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Recurrent shoulder dislocation: Comparison of early results obtained by three operative techniques

A. B. Wymenga and W. J. Morshuis

Andreas Hospital, Amsterdam, The Netherlands

The results after operation for recurrent shoulder dislocation in 51 patients treated by coracoid transposition according to Bristow-Latarjet were compared with those in 37 patients treated according to Putti-Platt or Magnuson Stack. The mean follow-up was 33 months.

External rotation in 90° abduction averaged 10° less in the Bristow group. General daily activities, work, and sports were resumed 6-12 weeks earlier after a Bristow operation. Satisfaction with the results of the operation was equal in all three groups. Apart from the risk of redislocation, which can be assessed only in the long run, the Bristow operation is to be preferred. It leads to recovery more quickly than the other two procedures, and this implies considerable cost saving.

The passive spatial mobility of the knee joint

L. Blankevoort, R. Huiskes and Th. J. G. van Rens

Biomechanics Section, Experimental Orthopedic Laboratory, University Hospital, Nijmegen

Motions of the knee are determined by forces applied to the joint (gravity, muscle forces) and its passive mobility, which depends on the geometry and structural characteristics of the ligaments, capsule, menisci, and articular surfaces. This study focuses on the passive mobility of the knee and the relative contribution of the joint structures to this. This is regarded as important for the development of operative procedures and joint and ligament prostheses. The spatial motions of five fresh cadaver knees were determined by means of a specially developed device for applying external forces to the knee and a radiostereophotometric system for accurate measurement of motions.

It was confirmed that the knee has two degrees of freedom – flexion and external/internal rotation – which are mutually independent. The results of this study clearly show the importance of the mobility determined by these two degrees of freedom. It was found that, within this mobility, the knee joint is in fact not stable. This is why muscular function is important to ensure stable motions. It was also found that the screw-home rotation of the knee is not a property of the joint as such. The forced external rotation during the final phase of extension can be explained as the result of a combination of muscle forces and passive spatial mobility.

Hydroxylapatite coatings for metal hip prostheses

K. de Groot

Biomaterials Department, Free University, Amsterdam, The Netherlands.

Ceramic implants consisting of hydroxylapatite ($Ca_{10}(PO4_6(OH)_2)$), the mineral most widely found in bone, have long been successfully used in surgery for filling small bone defects. After implantation in bone tissue, the bone grows directly against the implant and a strong bone/implant surface link develops.

However, the disadvantage of ceramic hydroxylapatite is that it does not withstand bending forces, so that its application has so far been largely limited to minor operations in oral surgery and otorhinolaryngology.

In view of this, a process was developed that makes it possible to apply a very thin layer of hydroxylapatite (about 30–50 microns) to a metal object. In this way the good mechanical properties of metal can be combined with the biocompatibility of hydroxylapatite. Such a

composite structure opens the way to the development of biocompatible implants that can withstand bending forces. Physicomechanical measurements have shown that such a coating does not influence the mechanical properties of the implant, and animal experiments have revealed that such implants remain firmly fixed in bone in the absence of physical retentions. (The animal experiments were performed by R. G. T. Geesink, University of Limburg; see the following abstract.)

Biological fixation of apatite-coated prostheses

R. G. T. Geesink and K. de Groot

Department of Orthopedics, University Hospital, Maastricht, The Netherlands

Hydroxylapatite-coated titanium (HACT) was tested as material for hip prostheses. Because the composition of hydroxylapatite is the same as that of the mineral phase of natural bone, direct molecular fixation of prosthesis material to bone is possible, with histologic processes conforming to the callus formation in fracture healing.

The strength of the coating, including its fixation to the substrate, compares favorably with the mechanical properties of the porous metal coatings so far used. HACT has been biologically tested in two experimental studies.

Ten dogs were submitted to insertion of smooth apatite-coated plugs (three in each femur) without any form of additional mechanical retention. After 2, 3, 6, and 12 months, histologic studies were done and the strength of the fixation to bone was mechanically tested.

In addition, a prosthesis implantation study was performed in dogs. A total hip replacement was developed for dogs and optimized for uncemented fixation to bone. For a specific study of the coating effect, the right hip replacement was coated while the left hip was used as a control with an uncoated conventional uncemented hip prosthesis.

The results of the plug study show that good bone growth occurred within 6 weeks of implantation without formation of connective tissue at the implant/bone interface. Examination with the scanning electron microscope confirmed the closeness of the bone/implant link. Pull-out tests sometimes caused fracture of adjacent bone and sometimes detachment of the coating at very high stress values (exceeding 70 MPa).

The implantation study revealed a significant difference in interface strength in favor of the coated version after only 3 weeks. Histologic findings were similar to those in the plug study. No adverse biological effects were observed.

Fixation of cemented and uncemented hip prostheses studied in an animal experiment

J. de Waal Malefijt, T. J. J. H. Slooff and R. Huiskes

Department of Orthopedics, University Hospital, Nijmegen, The Netherlands

Little is known about the early development and significance of the interface between uncemented endoprostheses and bone tissue immediately after operation. For more information the early reactions of adjacent bone tissue during the first weeks following implantation of a cemented or uncemented femoral endoprosthesis were studied in the African mountain goat.

In one group of goats a metal head-neck prosthesis was implanted and cemented via a standardized operative approach; in the second group of goats an uncemented plastic prosthesis was made to measure and implanted.

The animals were successively killed at 1-week intervals until 6 weeks after the operation. The locomotion of the animals was studied during this period.

Immediately after the operation the animals with a cemented hip prosthesis put full weight on the leg; the majority of the animals with an uncemented prosthesis did not walk naturally until after 6 weeks.

Histologic examination revealed that initial necrosis of bone was more extensive in the cemented than in the uncemented group. Microangiography and fluorescence microscopy showed that this necrosis disappeared more quickly in the uncemented group.

Results of intertrochanteric shortening osteotomies in the treatment of leg length differences in adults

M. G. A. Frenkel, P. P. Besselaar and E. L. F. B. Raaymakers

Academic Medical Center, Amsterdam, The Netherlands

Thirty-three patients (19 males and 14 females) – with a mean age of 25 (16–63) years, a mean height of 172.5 (166–185) cm, and a mean leg length difference of 4.5 (2–11) cm. – have been treated since 1974 by an intertrochanteric shortening osteotomy averaging 3.2 (2–5.5) cm according to the AO method. Motives to shorten rather than lengthen were the condition of the soft tissues, additional abnormalities, socioeconomic motives, and the patient's understanding of the disease. Causes of the leg length differences were trauma (23 cases), growth disorder (4 cases), and hypoplasia (6 cases). In view of the additional lesions in the first two

groups, 13 operations were performed prior to the intertrochanteric shortening osteotomy. Before the operation most patients were wearing special shoes and their general daily activities were affected. The osteotomy was combined with a derotational and/or varus correction in 7 cases, and with lengthening of the contralateral leg in 2 cases. The aim was to achieve equal leg length except in patients with arthrodesis of the hip.

There were no postoperative complications. All the patients were putting their full weight on the treated leg after 3 months. At follow-up 8 months to 10 years (mean 6 years) after the operation, all the patients proved to have been corrected as planned. Limitations in general daily activities were markedly improved. No patient regretted the operation or had any problems with the disproportionate habitus.

Conclusion. Intertrochanteric shortening osteotomy is a good (and sometimes the only) alternative. The AO method is accurate, safe, and quick.

Pain in the leg and walking disorders – back, hip, or both?

P. F. van Akkerveeken

Military Hospital "Dr. A. Matijsen," Utrecht, The Netherlands

Between April 1981 and April 1984, 118 patients underwent an operation for lumbar stenosis, while during the same period 324 patients underwent total hip replacement for arthrosis of the hip. Only 14 patients of this group had pain radiating to the inguinal region, to the knee along the anterior aspect of the thigh, sometimes combined with pain along the posterior aspect to the thigh, sometimes as far down as the foot, which increased during walking and prolonged standing.

Such a pain pattern may be ascribed to arthrosis of the hip, but may also result from compression of a lumbar root due to degenerative stenosis of a foramen.

Nine of these 14 patients showed electromyographic changes; in 8, degenerative stenosis of a foramen due to arthrosis of the facet joint and compression of a root was demonstrated. One patient was found to have a protruding disc with root displacement, although there was no radiographic evidence of degenerative stenosis. In this case, differential diagnosis was possible on the basis of a thecal blockade with Marcaine. Orthopedic-neurologic examination revealed no signs of root compression, but the hip-joint function was impaired and painful.

In 10 patients the symptoms disappeared in part or completely after injection of Marcaine into the hip joint; 6 patients underwent low lumbar decompression and total hip replacement in two stages. Five patients underwent only total hip replacement; two were treated solely by lumbar decompression; and 1 patient received no surgical treatment because the pain could not be located in the lumbar spine or in the hip by means of Marcaine blockades.

After a mean follow-up of 2 years and 8 months, 1 patient still complained of pain in the lateral aspect of the leg; 12 patients were free from pain and living normal lives according to their age; 4 patients had incidental complaints about the back.

The series of patients so examined and treated by total hip replacement, as well as lumbar decompression, has meanwhile increased to 38. The results continue to be good and in accordance with the conclusion based on invasive examinations.

Ruptures of the posterior ligament complex at the thoracolumbar junction

S. de Lange and R. J. Sanders

Westeinde Hospital, The Hague, The Netherlands

Ruptures of the posterior ligament complex at the thoracolumbar junction seem to be a rather forgotten group of lesions. Particularly if there is a compression fracture of the lower vertebra, the extent of the lesion is often underestimated and there is a tendency to institute functional treatment of the osseous lesion.

Posterior ligament complex ruptures accounted for three out of a total of 80 fractures at the thoracolumbar junction treated at the Westeinde Hospital. In addition, 3 patients had persistent complaints after treatment elsewhere.

The basic fracture mechanism was flexion with more or less distraction and in some cases rotation. With marked distraction a pure rupture of the posterior ligament complex occurred, and in this case the disc and sometimes the end plate of the disc also showed damage. With only slight distraction a rupture of the posterior ligament complex with compression of the upper end plate of the lower vertebra was seen, whereas the disc was intact.

Neurologic lesions were not observed. The level affected was always T12–L1 or L1–L2. After diagnosis the vertebral column was first repositioned by placing a pillow beneath the thoracolumbar junction. The alignment of the column was thus fully restored to normal. The next therapeutic step was compression osteosynthesis of the affected segment. We believe that even longer standing lesions with pain and kyphosis up to about 25° are best approached from behind by a compression osteosynthesis. Some correction of the kyphosis is certainly possible in such cases, and the pain depends largely on the abnormal mobility of the segment involved rather than on the kyphosis.

Meniscectomy in patients older than 65 years

K. de Rooy

Ignatius Hospital, Breda, The Netherlands

In a retrospective study the results of meniscectomy in patients older than 65 years were evaluated with special reference to radiographic arthrosis.

Between 1973 and 1982, meniscectomy was performed in 46 knees in 43 patients older than aged 65 years. The diagnosis was established by arthrography or arthroscopy. The follow-up averaged 5.5 (2–11) years and included radiography. Two patients had died.

Results. Excellent or good in 33, moderate in 8, and poor in 5 instances. The poor results were ultimately treated by total knee replacement. Analysis of radiographic findings showed that good results were most likely in patients with a preoperative Fair-Banks score of 1–3. In all the patients with a preoperative Fair-Banks score of 4, the results were poor.

Since the introduction of arthroscopy for use at the out-patient clinic, meniscus ruptures have been diagnosed in an increasing number of arthrotic knees of elderly patients.

The conclusion is that anticipation of meniscus lesions in elderly patients, even in the presence of arthrotic changes, has led to a more exact diagnosis by means of arthrography and arthroscopy. Degenerative menisci could thus be excluded. After a mean follow-up of 5.5 years, good to excellent results were observed in all but the severely arthritic knees.

Operative technique for reduction and stabilization of juvenile spondylolisthesis

C. M. T. Plasmans and H. Wijffels

Onze Lieve Vrouwe Hospital, Amsterdam, The Netherlands

The operation is performed in two stages. Bilateral decompression of the S1 root is followed by dorsolateral spondylodesis. Reduction of L5 in relations to S1 is then achieved in 2 weeks by traction according to Scaglietti.

Reduction is performed via a transabdominal approach and fixation is ensured with an AO screw. Immobilization in a plaster cast is required.

Consolidation was achieved in all 7 juvenile patients thus treated with permanent correction after 2–5 years. The ultimate reduction achieved at the second operation was less than expected.

Bone tumor biopsy techniques

J. W. van der Eeijken and A. H. M. Taminiau

Onze Lieve Vrouwe Hospital, Amsterdam, and University Hospital, Leiden, The Netherlands

Biopsy is probably the most crucial aid in the diagnosis of many lesions of the skeleton and of the soft tissues. Adequate therapy is impossible without a correct diagnosis. When a malignant tumor is suspected, staging by means of tomography, CT-scan, bone scan, and, if necessary, NMR and angiography is required before a biopsy is performed.

At operation the contaminated biopsy tract is to be excised in continuity with the tumor. In the case of an amputation, this poses no problem. However, limb-saving operations are performed more and more often in the treatment of malignant tumors of the extremities.

Very often an incorrectly localized biopsy site precludes a limb- saving operation. The incision for resection often has to be so displaced that a risk of skin-flap necrosis arises. For proper localization of a biopsy site the surgical possibilities should be considered in advance. In the case of doubt, it is always advisable to consult one of the oncologic centers.

Rheumatic patients with replacements of both hips and knees

J. A. G. van der Laar and K. J. Hamelynck

Slotervaart Hospital, Amsterdam, The Netherlands

During the period 1978 through 1985, both hips and knees were replaced in 24 rheumatic patients: 19 women and 5 men with a mean age of 60 (41–76) years. Five patients died of causes not related to the procedure. The remaining 19 patients were followed up over a mean period of 3.5 years.

The aim of the study was to establish whether joint replacement causes significant improvement in these cases, and to determine the factors influencing the results.

Subjective results: Pain was the principal complaint of 16 of the 18 patients who reported pain; inability to walk was the principal complaint of 3 and the second-ranking complaint of 12 patients. In 13 patients marked overall improvement was reported, in 5 improvement, and in 1 patient no change. Pain was much improved in 13 patients, improved in 4, and unchanged in 1 patient. Walking was much improved in 5, improved in 9, and unchanged in 1 patient. Mobility was improved in 17 of the 19 patients; it was good to very good in 15, moderate

in 3, and poor but improved in 1 patient. These patients rarely walked up and down stairs or outdoors.

General daily activities were not significantly influenced by improvement in the lower limbs, but largely depended on the upper limbs. All the patients stated that they would be willing to submit again to the entire procedure.

Objective results: Good in 14 patients, moderate in 3, and poor in 2. Good results depend on a good operative technique, good timing of the operation, and only to a slight degree on rheumatic disease activity. Moderate results were explained by a loosened prosthesis component at the time of follow-up and a post-patellectomy situation. Poor results were almost exclusively due to a wheelchair period exceeding 5 years. The technique played no role in these patients, and rheumatic disease activity was low.

Neuroorthopedic treatment of low back complaints

M. W. M. Breenninkmeijer

Oosterhout Hospital, The Netherlands

The loss of disc height involved in a normal degenerative process affecting a motor segment in the back can lead to a) abnormal mobility (instability) with traction spurs, b) arthrosis of facet joints, c) foramen stenosis, d) stenosis of the spinal canal. The last two are mainly due to bulging of the disc or swelling of the arcuate ligament. Whether neurologic problems develop depends mainly on the primordium of the vertebral canal. An excessively narrow vertebral canal is more likely to cause problems. If conservative treatment of neurologic symptoms fails, then intervention is necessary.

For patients with a wide vertebral canal and a slipped disc without sequestrum, a chymopapain injection was preferred. A slipped disc with sequestrum was treated with decompression and distraction spondylodesis if a previously normal disc was expected to slip further. This posterolateral spondylodesis was initially combined with instrumentation with Knodt rods (in 5 cases), but subsequently always with a rectangle.

A total of 130 patients were treated, the overall results being good in 111, moderate in 10, and poor in 9. Of the 44 operations without spondylodesis, 38 produced good, 2 moderate, and 4 poor results. Of the 5 spondylodeses done with Knodt rods, 2 had poor results. Of the 81 patients treated with rectangle instrumentation, 70 showed good results, whereas results were moderate in 8 and poor in 3 patients.

Results can be described as encouraging after a follow-up of 6 (1- 12) months. We have abolished the previously used Hartshill rectangle in favor of a modified Mecron rectangle, which is believed to give better distraction and stabilization.

Treatment of tibial fractures with a custom made functional brace.

W. M. van Leeuwen

Rotterdam Accident Hospital, Dijkzicht,
The Netherlands

From July 1980 to December 1983, 176 patients with tibial fractures were treated with a functional below-the-knee brace made of Orfit (a new thermoplastic material) in a prospective study. The early weight bearing was correlated with clinical and radiographic consolidation. The primary treatment of closed fractures (137) was reduction and 3 weeks with plaster of Paris; and of open fractures (39), external fixation. There were 6 types of fractures. The average time from injury to application of the brace was 26 days for closed and 48 days for open fractures. The mean time for full weight bearing was 7.4 weeks for the closed group and 12.8 weeks for the open group. Mean time for consolidation for the closed fractures was 14.7 weeks, for the open fractures, 22.5 weeks. There were 2 per cent delayed unions, which healed after fibulectomy or internal fixation. Nonunion developed in 2 per cent. Return to normal daily activities, including work, was possible for 66 per cent of the patients within 12 weeks after initial trauma. In 96 per cent of the patients, the shortening was less than 10 mm. Acceptable varus angulation less than 5° was achieved in 95 per cent, valgus in 100 per cent, apex anterior in 98 per cent, and apex posterior in 99 per cent.

At review a full year after the initial trauma, all the patients had a full range of motion of the knee; 2 per cent had a reduction of ankle movement more than 15 degrees. Subtalar movement was the same as in the contralateral joint in 94 per cent.

A highly significant correlation ($P<0.001$) between early full weight bearing and clinical and radiographic consolidation was seen. Walking and standing was unlimited in 92 per cent, and 94 per cent of the patients were satisfied with the method of treatment.