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The Swedish Orthopedic Society held its annual spring meeting in Helsingborg, Sweden, on June 1 and 2, 1987.

Helsingborg is situated in southern Sweden on Öresund and is traditionally called the "Pearl of the Sund" because of its beautiful location on the coast. This year the orthopedic clinic in Helsingborg celebrated its centennial. In 1887, the department started with 9 patients as a combined medical and teaching center for the rehabilitation of crippled youth. These patients received occupational training and remained usually 3–4 years in the rehabilitation school. In those days, patients suffered mainly from birth defects, osteomyelitis, or polio. The unit soon expanded; and by the 1930s, it had become a famous 175-bed rehabilitation center. Now, 100 year later, Helsingborg, with its population of 145,000, has a modern 66-bed orthopedic unit that is mainly engaged in arthroplasties and fracture surgery. Since 1975, the clinic has been located in the new central block of Helsingborg Central Hospital. The history of Swedish orthopedics is well exemplified by the history of the Helsingborg clinic, which is also amply exhibited in the local medical museum.

The Helsingborg staff, headed by Björn M. Persson, made the generous arrangements for the meeting, which was held in the Helsingborg Concert Hall, and abstracts of the sundry contributions are published below. At the opening ceremony, our colleagues Lars Kolmert and Dick Killander played classical music arranged for two pianos. The meeting was attended by 350 participants. Franco Lavini, Verona, Italy, the invited speaker, held an interesting lecture titled "External fixation for fractures and for leg lengthening."

Fracture treatment

Closed locked intramedullary nailing: Its application to subtrochanteric fractures of the femur

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The proximal femur is surrounded by large and powerful muscles. These together with the interplay of gravity result in characteristic deformities in the case of subtrochanteric fractures and fractures through the proximal third of the femoral shaft. The ilipsoas muscle flexes, abducts, and externally rotates the proximal fragment, and the adductors lead to adduction of the shaft. Shortening occurs as a result of the contraction of all the long muscles that span the height of the shaft. Correction of this deformity in the adult is extremely difficult with closed methods, and nonoperative treatment in the majority of patients has been proven to be an unsatisfactory mode of treatment. The operative methods can be divided into those involving internal fixation by means of intramedullary (load shearing) devices and sliding nail plates and fixed angle blade plates (load bearing).

In many situations, we still advocate open reduction and stable internal fixation. This means meticulous adherence to the principles of accurate open reduction

and atraumatic bone surgery, the careful reconstruction of the comminuted bones, the stabilization of the fragments with lag screws, and ultimately fixation of the fracture with an angled plate or compression screw and plate.

However, with the development of the interlocking nail for femoral fractures, the indications for intramedullary reaming and nailing came to include even fractures of the proximal third of the femur. We used this method in 33 patients with subtrochanteric fractures. The results in our series are comparable with the best results in series treated with open reduction and internal fixation with sliding nail plates or fixed angle plates. All our fractures healed within 4 months.

A new simplified external fixation device for Colles' fracture

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Introduction: In a number of recently published series on the treatment of the compound distal radial fracture, external fixation (EF) has proven to be the method of choice. However, many of the currently available systems are impaired by a number of disadvantages, such as high weight (shoulder pain), high prices, and lack of adjustability after mounting, which in turn necessitates an exact reduction of the fracture before frame application.

Material and methods: The adjustable part of the frame is made as a ball and socket joint (BS). With regard to maximum rigidity, the optimum design of the BS was established. The maximum rigidity occurred at a highly specific relationship between the diameters of the ball and the socket (0.90) and between the hardness of the material used in these two parts. The BS is part of an articulating head to which the bone pins can be attached. The ball is attached to a 3-cm-long circular pillar at the end of which a square hole is located and where the connecting bar can be secured.

As a result of this design, the bone pin can be inserted in any plane 360° around the axis of the pillar and the articulating head can be tilted in any direction, totally 64°. In biomechanical testing, it was found that the BS could resist a concentrated load on the top of the pillar of more than 500 N.

The total weight of a complete frame, two articulating heads, and one bar is 104 grams.

Conclusion: The high mechanical efficiency of the device allows for simple frame application in unstable fractures; and the versatility allows a full range of motion of the wrist with the frame *in situ*, which facilitates reduction of the compound distal radial fracture. By using a circular external bar, a complex external configuration can, if necessary, be built up in patients with more complex injuries of the forearm.

Stabilization of femoral fractures below previous hip implants

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Introduction: Hip prosthesis or nail and/or plate for hip fractures prevent application of intramedullary nails inserted proximally in case of femoral fractures below the implant.

Patients: In 13 elderly women with a mean age of 81 years, displaced fractures of the lower two thirds of the femur occurred. Six had had an arthroplasty, 5 osteosynthesis with a nail and plate, and 2 only with a nail or a plate prior to the fracture. All the femurs were osteoporotic.

Method: One or two Ender nails, a coupling piece, and two screws were applied from each condyle. To reduce pain from the wounds, an anterior plaster slab was laid postoperatively. All the patients were mobilized the day after surgery. The plaster slab was changed to a cast brace after 14 days.

Results: All the fractures healed. No infections occurred. Shortening was 2 cm in 2 patients and less in all the others.

Conclusion: The method for stabilization is simple and adjusts well to osteoporotic bone. It is an alternative in case of fractures of the lower two thirds of the femur when preexisting implants occupy the proximal medullary canal.

Intramedullary elastic nails for displaced tibial fractures

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Only a few series of displaced tibial fractures treated with elastic medullary nails have been published. The purpose of this study was to introduce a simple method for stabilization that prevents displacement and makes early weight bearing possible without additional support.

Patients and methods: Thirty-three patients, mean age

41 years, were treated for displaced tibial fractures with Ender nails. Twenty were operated on immediately after the accident, 10 following redislocation after primary closed reduction and plaster, and 3 after 5 months. Twenty-seven fractures were stabilized by two Ender nails, two fractures by three nails, and four fractures by one nail. Seventeen fractures were sustained from high energy. Two thirds of the fractures were situated between the middle and the distal third of the tibia. Fourteen fractures were open.

Results: All the fractures, stabilized by 2–3 nails, healed radiographically. The four fractures stabilized by one nail had a longer healing time. A slight postoperative diastasis in 11 fractures disappeared within the first month of weight bearing. Removal of the nails were necessary in 1 psychotic patient who developed osteomyelitis and 1 alcoholic. At follow-up, 1 patient had a varus displacement > 10° and 3 patients had an anterior angulation > 10°. One patient had a tibial shortening of more than 2 cm, the others 1 cm or less. During the treatment, there was no tendency to further shortening or displacement.

Conclusion: The stabilization of displaced tibial fractures with 2–3 intramedullary nails is a simple method and creates increased stability. Additional support by a plaster cast could often be excluded.

Hip fractures

Selection of social changes in 1,322 patients with hip fractures – a prospective study in an urban population

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Totally, 346 men and 976 women in Malmö, Sweden, with a hip fracture from 1982 to 1985 inclusive have been followed prospectively. The mean age of the men and women was respectively 74±13 and 79±10 years. The social status of the patients before the fracture has been compared with their status at a clinical follow-up about 1 year postoperatively. Thirty-four percent of all the men and 21 percent of all the women were deceased 1 year after the fracture. Sixty percent of all the men and 57 percent of all the women were discharged from our hospital to their original residence. Fifty-two percent of all the men and 61 percent of all the women had unchanged residence 1 year postoperatively. Thirty-four percent of all the men and 39 percent of all the women had an unchanged need of assistance from another person(s) in their daily activities at the follow-up compared with their prefracture status. Twenty-five percent of all the men and 27 percent of all the women had unchanged needs as regards walking aids. Twenty percent of all the men and 26 percent of all the women had unchanged walking capacity. Fifty-five percent of the 346 men with a hip fracture and 65 percent of the 976 women with a hip fracture seemed to have unchanged mental status at the follow-up.

This study indicates that the frail patient with a hip fracture becomes slightly more frail 1 year after the fracture.

Intracapsular pressure during operation of femoral neck fractures

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The intracapsular pressure was measured during the nailing procedure in 20 patients with femoral neck fractures. Randomly, a three-flanged nail or three screws were used. At traction and inward rotation of the leg, the intracapsular pressure increased; but as soon as the lateral cortex was penetrated, the pressure decreased significantly. The hammering of the nail did not increase the intracapsular pressure; and when the two different nailing procedures were compared, no differences were noted in intracapsular pressure, head-to-head ratio measured with scintigraphy, or size of intracapsular hematoma visualized with CT.

Cervical and trochanteric femoral fractures

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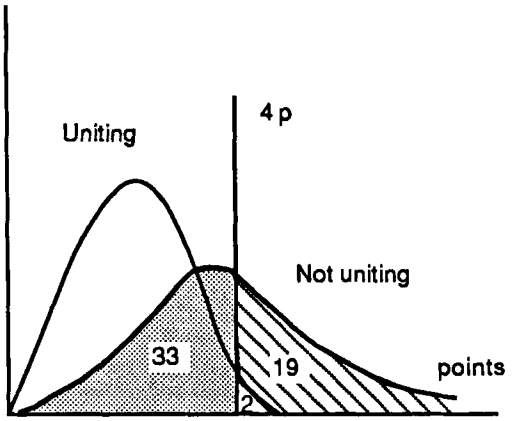
Introduction: According to Barnes et al. (1976), Garden III and IV femoral neck fractures proved prognostically quite similar and united in 65–70 percent. Prognostic scintimetry was proposed by Strömqvist (1983) 3 weeks postoperatively.

Patients and methods: There were 222 fractures (151 cervical and 71 trochanteric). Clinical and radiographic examinations were performed. Garden's classification was improved by a points scoring system: Cranial displacement 1.5–2.1 cm, 1 point: 2.2–2-5 cm, 4 points; over 2.5 cm, 6 points: Lateral angle ≥ 60°, 1 point; varus angle ≥ 45°, 2 points. Screws anteriorly in femoral head,

2 points. Ideal reduction with overall compression of 0.5 cm, 2 points.

Results: A) Fifty-two cervical fractures did not unite. Of them, 19 were recorded for at least 4 points. This latter category contained a total of 21 fractures, two of which did unite. Thus, 37 percent of all nonunion cases were predictable immediately after the operation with a 90 percent certainty. B) Ender nailing proved inferior to the MacLaughlin screw and plate.



Conclusion: If cranial displacement exceeds 1 inch, prognosis is very poor. The points scoring system is easy to use, costs nothing, and gives a reasonably accurate hint of impending failure when the score exceeds 4 points.

Intensified home rehabilitation of patients with a hip fracture within existing health and social resources

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Introduction: At the beginning of 1986, we decided at our department that all hip-fracture patients admitted from their own home in the central city catchment area (CA) should be discharged directly to their own home for rehabilitation provided that other medical conditions than the fracture or mental disorders did not interfere. No additional resources at the district health level or of the social service were allocated for the rehabilitation. This study presents the effect on direct discharge of the patients to their own home and the cost aspects in terms of utilization of rehabilitation resources before and after the changed policy.

Patients: Eighty-two consecutive patients from 1986 (Series I) were included in the study. They were followed for 4 months after the fracture. As controls, 84 consecutive patients with the same diagnosis, admitted from their own home in the central city area during the same period in 1985 (Series II) were selected. The mean age (80 years), sex and fracture distribution, and social situation of the patients in the two groups were similar.

Results: In Series I, 54 percent of the patients were discharged to their own home compared with 26 percent in Series II. A further number of patients returned home after a period of institutional rehabilitation. Thus, 4 months after the fracture, totally, 58 percent and 51 percent the patients of Series I and II, respectively, had returned to their own home. Sixteen percent of the patients from Series I were permanently institutionalized compared with 21 percent from Series II. If applied to all our patients with a fracture of the proximal femur, this program should save 4,400 rehabilitation bed days corresponding to 1.5 million Swedish kronor a year.

Conclusion: Recurrent assessment of the technologies for treatment of patients will improve treatment efficiency and save money for the health sector.

Differences in rehabilitation of cervical and trochanteric hip fractures

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The need of rapid rehabilitation after hip fracture has become increasingly important, for the total number of elderly patients has doubled during the last decades. To meet this demand, an active individualized treatment program was developed in Lund during the 1970s. This includes direct weight bearing and mobilization in the hospital after osteosynthesis, early return to the patient's own home, and continued early rehabilitation at home. The aim now was to describe the rehabilitation results of this program when in routine use, especially the differences between patients with cervical and trochanteric fractures.

For the period April 1981 through March 1982, all cervical (n 139) and trochanteric (n 111) hip fractures were studied. They comprised 250 patients of whom 150 were admitted from their own home, 72 from old people's homes, and 27 from geriatric hospitals. All of them were followed up to 2 years after their fracture.

Pain on walking postoperatively was recorded daily in the ward, as well as the need for walking aids and performance of ADL activities. On the first day after the operation, 15 percent of the cervical and 60 percent of the trochanteric fracture patients had pain on walking decreasing to 3 and 25 percent, respectively, within a week. At 2 months after the fracture, the majority (79 percent) of the patients had returned to their prefracture habitat. For the cervical fractures, the main rehabilitation results were achieved already within 1 and 2 months after the fracture, and the optimum return to the prefracture habitat was achieved. For patients with trochanteric fractures, the main return to the prefracture habitat was obvious at 2 months after the fracture, and at 3–4 months an optimum was achieved. The differences between cervical and trochanteric fractures must be taken into consideration when planning and evaluating the treatment of hip fractures.

United efforts in the rehabilitation of elderly with a hip fracture may save resources

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Rehabilitation of elderly patients with hip fractures includes a united effort by the orthopedic department and primary health and social services. This can reduce hospitalization and improve rehabilitation. The effect of such a cooperation, which started at the beginning of 1986, was studied at our hospital.

In all, 104 and 103 patients from 1985 and 1986, respectively, who received their primary treatment and rehabilitation at the orthopedic department or at the general surgery clinic in Hässleholm were included in the study. Both years, about two thirds of the patients who were admitted from their own home or a home for elderly returned directly to their original environment. The mean hospitalization for these two groups of patients was reduced by 6 days to 14 and 16 days, respectively, during 1986. Hospitalization for patients coming from other institutions was reduced from 20 to 5 days. A corresponding reduction was also observed in patients not returning to their original environment. Compared with 1985, the mean hospitalization during 1986 was reduced from 25 to 16 days, equivalent to more than 900 days for all the patients.

Great advantages for both patients and hospital can be achieved by close cooperation between hospital and primary health and social services. These advantages include not only patients returning to their own homes, but equally patients discharged to other care facilities.

Foot and ankle

Patterns of motion of the human foot – transferal of rotation

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The role of the hindfoot in transferal of pronation/supination of the foot into rotation of the leg and vice versa has been analyzed by roentgen stereophotogrammetry in healthy volunteers. At least three 0.8-mm tantalum marker balls each have been introduced into the tibia, fibula, talus, calcaneus, navicular, medial cuneiform, and first metatarsal bones of the right foot. The subjects have been placed on a platform that allows pronation/supination tilt, as well as recording of leg rotation. Paired radiographs have been obtained in 10° increments of pronation/supination of the foot and external and internal rotation of the leg.

Results: With pronation/supination, inclination of the platform rotation mainly occurred in the joints of the arch. Supination also caused a minor degree of external rotation of the leg. Internal rotation of the leg led to minimal motion in the tarsal joints, whereas external rotation of the leg caused considerable supinatory motion in the joints distal to the talus and raising of the arch.

The venous pump of the human foot

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Passive activation of the venous pump mechanism in the sole of the foot has been shown to reduce edema and pain in the lower leg. The mechanism for this is not known. The purpose of this study was to investigate the effect of the venous foot pump on the interstitial hydrostatic pressure in the lower leg.

Methods: Intramuscular pressure and subcutaneous pressure in the lower leg was recorded with a Myopress catheter in 6 volunteers and in 8 patients with medial tibial syndrome. The venous circulation of the foot and the lower leg during trauma proximal to the lower leg was simulated by application of venous stasis proximal to the knee joint. The venous plexus of the foot was compressed passively by the EBI pneumatic foot pump for 4 seconds twice a minute.

Results: The change of hydrostatic pressure during activation of the foot pump was (+= increased, −=decreased pressure mmHg) as follows:

Ankle joint	No stasis		Stasis	
	Fixed	Movable	Fixed	Movable
M. tibialis anterior	0	+0.6	0	+0.8
M. flexor digitorum	+1.3	+1.2	+3.6	+3.2
Subcutaneously	−2.6	–	−0.2	–
Effect of venous emptying	No	No	Yes	Yes

Conclusion: The interstitial hydrostatic pressure in the lower leg is influenced by passive mechanical stimulation of the sole of the foot. The mechanism for this is a change of muscle length. The volume increase of the lower leg by emptying the venous plexus of the foot has a minor effect on the interstitial pressure.

Posteromedial pain in the lower leg

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The existence of chronic compartment syndrome (CCS) in the deep posterior compartment has been under debate. This study reports the results of pressure recordings in patients with posteromedial pain induced by exercise in their lower legs.

Methods: Intramuscular pressure (IMP) was recorded in m. tibialis posterior (TP) and in m. flexor digitorum (FD) during exercise and at rest after exercise using the microcapillary infusion method (Myopress catheter) in 20 patients. They worked on a foot ergometer (ankle flexion and/or flexion of the toes) until they developed pain or muscle fatigue.

Results: The increase of muscle relaxation pressure during exercise and IMP at rest after exercise was within normal limits. During constant work by flexion of the ankle joint, muscle contraction pressure was 74 (SD 38)/51 (SD 22) mmHg in the TP/FD muscles, respectively. During maximum toe flexion, the muscle contraction pressure was 38 (SD 16)/93 (SD 22) mmHg in TP/FD muscles ($P < 0.01$). The muscle relaxation pressure had increased to 17 (SD 8)/10 (SD 5) mmHg at the end of the exercise test.

Conclusion: CCS in the deep posterior compartment as a reason for pain in the posteromedial part of the lower leg could not be demonstrated. The results depend on in which muscle pressure was recorded and on the type of work performed.

Chronic lateral instability of the ankle joint treated by anatomic reconstruction of the lateral ankle ligaments

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Reconstruction of the lateral ankle ligaments for chronic functional instability is necessary in many patients. Of the many surgical reconstructions, tenodesis using either the peroneus brevis or peroneus longus tendons have been most widely used. The results after anatomic reconstructions are, however, much less known.

Patients and methods: Totally, 152 patients, 95 men and 57 women who had undergone anatomic reconstruction of the lateral ankle ligaments, were reexamined 6 (2–12) years after the operation. The mean age at the operation was 23 (17–42) years.

Results: The functional results were excellent in 92 patients (60 percent), good in 40 (27 percent), fair in 11 (7 percent), and poor in 9 (6 percent). The results were better in the men than in the women. Sixteen of the patients with unsatisfactory functional results had either generalized joint hypermobility, long-standing ligament insufficiency, or had been previously operated on. Reconstruction of both the anterior talofibular and calcaneofibular ligaments gave better results than if only the anterior talofibular ligament was reconstructed. Complications were few. Mechanical stability was measured as anterior talar translation and talar tilt. Patients with excellent and good functional results had better mechanical stability than those with fair and poor functional results.

Conclusion: Anatomic reconstruction gives good functional and mechanical stability in the majority of patients, and is a simple and safe method for reconstruction of chronic lateral instability of the ankle joint.

Active ankle movements and weight bearing of operated on lateral malleolar fractures

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The purpose of this study was to elucidate the benefit of active ankle movements and weight bearing on operated on lateral malleolar fractures.

Methods: In a prospective, consecutive study dislocated lateral malleolar fractures were randomized to either active ankle movements without weight bearing using a dorsal plaster splint (n 26) or active ankle movements and weight bearing using an orthosis (n 25). Active unloaded plantar/dorsal ankle movements were performed several times daily from the 2nd to the 7th postoperative week.

The mean patient age was 43 years. Sex distribution was comparable. All the fractures were operated on using cerclage wires and staples. Clinical and radiographic examinations and roentgen stereophotogrammetric analysis were performed postoperatively and at 3 and 6 months.

Results: Exact reconstruction of the ankle mortise was achieved in 44/51 cases. No redislocation occurred and roentgen stereophotogrammetric analysis revealed only small movements in the ankle mortise during rehabilitation.

Loaded dorsal flexion capacity was significantly better in the weight-bearing group at 3 months ($P < 0.05$). Also, most other objective and subjective parameters showed a tendency to better results in the weight-bearing group at 3 and 6 months. We have compared the results of the present study with a previous study, designed in the same way and including similar fractures, but where ankle movements were not allowed (Ahl et al. 1986). Loaded dorsal and plantar flexion, as well as calf circumference at 3 months and even loaded plantar flexion at 6 months, were significantly better when active ankle movements were allowed.

Conclusion: Combined active ankle movements and weight bearing in an orthosis after operation on lateral malleolar fractures do not cause redisplacement and improve rehabilitation.

Reference:

Ahl, T, Dahlén, N, Holmberg, S and Selvik, S (1986) Early weight bearing of malleolar fractures. *Acta Orthop Scand.* 57, 526–529.

Results of hallux valgus surgery

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The Chevron osteotomy was first described by Austin in 1962. In 1980, he reported a good experience with 1,300 cases, but without detailed analysis. Johnson (1978) reported 26 cases without tenotomy of the conjoint tendon. The V-shaped osteotomy gives good early stability, but few results have been published. Retrospectively, we reviewed 75 consecutive patients with a Keller or Reverdin operation and interviewed the patients about the results as compared with a prospective series of 31 Chevron osteotomies examined by weight-bearing radiographs before operation and 6–12 months postoperatively. Ninety-three percent were women with a mean age of 55 (24–82) years in all the groups. The average sick-leave time was 8.5 weeks and the number of return visits 2.3. A medial plaster slab was used for 3–4 weeks.

Procedure	Satisfied	Dissatisfied
Keller	18/26 (0.69)	2/26
Reverdin	28/49 (0.57)	10/49
Chevron	20/31 (0.65)	4/31

There was no significant difference in the patients' own opinions between the three methods. In the Chevron series of 31 feet, the radiographic results were distributed as follows:

	Preoperatively	Postoperatively
Hallux valgus angle	34° (20–57)	19° (4–31)
Primus varus angle	14° (9–21)	8° (2–26)
Skeletal breadth (I-V)	9.3 (8–10)	8.8 (7.9–9.7)

There was no significant difference between satisfied, intermediate, and dissatisfied patients when we compared with preoperative and postoperative measurements. In 5 patients the intended displacement at the Chevron osteotomy had not been achieved, and we suggest the V-osteotomy should be directed towards the MTP V-joint to become stabilized by some shortening effect.

Arthroplasties

Eight years' experience of uncemented total hip replacements in young patients

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Since 1979, cementless hip arthroplasties have been performed on young patients with severe arthrosis of the hip. Three different prospective studies comprising three different prosthetic designs have been designed to document the clinical and radiographic results and complications.

Patients and methods: From 1979 to 1983, the Lord prosthesis was used on 123 patients with a mean follow-up of 3.8 (2–8) years. In 1984, a multicenter prospective study in Scandinavia was started using the PCA prosthesis. Totally, 450 patients have been followed with a mean follow-up time of 1.8 (0.5–3) years. In the third study the PCA and the Harris-Galante prostheses were compared in a randomized prospective study, but only in Gothenburg: viz., 80 patients with a mean follow-up of 1.2 (0.5–2) years.

Clinical and radiographic parameters were evaluated according to a standardized data formula. The mean age of the 613 patients was 49 years. The diagnoses were primary arthrosis in 60 percent, secondary arthrosis in 18 percent, and posttraumatic arthrosis in 20 percent.

Results: The results are evaluated according to the Harris hip score and Charnley's modified 6-point scoring system. At the latest follow-up, 92 percent were excellent or good, 6 percent fair, and 2 percent poor. No major differences so far in clinical outcome between the three prosthetic systems were found. In the radiographic evaluation, different patterns of bone remodeling were observed. Acetabular migration was noted in 14 percent with the Lord ring, in 2 percent with the PCA cup, and in no case with the HG cup. No fatal complications or deep infections were recorded. Totally, eight revisions have been performed.

Conclusions: Preliminary results over 8 years have revealed that biological fixation of THRs in young patients can be obtained. The different prosthetic designs seem to give different stability of the fixation of the cup and the radiographic changes in the proximal femur are important to define and observe, since they can serve as prognostic parameters for future clinical outcome.

The Mittelmeier hip prosthesis – A clinical, radiographic, and scintimetric evaluation

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Introduction: Uncemented total hip prosthesis has been recommended in the younger patient population with coxarthrosis. The Mittelmeier prosthesis has, however, been associated with a high frequency of poor results.

Patients and methods: The purpose of this study was to review 30 hips operated on with the Mittelmeier prosthesis. At the time of follow-up, eight hips had been revised owing to loosening. The remaining 22 hips were studied using clinical, radiographic, and scintimetric evaluation.

Results: Only five hips were painless. Seventeen hips were mildly or moderately painful on walking. Fourteen hips revealed radiographic signs of loosening mainly as an increased varus tilting and a distal migration of the femoral stem. Increased scintimetric activity was found in most cases, especially at the distal tip of the femoral prosthesis, which was consistent with a distal and lateral migration according to the radiographic evaluation.

Conclusion: Poor fixation of the prosthetic components is probably the main reason for a high frequency of pathologic findings after arthroplasty with the Mittelmeier prosthesis.

Importance of male sex for the risk of revision of total hip replacement

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Introduction: In the majority of long-term studies of primary total hip replacement, the surgical revision rates are biased. This is because the results are based on conventional statistics dividing the number of prosthetic removals by the number of prosthetic insertions without taking into consideration the varying duration of follow-up. It is also difficult to get a good picture of the results for a single diagnosis and the interrelationship of different risk factors, because most studies have been performed on a mixture of diagnoses and bivariate correlations of risk factors. However, the varying duration of follow-up can be adequately assessed by survivorship analysis and the interrelationship of risk factors by multivariate statistical analysis. These two methods have been used in this study of revisions for mechanical loosening after total hip replacement for primary arthrosis.

Patients and methods: During the 11-year period 1970–1980 inclusive, 799 total hip replacements were performed for primary arthrosis with a nontrunnion-bearing, metal-on-plastic prosthesis. In all the cases high-viscosity cement was used after removal of the acetabular cartilage, but without meticulous preparation or plugging of the femoral canal or pressurization of the cement. The acetabular and femoral revision rates for mechanical loosening were evaluated in view of different risk factors by survivorship analysis and multivariate statistical analysis.

Results: The overall cumulative revision rate for mechanical loosening was 3, 10, and 15 percent after 5, 10, and 14 years, respectively. Men had a 4–5 times higher relative revision risk of both prosthetic components than women. Also, young age at surgery and snap-fit prosthesis with a 35-mm head and short wedge-shaped stem significantly increased the risk of revision.

Lubinus THR – a 5-year follow-up survivorship analysis

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The Lubinus total hip replacement (Lub THR) has been widely used in Sweden during the last decade; however, documentation is sparse.

Patients and methods: In all, 134 consecutive Lub THRs were implanted in 120 patients at Jönköping Hospital during 1980 and 1981. There were 61 males and 71 females, with a mean age at operation of 65 (35–84) years. The operative diagnosis was arthrosis in 68 percent, a complication of nailed femoral neck fracture in 16 percent, RA in 8 percent, CDH in 7 percent, and others in 1 percent. In 2 cases the records or radiographs were lost, leaving 132 Lub THRs to be analyzed. Totally, 105/132 of the hips were available for a clinical and radiographic follow-up at 58 (22–71) months postoperatively. Survivorship analysis according to Armitage was performed regarding both clinical and radiographic survival. Clinical failure was defined as a revision arthroplasty; radiographic failure was defined as migration of one or both components more than 2 mm.

Results: No case of deep infection was documented. In all, 4/132 hips were revised owing to mechanical loosening. Totally, 24/105 hips were radiographic failures. Radiographic survival dropped markedly during the last 2 years of follow-up.

Heterotopic bone formation after total hip arthroplasty

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This study on heterotopic bone formation (HBF) after total hip arthroplasty (THA) was carried out to evaluate the significance of prophylactic treatment with oxyphenbutazone (Tanderil®) and the significance of different prosthetic designs and approaches.

Patients and methods: Totally, 81 McKee-Farrar, 53 Charnley, and 105 (54+51) Lubinus arthroplasties were studied. Lubinus arthroplasties contained only patients with arthrosis, all operated on with spinal anesthesia. All the patients except 51 with Lubinus arthroplasties received Tanderil per os postoperatively. A lateral approach with trochanter osteotomy was used in the Charnley group, whereas a dorsal approach without osteotomy was used in the other patients. The criterion for HBF was any new calcification visible on either projection at the 3-month follow-up. Confluent bone mass ≥ 20 mm was considered significant HBF.

Results:

	Charnley	McKee-Farrar	Lubinus	Lubinus (without Tanderil)
No HBF	63%	91%	81%	47%
HBF < 20 mm	7%	4%	17%	16%
HBF ≥ 20 mm	30%	5%	2%	37%

Conclusion: NSAIDs can reduce the development of HBF in a significant way. The approach to the hip is also a significant factor; the lateral approach with trochanter osteotomy results in a higher incidence of HBF than the dorsal approach without trochanter osteotomy.

Systemic antibiotic prophylaxis versus gentamicin cement in arthroplasty of the knee

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Introduction: Two modes of antibiotic prophylaxis were used in a series of 216 knee arthroplasties (174 patients). One hundred and ten patients received (Diclocil®) systemic antibiotics (SA group) and the other 106 received gentamicin mixed with Palacos® cement only (PG group). The average observation time was 4.5 (1–8) years.

Patients and methods: The series comprised 170 female and 46 male knees. The average age was 68 (43–88) years – the same in both sexes. Totally, 139 knees had arthrosis and 77 had rheumatoid arthritis. All the operations were carried out in modern, well-ventilated (Allander system) operating rooms.

Results: The cumulative rate of deep infection after the primary operation was four (2 percent) knees, two in each group. Two of the infections occurred early, i.e., immediately after the operation and after 2.5 months, respectively. The two remaining infections became manifest 14 and 26 months after the operation, respectively, with an acute onset of symptoms, probably due to hematogenous spread. One prosthesis was removed 9 months after the operation owing to chronic fistulation, but the remaining three responded well to irrigation drainage (two) and long-term antibiotic therapy.

Delayed wound healing with a confirmed or suspected infection occurred in 9 patients, 7 in the PG group and 2 in the SA group. These healed rapidly without further consequences. Two infected suture granulomas became apparent 2.5 and 4.5 months, respectively, after the operation. Both were in the PG group.

Conclusions: No difference as regards deep infection was found between the two modes of antibiotic prophylaxis. Superficial infection occurred significantly more often in the PG group.

Long-term follow-up of elbow prostheses – stabilized and nonstabilized

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Twenty-one patients (26 elbows) with rheumatoid arthritis were operated on with two different types of prostheses – one stabilized (Dee) and one nonstabilized (Wadsworth).

Seven Dee elbow prostheses were inserted during 1971–1973. Two elbows were revised because of mechanical loosening and three because of deep infection. The remaining two prostheses showed radiographic signs of loosening. Three patients died during the follow-up period, 1 as a consequence of deep infection.

Nineteen Wadsworth elbow prostheses were inserted during 1979–1982, with an average follow-up of 6 years. Five elbows were revised because of mechanical loosening, one because of a suspected deep infection. Of the remaining 13 prostheses, there were radiographic signs of loosening in 8 cases.

Thrombosis prophylaxis with low molecular weight heparin in total hip replacement

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Introduction: Low molecular weight (LMW) heparin preparations with their high anti-FXa/APTT ratio are expected to provide good antithrombotic protection and relatively low impairment of hemostasis. The aim of this study was to compare a LMW heparin with Dextran 70, an established method for thromboembolic prophylaxis in prosthesis surgery.

Patients and methods: In a randomized controlled trial, the antithrombotic effect of a LMW heparin, Kabi 2165, was compared with Dextran 70 in 98 patients undergoing elective total hip replacement. Prophylactic treatment with a subcutaneous dose of 2,500 anti-Factor Xa units of LMW heparin was started 2 hours preoperatively, and then the same dose was given twice daily for 7 days. After an initial dose of 20 ml hapten, Dextran 70 was given as an intravenous infusion of 500 ml on postoperative days 1 and 3. The ^{125}I-fibrinogen uptake test was used as a screening method for venous thrombosis in all the patients. Positive tests were controlled by ascending phlebography, evaluated by one experienced radiologist without knowledge of the prophylaxis.

Results: Deep vein thrombosis was detected in 22 of 49 patients in the Dextran group and in 10 of 49 patients in the LMW heparin group ($P < 0.03$). Femoral thrombosis or bilateral below-knee thrombi were found in 6 patients, exclusively in the Dextran group. Nonfatal pulmonary embolism was equally distributed in the two groups, being diagnosed in 4 cases. There was no difference in bleeding or requirement of transfusion and no allergic or other serious complication. Anti-Factor Xa levels showed no cumulative tendency, the mean of peak levels at 3 hours after LMW heparin injection varying day by day from 0.10 to 0.22 anti-FXa U/ml.

Conclusion: LMW heparin seems to have an increased antithrombotic effect with low bleeding-inducing activity, when given as a low-dose prophylaxis.

Self-assessed disability in patients with coxarthrosis: Reliability of the Nottingham Health Profile

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Patients and methods: The Nottingham Health Profile (NHP), a short (45 yes/no questions) instrument for the assessment of health-related problems was administered twice by mail (4 weeks apart) to 73 patients between 30 and 80 years of age who were waiting for a total hip replacement (THR) at our hospital. The purpose was 1) to describe how the patients perceived the impact of arthrosis of the joint in terms of the six sections of the NHP: pain, energy, physical mobility, emotional reaction, sleep, and social isolation, and 2) to test the reliability of the instrument. The degree of disability was also classified according to the Charnley/d'Aubigne scale. Demographic data and duration of symptoms were noted.

Results: A high response rate was noted, 71/73 for the first administration and 69/71 for the second. The predominant complaints were found within the sections of pain, energy, sleep, and physical mobility. Duration of symptoms was related to degree of disability. Pain was also the main indication for THR. The correlation

between the NHP and the Charnley/d'Aubigne scale were, apart from the section of pain, low or moderate, indicating that patients perceived disability different from the surgeon's classification. In terms of reliability, the correlation between the two test administrations was very high.

Conclusions: The NHP is a reliable and comprehensive instrument that can be useful in monitoring health status in patients with a chronic disabling condition such as coxarthrosis. It provides a more valid assessment of disability and life quality than the Charnley/d'Aubigné score and can improve the accuracy in selecting patients for THR.

Amputation

Syme's amputation

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Introduction: Traditionally, the Syme's amputation has been a discredited operation in Sweden. Cosmetic problems and lack of knowledge in proper prosthesis fitting might have been the reasons, although Waters et al. have proven that amputation through the ankle gives superior walking results in comparison with the below-the-knee amputation.

Patients: The Syme's amputation technique was introduced in 1977 at our clinic, and the results of totally 56 amputations during a 10-year period have been evaluated. The patients suffered from diabetes in 39 cases, arteriosclerosis in 8, and other conditions in 6. The mean age of the patients was 70 (9–87) years.

Results: The amputations were successful in 33 cases, with a mean follow-up time of 2 years. Fourteen of these were followed 2 years (1 month-5 years) before death. Three patients died prior to healing. Reamputation was indicated in 23 cases.

Conclusion: In spite of a high frequency of reamputations, the benefit of trying a Syme's amputation is obvious. During the healing period, the patient is mobile with a temporary prosthesis, and the permanent fitting does not require hospitalization.

Autoamputation – the salvage of the foot

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Introduction: In the case of active expectance by protective treatment in a walking cast in handling the gangrenes of the toe tips, toes, and the forefoot in diabetic and arteriosclerotic patients, autoamputation will diminish the need of major and high amputations of the limb. The patient is kept ambulant, the most distal level of amputation is achieved, and the different tissues will grow together and prevent a spread of infection while the dead tissues demarcate and fall off. The cosmetic and functional end results are astonishingly good.

Material: Forty-four consecutive patients were selected: Eighteen of 30 diabetics, mean age 69 years, healed or were healing, but 3 died before complete healing. Another 3 patients were amputated before death; 6 of 10 arteriosclerotics healed and 4 were amputated. The younger "others" all healed: 1 crush injury, 1 freezing injury, and 2 rheumatic vasculitis.

Conclusion: Conservative expectant, but active, treatment of distal gangrenes in diabetic, arteriosclerotic, and other patients is worthwhile and strongly advocated in cases presenting dry or almost dry necrosis of the toes or forefoot. The risk of distal surgical amputation in dysvascular cases is well known. The only disadvantage of autoamputation is that the process of mumification is time consuming.

Nail matricectomy by phenol treatment

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Introduction: Ingrown fungused or traumatically deformed nails mostly involve the big toe and may result in paronychia, gangrene, and amputation in dysvascular cases. Numerous surgical procedures have been described concerning nail-bed ablation, which is a necessity to prevent recurrence of the abnormal toenail.

Total proximal nail-bed ablations nevertheless are accompanied by a rather high regrowth rate. Surgical interventions might be hazardous in dysvascular cases.

Method and patients: We have found the phenol treatment more appealing and used chemical matricectomy as the method of choice following evulsion carried out on 32 big toenails under local anesthesia and digital tourniquet. Eighteen subjects were diabetics, 4 arteriosclerotics, and 7 with sundry conditions. The mean age was 69 (44–92) years.

Results: A follow-up of 6 (2–24) months disclosed five major recurrences and six insignificant ones. Two cases were recauterized. No problems due to the permanent loss of the nail were reported, but a number of patients were anxious about the prolonged secretion from the toe. The cosmetic and functional results were good.

Conclusion: In diabetes mellitus, neuropathia, and arteriosclerotic cases, the method is valuable in prophy-

lactic treatment of the foot. The simplicity, low morbidity, high rate of success, and rare complications of the method makes it useful in the treatment of dysvascular feet when nail deformities are common.

Amputation for vascular disease

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Amputation for vascular disease is now one of the most cost-consuming diagnoses within orthopedic hospital care. In the Helsingborg district with 140,000 inhabitants, 91 patients had major amputations during 1985–1986. Our incidence of 0.33 per thousand inhabitants corresponds to Liedberg's incidence of 0.32 in 1979, also with the same proportion of diabetics. In all, 135 amputations – 9 bilateral ones – were performed. Reamputations were 18 percent and 20 percent of the major amputations were above the knee and 20 percent were through the knee. The average age was 76 (48–94) years, and 35 percent were diabetics. The routine included preoperative consultation with a vascular surgeon, prophylactic antibiotics, sagittal incisions at below-the-knee level, and a postoperative plaster cast.

The Swedish Medical Research Council has initiated a multicenter study to stimulate measurements of the efficiency of treatment and rehabilitation for this group of patients with an aim to stimulate improvements in surgical technique, postoperative care, prosthetic equipment, and independence. More conservative treatment of diabetic feet according to Jernberger and better vascular reconstruction with vena saphena in situ will be of interest for reduction of the amputation incidence, as well as diet, exercise, and altered smoking habits.

Shoulder

Late results after fracture of the scapula

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It is a common belief that fracture of the scapula is a benign lesion with uniformly favorable outcome. The aim of the present study was to evaluate the shoulder in a group of patients who had sustained a fracture of the scapula, on an average, 15 years before the examination. Eighty-five patients, 61 men and 24 women, were included. There were 36 fractures of the corpus scapulae, 18 fractures of the collum scapulae, 23 fractures of the glenoid, four fractures of the scapular spine, two of the acromion, and one coracoid fracture. Thirty-two fractures of the scapula were associated with other injuries necessitating hospitalization in 20 cases. Eighty-three fractures were conservatively treated with early mobilization. One glenoid fracture and one acromion fracture were openly reduced and internally fixed. At follow-up the shoulders were evaluated clinically; and radiographically, shoulder symptoms related to the original scapular fracture were assessed.

Eighteen patients had intermittent shoulder pain, and 13 patients reported constant shoulder pain. Function was slightly reduced in 10 shoulders, and moderate in 3 cases. There was no significant relation between the late symptoms and the original fracture type.

In our study, 38 percent of the patients with an earlier fracture of the scapula had persistent shoulder pain. Very few, however, had severe functional impairment.

Arthroscopy of the shoulder in evaluation of patients with shoulder instability

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The object of this retrospective study is to report our experience of the diagnostic value of arthroscopy in patients with shoulder instability.

Patients and methods: Eighteen patients (28±7 years) with symptoms of shoulder instability were examined with arthroscopy. Eleven had recurrent anterior dislocations and 3 had posterior instabilities. Their arthroscopic picture was compared with the corresponding findings in 55 patients who had a shoulder arthroscopy because of shoulder pain. Arthroscopy was performed with a posterior approach. In patients with posterior instability, an additional anterior approach was used.

Results: Patients with recurrent anterior dislocations had typical Bankart lesions with avulsion of the upper part of the inferior glenohumeral ligament (LGHI). In addition, all of them had more or less degenerative lesions of the anterosuperior labrum and the adjacent chondral surface. Three of 4 with anterior subluxations exhibited a "pre-Bankart lesion," with avulsion of the upper third of the LGHI. A Hill-Sach lesion was found in 9/15 with anterior instability. Hill-Sach's, Bankart, or pre-Bankart lesions did not occur in any in the reference group. In 2 of 3 patients with posterior instability, tears of the posterior labrum occurred. In the third patient, arthroscopy was normal.

Conclusions: Typical pathologic findings are visual-

ized with arthroscopy in patients with anterior shoulder instability. Although the diagnosis is obvious clinically and radiographically in most patients with anterior dislocations, arthroscopy may be valuable in the evaluation of patients with subluxations and dislocations of unknown direction in multidirectional instability.

The diagnostic significance of subacromial bursography in shoulder impingement

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In a consecutive series of 26 patients with shoulder impingement, we have evaluated the diagnostic significance of subacromial bursography by comparing the bursographic findings with pathoanatomy observed at subsequent surgery.

Patients and methods: All the patients had a confirmed clinical diagnosis with impingement syndrome including a positive impingement test. At surgery, all the patients had a decompression with an anterior acromioplasty according to Neer, and where indicated a rotator cuff repair and/or a resection of the lateral end of the clavicle.

Results: At surgery, impingement was found in all the patients. Bursographic signs of impingement were demonstrated in 13 cases with the appearance of an obliterated zone of the midportion of the bursa in the most painful position of abduction. In 3 of these cases, there was also a concomitant distension of the bursa lateral to the obliteration. Inflammatory changes in the bursal walls were observed in 17 cases. The bursography was normal in 3 of these cases; in the others, different changes in the size and configuration were visualized. The bursograms were normal in 6 out of 9 cases that did not exhibit any bursal inflammatory changes at surgery.

Three out of 5 cases with partial thickness tears of the upper side of the rotator cuff were visualized bursographically. A full thickness tear of the rotator cuff was observed at surgery in 6 cases, all of which were demonstrated in the bursograms, as well as in the arthrograms.

Conclusion: Bursography visualized the subacromial mechanical conflict in half of our patients with impingement syndrome. This technique is, thus, too insensitive as a diagnostic aid in the impingement mechanism per se. However, the diagnostic outcome was better regarding the specific pathoanatomic findings in the bursa and the rotator cuff. Subacromial bursography might replace arthrography in the diagnosis of a full thickness tear of the rotator cuff.

Arthroscopy in evaluation of shoulder pain

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This retrospective study was done to evaluate the value of arthroscopy in patients with shoulder pain.

Patients and methods: Fifty-five patients (mean age 39±12 years) had arthroscopy of the shoulder because of shoulder pain. In 13 patients, it was possible to make a clinical diagnosis of rotator cuff syndrome (RCS; typical painful arc and temporary relief of subacromial local anesthesia). In three fourths of the remaining 42 patients, a clinical diagnosis was not possible; however, symptoms of RCS were involved. All 42 patients had a history of 6 months or more, and most of them were severely handicapped and unable to work.

Arthroscopy was performed with a posterior approach.

Results: The mean operation time was 20 minutes. In 13 patients with a clinical diagnosis of RCS, all of them had partial tears or tendinitis in the rotator cuff. They were all operated on with a Neer acromioplasty. In the remaining 42 patients, 19 had a pathologic arthroscopy. In 9, a partial tear or tendinitis in the rotator cuff was found. One had a tendinitis in the biceps and 2 in the infraspinatus tendon. Five had labrum tears and 2 had adhesive capsulitis. All the labrum tears, the biceps tendinitis, and 2 of the patients with rotator cuff pathology were treated arthroscopically. Both the patients with adhesive capsulitis were treated with mobilization under anesthesia. In 23 of the 42 patients with a clinically unclear diagnosis, the arthroscopy was normal in 17. In the remaining 6 patients, a slight synovitis in the anteriosuperior part of the joint was found.

Conclusion: In all the patients with a clinical diagnosis of RCS, the diagnosis was verified at arthroscopy. Arthroscopy did not give any additional information of importance for the selection of treatment. The arthroscopy was pathologic in almost half of the patients with a clinically unclear diagnosis. In the remaining patients, arthroscopy did not give any new information except that intraarticular pathology could be ruled out.

Surgical treatment of impingement syndrome of the shoulder

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The purpose of this prospective study is to report the results of surgical treatment in a consecutive series of

patients with shoulder impingement and to analyze timing of surgery and factors that might influence the results.

Patients and methods: Fifty-two patients underwent surgery at our department between February 1981 and November 1985. The average age was 49 (19–68) years. All the patients had an established clinical diagnosis of impingement syndrome, including a positive impingement test. The mean duration of preoperative symptoms was 27 (5–72) months. Forty-four patients were on sick leave prior to surgery, with an average duration of 11 (1–34) months. At surgery, all the patients had a decompression with an anterior acromioplasty according to Neer. A rotator cuff repair and/or a resection of the lateral end of the clavicle was added when indicated. There was a full thickness tear in 14 cases. The patients were followed up according to a protocol for an average period of 11 (6–24) months. The results were evaluated according to the patient's own opinion of the result, and an overall rating based on pain, motion, and strength.

Results: The results were excellent in 17 cases, good in 23, fair in 9, and poor in 3. Subjectively, 19 patients considered themselves as asymptomatic, 26 as significantly improved, 2 as somewhat improved, and 5 as unchanged. Of the 49 patients actively employed preoperatively, 32 returned to work postoperatively. No prognostic significance could be related to sex, trauma, duration of symptoms, or operative findings. Age and duration of preoperative sick leave influenced the results.

Conclusion: Anterior acromioplasty is an effective decompressive procedure for impingement syndrome of the shoulder. The results in this series indicate that surgery should be considered if the symptoms are severe enough that the patient is still unable to work after 4 months of sick leave. The patient at risk was apparently above 50 years of age with heavy manual work who had an associated cervical disorder and had been on sick leave for more than 12 months.

Evaluation of the rheumatoid shoulder after heimarthroplasty and arthrodesis

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Rheumatoid arthritis frequently involves the shoulder, causing pain. In the advanced stages of the disease, the treatment of choice has been either arthroplasty or arthrodesis. We have compared five shoulder arthrodeses with five hemiarthroplasties in 8 patients. The mean age for arthrodesis was 34 years, with a mean observation period of 10 years. The mean age for hemiarthroplasty was 38 years, with a mean observation period of 2 years. The period of postoperative immobilization was much shorter for hemiarthroplasty; both procedures relieved pain, but personal hygiene was earlier to perform after hemiarthroplasty.

The position of arthrodesis was measured with a new method using Moiré photography to find the neutral position of the scapula and to simultaneously record the position of the humerus with two mirrors.

Shoulder arthrodesis with fixed internal rotation greater than 40° can prevent the hand from reaching the face. Arthrodesis of the rheumatoid shoulder may be reserved for the failed arthroplasty.

Spine

Flexible carbon fiber implants in the spine – 6 years of experimental and clinical studies

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Stabilization of the cervical and lumbar spine is performed for a variety of disorders. Numerous surgical techniques have been tried with varying success. However, the majority of synthetic materials that are used include wire, and breakage of wire is a well-known postoperative complication. A short review of our experimental studies in rabbits and goats is given. The flexible carbon fiber and its reaction in different compartments of the spine – namely, in epidural adipose tissue, in narrow space close to the dural sac, and in surgically created drill holes in the vertebra – has been studied. Finally, strength tests of implanted carbon fibers in the lumbar spine in goats were summarized.

Clinically, the method has been used in spinal instability: in the upper cervical spine of 19 patients, in the lower cervical spine of 4 patients, and in the lumbar spine of 47 patients. All the patients tolerated the carbon-fiber implant well, and the postoperative tests showed good stabilization.

Changes in incidence and prevalence of vertebral fractures during 30 years

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Fragility fractures have increased in incidence during the last few decades. It is therefore interesting to study

vertebral compression fractures, considered to be one of the most typical fractures of postmenopausal osteoporosis.

Material and methods: For incidence calculations, all the radiographs of fractured thoracic and lumbar vertebrae were reexamined for the years 1950–1952 inclusive and 1982–1983 inclusive. Age- and sex-specific incidences were calculated using the census figures of the city files. The prevalence of vertebral fractures was evaluated from lateral projections of normal chest radiographs. The following years were examined for prevalence calculations: 1950–1954 inclusive and part of 1983.

Results: In the incidence study in 1950–1952, there were 21 men with 21 fractures and 27 women with 31 fractures; in 1982–1983, there were 63 men with 80 fractures and 244 women with 316 fractures. The most common vertebral fracture was L1 in both decades. There is a substantial increase of incidence over the years in elderly women, the differences statistically significant over aged 70 years; in men there is a statistically significant difference over 80. In the prevalence study in the 1950s, 783 normal chest radiographs in men and 1,076 in women were examined. In 1983, 792 normal chest radiographs in men and 1,038 in women were examined. In the 1950s, there were 13 fractures in 8 men and eight fractures in 6 women. In 1983, 32 fractures in 19 men were seen and 99 fractures in 42 women.

If the prevalence instead is estimated from the cumulative numbers in the incidence study, the outcome is only half of that found in the prevalence study – only half of the vertebral compression fractures are being diagnosed. In the prevalence study of normal chest radiographs, the outcome becomes more impressive if the number of fractures or the millimeter depression/100 chest radiographs is introduced indicating that vertebral compression fractures are not only more common, but also more extensive than 30 years ago.

Luxation of the cervical spine in rheumatoid arthritis

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For more than 15 years, we have in collaboration with the orthopedic and neurosurgical clinics in Lund and the radiologic clinics in Lund and Malmö treated rheumatoid patients with luxation of the cervical spine, mainly atlantoaxial luxations. More than 200 patients have been referred to us for evaluation; and more than 50 percent have had surgery, with few exceptions an occipitocervical fusion using wiring, bone cement, and bone chips. With this method, it is possible to mobilize the patient the day after surgery without any heavy external fixation. Indication for surgery has been severe, intractable pain in the region and/or neurologic signs of compression of the medulla.

The results of the first 101 operated on cases have been analyzed. The preliminary results were as follows: 1) Very few complications occurred. 2) Total or considerable pain relief was obtained in about 80 percent. 3) No progress of the neurologic signs occurred. 4) Wire breakage or fracture of a spinal process has indicated reoperation in about 5 percent. 5) In about 20 percent, there was a *vertical* luxation with protrusion of the dens and the posterior arch of the atlas into the foramen magnum. In these cases a laminectomy of the atlas was considered necessary to decompress the medulla. 6) The postoperative stability was usually satisfactory, and only a few dislocations at lower levels of the spine have developed. 7) Early surgery in *horizontal* luxations is recommended to prevent the more difficult to treat *vertical* luxations. 8) Examples are given how luxations at lower levels have been treated. 9) Magnetic resonance imaging (MRI) has provided useful information about the synovitis around the dens and its compression of the medulla.

Internal stabilization of pathologic fractures in the cervical spine

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Tumorous infiltration of the body of a cervical vertebra may lead to a pathologic fracture similar to a burst fracture. When the body of C2 is infiltrated, the resulting fracture may be a pathologic dens fracture. The patient suffers local pain, often rhizopathic pain, and a risk of compression of the medulla is sometimes present.

During 5 years, we have treated 28 pathologic fractures of the cervical spine at our clinic. The most common primary tumors have been carcinoma of the mammary gland, myeloma, and carcinoma of the thyroid gland. Neck pain has been the major indication for surgical stabilization. Rhizopathic pain has also been common. Only 1 patient has shown major signs of medullary dysfunction, although CT in several cases has shown an anterior deformation of the medulla from the collapsed vertebra.

The standard surgical procedure has been anterior resection of the affected vertebral body, reduction, and

filling of the resulting defect with acrylic bone cement. The cement body has then been fixed to the adjacent vetebral bodies with screws and an Orosco plate. In cases with pathologic dens fractures, two screws have been placed in the dens and a part of these screws then incorporated in the cement body that replaces the tumorous cavity in the body of C2. The cement body has then been fixed to C3 in the manner described earlier.

In 20 patients an anterior vertebral resection and stabilization have been done of which 6 have been pathologic dens fractures. A supplementary posterior fusion has been performed in 5 of the anteriorly stabilized patients; 8 patients have only had posterior stabilization done.

The pain-relieving effect of the stabilization has been excellent and lasting in all the patients. There has been no peroperative complication, and only one osteosynthesis failure requiring further operations.

Radiographic changes in the thoracic and lumbar spine in athletes

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Introduction: Radiographic changes in the spine among young people participating in sports with great demands on the back have attracted more attention over the past few years. Modern sports with high-intensity rational training, together with high loads at low age, may cause an increased risk of negative effects on the spine. This study was done to analyze the frequency of radiographic changes in the thoracic and the lumbar spine of top athletes in comparison with a reference group.

Patients and methods: Totally, 117 Swedish, male, top athletes (15–25 years old) representing four different sports (wrestling, soccer, gymnastics, and tennis), 26 female gymnasts (13–25 years old), and a reference group of 30 male nonathletes (18–25 years old) were selected for the study. They were chosen without knowledge of previous back symptoms or injuries. Radiographs – anteroposterior and lateral projections – of the midthoracic, lower thoracic and lumbar spines were obtained. The radiographs were examined by 2 radiologists without knowledge of the patients' identities. In this report, changes in the vertebral disc complex are presented, excluding irregular end plates, Schmorl's nodes outside the vertebral ring apophyses, and changes in the neural arch.

Results: Signs of vertebral disc degeneration with more than 50 percent reduction of disc height, changes in the vertebral ring apophyses and vertebral body deformations were noted in higher frequencies in all the athletic groups as compared with the reference group. The differences were statistically significant for wrestlers (13 of 30 individuals; $P < 0.01$) and male gymnasts (10/26, $P < 0.05$) as compared with the reference group (3/30). The frequency of lumbar changes for the wrestlers was 9/30, for the gymnasts 6/26, and for the reference group 1/30.

Conclusion: Radiographic changes in the spine were seen in a significantly higher frequency among elite wrestlers and gymnasts when compared with a reference group of nonathletes.

Autotraction in lumbago-sciatica

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This study presents the results in 83 patients with lumbago-sciatica who were treated with autotraction a.m. Gertrud Lind. Factors that may influence the results were analyzed.

Patients and methods: The mean age was 40 (15–60) years. Of 78 patients actively employed before treatment, 63 had been on sick leave for an average of 5.3 months. The indication for treatment was a duration of symptoms for at least 6 weeks and a positive Laségue's test. Neurologic deficits were present in 63 patients. They were all treated under a protocol as inpatients during a 4-year period. The results were analyzed at discharge from the hospital and at the follow-up on an average of 8 (3–12) months. The effect on pain, Laségue's sign, and neurologic symptoms were evaluated according to a 3-grade scale.

Results: In 29 patients the treatment was an immediate failure, and 5 patients had a delayed failure. Twenty of these patients underwent subsequent surgery. In the other 49 patients the following results were obtained. The sciatica was relieved in 26 cases, improved in 17, and unchanged in 6 cases. The low back pain was relieved in 24 cases, improved in 17 cases, and was unchanged in 8 cases. A positive Laségue's sign was normalized in 25 cases , improved in 16, and unchanged in 7. Neurologic deficits normalized in 29 cases, improved in 17, and were unchanged in 2. Thirty-four patients returned to work after treatment, 8 of whom returned to modified work.

No prognostic significance could be related to sex, age, occupation, the number of earlier attacks of lumbago-sciatica, duration of symptoms, and sick leave, or the presence of neurologic deficits. However, patients with a positive Laségue's sign $\leq 30°$ had an increased risk of failure.

Conclusions: Although autotraction was ineffective in 29/83 cases, we consider that this treatment has a place

under given indications. Probably many additional patients would have required surgery if autotraction had not been performed. Exclusion of patients with a Laségue's sign less than 30° should improve the results.

The degree of disability after cervical spine injuries

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A cervical spine injury means primary survival or death. In the emergency situation, primary survival is the most common outcome. Most of these patients recover without any residual symptoms after treatment. There is a very small group of patients with tetraparesis or paraparesis.

In the group of patients with residual symptoms (10–15 percent), tetraparesis and paraparesis excluded, the residual symptoms are of a rather mild degree, mostly local and/or radiating cervical pain. However, the degree of disability as judged by private insurance companies varies for similar cervical spinal injuries and residual symptoms with the level of disability awarded being 0–25 percent. With respect to the receipt of a disability pension, data from the social insurance office revealed that operative treatment gave the highest number (42 percent), followed by skull traction (18 percent), halo vest (8 percent), and treatment with a collar (8 percent).

These data are based on a material of 332 cervical spine injuries and a follow-up study of 85 axis and 10 atlas fractures.

The degree of disability should focus on the residual symptoms and not on the type of injury or the given treatment. A better uniformity in this respect is desirable.

Knee

Dysplasia of the patellofemoral joint with recurrent patellar dislocation – a new surgical procedure

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Recurrent dislocation of the patella can lead to severe disability. More than 100 surgical procedures have been described for stabilization of the dislocating patella. In spite of this, there are still different opinions about the optimal treatment, because several of the surgical methods have given unsatisfactory results.

Patients and methods: This study comprises patients with dysplasia of the patellofemoral joint, i.e., dysplastic intercondylar femoral groove in combination with recurrent patellar dislocation or subluxation. The operation included deepening of the intercondylar groove in combination with lateral release, vastus medialis obliquus transposition, and medial and distal transfer of the tibial tubercle.

Results: Seventeen patients, 13 women and 4 men have been followed for 6 (2–12) years. No redislocations occurred. The functional results were excellent in 10 patients, good in 5, and fair in 2 with moderate pain, although less than preoperatively. Twelve of the patients had previously been operated on with different stabilizing procedures without success.

Conclusion: Dysplasia of the patellofemoral joint can give rise to recurrent patellar dislocation or subluxation and proceed to cartilage damage of the patella and patellofemoral pain syndrome. The results in this study have been encouraging in the majority of patients, as no redislocations have occurred and only 2 of 17 patients experienced moderate pain at the follow-up. The study is continuing, and now CT is used in the preoperative planning. We feel that if dysplasia of the patellofemoral joint in combination with recurrent patellar dislocation or subluxation is found, reconstruction of the extensor apparatus should be done without undue delay in order to minimize the risk of cartilage damage in the patellofemoral joint.

Surgical or nonsurgical treatment of acute rupture of the anterior cruciate ligament – a randomized study

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Introduction: The aim of this study was to compare surgical and nonsurgical treatment of the acutely torn anterior cruciate ligament.

Patients: Totally, 111 consecutive patients, 81 men and 30 women aged 25 (13–49) years, were randomized to either group. Major associated ligamentous or meniscal injuries were treated in all the patients.

Methods: In all, 52/111 (47 percent) of the patients had the ACL repaired either by primary suturing (23/52) or suturing combined with augmentation from the iliotibial tract (29/52).

Results: Of the patients, 102 have been followed up after a minimum of 4 years. In all, 18/111 (16 percent)

of the patients developed symptomatic instability requiring a late reconstruction of the ACL, most of them (15/59) from the conservative group. Totally, 19/111 (17 percent) were reoperated on owing to a late meniscal injury.

Residual instability, as measured by a Stryker laxity tester, was significantly increased in the conservative group as compared with the augmented group.

Conclusion: Primary suturing in combination with augmentation of the ACL showed superior results as regards the frequencies of late reconstruction, meniscal injury, and stability.

Functional anatomy of the posterior cruciate ligament

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To repair or reconstruct a torn PCL successfully, the surgeon must fully appreciate its anatomic structure and its function. The aim of this investigation was to study the functional anatomy of the PCL in normal knees and to identify landmarks important in PCL surgery.

Material and methods: Forty normal human cadaver knees (mean age at death 29 years) were obtained from the Department of Forensic Medicine. The PCL was exposed and measured, as well as the attachment areas. Twelve PCLs were sectioned transversely. The functional significance of different attachment sites of the PCL was studied regarding length changes of the ligament in different degrees of knee flexion.

Results: The angle between the ligament and the long femoral axis in extension was 43±3°. The distance between the central points of the ligament insertion areas (ligament length) was 38±4 mm. The thickness was 6±1 mm and the width 14±2 mm measured in the middle third of the ligament. The most favorable position on the medial femoral condyle was in the middle of the posterior area of the normal attachment.

Discussion: A standardized replacement operation for the posterior cruciate ligament should attempt to 1) create a normal space for the ligament by increasing the tunnel width to 21; 2) position the femoral insertion of the ligament at a point 38 mm from the tibial insertion; 3) make the angle between the substitute ligament and the long axis of the femur 43° with the knee in extension; 4) use a trial prosthesis to make sure that the distance between the insertion points is isometric during flexion and extension of the knee. To accomplish this, a drill guide that gives correct and reproducible alignment of the ligament has been designed.

Rotatory stability of the anterior cruciate-deficient knee

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Introduction: Anterolateral rotatory instability of the knee has been associated with a previous injury to the anterior cruciate ligament and constitutes the basis for clinical tests, such as the Pivot shift.

Materials and methods: The purpose of this study was to map out the kinematics of the knee in 15 patients with a chronic injury of the ACL. A standardized testing procedure was designed to record the laxity of the knee during simultaneous application of rotatory torques and anterior-posterior tractions. Tibial rotations and translations of both tibial condyles were measured using roentgen stereophotogrammetric analysis.

Results: At 20° of flexion and no traction, the ACL-difficient knees displayed an increased rotatory laxity. When the tibia was displaced anteriorly, the internal rotation increased on both sides and the external rotation decreased, especially on the injured side because of a tendency of the lateral tibial condyle to get caught in the anteriorly displaced position. Posterior displacement of the tibia resulted in a decreased rotatory laxity on both sides indicating a stabilization of the knee joint.

Conclusions: The most important instability of the ACL-deficient knee is anterior tibial subluxation. The internal rotatory laxity at the anteriorly subluxated position is equal to the normal knee. These findings might explain why the results after some extraarticular operative procedures, such as transfer of the iliotibial tract, tend to deteriorate with time.

Reconstruction of the anterior cruciate ligament using a ligament prosthesis: A 2-year follow-up

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Twenty-one women and 39 men (aged 16–35 years), were operated on because of anterior cruciate insufficiency. The patients were selected from a larger population subjected to muscle rehabilitation due to significant instability of the knee. Only those who still had significant problems in spite of complete muscle rehabilitation were accepted for operation. The anterior

cruciate was replaced with a Dacron prosthesis using a new technique for accurate positioning of the drill holes. Stability, muscle strength, and knee function were measured before and on several occasions after the operation. The positioning of the prosthesis was controlled by radiography. Immediate rehabilitation with full weight bearing was allowed after the operation.

Results: The preoperative mean Lysholm knee function score was 72±14.5, which increased to 92.2 at 6 months and remained at about the same level during the follow-up. Stability measured as a difference between legs with a laxity tester was preoperatively 5.2 (3.1) mm, 1.5 mm at 1 and 2 years, and 2.0 mm at 3 years. Muscle strength was generally normal at 5 months postoperatively, and the results of a figure-8 run, as well as a one leg hop, were normalized at 1 year.

Complications: There have been 4 cases of graft rupture ; all have had another Dacron graft inserted. One patient has had a synovial fistula that healed after removal of the graft, and 1 had a superficial wound infection that healed without consequences. Repeat arthroscopy in 22 of the patients has shown good collagen ingrowth into the prosthesis, as well as synovial covering. The results are promising, but with time the number of ruptured grafts will probably increase. The technique should be regarded as experimental until longer follow-ups in controlled series can be provided.

Intercondylar notch measurements with special implications on ACL reconstructive surgery

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Introduction: The formation of osteophytes in the femoral notch in the anterior cruciate ligament (ACL) deficient knee is a well-established phenomenon. We have noticed graft ruptures apparently caused by wear on the graft at a point corresponding to the joint margin of the lateral femoral condyle. The aim of this study was to gather further anatomic information of the intracondylar notch.

Patients and methods: The intercondylar notch distance at the anterior (distal) opening was measured in 31 patients who had undergone acute ACL repairs, and in 93 patients who had undergone ACL reconstruction due to chronic instability following a previous ACL rupture. A group of 38 cadaver knees from young accidentally diseased persons without previous knee injury served as a control. Seven cadaver knees were subjected to further dissection and measurements of the notch.

Results: The mean tunnel width in the acutely torn ligament group was 18.8±2 mm, in the old ligament tear group 16.4±2.8 mm, and in the cadaver group 20.4±2.5 mm. The difference was significant between all three groups. In the dissected knees the angle between the roof to the notch and the long axis of the femur was on an average 33±5°; the angle between the wall of the medial and the lateral condyles and the long axis of the femur was 6±2° and 3±2°, respectively. In both instances the angle opened outwards posteriorly, resulting in a wider posterior part of the tunnel.

Conclusion: We conclude that the osteophyte formation in ACL-deficient knees is a common finding that gives a narrowing of the intercondylar notch opening and which might threaten the life span of the ACL graft. Notch plasty in the anterior (distal) part of the tunnel is therefore recommended. Due to the divergent shape of the tunnel, there seems to be little need for notch plasty in the posterior (superior) part.

Prognosis of repaired and intact menisci in unstable knees: A comparative study

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Meniscal repair has been advocated for ruptures in the posterior horns of the menisci. It has been shown that repair leads to a high success rate and survival up to 7 years. Most of the repairable meniscus ruptures occur in patients with anterior instability. The present study was done to analyze the fate of the repaired meniscus compared with the rupture frequency of initially intact menisci in knees with anterior cruciate insufficiency.

Patients and methods: Forty patients, 6 women and 34 men (mean age 27±10 years), formed 20 pairs matched according to sex, age, knee injuries, and follow-up. They had complex knee ligament lesions always including the ACL. Group I had in addition a peripheral meniscal rupture (18 medial and 2 lateral), while group II had two intact menisci. A ligament reconstruction was performed after arthroscopic evaluation in most of the cases, and in group I the meniscal tear was repaired with an open technique. Meniscal healing was confirmed about 1 year later arthroscopically or clinically (16/4). The patients were reexamined 6 to 8 years after the initial repair. They underwent a clinical examination: the Lysholm knee function score and the Tegner activity score were used. The subjective evaluation of the result was recorded.

Results: All the knees in both groups were quite unstable at follow-up. A mean laxity difference of 5±4 mm was measured with the Stryker laxity tester (Stryker

Inc., Kalamazoo, U.S.A.). The knee function score was in both groups 86±6. The activity level dropped equally 2 points from 8 to 6. The subjective evaluation showed no significant difference. Out of the meniscus repaired group, 3 menisci had reruptured at follow-up; the intact meniscus group showed a rerupture rate of six menisci, but three of them could be repaired and are still intact.

Conclusion: A healed meniscal tear has the same chance of survival in an unstable knee as an intact meniscus. The limiting factor is the grade of instability and the activity level of the patient.

Discoid lateral menisci: A report on 29 cases

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Introduction: A discoid lateral meniscus was first described in 1889 by Young, and since then numerous reports have been published on the subject. As we had the feeling that we saw fewer discoid menisci than others had reported and to evaluate our treatment policy, we found it interesting to do this study; and during the study, we used Watanabe's classification.

Patients and methods: During the period September 1979 to November 1986, 7,056 knee arthroscopies were performed at our clinic – and of those, 30 patients proved to have discoid menisci, 29 laterally, and one medially (excluded). Hospital records of these patients were perused to gather information, and then all the patients but 1 answered a questionnaire to make an evaluation of knee function according to Lysholm's knee score possible.

Results: Of 7,056 knee arthroscopies, 29 patients (0.4 percent) had discoid lateral menisci, and of these 11 were males and 18 were females. The average age at diagnosis was 35 years, and the average follow-up time was 48 (3–86) months. In only 3 cases was the preoperative diagnosis of a discoid lateral meniscus made. All the menisci were of the complete or incomplete types. In 11 patients the menisci were ruptured and in 10 patients they were thought to cause the symptoms and were resected, nine partially and one totally. The Lysholm's knee score at follow-up in this group was 87.6, but 87.0 for those patients whose discoid menisci were an incidental finding, and hence according to our policy were left intact.

Discussion: The frequency seems to be lower here in Scandinavia than in Scotland, North America, and Japan. Our results support our policy to perform meniscectomy (most often partial) only when the discoid meniscus is thought to cause the patient's symptoms, but when an incidental finding, to leave it intact.

Children's hips

Transient synovitis of the hip in the child: Increased levels of proteoglycan fragments in joint fluid

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The etiology of transient synovitis is unknown, but viral infection, hypersensitivity, or trauma have been implicated. Experimental models with induced hip joint synovitis have shown rapid loss of cartilage glycosaminoglycan, increased hydration, and mechanical deformability of the joint cartilage. The purpose of this study was to investigate the possible similar reaction in children with transient synovitis of the hip.

Patients and methods: Synovial fluid was aspirated from 16 children with transient synovitis of the hip (TSH). For comparison, synovial fluid was aspirated from 2 children with congenital dislocation of the hip (CDH) and from 4 children with established Legg-Calvé-Perthes disease (LCPD). Proteoglycan fragments were analyzed by an enzyme-linked immunosorbent assay using antibodies against the protein core of the proteoglycan.

Results: The level of cartilage proteoglycan fragments in the children with transient synovitis corresponded to 198 μg of proteoglycan per ml (73–307 μm/ml). The corresponding values in children with CDH were 9 and 3 μg/ml, respectively. In the children with LCPD, 2, 6, 84, and 169 μg/ml, respectively, were noted. The latter 2 patients had a history of synovitis, whereas the children with low values were asymptomatic at the time of aspiration.

Discussion: The concentration of proteoglycan fragments in TSH were consistently high and of the same magnitude as in patients with reactive arthritis, whereas children with CDH or LCPD without synovitis showed consistently low values, as found in knee-joint fluid collected during arthroscopy in patients without synovitis (unpublished). We suggest that the high levels of proteoglycan fragments are the result of an increased rate of degradation of the hip joint cartilage induced by synovitis. This may, as shown experimentally, affect the biomechanical properties of the cartilage and the metabolism of the cartilage cells leading to hypertrophy, which may explain the coxa magna development frequently seen in these children.

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Strict nontreatment in Legg-Calvé-Perthes disease

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Introduction: The treatment of Legg-Calvé-Perthes disease (LCPD) is still a topic for discussion. Surgical treatment does not always show convincing results. In 1975, we discontinued both surgical and orthotic treatment of LCPD, irrespective of the Catterall classification, head-at-risk factors, etc.

Patient and method: In this way, we have created a nonselected material of patients with LCPD treated only with symptomatic measures, such as a few days of traction followed by unrestricted activity. We have studied 20 persons older than 15 years of age. They were examined clinically using the Iowa hip score, and bilateral hip radiographs were taken and evaluated.

Results: Only a few patients had a full 100 points in the hip score. No hip showed normal sphericity at follow-up. There was no correlation between primary Catterall classification and the final clinical picture. The tear-drop sign correlated well with the development of LCPD. No truly poor end results were recorded.

Treatment of physiolysis of the hip in Sweden

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Introduction: The study surveys the present policy in treating physiolysis of the hip (slipped capital femoral epiphysis) in Sweden.

Method: A questionnaire was sent to all the departments of orthopedics and pediatric surgery, and to all the surgical departments in the country hospitals in Sweden, thus including all the departments that might treat physiolysis of the hip.

Results: Almost all the children with physiolysis of the hip in Sweden are treated by orthopedic surgeons. Mild slippings are treated with in situ fixation, using various types of screws or pins; 15 different types were reported. In acute severe slippings, the same types of fixation devices are used: in four fifths after closed reduction and one fifth without previous reduction. In chronic severe slippings, one fourth of the departments use some type of osteotomy, mostly at the trochanteric level and three fourths prefer pinning also in these cases.

At one fourth of the departments, the contralateral hip is treated by prophylactic pinning; in the rest, the hip is followed with repeated radiographic and/or clinical examinations. The screws or pins are usually extracted after growth-plate closure; but surprisingly, at one fifth of the departments they were extracted already after 3–12 months, i.e., usually before growth-plate closure.

Conclusion: There is a uniform policy to treat mild slippings with in situ fixation, but many different fixation devices are used. Opinions differ on the treatment of severe slippings and on the management of the contralateral hip.

Bilaterality in physiolysis of the hip

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Introduction: The incidence of bilateral physiolysis of the hip (slipped capital femoral epiphysis) differs according to the recording method. At primary admission, 5–13 percent of the children with physiolysis have bilateral involvement, whereas at the end of the growth period up to 80 percent bilateral slipping has been reported.

Method: Totally, 260 patients with physiolysis of the hip were reexamined 33 (16–66) years after the primary diagnosis. From clinical and radiographic reports, the frequency of bilateral slipping at primary admission and later during adolescence was recorded. No patient was treated with prophylactic pinning of the contralateral hip. At the radiographic reexamination, anteroposterior, lateral, and Lauenstein projections were used. The calcar femorale was visualized with fluoroscopy and used to predict the original position of the femoral head.

Results: At primary admission, 23 children had bilateral slipping. Later on during adolescence, another 24

children had a symptomatic contralateral physiolysis and 8 had an asymptomatic physiolysis diagnosed. Thus, in total, 55 of 260 (21 percent) had bilateral slipping diagnosed during adolescence. At the follow-up examination, an additional 104 hips showed physiolysis, giving a total of 159/260 (61 percent) bilateral slippings. Of the 104 slipped hips diagnosed at follow-up, 28 showed arthrosis; and of the 101 normal contralateral hips, 9 showed arthrosis.

Conclusion: The high frequency of bilateral physiolysis and the increased risk of arthrosis in these hips indicate prophylactic pinning of the contralateral hip.

Intracapsular pressure in Legg-Calvé-Perthes disease

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Revascularization of the proximal femoral epiphysis in Legg-Calvé-Perthes disease (LCPD) is dependent on intracapsular branches of the medial circumflex vessels. These branches are exposed to a possible increase in intracapsular pressure (ICP). The purpose of this study was to evaluate ICP in the course of LCPD.

Patients and method: Seventeen children with LCPD in various stages of the disease were investigated in connection with arthrography. A 1.2-mm epidural needle connected via a closed saline-filled system to a piezoelectric pressure transducer was introduced anterolaterally under image-intensifier control. The correct position of the needle was verified at arthrography via the same needle at the end of the procedure.

Results: ICP was dependent on the position of the joint. With the hip in extension and neutral position with regard to rotation, it was 36 (3–83) mmHg; in extension and inward rotation, it rose to 71 (6–128) mmHg; in outward rotation it was 26 (7–45) mmHg; whereas in 45° flexion, it fell to 9 (0–35) mmHg.

Discussion: The levels of ICP noted in this study in some patients exceed the arteriolar pressure supplying the epiphysis, and in most cases increase the venous drainage pressure with a probable negative effect on epiphyseal perfusion. Histologic studies have indicated that the epiphysis in some of these children is subject to repeated incidences of ischemic damage in the course of the disease. Because intermittent episodes of synovitis are common during LCPD, an increase in ICP owing to episodes of synovitis may well explain these histologic findings and has a deleterious effect on the healing process of the disease.

Varia

Muscle fiber changes in work-related chronic myalgia

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Introduction: Neck myalgia related to static load is a great problem in assembly work. EMG studies have shown muscular fatigue, but underlying muscle changes have not been described to date.

Patients and methods: Ten patients with long-term sick leave and 9 healthy volunteers had a muscle biopsy of the aching trapezius muscle. Histopathologic, histochemical, and biochemical analyses were performed.

Results: Exclusively in patients (8 out of 10), "ragged-red" fibers were found, indicating myopathy. Distinct zones of fibers showed abnormal mitochondriae (type I fibers). Further, frequency of type I fibers was significantly increased. Contents of ATP and ADP, as well as ATP/TCr, were significantly reduced, although lactate, pyruvate, and glycogen were normal.

Conclusion: Myopathy was found and related to long-term, extreme static load in assembly work. A mitochondrial disorder is suggested. There was a low content of high-energy phosphates despite a normal supply of substrate.

Integrated motion analysis

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Introduction: Functional analysis and evaluation of the human musculoskeletal system provide a basis for clinical orthopedic research. The scope of biomechanical analysis can be divided into kinematic study of limb and joint motion, foot/ground reaction force and contact pressure analysis, and internal joint and muscle prediction. The variables can be provided either from direct recording or mathematical solution of "inverse dynamic problems," i.e., motion of the mechanical system is known and externally applied forces and moments are to be determined.

Method: The motion analysis system (Selspot multilab) is computerized, and thus makes integrated analysis possible. Three-dimensional movement recording identifies the position of active markers placed on anatomic landmarks. The ground reaction forces are

recorded by means of a force plate. EMG demonstrates muscular activity. Time-series presentation of data is valuable in the study of sports medicine situation, gait, postural control, etc. Kinematic analysis is based upon derivation and needs high resolution, as well as high sampling rate, and a low noise and filtering of the signal. The body is approximated by biomechanical modeling into an ensemble of several partial linkage systems. Through the joints the muscles apply the moment required for motions and equilibriums. By calculating the external forces and torques – i.e., reaction forces, gravity, and inertia – the internal load conditions can be estimated.

Results and conclusion: Our preliminary results from functional analysis confirm that this type of evaluation is useful in orthopedic research. In particular, the flexibility of the system is valuable.

Paralysis of the posterior interosseus nerve caused by tumor

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Below the elbow the posterior interosseus nerve passes beneath the proximal edge of the superficial supinator muscle. This is often fibrous. The nerve innervates the extensor carpi ulnaris, the extensors of the fingers and thumb, and the abductor pollicis longus. The extensor carpi radialis brevis and longus are supplied proximally. A tumor located beneath the nerve at the level of the proximal edge of the supinator muscle may press the nerve against the edge and cause a nerve lesion. If the nerve is paralyzed, the hand deviates radially and the patient cannot extend the fingers at the metacarpophalangeal joints or radially abduct the thumb.

Since 1974, the author has observed 10 patients with nontraumatic posterior interosseus nerve paralysis due to tumor.

Totally, 38 such cases have been reported previously. Malignant tumors have never been reported. Including the author's 10 cases, the reported tumor distribution now would be lipoma 35, neurofibroma 4, ganglion or cyst 4, neuroma 3, fibroma 1, and neurilemmoma 1. The recovery of function after surgery is usually good, except with neurofibromas.

Sex	Age	Side	Occupation	Duration (years)	Tumor	Size (cm)	Recovery
F	66	R	housewife	1.5	lipoma	3×2.5×2	yes
F	63	R	charwoman	0.5	lipoma	3×2×2	yes
M	60	R	mechanic	2	neurofibroma	7.5×5×5	incomplete
M	63	R	housepainter	2	lipoma	5×4×4	yes
M	57	L	military officer	1	lipoma	7×4.5×3.5	yes
F	44	R	factory worker	1.5	neurofibroma	2×1.5×1	no
M	60	L	housepainter	1	lipoma	4×3.5×3	yes
M	59	R	caretaker	1	lipoma	3×3×3	yes
M	69	R	physician	0.5	lipoma	4.5×3×3	yes
M	65	L	sailor	3	neurilemmoma	4×3×3	incomplete

Preoperative diagnosis of soft tissue tumors

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By avoidance of open biopsy, soft tissue sarcoma can often be operated on with less extensive margins than is otherwise necessary. Function is thereby saved. This requires that the patient is referred before surgery, a high reliability of the preoperative diagnosis, and minor consequences of a falsely benign or malignant preoperative diagnosis. In a consecutive series of patients with deep-seated benign and malignant soft tissue tumors in the extremities, we analyzed to what extent these prerequisites could be fulfilled.

From 1983 through 1985, 35 patients with deep-seated soft tissue sarcomas without metastases were diagnosed in the southern region of Sweden (1.5 million inhabitants). All of these 35 patients were referred to the Musculoskeletal Tumor Center in Lund – 30 before and 5 after surgery. During the same period, 37 patients with a deep-seated lesion in the extremities that was later proven to be benign were referred before surgery for evaluation because of suspected malignancy.

In 59 of the 67 patients referred before surgery, open biopsy was dispensed with; the definitive surgery was based on the combined information from clinical find-

ings, aspiration cytology, and radiographic examination. A correct preoperative diagnosis as regards benign versus malignant tumor was achieved in all but one of these 59 cases. One patient with a benign leiomyoma in the semitendinosus muscle was treated by myectomy of that muscle because of a false preoperative diagnosis of sarcoma. The patient experienced no loss of function.

We conclude that the prerequisites for surgery without open biopsy could be fulfilled in our region: most patients were referred before surgery, the reliability of the preoperative diagnosis was good, and the consequences of the only one false preoperative diagnosis were minor.

Send a copy of the discharge summary to the patient as well

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Patients are increasingly requesting good information in connection with hospital care. Questions of malpractice sometimes are raised because of poor communication between the patient and his/her doctor. In order to created a more open and concise relation, we started in 1985 to send a copy of the discharge summary to the patient, as well as adding only a Swedish translation of the diagnosis and surgical procedure. Excluded were only institutionalized chronic patients. To evaluate the patients' response to this service, a questionnaire was enclosed during a 9-month period in 1986. The questionnaire was returned by 448 patients, who answered as follows:

Questions	Yes (%)	No (%)	Other (%)
Summary was valuable	440 (99)	1 (0)	1 (0)
Summary difficult to understand	105 (23)	321 (72)	19 (4)
Facts in summary correct	402 (90)	20 (4)	26 (5)
Patient satisfied with treatment and care	435 (97)	4 (1)	9 (2)

Among special comments (totally 287) added to the questionnaire, patients had specified excellent nurses (40), excellent nursing (34), more Swedish translation of Latin wanted (30), more information (13), additional medical prescriptions or measures wanted (7), improved housecleaning (2), etc.

In summary, we found orthopedic inpatients regarded this new type of individual and precise information valuable. The routine creates a lasting document without costs, and the doctor who formulates it avoids questionable words and statements. Until now, after sending more than 2,000 such reports, no significant negative response has been reported.