially of the head of femur or humerus, pseudo-osteomyelitis, osteomyelitis and pathological fractures were the most frequent orthopedic problems and of these, the aseptic bone necrosis and osteomyelitis were the most crippling conditions. Radiologically demonstrable skeletal abnormalities were present in 29 of the 32 patients. Most characteristic were Erlenmeyer deformation of the long bones, patchy sclerosis of the bone and major secondary arthrosis of the hips, knees and shoulders.

Apart from survey radiographs, useful examinations were NMR imaging in particular, and to a less degree gallium and technetium scanning. So far, Gaucher's disease can only be treated symptomatically. The extremely expensive enzyme, ceredase, has recently become available to a limited extent. Possibly, the characteristic orthopedic lesions of Gaucher's disease may one day be something of the past.

Human histology of hydroxyapatite coated hip prostheses

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The effectiveness of hydroxyapatite (HA) coatings for fixation of implants is supported by experimental histology. However, only little material is as yet available regarding the behavior of HA coatings in vivo in humans. The present study describes the histology of six HA coated Osteonics Omnifit femoral prostheses (50 μ HA coating) all obtained at autopsy from patients deceased of causes not connected with their hip condition. The material included one revision and five primary implantations with implantation periods of 4, 5, 6, 9, 14 and 25 months, respectively. All implants had functioned clinically without problems. Histological processing without decalcification to sections of 50 m. The thickness of the HA coating was measured circumferentially in all sections.

Results: hydroxyapatite was present on all explants with a mean thickness of the coating of 40 m. 'Delamination' of coating material was not found. There was no correlation between mean coating thickness and duration of implantation. There was a uniform layer of adherent bone over the HA coating measuring from 32% to 78% of the circumference per section. Over 60% on average of the available HA coating surface showed osseous integration. Bone remodelling was seen in all sections with osteoclast channels extending to/into the HA coating. Foci of osteoclast resorption of the HA coating were seen. Quantitatively this accounted for less than 10% of the surface after two years. At these sites, direct osseous integration between titanium and bone was observed. No interposition of connective tissue between HA coating and bone was observed, nor were any foreign body reactions.

Conclusion: up to at least two years after implantation of a HA coated prosthesis in humans coating of relatively uniform thickness and quality is present. The lack of correlation between coating thickness and duration of implantation suggests a minimal early loss of HA coating material to the extracellular fluid. The presence of osteoclasts with focal loss of HA does suggest strongly that in time a cell-bound (osteoclast) absorption of the HA coating will occur as part of the bone remodelling such as it occurs always and everywhere else in the body. In the process, HA is replaced gradually by natural bone without any adverse effect on the quality of osseous integration of the prosthesis.

Results of hydroxyapatite coatings at revision operations

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The good osteoconductive qualities of hydroxyapatite (HA) render the use of HA in revision surgery of the hip attractive.

This paper describes the clinical and radiological results of the first 50 patients in whom a HA coated hip prosthesis was implanted after loosening of a cemented (n=22), uncemented (n=14), double cup (n=4) or infected (n=10) hip arthroplasty. Multirevisions were involved in 21 cases.

The patients were evaluated prospectively with an average follow-up of two years. Mean age was 55 years, male/female ratio 1:1.Right/left ratio 3:2. No complications

regarding method of implant fixation. Three prostheses of the infected group had a recurrent infection, two of these were removed again after 2 and 3 weeks, respectively. The mean Harris hip scores were 74 after 3 months, 84 after 6 months, 93 after one year and 97 after 2 years. Residual pain after 2 years in 4%. The pattern of radiological signs of ingrowth is far more irregular than after primary implantations, but the rapid and reliable regeneration of bone round the HA coated components was noticeable. According to the radiological ingrowth criteria of Engh, all patients showed bone ingrowth after 2 years. Measurements of implant positions revealed no migration, while measurements of bone mass showed a distinct increase of both bone thickness and density round the stem. No formation of radiolucent lines round the HA coated part of the prosthesis.

Conclusion: the 2-year clinical results of HA coated total hip prostheses for revision indications are excellent. The spontaneous recovery of bone mass was particularly striking. No early mechanical loosening of HA coated revision prostheses was seen, but the risk of recurrence of infection in infected implant revisions is high.

Three-year results of hydroxyapatite coated hip prostheses

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Earlier experimental study had shown hydroxyapatite (HA) coating to be a reliable method for implant fixation. Human implantations have been performed since 1986. This paper describes the clinical and radiological results in the first one hundred patients with a HA coated primary total hip prosthesis. Prospective evaluation with follow-up of at least 3 years. Mean age 53 years, diagnosis mostly primary arthrosis, male/female ratio 1:2. After treatment immediate mobilization with full weightbearing.

No complications regarding method of implant fixation. Two reoperations after one year, one to remove calcifications and one for exchange of cup because of habitual dislocation of the prosthesis. Mean Harris scores 91 after 3 months and 98 after 1, 2, 3 and 4 years. Mean ADL level is high. Residual pain after 3 years in 3%.

Roentgenologically ingrowth is present from the third month, beginning over the distal half of the HA coating. Spread to proximal coating from 6 to 12 months and osseous integration over part of uncoated distal prosthesis stem from 2 years, with increase of bone mass. According to Engh's radiological ingrowth criteria bony fixation at the femoral component present after one year in 97% and after 2 years in 100%. Ingrowth at the acetabular component is slower, but here, also, after 3 years there were positive signs of osseous integration in 96%. Measurement of implant positions showed no migration. No formation of radiolucent lines round HA coated part of the prosthesis. In the first year there is a positive correlation between rate of bone ingrowth and clinical results.

Conclusion: the very good quality of osseous integration of HA coated hip prostheses is reflected in the good clinical results.

The accessory soleus muscle

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The accessory soleus muscle (ASM) is a rare anatomical variant which causes a posteromedial swelling of the ankle. Pain and swelling are the main symptoms.

In the literature, pain is ascribed to the marginaL vascularization of the muscle, although neurovascular compression has also been described. For the diagnosis, MRI scanning is to be preferred if available. CT scanning will also lead to the correct diagnosis. There is no consensus on treatment. Mostly, fasciotomy of the ASM and extirpation are carried out. Since for fasciotomy there has to be suspicion of a compartment syndrome, pressure in the ASM was measured in four of the five patients. No abnormal variations of pressure were demonstrated.

In our opinion, extirpation is the most reliable treatment when complaints persist. The ASM was removed in four patients who so far have remained free of complaints.

Surgical treatment of metatarsalgia

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In Maastricht University Hospital a retrospective study was made of the results of surgical treatment of metatarsalgia not responding to conservative treatment. The operations were carried out in the period 1978 to 1988, on 63 feet of 50 patients. The operation consisted in oblique osteotomy of the IInd, IIIrd and IVth metatarsal bones as originally described by Helal.

Forty-six patients with 58 operated feet were followed up. Thirty of the 58 operated feet were free of pain and 39 of the 58 feet had been operated to the patients' satisfaction.

The modified Duquennoy operation in chronic anterolateral insufficiency of the ankle

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In the Gemini Hospital of Den Helder between 1983 and 1990, 232 Duquennoy-operations of the anterolateral ligaments of the ankle were carried out in 214 patients. A questionnaire was sent to 212 of these. One hundred and forty-three reactions (67.5%) were received. Seventeen patients had been operated on both ankles, so that the total number of operated ankles was 160. The group consisted of 87 females (60%) and 56 males (40%) with a mean age of 27 (11–64) years at the time of operation.

For an average of 2.7 years before operation they had had one or several of the following complaints: giving way, pain, swelling or unreliable feeling of the ankle. Mean follow-up was 3 (0.5–6.5) years.

Of the patients polled, 91% were satisfied or reasonably satisfied with the ultimate result of the operation. Satisfaction proved to depend on a number of factors such as age of the patient, duration and nature of the preoperative symptoms and the level of sports practised.

Conclusion: The modified operation of Duquennoy is a reliable treatment of insufficiency of the anterolateral ligaments of the ankle.

Indications for hemi-arthroplasty of the hip in relation to the patient's mental condition

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In the St Franciscus Hospital of Rotterdam, in the period 1979–1988, 543 patients were subjected to a Thompson hemi-arthroplasty because of a medial fracture of the neck of the femur. A considerable proportion of these patients came from psychogeriatric institutions. The objective of this retrospective study was evaluation of the results of the treatment with regard to survival and mobility. There were 428 females and 115 males. The mean age was 81 years. Of these patients, 40% suffered from senile dementia. The Cox multivariant analyse of survival showed that senile dementia was the only statistically significant factor (hazard ratio = 0.7525, $p < 0.024$). Mortality after 6 months amounted to 34% for patients with and to 17% for patients without dementia. The mortality rates after one year were 44 and 24%, respectively. The functional result was defined as the difference in mobility before and 4 months after operation. In the group of aged patients without dementia, 98% were capable of independent mobility before operation. Four months after operation, 91% were capable of walking. Of the group with dementia (n=156), 90% prior to operation were mobile, with or without an appliance. After operation, only half of the patients could be mobilized satisfactorily.

Conclusion: Thompson hemi-arthroplasty of the hip is a major operation. In view of the low probability of survival and the disappointing functional result, operation should not always be regarded as indicated for a medial fracture of the femoral neck in the patient with dementia. A less radical surgical technique, or even just alleviation of pain in our opinion are justified alternatives.

Benign lesions presenting as malignant tumors

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The objective of this study was to determine factors for the differentiation between malignant and benign bone lesions, so that expensive, unpleasant and—in retrospect— unnecessary staging studies for biopsy can be avoided. A retrospective study was made of the data of patients admitted for biopsy on the suspicion of a bone malignancy between 1980 up to and including 1990. A more detailed study was made of the patients with bone lesions which at biopsy of the lesion ultimately proved to be histologically benign: 31 patients with a mean age of 12 (1–42) years. Most lesions were localized in the meta-diaphysis of the long bones. The preoperative diagnoses were Ewing sarcoma in 15 patients, osteosarcoma in 5, giant-cell tumor in 2, one malignant fibrous histiocytoma and malignant bone processes without further specification in 8. The ultimate diagnoses were subacute osteomyelitis in 19, reactive process in 3, ossifying myositis in 2, stress fracture in 2, osteoid osteoma, eosinophilic granuloma, non-ossifying fibroma, aneurysmal bone cyst, and an old hematoma in one each. No differentiation between benign and malignant lesions proved possible on the basis of symptoms, duration of symptoms, localization, laboratory tests and radiographs. Treatment included cleansing and antiobiotics. With one exception, all patients recovered completely.

Conclusion: In this group, no statements concerning a malignant or benign nature could be made on the basis of the parameters investigated. In case of doubt concerning the malignancy of the bone process, advice should be requested from an oncological center or the Bone Tumors Commission, before resorting to staging. After evaluation and possibly CT scanning, biopsy with frozen section and culturing may be performed.