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The annual meeting of the Norwegian Orthopedic Society is arranged in Oslo in October as a section of a joint meeting for all the Norwegian Surgical Associations. Every second year, a spring meeting is arranged outside Oslo. In 1987, the spring meeting was held in Ålesund, a town situated on the west coast of Norway.

The papers of the two meetings in 1987 considered mainly experimental orthopedics, fractures, arthroscopy - including knee and shoulder surgery, lesions in the spine and hip, and orthopedic oncology.

Experimental orthopedics

Limb lengthening by physeal distraction in chondrodystrophic bone: An experimental study in the canine femur

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Physeal distraction of the left distal femur was accomplished in 18 chondrodystrophic Drever dogs (age 4.5-5.5 months). An external fixation device (Sophies Minde design) of the Wagner type was used as a unilateral distraction frame. A distraction rate of 0.5 mm/day was applied for 3 weeks. Physiolysis occurred after 4 to 9 days. Five animals were killed at 3 weeks (Group 1), 10 animals at 19 weeks (Group 2), and 3 animals at 71 weeks (Group 3) after the end of distraction. After the lengthening procedure, the growth plate appeared less distinct in all the animals on radiographic examination. The gain in length obtained by distraction was significantly reduced with time due to growth retardation in the distal femur of the operated on limb. The average final lengthening was 1.2 (12.3 percent), 0.8 (7.8 percent), and 0.2 (1.6 percent) cm in Groups 1, 2, and 3, respectively. Thus, an analogous reduction in growth potential was found in chondrodystrophic bone as previously reported in animals with normal growth.

Femur from both sides was tested in torsion. The average torsional strength of the elongated femur compared with the control was 83 percent in Group 1, 98 percent in Group 2, and 107 percent in Group 3. The increased torsional strength of the lengthened bone observed in Group 3 was due to a significantly enlarged diameter attributable to the remodeling effect of an elongated bone.

Comparison between four different methods of treatment in experimental fracture healing

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Introduction: The aims of the present study of experimental osteotomies were to find out what method of treatment brought about the most rapid bone healing, and whether there were significant differences between the methods in the pattern of healing.

Material and methods: Fifty-seven Chinchilla rabbits weighing 2,430-3,655 grams were used. An open, transverse, midshaft tibial osteotomy was performed on one leg, whereas the other served as a control. Four different methods of treatment were tested: Plate fixation (16 animals), intramedullary nailing (11 animals), external fixation (16 animals), and plaster bandage (14 animals).

The rabbits were killed after 6 weeks, and bone healing was evaluated by measuring periosteal callus and by mechanically testing in 4-point bending.

Results: The amount of periosteal callus was insignificantly greater in osteotomies treated with a plaster cast and in those with intramedullary nailing, as compared with that after plating and external fixation. In relation to the strength of the control bones, the median strength of the healing bones was 107 percent after plating, 92 percent after nailing, 71 percent after plaster treatment, and 64 percent after external fixation. The difference between plating and nailing was not significant; however, the differences between these methods and the other ones were significant. The stiffness, too, was greater after nailing and plating than after plaster treatment and external fixation.

Conclusions:

1. Bone healing was more rapid after plate fixation and intramedullary nailing than after plaster cast and external fixation.
2. Periosteal callus was most abundant in bones with a plaster cast and in those with intramedullary nailing.
3. Regarding the speed of bone healing, the maturation and quality of the callus appear to be as important as its quantity.

Biomechanical studies of three locked nails

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We inserted three locked intramedullary nails – Grosse-Kempf slotted nail (n 7), Grosse-Kempf unslotted nail (n 7), and AO/ASIF locked nail (n 6) – randomized and pairwise into cadaveric femora. The length of the nails was 44 cm and the diameter 14 mm. The femora were reamed to 15 mm and a 10-cm defect was created in the middle of the bone. Two pairs of femora served as controls. The bone mineral density of the femora was determined by quantitative computerized tomography GE 8800 (Alho et al. *Clin. Orthop.*, in print). The bones were tested to torsion in an Instron machine, speed 15°/min.

The torsional moments at 30° were similar in the slotted GK and AO groups: 11.0 ± 6.3 and 8.4 ± 4.6 Nm, respectively ($M \pm SD$). The moments of the unslipped GK nails were significantly higher 49.7 ± 8.5 Nm, but still significantly lower than those of the control bones: 133.0 ± 40.1 Nm. The torsional stiffnesses of the slotted GK nails and AO nails were similar: 9.7 ± 4.7 and 7.7 ± 4.3 Nmr^{-1} , respectively, whereas the stiffnesses of the unslipped nails and control bones were 50.7 ± 7.1 and 126.8 ± 9.0 Nmr^{-1} , respectively. The maximal moments

of the slotted GK nail and the AO nail were 25.1 ± 10.3 and 19.2 ± 3.7 Nm, respectively. The maximal moment of the unslipped GK nails was significantly higher: 65.9 ± 15.9 Nm (control 138.2 ± 40.5 Nm).

From our clinical experience, we deduct that the torque of the slotted Grosse-Kempf nail is sufficient for uneventful fracture healing. In this respect, we did not find differences between this nail and the AO nail. The possible clinical advantages of the increased rigidity of the unslipped Grosse-Kempf nail have to be weighed against the need for more reaming and the risk of distal splintering, especially in osteoporotics.

Fractures

Early fixation failure in femoral neck fractures in the elderly treated with von Bahr Screws

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The investigation was carried out as a part of continuous quality control. The results of 100 osteosyntheses with special regard to early redislocation (within 3 months) were compared with those obtained by earlier methods (Thornton nail, three Gouffon pins, and three Mecron screws). After accurate reduction, a percutaneous osteosynthesis was performed using two von Bahr screws. All the patients were over 70 years of age (mean 81 years), the female:male ratio was 4:1. Sixty-three patients were admitted from their homes, and 93 patients were mobile with or without walking aids. Seventy-five fractures were classified as Garden 3 or 4. The mean operation time was 29 minutes, and the average hospitalization was 14 days. There were no wound infections. Five patients died.

Within 3 months, 13 patients were reoperated on for redislocation. In 2 patients a reosteosynthesis was performed using a Richard's sliding hip screw; 10 hips were replaced with a Hastings hemiendoprosthesis, and one with a Charnley total hip prosthesis. In 1 case of screw perforation of the femoral head, the screws were removed. Eighty-two patients were able to move around, and 57 were back in their homes.

The percentages of reoperations after Thornton, Gouffon, and Mecron osteosynthesis in a similar previous series were 26, 19, and 9, respectively.

We conclude that percutaneous osteosynthesis by using two solid screws gives acceptable short-term results in the treatment of subcapital femoral neck fractures.

Fractures of the pelvic ring and acetabulum – a patient review

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Included in the study were all the patients admitted for pelvic fractures in 1983–85. Of the yearly average, 77 patients, 57 had stable ring fractures, 10 unstable ring fractures, and 10 acetabular fractures. Two thirds of the patients with stable ring fractures had one or more concomitant injuries, most often a fracture in the upper extremity. Their average hospitalization was 14 days.

Thirty patients had unstable ring fractures. Five patients without concurrent injuries required an average of 1.5 liters of blood during the first 24 hours. None of them died. Twenty-five multitrauma patients required an average of 10.2 liters of blood; 9 of them died. The main treatment of the pelvic fracture was closed reduction and stabilization with the Double-A external frame (Howmedica). In some early cases, skeletal traction on the leg of the affected side was used as well. More recently, operative posterior fixation has been used.

Twenty-nine acetabular fractures were divided as follows: posterior wall (2), posterior column (1), anterior column (4), transverse (21), and combined (1). Twenty patients with a solitary acetabular fracture needed 0.8 liters of blood during the first 24 hours, while 9 patients with concurrent injuries required 3.7 liters. No one died. Four patients were treated with open reduction and osteosynthesis, 16 patients with traction, and 9 with early mobilization. Complications were more frequent in the unstable ring fractures than in the acetabular injuries: urinary tract injuries 11 vs. 1, coagulation disorder 18 vs. 8, and ARDS 19 vs. 10.

We conclude that unstable pelvic ring fractures are severe injuries especially when combined with other injuries. Aggressive resuscitation is necessary, and fixation with an external frame is an emergency procedure to reduce blood loss. To improve the results, the treatment of unstable ring and acetabular fractures, both which are relatively rare, should be centralized to a few hospitals.

Arthroscopy, knee and shoulder surgery

Arthroscopy in an outpatient clinic

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We have analyzed the arthroscopic activity in an outpatient clinic. One hundred randomly selected patients

who were submitted for an arthroscopic examination were studied. In this series, there were 54 men and 46 women aged 34 (18–67) years. In the waiting period before arthroscopy, 16 of these were improved to such a degree that they did not find it necessary to undergo an arthroscopic examination. Diagnostic arthroscopy was performed in 42 patients. In the remaining 42 patients, therapeutic arthroscopy was performed: small tears of the meniscus were resected in 27 cases, bucket-handle tears of the meniscus were resected in 10 cases, and in 5 patients another form of arthroscopic surgery was performed. The study indicates that in doubtful cases an expecting attitude is justified. However, when small tears of the menisci are found at arthroscopy, good results are obtained by local resection.

Posterior shoulder dislocation diagnosed by CT

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Posterior dislocations of the shoulder are rare conditions. For diagnostic purposes, such patients can be examined by computed tomography. In 2 cases a posterior dislocation of the shoulder was diagnosed by CT, which also showed a typical, but inverse Hill-Sachs' deformity. In another 2 cases with symptoms due to posterior subluxations of the shoulder, the condition was diagnosed when the patients voluntarily dislocated the shoulder. In all the cases the CT examination was of significance for the choice of treatment.

Arthroscopic resection of the acromion

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Subacromial impingement syndrome is treated by resection of the acromion and of the acromioclavicular ligament. In 8 patients, we have performed this operation by an arthroscopic technique. The arthroscope was inserted into the subacromial space via a posterior portal and the instruments via a lateral portal. The thickened bursa beneath the acromion was cleaned off with a debrider. The acromioclavicular ligament was identified and cut with a meniscal knife close to its acromial insertion. The acromion was then resected with a 5- or

6-mm diameter burr. The arthroscopic procedure was followed by an open operation to check what we had achieved arthroscopically. With the arthroscopic technique, the acromions were insufficiently resected anteriorly and laterally in all the cases, the central parts were adequately removed in 4 out of 8 cases. The acromion-coracoid ligament was totally divided in 2 cases. Our last cases were the most sufficiently treated, demonstrating that the arthroscopic technique has a "learning curve."

We conclude that arthroscopic subacromial decompression is a difficult procedure. The visualization of the acromioclavicular ligament and the anterolateral parts of the acromion can be a problem.

Five-year follow-up after extraarticular lateral stabilization of the knee a.m. Losee

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During the period 1979-1982, 35 patients were operated on a.m. Losee. Two patients were reoperated on at 2 and 3 years postoperatively because of recurrence of instability symptoms. Of the rest, 27 were available for follow-up after 5 years. The majority also were evaluated after 2 and 3.5 years by the same examiners. All the patients had a functional instability and 2-3+ pivot shift preoperatively.

At the 5-year follow-up, only 3 patients were stable regarding ALRI while 16 had a 1+ and 8 a 2+ pivot shift. Fifteen patients had instability symptoms, 7 of them also during everyday activities. At early evaluation 2 years postoperatively, three fourths of the same patients were stable regarding ALRI and only one third had symptoms of instability. The median Lysholm score was 68 preoperatively, 94 at 2 years, and 81 at 5 years postoperatively. The evaluation at 3.5 years gave values between these, suggesting a steady deterioration of the results from the 2-year evaluation. The level of activity estimated by the Tegner score was very high before injury, reduced before the operation, and increased afterwards. From 2 years on, it remained constant during the observational period.

Lateral repair a.m. Losee does not, from our experience, give satisfactory sagittal stability, and too many patients develop rotational instability during follow-up. The operation was abandoned at our departments in 1984 for the benefit of intraarticular patellar-tendon plasty a.m. Clancy.

Orthopedic oncology

Surgical treatment of bone tumors: A preliminary report

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During the period 1984-1987, we treated 45 patients for bone tumors in cooperation with the Norwegian Radium Hospital, where all the patients had their preoperative examination and chemotherapy and radiotherapy when indicated. There were 24 males and 21 females. The average age was 35 years. Eleven were in the second decade of life and 9 in the sixth decade. Sixteen tumors were malignant: chondrosarcoma (7), osteosarcoma (5), Ewing's sarcoma (2), metastasis from leiomyosarcoma (1), and "clear cell" tumor (1). Twenty tumors were classified as potentially malignant: giant cell tumors (11), osteochondroma (2), adamantinoma (2), enchondroma (2), desmoplastic fibroma (1), and synovialoma (1). Nine were benign: aneurysmal bone cysts (6), fibroma (1), osteoid osteoma (1), and Paget's disease (1).

For nearly 2 years, we have had a bone bank for deep-freezing (-70°C) of large cadaveric osteoarticular allografts. Allografts were used in 15 cases: osteoarticular allograft (9), allograft and total hip prosthesis (2), allograft segment (3), allograft and autograft (1). Resection of the pelvis and hip arthrodesis was done in 1 case, resection of the proximal humerus (metastasis from leiomyosarcoma) and reconstruction using tendon of biceps muscle and Dacronband (1). Resection/extirpation and autograft (4), resection (6), excochleation with bone cement (5), excochleation and bone chips (13).

In 3 cases, tumor infiltration made a planned limb-saving procedure impossible. In these cases, forequarter amputation, hemipelvectomy, and above-knee amputation was done.

Most of the tumors were localized in the distal femur (10) and upper humerus (8). The osteoarticular allografts in the distal femur were fixed with a long condylar compression blade-plate, and in the humerus an intramedullary locking nail was used. In the proximal femur resections, we have used an allograft and a total hip prosthesis with a long cemented femoral stem protruding 12-15 cm into the distal femur and a plate fixation between the resected femur and the allograft.

Three patients with spinal tumors had 2-stage surgery: removal of posterior elements, decompression, and internal stabilization followed by an anterior resection and fusion.

Two patients died of metastases and 1 patient with a tibia allograft had a deep infection that was controlled by antibiotics, cancellous bone grafting, and removal of interlocking screws.

In reconstructive surgery using allografts, we often see an obliteration of the osteotomy line with callus formation at the junction of the resected bone and allograft after 6 months. This procedure seems to be a useful alternative in limb-saving surgery.

Osteoid osteoma

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We have reviewed all the patients treated for osteoid osteoma at our hospital from 1956 to 1987. Until 1970, only 3 patients were found in our file. This may be due to insufficient registration. The material consisted of 11 male and 6 female patients. The mean patient age at surgery was 17 (5-45) years. The average postoperative observation time was 20 months. The localization of the tumors was proximal femur 5, mid- and distal femur 6, vertebral pedicles 2, mid-tibia 2, neck of the talus 1, and the os capitatum 1.

The average time from the onset of symptoms until a correct diagnosis was made was 15 months. Only 6 patients were admitted with a correct primary diagnosis. Other diagnoses were torn meniscus, tendinitis, osteomyelitis, enchondroma, sciatica, and idiopathic scoliosis.

Ten patients had relief of pain with salicylates, while 2 did not. The remainder had never tried this drug. Pain during rest and at night was usually present, and the pain was often referred to adjacent joints. In 2 patients with a tumor in the proximal and distal femur, arthroscopy had been performed. Muscular atrophy was frequently present.

Preoperative and postoperative radiographs were available. Bone scanning had been performed in 7 cases and was positive. CT scanning was used only twice, but successfully demonstrated the nidus. One patient had previously been operated on elsewhere, but still had pain. Also in this case, a nidus was found.

A 14-year-old girl with back pain had a scoliosis of 20 degrees. Examination disclosed an osteoid osteoma of the pedicle of the 12th thoracic vertebra. She was treated postoperatively with a spinal orthosis and the curve disappeared.

We have found that conventional radiography, supplemented with tomography and a bone scan, are sufficient in the evaluation of patients with symptoms typical of this condition. En bloc resection has been conducted in combination with autologous transplantation of bone, usually with the aid of an image intensifier to localize the pathologic process. Relief of pain occurred almost immediately in all the cases.

There were few complications. One boy with a

diaphyseal femoral tumor stumbled some days after the operation and suffered a spiral fracture of the femur. In 1 case we had a local wound infection that healed well with antibiotics. Two patients with lesions in the femoral condyles still have mild residual flexion contracture of the knee.

We conclude that complete removal of the lesion cures osteoid osteoma.

Spine

Long-term observation of patients treated for spondylolisthesis with intertransverse (posterolateral) fusion

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In 1976, the first 97 patients operated on for spondylolisthesis in our hospital with intertransverse fusion were examined. With an observation time of 4 years, more than two thirds of the patients were asymptomatic or had improved. Eighty percent of the patients had resumed their work or former activities, and 90 percent of the fusions seemed radiographically healed.

In 1986, we were able to evaluate 89 of the 97 patients from the former study, now with a mean observation time of 13 years. To be able to compare the results, the present study was done in exactly the same way as 10 years earlier, with an interview formula answered by the patient, and review of the hospital records and radiographs. With most of the patients, the condition had changed very little compared with the situation 10 years ago, because still somewhat more than two thirds of the patients were satisfied with the treatment result. Of the patients with an unfavorable result, more than half appeared to have a pseudarthrosis or resorption of the transplants. So far, in 12 percent of the patients, a pseudarthrosis has been diagnosed. Some needed a CT investigation in addition to traditional radiographs to have this diagnosis established. The results of posterolateral refusion in 10 patients were somewhat disappointing, as only 4 patients became asymptomatic after the reoperation. Of the patients with an unsatisfactory long-term result, women and the elder patients seemed to make up the majority, whereas the degree of slip seemed to bear no influence on the end result.

Conclusions: The results of intertransverse fusion for spondylolisthesis seems to change little during the span from 4 to 14 years with respect to the patients' subjective symptoms. In more than two thirds of the cases, the result was satisfactory. Some nonunions not demonstrable by radiography were revealed by CT, which

should be considered in patients with persistent complaints after fusion. If the indication for refusion seems strong, one should consider using another method, for instance, anterior interbody fusion.

The long-term effect of Boston brace treatment in progressive idiopathic scoliosis

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In a retrospective study the development of scoliotic curves in idiopathic scoliosis during and after treatment with the Boston brace was assessed. Totally, 200 cases of progressive idiopathic scoliosis started treatment with the Boston brace in our hospital through the years 1977-1980. The patients were followed up by clinical and radiographic controls at 4-month intervals. In 8 patients the scoliosis increased seriously despite brace treatment, and spondylofixation a.m. Harrington was performed. The average period of brace treatment was 32 months. At controls after weaning of the brace, with an observation time of 1.5-2 years or more than 2.5 years, the average prebrace value of the scoliotic curve was reduced from 32.8 degrees to 29.5 and 29.9 degrees, respectively. This correction was significant ($P < 0.05$). The primary correction of the major scoliotic curve during brace treatment was used as a parameter of the flexibility of the curve. Primary correction of < 30 percent was assigned as bad flexibility (BF). Correspondingly, a correction of 30-70 percent was assigned as good flexibility (GF), and a correction of > 70 percent was characterized as excellent flexibility (EF). Longitudinal studies of the development of the curves in the three flexibility groups revealed significantly different pathways as to long-term correction results. Primary correction of a major curve > 30 percent during brace treatment indicated that a significant long-term reduction of the scoliotic curve would be obtained after weaning. We concluded that the Boston brace treatment is effective for stopping progression of idiopathic scoliosis.

Facet fracture caused by hyperextension injury of the lumbar spine: A case report

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Spinal injuries among athletes are not uncommon, and participants in diving and gymnastics appear to be particularly at risk. The combination of forced hyperex-

ension and the start of hard training at an early age is supposed to be the main reason. According to the literature, repeated hyperextension injuries of the lumbar spine may cause spondylolysis or increasing spondylolisthesis in the presence of spondylolysis.

An 18-year-old female had been active in gymnastics since she was 4 years old and had suffered from back pain periodically since she was 12. At the age of 14, she started competitive diving and 1 year later she suffered a lumbar hyperextension injury during a dive from 10 meters. This resulted in severe low back pain and subsequently radiating pain in her right gluteal region. Although she discontinued all physical training, her symptoms persisted, and repeated medical examinations during the following 3 years did not reveal the cause of her symptoms. In November 1986, she was admitted to our hospital for further evaluation after a lumbar myelography that had shown possible herniation of the fourth lumbar disc. However, neither the clinical nor the radiographic findings were convincing, and a lumbar computed tomography (CT) was performed. The CT examination revealed a fracture of the right superior articular process of S1. This fracture was not seen on plain radiographs. The patient was operated on, and a posterolateral fusion from L5 to the sacrum was carried out. One year postoperatively the girl had remained free of symptoms.

The case reminds us that hyperextension injuries of the the lumbar spine not only can contribute to an increased slipping of a spondylolisthesis, but may also cause fractures of the posterior vertebral structures. A fracture of an articular process can easily be visualized by computed tomography.

Hip and lower extremity

A new measuring method for the evaluation of newborns' hip joints by ultrasound

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Introduction: The purpose of the study was to evaluate the use of ultrasound in the screening of newborns' hip joints.

Patients and methods: In all, 500 newborns were examined consecutively. A clinical and an ultrasonographic examination were performed during the first 4 days of life. With the infant in the supine position, the transducer was positioned on the lateral aspect of the hip region and was kept parallel to the long axis of the body. We measured the distances from the deepest part of the acetabular fossa to the bony rim of the acetabu-

lum, and from the same point in the acetabular fossa to the lateral joint capsule. The measurements were taken along a line perpendicular to the long axis of the transducer. The percentage ratio of the first distance to the latter was called the Bony Rim Percentage (BRP). This value is an expression of the percentage of the femoral head that is covered by the bony acetabulum.

Results: The mean BRP was 55 percent in girls and 57 percent in boys, and the lower normal limits (mean minus 2 SD) were 44 percent and 47 percent. The difference between girls and boys was significant. The incidence of newborns with unstable hips was 1.4 percent, and the mean BRP of these hips was 41 percent. In 9 newborns, the hips were clinically stable, but the BRP was below the lower normal limit in one or both hips. These cases have been followed up at 2 and 4-5 months, and the BRP normalized without any treatment in 8 infants. In 1 case the BRP did not spontaneously normalize, and at 5 months abduction treatment was started because a subluxation was revealed by ultrasound and radiography.

Conclusions:

1. Evaluation of newborns' hips by ultrasound using the BRP seems to be an appropriate method in screening for hip dysplasia.
2. Unstable hips have significantly lower BRPs than stable hips.
3. Newborns with normal clinical findings and with BRPs below the lower normal limit should be regularly followed to see whether they spontaneously normalize or need abduction treatment.

Treatment of congenital dislocation of the hip in children more than 1 year of age

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The results in 79 hips in 65 patients (50 girls and 15 boys) who started treatment during the years 1969 to 1979 have been reviewed. There were 51 unilateral and 14 bilateral dislocations. The average age at diagnosis was 19 (12-54) months. Reduction by skin traction succeeded in 74 hips, five (6 percent) required an open reduction. The average duration of traction was 4 (1-10) weeks. After reduction the hips were immobilized in a bilateral hip spica cast for an average of 9 (3-19) months. In addition, a brace/cast that allowed mobilization was used for another 7 (2-13) months. Secondary procedures were often performed in hips with a high degree of femoral anteversion and residual acetabular dysplasia after bracing. Proximal femoral varus derotation osteotomy was usually done bilaterally even in unilateral

dislocations. Thirty-four patients had this procedure, 31 bilaterally (19 with unilateral dislocation) and 3 unilaterally. Innominate osteotomy was done in 13 hips (one bilaterally), five of which also had had a derotation osteotomy. Three hips had a second varus osteotomy 3 to 12 years after the first; one of these also had an acetabuloplasty simultaneously. Twenty-three patients had no secondary procedures.

The average follow-up was 11 (2-17) years. Four patients had a follow-up less than 5 years.

Reduction succeeded in all the hips. None developed avascular necrosis. On clinical evaluation, 73 hips (92 percent) were rated as excellent. Two had a slightly positive Trendelenburg sign, 1 an intoeing gait, and 1 a moderate roll in her walk. Two felt some hip discomfort during heavy exercise.

Radiographically, 49 hips were rated as Severin group I, 11 group II, 11 group III, and 6 group IV. There were none with a secondary acetabulum or redislocation.

A prospective study evaluating patients with a total hip prosthesis with regard to method of posthospital training

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Introduction: The opportunity for rehabilitative training in a special facility for patients discharged after total hip surgery is limited. Although some patients prefer to be discharged directly to their homes, traditionally there has been a tendency to transfer patients to special rehabilitative training facilities. We therefore wanted to find out how the patients who were discharged directly to their homes progressed during the first year after the operation when compared with patients who were trained postoperatively in a special rehabilitative facility.

Patients: Of 118 patients, 13 were excluded for various reasons. The patients were randomized into two groups according to date of birth. Patients born on an even numbered day were discharged directly to their own homes; the others were offered a stay in a rehabilitative facility. The average age was 68 (57-81) years. Fifty-eight patients were transferred to a specialized training facility, whereas the remainder were discharged to their own homes for ambulant physiotherapy.

Method: We used a Harris scheme, modified by Alho, for evaluating the results. We evaluated the patients preoperatively and 3 and 12 months postoperatively. The evaluation is mainly functional, so that the patient's daily activities are emphasized along with degree of pain.

Results: There was an astonishing equality within the two groups. There was no significant difference preoperatively or during the two later check-ups. The total result was very good, the average for all the patients at 1 year after the operation being 95 out of 100 points. No difference in the speed of rehabilitation was seen between the two groups.

Conclusion: From this study, it seems reasonable to discharge patients after total hip replacement directly to their own homes. Ambulant physiotherapy can be improved by developing training programs or organizing training groups to make the return home feel more secure.

Equalization of leg length with shortening osteotomy

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Twenty women and 15 men, aged 23 (18-46) years, were treated with intertrochanteric shortening osteotomy of the femur for equalization of leg length. The 95° AO-angled plate was removed after 1-2 years. Preoperatively, the difference in leg length was 26 (15-71) mm, as assessed in radiographs of the pelvis with the patient standing with a support under the shorter leg.

Two minor complications without sequelae were observed.

At follow-up (1-5 years), the leg-length discrepancy was within 5 mm of that intended in 29 of the cases. Twenty-three patients had recurrent backache before treatment. Seventeen of these were improved or completely relieved.

The Exeter hip system: A preliminary report of a 4 years' experience

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The Exeter total hip system has been used as our standard routine hip replacement operation since January 1983. Several new concepts were introduced by Mr. R. Ling in Exeter in 1969. From our point of view, the most important detail was the cement pressurization technique. The collarless straight stem and the centralizing jig are other important ideas.

We have performed 567 replacements during the years 1983-1986. Peroperative complications included 3 femoral fractures - all in revision arthroplasties. Postoperative complications comprised 9 hematomas, 8 temporary sciatic nerve affections, 4 cases of pulmonary

embolism, and 8 dislocations. Only 1 dislocation had to be reoperated on, the remaining 7 became stable after closed reduction.

So far, we have not observed any loosening of the acetabulum or the femoral component. Three patients have had deep wound infections. All of them recovered during antibiotic treatment and ended up with excellent hip function.

It is too early to draw any conclusion concerning the value of the Exeter hip system compared with other artificial hip joints. However, we find the results promising. The recommended operative technique is simple and safe, and we think the Exeter hip system is a good alternative in hip replacement surgery.

Tibial torsion determined by CT

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Accurate measurement of the tibial torsion can be obtained in anatomic specimens. In clinical studies, only approximate values seem to be obtainable. To obtain more accurate measurements of tibial torsion in relation to the thigh, we have used computed tomography. Scanning of the femoral condyles gave a reference line determined as the dorsal tangent of the condyles. Tomographic cross sections through the ankle joint were then selected for measurements of the tibial torsion as the angle formed by a line through the middle of the malleoli and the reference line. In 15 women and 10 men, this angle was found to be $41 \pm 10^\circ$.

A new simplified external fixation device for management of compound limb injuries

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Improved pin-insertion technique and reduction of effective pin length, combined with maximal simplicity, would be a more attractive developmental direction rather than to compensate pin-related instability with a complex and space-occupying external frame. With these hypotheses in mind and a rather discouraging experience with bilateral transmuscular systems, a developmental program was started in 1976. The optimal mechanical design of a simple universal ball-and-socket joint was established. The maximum resistive moment of this ball-and-socket joint provides adequate rigidity for unilateral monoplane application, no matter what

type or location of injury. A complete set consists of two ball-and-socket joints and one square tubular connecting rod of different lengths, the weight being 500 N. The clinical evaluation is based on unilateral application in 36 patients of whom the majority had compound injuries of the lower limb. Further, the basic set provided adequate stabilization in war-injured patients with massive bone defects and compromised soft tissue caused by high velocity missiles or mine explosions. No fixator-related complications or mechanical failures have been recorded.

Miscellaneous

Posttraumatic sympathetic dystrophy treated with Bier block

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In 1 year, 11 patients were treated with mobilization under i.v. regional anesthesia mixed with 80 mg Solu-Medrol for posttraumatic sympathetic dystrophy (PTSD), stages 2 and 3, in the upper extremity including the elbow joint. The joints were immobilized for 1-2 weeks after the block in an overcorrected position and were later treated with dynamic splints.

The block was repeated once in 2 patients. All the patients benefited remarkably from this treatment. Pain and swelling disappeared, and a full range of motion was obtained in almost all the joints.

This treatment can be recommended for all stages of PTSD.

Pyodermia gangrenosum

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Pyodermia gangrenosum is a necrotizing skin lesion seen in 5 percent of the patients with ulcerative colitis. We have recently treated a 40-year-old male with a rapidly increasing necrosis involving a greater part of the left leg despite repeated wound debridements and antibiotics.

When his bowel lesion was more appreciated (it had been treated for approximately 10 years with Salazopyrin), treatment was changed to high-dose steroids with a dramatic improvement in local and general symptoms.

Under high steroid medication a successful splitskin coverage was performed, and the patient was back at work after 4 weeks.

The treatment of choice in these cases is therefore

steroids, total parenteral nutrition and split-skin coverage of the skin lesion.

Complications secondary to the use of standard bone wax in 6 patients

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Six women showed complications secondary to the use of standard bone wax over a 2-year period; 5 of them were operated on in the foot and 1 in the shoulder region. In all the patients, standard bone wax, made of beeswax, was used to stop bleeding from cancellous bone.

After the operations, these patients experienced disabling local pain and tenderness. Three of them developed firm swellings visible under intact skin. At reoperation 4-17 months later, masses of brownish, soft granulation tissue where the bone wax had been applied were found in all the patients. This was excised, and the symptoms disappeared in all but 2 patients, who had persistent pain.

Histologic examination showed a chronic inflammatory reaction, granulation tissue with foreign body multinucleated giant cells, and macrophages around cystlike spaces. Further, there were cholesterol clefts and birefringent material.

Use of a new hemostatic, bioerodible bone wax versus standard bone wax made of beeswax in rats

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To compare the hemostatic effect, the foreign-body reaction and the inhibition of the bone healing, 2-mm drill holes on the left side of the skull, the iliac crest, and the tibia of rats were filled with bone wax made of beeswax (Ethicon), while on the right side the holes were filled with a new, water labile, bioerodible bone wax (Alzamer®). Empty holes served as controls. To study the foreign-body reaction in muscle, beeswax and bioerodible wax were deposited in the left and right oblique abdominal muscles, respectively.

The handling and the hemostatic effect of the new, bioerodible wax was assessed as being equal to beeswax.

Histologically, the beeswax was not resorbed, inhibited bone healing, and elicited a marked foreign-body reaction. The bioerodible wax was resorbed, did not inhibit bone healing, and the foreign-body reaction was transient.