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Hip

Two-year results of PCA total hip replacement

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The PCA THR has been used since 1984 in 140 patients. Twenty-nine patients with 30 THRs had a follow-up examination at 2.6 (2–3.2) years. There were 16 women and 13 men with a mean age of 50 years.

The preoperative diagnosis was primary arthrosis in half the cases, and the remainder were evenly distributed between rheumatoid arthritis, secondary arthrosis, and postoperative arthrosis.

The clinical results were evaluated according to the Harris hip score system. The preoperative score was 43.0; the 1-year score was 89.6; and at the latest follow-up, the score increased to 92.8. The radiographic examination showed no migration of the acetabular component. In 2 cases a slight subsidence of the femoral stem was seen. Eight hips showed remodeling of the femoral shaft. There were no infections or dislocations, and no major systemic complications.

We have found the early results with an uncemented PCA THR very promising.

Early postoperative complications following total hip replacement

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This report concerns early postoperative complications following total hip replacement a.m. Charnley in our department from 1982 to 1987. Totally, 522 operations were performed in 272 men and 250 women aged 69 (16–87) years.

Early complications influencing the postoperative course were found in 16 percent of the operations. The postoperative mortality rate was 0.4 percent.

Thromboembolic complications (pulmonary embolism 1.7 percent, deep venous thrombosis 3.3 percent), cardiac complications (3.3 percent), acute renal failure (2.5 percent) were considered the most important complications.

A connection between obesity and thromboembolic complications, old age (more than 70 years) and acute renal failure, and hypotensive episodes during and after the operation and acute renal failure was suggested.

Preoperative cardiovascular disease was found to be an important risk factor in developing postoperative cardiovascular complications.

Serum alkaline phosphatase as a predictor of heterotopic bone formation after total hip arthroplasty

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The aim of the study was to evaluate if patients at risk of contracting severe heterotopic bone formation (HBF) after cemented total hip arthroplasty (THA) could be selected from their preoperative or postoperative level of serum alkaline phosphatase (SAP).

Patients and methods: Totally, 95 persons that had a THA were included in the study. They made up the placebo group in a randomized, double-blind clinical trial of indomethacin in prevention of HBF after THA. SAP was determined preop-

eratively, and 6 and 12 weeks postoperatively. HBF was graded on AP hip radiographs obtained 52 weeks after the arthroplasty.

Results: Twenty-four hips had no ossification, 24 hips a grade I HBF, 29 a grade II HBF, and 18 hips had the severe grade III HBF. No correlation could be shown between the preoperative level of SAP and the postoperative development of HBF ($r=-0.005$; $P > 0.1$). Six weeks after THA, the mean SAP had increased significantly in patients with HBF. This increment correlated with an increase in the degree of HBF ($r=0.31$; $P < 0.001$). Only a rise above 250 IU/l 12 weeks after THA indicated patients that were at risk of developing the severe HBF.

Conclusions: The preoperative level of SAP is of no use in selecting patients at risk of severe HBF after THA. The mean SAP 6 weeks after THA increases significantly with increasing degree of HBF. A level in SAP above 250 IU/l was neither 6 nor 12 weeks after THA a reliable predictor of severe HBF.

The Garden classification of femoral neck fractures

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The aim of the study was to examine the interobserver variance for different observers' use of the Garden classification system. Before the classification was started, a short reinstruction of the system based on Garden's original paper was given. One observer had less than 1 year of training in orthopedics, whereas the other 3 had more than 2 years of training. Each observer, working alone, classified 100 pairs of radiographs of femoral neck fractures, which had been treated in the department. The radiographs were randomly chosen. We used weighted kappa statistics because this method focuses on interobserver agreement expressed in pairs, and agreement by chance alone is taken into account, as well as the degree of disagreement. Kappa values for classifying the fractures in an undisplaced versus a displaced group were estimated. A kappa value at −1 expresses total disagreement, whereas a value at +1 expresses total agreement excluding chance agreement. Nineteen fractures were classified equally by all the observers and 56 fractures were classified as displaced, whereas four were classified as undisplaced fractures. Kappa values for classifying into the four stages according to Garden varied from 0.28 to 0.43. Kappa values varied from 0.58 to 0.81 when the observers had to discriminate between undisplaced versus displaced fractures. We have shown a very high interobserver variance in the usage of the Garden system, but an acceptable variance when observers had to classify the fractures in an undisplaced or a displaced group.

Lower extremity

Fractura patellae: Modified tension band osteosynthesis

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In a retrospective investigation the ability of modified tension band osteosynthesis to retain 45 reduced fractures of the patella and the functional end result were studied. Postoperatively, 24 patients were immobilized in a plaster cast for 0–14 days and the rest for 25–56 days. Postoperative radiographs revealed nine fractures (4 transverse, 3 comminuted, and 2 pole fractures) with displacement exceeding 2–3 mm. Among these, three fractures had secondary dislocation, and one additional had an exactly reduced pole fracture dislocated. The operation was complicated by infection in 4 cases: 2 superficial wound infections, 1 subcutaneous fistula, and 1 pyarthron. Operative release of adhesions was performed in 5 cases, 2 patients were patellectomized, and 1 had a unicondylar prosthesis. At follow-up 18–80 months after injury, 37 patients were clinically examined. Among 29 patients without concomitant injuries, 7 patients were asymptomatic and 13 patients were without any pain. Full knee movement and quadriceps atrophy < 1.5 cm were found in 17 patients.

The modified tension band can retain sufficiently reduced transverse and comminuted fractures of the patella, and probably without immobilization in a plaster cast. A dislocated fracture of the patella is a serious lesion, which must be treated with care.

Conservative treatment of patellar dislocation

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In a follow-up study of 37 patients sustaining primary patellar dislocations during the period 1982–86 and treated with cylinder cast immobilization, 30 patients were reexamined using clinical, radiographic, and biomechanical (Genucom) methods. (Four of the patients had moved, and 3 patients did not wish to participate in the follow-up study).

The group of patients consisted of 22 females and 15 males, with an average age of 18 (8–32) years, and the average follow-up period was 31 (15–64) months. During the same period, 3 patients were operated on for acute primary dislocation.

At the follow-up, 4 cases of redislocation and 9 cases of subluxation were found, and 8 patients noted pain during vigorous activity. A total of 14 of 30 patients had one or more of the symptoms mentioned.

If Cox's rating system for surgically treated patients is used on this material, 16 of the patients rated excellent, 5 good, and 9 poor, with patients experiencing subluxations being included in the "poor group." This does not correspond to the patients' own assessments, as only 3 of those who had redislocations found the result unsatisfactory, and only 5 patients stated restricted activity due to knee problems.

There was no difference between the two groups "excellent/good" and "poor" as regards clinical parameters: Q-angle and hypermobility and radiographic parameters: patellar tendon/patella ratio, patellofemoral angle, and lateral patellar displacement. Nor was any difference found as regards biomechanical parameters: medial/lateral tracking, medial/lateral displacement, and Q-angle (Mann-Whitney).

Cylinder cast immobilization still seems to be a good method of treatment for patients with primary patellar dislocations. It should be noted that the results of the treatment as assessed according to Cox's rating scale differ greatly from the patients' own assessments.

The Genucom goniometer

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The Genucom goniometer is a computer-controlled device for objective examination of the stability (laxity) of knee joints. The results are based on measurement of tibial dislocation (in millimeters or degrees) related to the femur and relative to the applied force. Fixation, recording of well-defined anatomic landmarks, and a soft-tissue compensation procedure precede the test. In case of incorrect procedure, relevant warnings are given. The results are graphically presented as curves. It is promised that at least 90 percent of repeated tests will yield results within ±1.5 mm of the arithmetric mean of the tests.

Results of examination of asymptomatic persons. Bilateral examination of 27 persons without subjective knee problems gave results comparable to other investigations of normal materials. The opposite knee represents a better reference than average values from the normal material.

Results from the intraobserver and interobserver study. Four examiners tested the other 3 examiners' right knee five times, each time after repeated installation procedure. The tests performed were a/p drawer at 90°and 30°and v/v tests at 0°and 20°. The results of the v/v tests demonstrated a reproducibility within the promised limit (90 percent of the tests within ±1.5 mm from the mean). The a/p drawer interobserver results were acceptable, however, not within the promised limits (±2.16, 1.63, 1.92, 1.56 mm). The interobserver results were not acceptable, because the calculated critical value is approximately ±3 mm. We recommend that "preexaminations and postexaminations" are carried out by the same examiner.

Arthrosis of the ankle following angular deformities of tibial shaft fractures

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Varus deformity exceeding 6°and valgus deformity exceeding 12° are considered "prearthrotic deformities" (Rosemeyer and Pförringer 1979). The aim of our study was to evaluate the effect of angular deformities as regards arthrosis of the ankle joint in a follow-up study where the observation time is at least 20 years and the influence of other factors is minimized.

We interviewed 92 patients with conservatively treated tibial shaft fractures with a minimum of soft-tissue injury 20–39 years after the injury. Seventeen fractures had healed with an angular deformity of more than 10°. Eighty-five patients were asymptomatic, 4 had negligible symptoms, and 3 had moderate pain after exertion. The 7 symptomatic patients and 15 asymptomatic patients, but with an angular deformity greater than 10°, were examined clinically and radiographically. None of these 22 patients had arthrosis of the ankle. The 7 symptomatic patients had a limited range of ankle motion of maximally 10°, and the 3 patients with moderate symptoms had limited subtalar joint motion as well. The 15 asymptomatic patients with angular deformities exceeding 10° had a normal range of joint motion.

We conclude that angular deformities under 15° do not lead to restricted motion, pain, or arthrosis of the ankle.

The relation between the trauma and the type of ankle fractures in parachuting

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The patient injured in a dramatic accident will most often describe the development of the trauma in an incomplete and biased way, and the evaluation of patients based upon subjective information of this kind can be misleading and of no value for recommendations.

Following a general summing up of parachuting accidents in Denmark from 1979 to 1983, a more intimate investigation of clinical, radiographic, and operative findings in 46 parachutists with ankle fractures was conducted in order to describe the relation between the mechanical factors of the trauma and the lesion.

The classification was possible in 44 of 46 fractures. Comparing the subjective descriptions of trauma, we found none incompatible with the injuring forces deducted from the classification of Lauge-Hansen, and we find it suitable for evaluation of ankle fractures following parachute jumps.

The subjective description of the cause of the trauma in 21

supination-eversion fractures and 13 pronation-eversion fractures most commonly was faulty landing position or obstacles and the pathogenesis eversion. The cause of seven supination fractures was oscillation with sudden impact against the lateral aspect of the foot.

For prophylaxis, we recommend improvement of steering and landing techniques. The support of semicalf boots may prevent some of the supination-adduction fractures.

Total ankle joint replacement a.m. TPR – 3–7-year follow-up

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In the past 10 years, total ankle arthroplasty has been a realistic alternative to arthrodesis. The advantages of total ankle arthroplasty are rapid mobilization, no need of splinting, and because joint motion is preserved there will be no increase in the mechanical stress of the neighboring joints; especially patients with rheumatoid arthritis would benefit from this.

Richards' TPR type of total ankle-joint replacement was employed. Twenty-five patients with 30 ankles underwent total ankle arthroplasty. At follow-up, 2 patients were dead and 5 patients were excluded because of the follow-up was too short. For follow-up, there were 23 ankles and 18 patients; 21 had RA and 2 had arthrosis. The mean age was 62 (37–77) years and the mean follow-up time was 58 (36–87) months. The maximum score for function was 50 points, for pain 40 points, and for motion 10 points.

The average preoperative/postoperative score was 19/29 for function, 12/32 for pain, and 2/2 for movement. The improvement was especially obvious with respect to pain and function. In all, 14/23 ankles had total or significant pain relief. The average walking distance was improved from 260 meters preoperatively to 975 meters postoperatively. In view of our results and the results reported by others, we conclude that results of ankle joint replacements when compared with arthrodesis are so poor that it will only be indicated in a very few and carefully selected cases. Unless design and method of fixation are improved, not even the RA patients, who have slightly better results than in the arthrosis group, should be offered this procedure before considering arthrodesis.

Correction of hallux valgus and metatarsus primus varus

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Forty-five feet of 31 patients were operated on for hallux valgus and metatarsus primus varus a.m. Cedell. The Cedell procedure comprises a proximal wedge osteotomy of the first metatarsal to correct the metatarsus primus varus, a soft-tissue resection laterally at the first metatarsophalangeal joint, excision of the pseudoexostosis, and shortening of the medial capsule. For follow-up, there were 41 feet. The mean patient age was 24 (16–43) years and the mean follow-up period was 23 (8–56) months.

Hallux valgus was corrected from 33°(18–60°) preoperatively to 8°(0–20°) degrees postoperatively and metatarsus primus varus from 15°(8–30°) to 6°(0–15°). Thirty-one feet were painless, 9 had only slight pain, and 1 foot had disabling pain postoperatively. In total, 38 feet were regarded as cosmetically satisfactory. Postoperatively, 4 patients developed metatarsalgia. There were two minor wound complications, one delayed union, and 3 patients complained of recurrence of pain at the bunion. Postoperatively, 1 patient developed a hallux rigidus and arthrosis at the first metatarsophalangeal joint.

Lower limb amputation in patients ineligible for vascular reconstruction

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During 1980 and 1981, 282 major lower extremity amputations were performed because of ischemic disease. Prior to amputation, all the patients had been found ineligible for vascular reconstruction.

The table shows a knee retainment of 52 percent after elective amputation. If amputation was done less than 1 month after a failed vascular reconstruction, the knee could be preserved in 53 percent.

	No.	Amp. level BK	TK	AK	Reamp.	Mort*. %
Elective amputation	202	120	6	76	18	9
Failed vasc. surg.**	15	10	0	5	2	0
Failed embolectomy	12	1	0	11	0	42
Acute amput.***	53	8	2	43	5	25
Total	282	139	8	135	25	13

* Death before discharge.
** Amputation less than 1 month postoperatively.
*** Vital indication (intoxication) and nonembolectomized patients.

Acute amputations and amputations after failed embolectomy could only be performed at the below-knee level in 9 and 8 percent, respectively, and the mortality was very high.

When judging the results of lower limb amputations for ar-

terial occlusive disease, it is decisive to account for the indications.

Upper extremity

Treatment of simple humeral bone cysts with methylprednisolone acetate

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In the treatment of simple bone cysts (SBC), intracystic instillation of methyprednisolone acetate (MPA) is an alternative to curettage and bone grafting.

The study comprised 6 male and 4 female patient with SBC in the upper humeral metaphysis treated with MPA. Five cysts were active and five cysts were latent. The average age at the time of treatment was 9 years. All the patients had sustained one or more fractures prior to treatment.

Under radiographic control, two cannulated needles were inserted into the cyst cavity. The content of the cyst was aspirated, and 30–200 mg MPA was instilled. Eight patients had one instillation, and 2 patients had two instillations.

The average follow-up was 4 (1–7) years. Five cysts healed completely (the cavity was completely filled by new bone), and five cysts healed incompletely (the cavity was filled by new bone; however, small sites of osteolysis were seen within the previous cystic area). One patient sustained a fracture 1 month after treatment. One patient developed physiodesis in the upper humeral epiphysis.

Intracystic instillation of MPA is a simple nonsurgical procedure. The result in this study comprising 10 patients was good. All the patients responded on the treatment. Only 1 patient sustained a pathologic fracture during the treatment.

The contribution of the lateral ligament complex to stability of the elbow: An experimental study

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Introduction: The ulnar ligaments of the elbow have been described in detail, but less information is available on the lateral ligament complex. The aim of the present study was to evaluate the stabilizing role of the different components of the lateral ligament complex.

Materials and methods: Twelve osteoligamentous elbow specimens were tested in a stress apparatus. The movement patterns of the specimens were traced after sequential severance of the ligaments. All the data were computerized; and a software program selected corresponding values for momentum, torque, instability, and flexion.

Results: The lateral collateral ligament (LCL) was constantly defined. The accessory collateral ligament (ACL) was identified in all the preparations, but demonstrated variations. The lateral ulnar collateral ligament (LUCL) was identified in four of 12 specimens. Cutting ACL produced a maximal varus and external rotatory instability of 1.8° and 3.2° in 60° of elbow flexion. Further cutting of the LCL significantly increased the instability by a maximum of 4.1°, and finally, transection of the annular ligament (AL) increased instability by 13.8° and 20°. After a reversed cutting sequence in six specimens, the maximum instability was recorded after cutting of the ACL, 12.4° and 18° varus and external rotatory instability, respectively.

Conclusion: The present study demonstrates the complex anatomy of the lateral ligament complex. The primary stabilizers of the lateral aspect of the elbow are the AL and ACL. Postoperative varus and external rotatory instability may be related to release of one or both of the ligaments.

Colles´ fracture – late subjective sequelae in relation to radiographic classification

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A follow-up study of 124 postmenopausal women with Colles´ fractures (mean observation time 4.5 years) showed that 13 patients were suffering from disabling nuisances mainly because of deformity of the wrist. Radial shortening of more than 2 mm in relation to the ulna correlated with this condition. Moreover, radial shortening seemed to be related to dorsal angulation of the radial fragment. Rehabilitation time was independent of radiographic findings, and was up to 1 year.

We conclude that a radial shortening of more than 2 mm, combined with dorsal angulation, should not be accepted in the treatment of Colles´ fractures.

Fracture of the lunate bone

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Over a period of 30 years (1956–86), 17 patients with a fresh lunate bone fracture were seen at the University Hospital in Odense. Of the 17 patients, 11 were seen at a clinical and radiographic reexamination in 1988. The incidence of FLBF amounted to 0.5 percent of all the fresh carpal bone fractures.

This investigation represents the largest published material of FLBF.

Of the 11 patients, 10 were males and 1 was a female, and the mean age at the time of fracture was 31 (15–46) years. The mean time of observation was 13 (1–31) years. Records concerning pain, occupation and occupational changes, types of plaster cast, time of immobilization, and cause of fracture were obtained. Movements of the wrist and forearm and power of grip were tested, and atrophy was measured. Radiographs of the wrist in two planes were obtained.

Despite different treatments varying from no immobilization to plaster cast for scaphoid fractures for 8 weeks, there were no signs of lunatomalacia or pseudoarthrosis. There were no complaints of pain and no occupational changes. Not even when the dominant hand was injured were differences in movements, power, or atrophy between the fractured and the opposite hand observed.

Abbreviatio, a new method for treating chronic mallet finger

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An old, but hitherto unpublished, method of surgical correction for chronic mallet finger was carried out in 42 patients.

At the abbreviatio operation the elongated tendon is transected and resutured. The scar tissue developing usually causes adequate shrinkage for correcting the drop deformity. The DIP joint is transfixed with a K-wire in slight hyperextension and is secured in a "Carstam"-splint for 6 weeks. Shortening of the tendon or forced hyperextension splintage is not advisable because of increased risk of impaired flexion of the DIP joint.

Forty patients were controlled on an average 49 months postoperatively. The result was excellent in 16 patients with normal extension and flexion. On an average, the extension defect decreased from 38° to 12°. Seven patients acquired flexion defects at the DIP joint (30–60°). There were two failures caused by secondary tendon rupture. Two patients were infected: 1 ended up with impaired flexion of the DIP joint, whereas the other had an excellent result. Although the method is not quite faultless, the abbreviatio operation is easily performed and shows only few complications. It is therefore an alternative for patients with annoying chronic mallet finger who refuse arthrodesis or further conservative treatment.

Displaced diaphyseal forearm fractures in children: classification and evaluation of the early radiographic prognosis

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See abstract in Proceedings of the Scandinavian Orthopedic Association, *Acta Orthop Scand* 1988;(Suppl. 227).

Orthopedic infections

Bacteria in an operating room with laminar horizontal air-flow system during total hip replacement

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The number and species of microorganisms in the operating room with laminar horizontal air flow were studied in 230 consecutive total hip replacements. The colony-forming units were sampled on two exposed settle plates during the entire operation. The average number of colony-forming units was 0.7 per settle plate. The number did not rise from the first to the second operation on the same day. No significant difference in number was found when operations performed under 65 minutes were compared with operations lasting more than 100 minutes.

Bacteria were the only cultivated microorganisms. Ninety-seven percent were *Staphylococcus albus* and 3 percent were *Staphylococcus aureus*.

No deep infections were found in the clinical material. Two superficial wound infections occurred, but could not be referred to species cultivated from the operating room.

We conclude that in an operating room with laminar horizontal air flow the number of colony-forming units is low and does not rise during the day. Two or more arthroplasties may be performed without hesitation.

Collecting samples on settle plates during the operations is an easy and inexpensive means of monitoring the air in the operating room.

Methicillin/dicloxacillin-associated nephropathy in elderly patients treated for orthopedic *Staphylococcus aureus* infections

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To evaluate the side effects of methicillin (M) and dicloxacillin (D), we initiated a double-blind study where patients with *Staphylococcus aureus* infections were randomized to treatment with either M (2 g x 3) or D (1 g x 3). Serum concentrations of M and D were followed, as well as serum creatine and carbamide, and creatine clearance. Because of a high numbe

Results	M	D
Number	7	5
Age	74 (60–84)	65 (32–79)
Total dose (grams)	41 (19–78)	15 (5–29)
Days of treatment	14 (5–15)	6 (3–11)
Nephrotoxicity	6	0
Eosinophilia	5	2

of nephrotoxic reactions, the study was stopped after 15 patients.

Conclusion: Six out of 7 M-treated patients had reversible renal impairment. We did not find the same high frequency in the D-group. This could be ascribed to shorter treatment length, lower dose, and lower age.

Prolonged oral Ofloxacin therapy of osteomyelitis and infected joint prosthesis

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Chronic osteomyelitis and infected joint prosthesis due to gram-negative bacteria frequently respond poorly to conventional therapy and often require 4–6 weeks of parenteral antibiotics. Ofloxacin, which is a new broad-spectrum antibiotic, was evaluated in an open study for efficacy and tolerance.

In all, 11 patients, 54–78 years old, were selected. Seven had osteomyelitis, 3 had an infected total hip prosthesis, and 1 had a chronic infected deep ulcer. The etiologic agents were enterobacteriaceae, *Pseudomonas aeruginosa, Staphylococcus aureus* and other *Staphylococcus* species, and *Streptococcus faecalis*. Surgical treatment was performed in 9 of 11 patients. All the patients were treated with Ofloxacin 200 mg twice daily. Two patients had prolonged treatment with 100 mg twice daily, and 1 patient had the dosage reduced because of primary reduced renal function. Laboratory parameters were measured before and at the end of the treatment. Seven of the patients had treatment success. They were treated for 75 (29–148) days and followed for 8 (1–18) months. Two patients are still under treatment (58 and 124 days). One of these is clinically cured and the other is improving. Two patients were failures. They both had inadequate surgery. There were only a few adverse reactions: 1 patient had stomach upsets and 1 had diarrhea. Ofloxac in seems to offer a possibility of oral antimicrobial treatment of osteomyelitis, especially when caused by enterobacteriaceae or *Pseudomonas aeruginosa*. The side effects were minor even when the therapy was prolonged.

Varia

Decreased uptake of ^{99m}Tc-DPD in juxtaarticular epiphyses and growth plates in experimental synovial effusion

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Introduction: Chronic synovitis of the immature knee causes hypoplasia of the distal femoral metaphysis and decreased uptake of ^{99m}Tc-DPD in juxtaarticular growth plates. Previously, microsphere studies have shown a relationship between joint pressure and epiphyseal hemodynamics, but these studies were inconclusive with respect to metaphyseal affection.

Material and methods: ^{99m}Tc-DPD scintimetry of the knees was performed in 8 puppies under controlled conditions and after intraarticular infusion of dextran at 10 kPa (75 mmHg). The investigations were repeated after induction of right-side chronic synovitis by weekly carragheenan injections for 10 weeks. The uptake ratio between experimental and control knees (mean ±SEM) was determined in the distal femoral epiphysis (FE) and the growth plates of femur (FGP) and tibia (TGP).

Results: Both growth plates had decreased uptake due to the presence of synovitis. Increased joint pressure significantly reduced uptake in all the regions studied in arthritis, as well as in normal knees.

	Normal joints		Synovitis	
	No effusion	10 kPa	No effusion	10 kPa
FGP	0.99 ±0.02	0.85 ±0.02	0.69 ±0.03	0.50 ±0.04
FE	1.00 ±0.02	0.80 ±0.02	1.00 ±0.01	0.80 ±0.03
TGP	1.04 ±0.02	0.95 ±0.02	0.78 ±0.03	0.66 ±0.04

Conclusion: The study demonstrates a previously unrecognized impact of intraarticular pressure on metaphyseal hemodynamics. Thus, increased knee joint pressure may cause hypoperfusion of both epiphyses and growth plates and contribute to the growth disturbances associated with chronic synovitis.

The seasonal variation in extremity fractures in women

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We studied the seasonal effect on the incidence of fractures in women.

Subjects: At Hvidovre Hospital, extremity fractures in adult women were recorded during the period 1976–84. Distal radial (1,534), humeral (601), and cervical (907) and trochanteric (630) hip fractures were recorded. The monthly number of the different fractures was analyzed by a multivariate correlation analysis, $P < 0.05$ (*).

Results: In winter the number of humeral, radial, cervical and trochanteric fractures rose by 31, 12, and 4 percent, respectively, while the number of cervical hip fractures was unchanged. The coefficient between radial and humeral fractures was $r = 0.42$ (*), whereas no seasonal association was found between trochanteric and cervical hip fractures ($r = 0.09$).

Conclusion: A preventive campaign against falls in snow or on ice will probably affect the incidence of upper extremity fractures, but hardly the incidence of hip fracture.

A method of allograft bone storing

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Allograft bone chips are often needed in orthopedic surgery. Preservation and storage of allograft bone chips are normally performed by freeze-drying or freezing from –20°to–196°C. We have developed a new method of preservation and storage of allograft cancellous bone.

The cancellous bone is formed into pieces of 2 x 2 x 2 cm. The pieces are placed in physiologic saline with antibiotics for 24 hours. The tissue is then immersed into pure glycerol ($87\ ^{v/v}\%$) in transparent containers and irradiated. The allograft bone can now be stored for many months (years) at room temperature. Before use the tissue is rehydrated by immersing the bone plug in 500 ml physiologic saline for 5 minutes. The allograft is then ready for use.

Forty-five patients had glycerol-preserved allograft bone inserted during orthopedic operations. Two patients contracted postoperative infections. The control swab cultures from the batches obtained postoperatively were negative. The other 43 patients healed without problems. The method is an alternative to freezing and freeze-drying, and the advantage of this method is the storage at room temperature and the possibility for the surgeon to choose the proper amount of bone allograft during surgery. The glycerol preservation is an easy, inexpensive, and safe method for storing cancellous bone allograft.

Field testing of the proposed draft version of ICD-10, chapter XIX, on injuries, poisonings, and other consequences of external causes

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As a result of input from mainly Danish epidemiologists and trauma surgeons, the Expert Committee on the International Classification of Diseases (ICD) decided at its meeting in Geneva in November 1987 to change the main axis of the chapter from type of lesion to body region involved. The physical lesions accordingly are now arranged in a 10 x 10 matrix of body regions and types of lesions at the 3-character level of coding. The subspecification at the 4-character level follows traditional coding practices.

The trial used 1,025 clinical diagnoses found among 700 consecutive emergency-room patient contacts and 245 randomly selected hospitalized trauma cases. Each diagnosis was coded four times using, respectively, the 9th revision of ICD and the proposed 10th revision, both at the 3-character and the 4-character level. Two aspects of the classification were estimated: the clinical precision and the feasibility using a four-step ranking scale for each aspect. For statistical tests the chi-square test for discrete distributions was used.

Results: With regard to precision at the 3-character level, the ICD-9 showed greater precision than ICD-10 ($P < 0.001$). Regarding feasibility, the two classifications were equally "easy" to work with at the 3-character level ($0.20 < P < 0.30$), whereas ICD-10 at the 4-character level was much "easier" to use ($P < 0.001$). Among the cases used for the trial, more than 90 percent could be coded using the 10 x 10 matrix section.

In Denmark and other countries where the ICD is used at a 5-digit/character level, the 10th revision seems to provide both increased precision and greater feasibility.

Lixiscope and conventional radiographs: An in vitro and in vivo investigation

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Lixiscope LSM-83–209 is a hand-borne (3.0 kg) image intensifier based on the gamma emission (33 keV) from the isotope iodine–125. The use of Lixiscope has been recommended for use in sports medicine and traumatology. We studied the diagnostic specificity and sensitivity of the Lixiscope compared with conventional radiography.

Results: A blind, in vitro investigation on femur from an ox (n 50); ±fissure) showed a diagnostic specificity of 1.0 (0.87 – 1.00; 97.5 percent confidence limit [CL]) and a diagnositic sensitivity of 1.0 (0.87 – 1.00; 97.5 percent CL).

At the acute ward, 24 cases suspected of fracture had a Lixiscope investigation and later a conventional radiograph. Radiologic fissure or fracture was found in 8 out of the 24 patients investigated. The diagnostic specificity of the Lixiscope was for doctor A (graduated 2 years before): 0.67 (0.29–1.00, 95 percent CL; 4/6) and doctor B (graduated 6 years before): 1.0 (0.40–1.00, 95 percent CL; 4/4). The diagnostic sensitivity for doctor A was 0.78 (0.59–0.97, 95 CL; 14/18) and for doctor B 0.84 (0.68–1.00, 95 percent CL; 16/19). Cranium, columna, pelvis and femur were not accessible for investigation with the actual type of Lixiscope because of a short distance between the iodine-125 dose and collimator.

Conclusion: The diagnostic power of the Lixiscope was found to be good, and the Lixiscope will be of value where conventional radiography is not available.