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# PROCEEDINGS OF THE NORWEGIAN ORTHOPAEDIC ASSOCIATION

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EDITOR: BERNHARD PAUS

## DIAGNOSIS AND TREATMENT OF INJURIES TO THE LATERAL MENISCUS

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Over a period of 12 months 80 selected patients with knee problems were examined by arthroscopy. Twenty of them had a lesion of the medial meniscus and 19 a lesion of the lateral meniscus. The majority of the lateral lesions were tears of the peripheral attachment, mainly in the posterior part. In the light of previous experimental observations (King 1936) 5 patients were treated with suture of the meniscus combined with 3 weeks' immobilisation in plaster of Paris.

Preoperatively these patients had suffered from recurrent knee problems for several months. At follow-up 6 months postoperatively they were all functioning and free from symptoms.

## DIAGNOSTIC PROBLEMS IN CHRONIC KNEE INJURIES

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Fifty-four patients with untreated complex knee instability were treated an average of 4 years after injury. Combined anterior rotatory instability (AMRI + ALRI) was the most common diagnosis. All the knees were unstable but some patients only complained of pain. Examination without anaesthesia often indicated an incorrect type or degree of instability. Arthroscopy showed a high rate of meniscus and cartilage injuries whereas the arthrographic findings were negative.

Chronic knee injuries often represent combined instabilities, pseudoinstability for various reasons and multiple intraarticular injuries. Accurate examination is necessary, with anaesthesia and arthrosopy, and an understanding of the pathomechanics. Subjective instability as the main symptom is a most important factor in the choice of treatment.

## TREATMENT OF CHONDROMALACIA PATELLAE

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By random selection 27 patients with chondromalacia, verified by arthroscopy, were included in a prospective study of three methods of treatment. The preliminary results after 6 weeks to 12 months were:
Out of ten patients treated with strengthening exercises for the vastus medialis only, none derived any benefit. Out of nine patients treated with lateral retinacular release, seven were symptom-free or markedly improved. Out of eight patients treated with anterior displacement of the tibial tuberosity, seven patients were symptom-free or markedly improved.

The short-term results of lateral retinacular release or anterior displacement of the tibial tuberosity are satisfactory but more patients and a longer observation period are needed before any definite conclusions can be drawn.

## PATELLOFEMORAL DISORDERS TREATED BY MEDIALISATION PROCEDURES

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Fourteen males and 30 females, 12–55 years, operated on in the period 1974–1980 for chondromalacia, recurrent dislocation or subluxation of patella, were followed up for 6–72 months, mean 29. Thirteen patients represented a pure chondromalacia group (Group I) with only retropatellar pain but no symptoms of instability, 19 had instability but no pain (Group II) and 12 had both pain and instability (Group III).

In Groups II and III patella alta was found in 12

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patients and a low lateral femoral condyle in seven; these abnormalities were not found in Group I. Genu valgum or squinting patella was not present.

The operative procedures were lateral release, medial capsular reefing, distal medial patellar tendon transfer and combinations of these methods.

In Group I only half of the patients had good or fair results; in Groups II and III 23 out of 31 achieved good or fair results.

## RECURRENT DISLOCATION OF PATELLA

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Results of operation for recurrent dislocation of the patella were evaluated after a mean observation time of 5.6 years. Thirty-one cases had been operated on by Hauser's method, nine by Roux-Goldthwait's and seven by other methods. Five had been reoperated, three of them because of dislocation. Two more patients had redislocation. Twenty-seven knees were found to be pain-free. Function was slightly impaired in 18 and significantly in three knees.

No significant difference was found in the results of the various methods used. The somewhat disppointing results may partly be due to the insertion of the patella tendon, in Hauser's and Roux-Goldthwait's methods, deeper than preoperatively. This causes higher pressure in the patellofemoral joint with pain and dysfunction. Ventralisation and medialisation of tuberositas tibia with lateral capsulotomy and medial capsular reefing is proposed as the method of choice.

## THE MANAGEMENT OF LATE DIAGNOSED CONGENITAL HIP DISLOCATION IN OLDER CHILDREN

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Five hips in five children between 6–12 years were treated by traction and open reduction. In three hips a shelf procedure was done and 6 weeks later a derotation subtrochanteric osteotomy. One was treated with a Chiari osteotomy and in one a trochanteric advancement was found to be sufficient. One hip reluxated and had to be reoperated on, creating a more solid shelf reconstruction.

The investigation confirms that it is possible to reduce dislocated hips in older children.

## SHELF OPERATION FOR HIP DYSPLASIA

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Fifty-five hips were followed up 3–30 years after a shelf operation had been performed, to assess whether this operation could be advocated as treatment for hip dysplasia/subluxation in patients more than 40 years old. In 14 cases the operation had been done as late as this.

There was no difference between patients older or younger than 40 years at operation as regards the number experiencing lasting complete satisfaction with the result as well as those having only a transitory period from ½–20 years with satisfactory results.

The duration of symptoms before operation had no influence on the results, and nor did the presence of dysplasia alone or dysplasia combined with subluxation. The results were slightly better if the shelf was located not higher than the acetabular roof.

## HABITUAL SUBLUXATION OF THE HIP JOINT

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Habitual luxation of the hip joint has been reported in Down's syndrome, in generalized joint laxity and after traumatic luxations in children. Otherwise it is a very rare condition.

A 19-year-old girl had for several years experienced painful, audible snapping in the right hip region. At the age of 14 she had had an operation on the iliotibial band, but this had no effect on the snapping.

The snapping was found to be connected with a radiologically demonstrable posterolateral subluxation of the femoral head, which she could reduce voluntarily. The acetabular roof was slightly flattened compared to the other side, but there were no other signs of hip dysplasia. At arthrotomy a somewhat lax joint capsule was found. No intraarticular pathology could be demonstrated. An iliopsoas-tenotomy and a reefing of the joint capsule were performed.

One year after the operation the patient is normally active and has no hip symptoms.

## TOTAL HIP REPLACEMENT BY THE MÜLLER-CHARNLEY PROSTHESIS

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During the period 1969–1972, 138 total hip replacements with the Müller prosthesis were performed at Kronprinsesse Märthas Institutt. The results of the operation at follow-up after 2.5–8 years were recorded

as excellent or good in 93.0 per cent, with aseptic loosening in 5.6 per cent and infection in 1.4 per cent. With a follow-up of 8.5–12 years the loosening frequency increased to 18.1 per cent whereas the infection still was 1.4 per cent; 22.5 per cent of the patients had died from unrelated causes and in the remaining patients the results were excellent or good. The results would indicate that loosening of the prosthesis as a problem is far more important than infection.

## THARIES SHELLS: PRELIMINARY EXPERIENCES

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Since January 1979 the Tharies prosthesis has been used as a routine procedure in patients with hip disease where a prosthesis is indicated. The vascularisation and solidity of the head of the femur at the time of operation has been the decisive factor in whether or not this prosthesis could be used.

Sixty-seven patients were operated on using an anterolateral incision without osteotomy of the trochanter: two patients were operated bilaterally. The average amount of bleeding during operation was 510 ml. Eleven of the 60 patients did not need a transfusion. Three hips dislocated and one prosthesis loosened 6 months postoperatively.

Sixty patients were examined personally after 1 year. The average preoperative total movement was 100°; 1 year postoperatively it was 155°. Eighty-one per cent of the patients were classified as having an excellent result.

## THE BOSTON BRACE IN THE TREATMENT OF HIGH THORACIC IDIOPATHIC SCOLIOSIS

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Treatment with the Boston brace for idiopathic scoliosis with the apex of the curve up to Th 7 is discussed. Sixty-five patients with a mean age of 13 years and an apex between Th 7 and Th 9 began treatment in 1979–80.

The major thoracic curve before treatment averaged 34 degrees and a correction of 15 degrees was achieved. Twenty-four patients were examined ½–2 years after treatment started and the mean thoracic curve was found to be corrected 5.4 degrees. The treatment continued with a new, high Boston brace and another 10 degrees correction was gained.

The scoliosis is still well corrected with no deterioration of the curves, but too few patients have finished treatment to allow an assessment of the long-term effect.

## SITTING BRACE FOR PATIENTS WITH NEUROMUSCULAR DISEASES

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Patients with neuromuscular diseases represent a special problem in the treatment of scolioses. The usual methods of treatment – observation, brace and operative fixation – ought to be the rule. However, because of cerebral insufficiency and problems of co-operation with these patients, the risk of complications is increased. The unavoidable traction in a brace or a corrective operation can result in the so-called spinal-traction syndrome. In our scoliosis center we have observed two typical cases of STS, both with neuromuscular diseases.

This is a demonstration of a sitting brace, or basket, with corrective pads built in like in the ordinary brace. With the use of these sitting baskets a correction of the body is obtained, and no symptoms of STS have occurred.

## OPERATIVE TREATMENT OF LUMBAR DISC HERNIATION: A FIVE-YEAR SURVEY

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During the period 1971–1975, 142 patients with lumbar disc herniation were operated on at the Department of Orthopedics, Tromsø Hospital. The radiculographic diagnosis differed from the operative findings in 5 patients. One nerve root was injured during operation. No other serious complications occurred. After an observation period ranging from 5–10 years, 90.5 per cent stated that they had benefited from the operation. Re-operations were performed in 7 patients. Three patients were not working at the time of the follow-up.

## AIR CONCENTRATION OF METHYL-METHACRYLATE MONOMER IN OPERATING THEATRES DURING ARTHROPLASTIES

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Air concentration of methyl-methacrylate monomer was measured during 19 total replacement operations and during 14 simulated operations. Three types of ventilation devices, in addition to general ventilation and laminar air flow, were used for the measurements. One series was performed without any kind of ventilation. The measurements were performed, after collection of monomer gas in active charcoal, using a MIRAN 80 IR-spectrophotometer. The concentrations were

below currently accepted safety limits when general ventilation and ventilation devices were used. Values far above accepted limits were measured for short periods when the polymerisation process was undertaken without any ventilation. Unwanted synergism between monomeric gases and anaesthesia gases can not be excluded. Individual susceptibility may vary according to genetic factors. It is recommended that the monomeric gas concentrations be kept as low as possible by means of ventilation devices in addition to optimal general ventilation.

## MYCOBACTERIAL OSTEOMYELITIS

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Osteomyelitis due to mycobacteria other than *Mycobacteria tuberculosis* is uncommon. Among the complications after BCG vaccination, metastatic osteomyelitis has been described. Operative treatment combined with conventional triple drug therapy from ½ to 1 year is recommended.

The treatment of osteomyelitis due to the "anonymous" or "atypical" mycobacteria is difficult because these organisms show relative or complete resistance to antituberculous drugs. Surgical drainage combined with prolonged and intensive multiple drug therapy for about 2 years is recommended.

A man suffering from recurrent osteomyelitis for 20 years due to these mycobacteria is reported. This case demonstrates the clinical and therapeutical problems of osteomyelitis caused by these mycobacteria.

## EXPERIMENTAL IN VITRO INVESTIGATION OF THE STRENGTH OF ACHILLES TENDON SUTURES

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Experimental ruptures of cadaver Achilles tendons were sutured with various suture techniques and suture materials. Tensile strength of the sutured tendons was investigated in a "low speed tensometer".

Sutures with the original Bunnel suture technique were stronger than the same suture with the knot at the rupture level. The double right angle suture of Kleinert was significantly weaker than the Bunnel suture because of cutting which occurred through the tendon ends.

Mean suture strength with the original Bunnel technique was 24.5 kp for Supramid No. 3, 24.5 kp for Ethibond No. 3, 22.7 kp for supramid No. 2 and only 13.9 kp for Ethibond No. 2.

## EMG ANALYSIS OF THE STRAIN ON SUTURED ACHILLES TENDONS IN A WALKING CAST

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The regression line of the EMG/torque relationship of the triceps surae muscle in the contralateral leg was investigated during isometric contraction. A linear relationship was found.

The ankle torque provided by the triceps surae of the injured leg in a short-leg walking cast was calculated from the EMG activity and the regression line. The strain acting on the sutured Achilles tendon was calculated after measuring the lever arm.

There was no significant difference in calculated strain on the sutured tendon during full, partial or non-weight-bearing in POP. The actual strain is unlikely to exceed the strength of a sutured tendon.

## INVESTIGATION OF RELEASE BINDINGS IN NORWEGIAN AND SWEDISH SKIERS

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The binding release torques of 362 randomly selected Norwegian and Swedish skiers were measured in Hemsedal, Norway in 1980. According to the BfU and IAS reference systems, only 20–25 per cent of the skiers had bindings which released at the recommended torque. Older skiers, females, beginners, and skiers with old or untested bindings had a high frequency of too tight bindings.

Significantly more Norwegians than Swedes skied with too tight bindings, and more Swedes than Norwegians had tested their bindings. These findings probably reflect the effects of the Swedish propaganda for safer skiing, and may explain our previously reported higher injury rate in Norwegian as compared to Swedish skiers.

## ARTHROSCOPY OF THE SHOULDER JOINT

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Arthroscopy of the shoulder joint has been carried out in 30 patients with various shoulder diseases such as "cuff rupture", posttraumatic changes, "snapping shoulder", habitual luxation and postoperative conditions. The examination has mostly been undertaken

under anaesthesia followed by operative treatment and confirmation of the arthroscopic findings, but sometimes only local anaesthesia has been used. Complications were not recorded.

Shoulder arthroscopy seems to be a safe and relatively simple examination which with some experience gives excellent information on the intraarticular changes caused by several shoulder disorders. It is more exact than other conventional examination methods, and may be the only way to make an accurate diagnosis without arthrotomy.

## SURGICAL TREATMENT OF RECURRENT DISLOCATION OF THE STERNOCLAVICULAR JOINT

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Six patients, one male and five females, were operated on during the past 6 years for recurrent dislocation of the sternoclavicular joint. Three were operated on by Burrow's method with fixation of the medial end of clavicula by m. subclavius, and two were operated by Brown's method using the sternal part of m. sternocleidomastoideus for fixation of the medial part of clavicula. The operation was followed by immobilization in a Velpeau bandage for 6 weeks, and restricted abduction of the arm for another 4 weeks. At follow-up all five pastients were satisfied and able to perform normal activities including sports.

The sixth patient had psoriatic arthropathy and was operated on with resection of the medial 2 inches of the clavicle.

## BONE SCANNING IN THE ASSESSMENT OF FRACTURES OF THE CARPAL SCAPHOID BONE

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The study includes 30 patients with clinical signs of fracture of the carpal scaphoid bone. Only patients with negative or non-diagnostic initial radiographs were included.

All patients had a bone scan taken within 14 days of the trauma. Radionuclide imaging was performed 3 hours after the administration of 10–15 mCi Tc 99 m. They also had radiographs taken 2, 4 and 6 weeks following the trauma.

Nine patients had fractures of the scaphoid evident on the bone scans a few days after the injury. It took 2–6 weeks before these fractures showed up on the radiographs. There were no false negative bone scans.

Bone scans can demonstrate fractures of the carpal scaphoid bone several weeks before some of these fractures show up on radiographs.

## MID-FOOT FRACTURE DISLOCATION

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Fractures in the middle part of the foot may be overlooked if the trauma has been moderate. If the trauma is severe, there will often be multiple fractures associated with dislocations, frequently resulting in arthrotic changes in the small joints. These may cause severe disability.

Eleven patients were treated in the period 1966–79 because of severe disability of this type. Eight had an arthrodesis of the mid-foot performed, an average of 1 year after the injury. Three were not operated on.

At the follow-up the results were good in four of the operated cases and fair in the other four, and were fair in two of the non-operated cases, but poor in the third.

## EXPERIMENTAL FRACTURE HEALING AFTER RIGID INTRAMEDULLARY NAILING

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Male Wistar rats weighing 300–400 g were operated on and an osteotomy of the right tibia with resection of the fibula was performed. Reaming and intramedullary nailing of the tibia was carried out using solid stainless steel nails with a diameter of 1.4 mm, giving a stiffness of about the same magnitude as intact tibiae, as measured by our bending test (40 kp mm). The tibia on the left side was left unoperated as a control. The animals were sacrificed in groups after 4, 8, 12 and 16 weeks, and both tibiae were tested using a 3-point bending test. Only animals with the nail *in situ* were included in the study. Out of 35 animals, 9 had non-union at the time of sacrifice. Mechanical testing of the remaining tibiae showed that the median value of stiffness reached normal levels between 8 and 12 weeks, and remained at the normal value also after 16 weeks. Strength and deformability reached about half normal values at 8 weeks, and thereafter reached a plateau as no further increase was measured at 12 and 16 weeks after osteotomy. The results indicate that Wolf's law is valid also for the newly formed bone of fracture healing. The support given by the rigid nail inhibits further increase in strength and pliability.

## THE IN VITRO EFFECT ON INTACT TIBIA OF PLATE FIXATION AND EXTERNAL FIXATION

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Intact human and rabbit tibiae were tested using 3-point bending, before and after plate fixation or external fixation. A Linear Variable Differential Transformer (LVDT) was used, which measured the defor-

mation only in that part of the tibial shaft where the plate or external fixation was placed. Plate fixation gave a considerably greater stiffness increase than external fixation. The stiffness increase in rabbit tibia after application of a thin plate (45 × 5 × 1 mm) corresponded well to that obtained in human tibia with tibial plates. In previous reports on plate fixation in rabbit tibia much more rigid plates have been used, and this might be responsible for the marked bone strength reduction found.

## THE EFFECT OF IMMOBILIZATION IN A PLASTER CAST ON ANKLE FRACTURES AFTER STABLE OSTEOSYNTHESIS. A RANDOMIZED TRIAL

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The purpose of our investigation was to see if any differences could be found between two groups of patients with stable osteosynthesis of ankle fractures. One group wore a plaster cast for 6 weeks and the other group was allowed immediate non-weight-bearing exercises. After 6 weeks both groups started full weight-bearing. The series consisted of 39 patients (age range 16–66 years) randomly divided into two groups. The patients were examined 6, 12, 18 and 52 weeks postoperatively. Strength was measured as dorsiflexion and plantarflexion while movement was measured as dorsiflexion, plantarflexion, pronation and supination. Osteoporosis and height of the ankle joint cartilage were judged from x-rays. This is a preliminary report concerning plantar strength, plantarflexion, osteoporosis and ankle joint height after 12 and 52 weeks. No significant differences were found between the two groups in any of the four parameters examined at 12 weeks or at 52 weeks.

*Conclusion:* A plaster cast is unnecessary in most cases of operatively stabilized ankle fractures. In cases of doubt it can be used without detrimental effect.

## FAT INCLUSIONS IN PULMONARY ALVEOLAR MACROPHAGES AND FAT EMBOLISM SYNDROME

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Cytological examination of bronchial expectorates and examination of arterial oxygen tension were performed in 52 patients aged 15–90 years.

Pulmonary alveolar macrophages were found in 19 patients without fat inclusions, in 18 with inclusions, and no macrophages were found in 15.

A significant increase in macrophages with fat inclusions was found in younger patients, aged 15–40. A positive correlation was found between macrophages with inclusions and a reduced $PaO_2$, and intramedullary nailing, and between low age and intramedullary nailing.

Four patients developed posttraumatic pulmonary insufficiency; all had macrophages with fat inclusions. Fat macrophages with reduced $PaO_2$ may indicate a subclinical form of fat embolism.

# *Oslo, November 21, 1981*

## FLEXOR TENDON LESIONS

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Thirty-nine patients with flexor tendon lesions in 52 fingers were treated during 1970–79. Forty-six of these received immediate repair. Thirty fingers in 29 patients were examined 1–10 years later. The result was good or excellent in 47 per cent of the patients (44 per cent in "no man's land") compared with 70–80 per cent in hand surgical clinics. It is concluded that flexor tendon repair should be left to special departments for hand surgery.

## BILATERAL TRAUMATIC POSTERIOR DISLOCATION OF THE HIP JOINTS

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Traumatic dislocation of the hip joint comprises 5 per cent of all traumatic dislocations. In an urban population there are two dislocations per 100,000 persons per year. Posterior dislocations are most frequent and in 50 per cent of these there is concomitant acetabular rim fracture.

A 50-year-old woman was involved in a car accident and dislocated both hip joints posteriorly, without concomitant fracture. She was treated with skeletal traction for 4 weeks and delay of weight-bearing for 3 months. Six months after the injury she complained of pain and stiffness in both joints, but there were no visible roentgenological changes.