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The piriformis syndrome – the scalenus syndrome of the lower limb?

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Three cases of patients with the signs and symptoms of sciatic nerve entrapment at the greater sciatic notch are presented. The mean age of the patients was 32 years, and all were female. The average interval between onset of gradually worsening symptoms and surgery was 6 months. The pain was most prominent in the gluteal region and radiated to the ankle or the foot. All the patients had a distinct tenderness over the piriformis muscle and a diagnostic injection of local anaesthetic into the piriformis muscle relieved the pain temporarily. Stretching the piriformis muscle by adduction flexion-internal rotation of the hip with the knee extended aggravated the pain. During the operation the tendon of the piriformis muscle was sectioned. In one case, a calcified deposit was found within the piriformis tendon. In two cases a tendinous portion 3–4 mm in diameter was noted along the inferior border of the muscle. The postoperative result was good in two patients after follow-up of 11 and 5 months, respectively, although the third patient had recurrence of symptoms 1 month after operation. Preoperative elevtroneuromygraphy and lumbar myelography are recommended to exclude the possibility of nerve lesion at the root level.

Football injuries in Finland, 1980

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In Finland, there are 35 500 licensed players playing league football. All these palyers are insured. The purpose of the present study was to investigate the nature and profile of football injuries and for this purpose we analysed the insurance company files on all the football injuries reported in Finland in 1980.

Most injuries happened in May and August and on Saturdays and Sundays. There were 2072 football injuries during the 1-year period, the incidence of injury being 5.8 per cent. Since 1761 teams were included in the investigation, the average number of injuries per team was 1.17 for the year. Most injuries were to the lower extremities (64 per cent), followed by injuries to the upper extremities (14 per cent) and head and neck (13 per cent). Distortion was the most common type of injury (45 per cent), followed by wounds (42 per cent). Fractures and luxations accounted for 11 per cent. The injury profile did not vary statistically significantly with age group. There were more injuries in the top two divisions than in the lower ones. Significantly more injuries ($p<0.01$) happened in actual games than in practice sessions. The injury frequently was the same on sand as on grass. When both half-times were divided in two, there was no difference between the four quarters. Most injuries were caused by another player ($p<0.001$), and only exceptionally did the ball cause the injury. Forward and defensive players had the same injury frequency.

Primary axial loading stability of femoral neck fracture osteosynthesis. An experimental study on cadaver bone

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In the present investigation we studied forces which can be used immediately after an osteosynthesis of a femoral neck fracture to produce an axial load on the femoral head. For this purpose, we investigated 13 upper thirds of cadaver femurs. Two of the bones were used to test the axial load an intact bone can bear. On the remaining 11 bones, a Pauwels I, II and III type osteotomy was performed and the osteotomies were stabilised using AO 130° compression gliding screws. We also tested the axial load-bearing capacity of each type of these osteosyntheses devices.

The fracture loading points of the two cadaver femur upper thirds tested were 802 and 816 kp. In the axial loading test on the osteosynthesis devices, the following bending forces were recorded: 160 kp for the AO 130° plate, 150 kp for the Jewett 135° plate and 200 kp for the Richards 130° compression gliding screw. In the loading test on the experimental osteosynthesis, the yield load/ultimate stress was given particular attention and the following values were recorded for the different experimental osteotomies (in kp):
AO 130°

	Pauwels I	Pauwels II	Pauwels III
AO 130°	450/615	75/293	175/337
Jewett 135°	350/403	150/403	100/375
Richards 130°	300/570	340/489	150/428

The present results suggest that a Pauwels I type fracture seems to tolerate immediate postoperative weight-bearing after those types of osteosynthesis used experimentally by us. The axial load-bearing resistance is lower in the Pauwels II and III groups.

Clinical picture and ultrastructural appearance of aneurysmal bone cysts

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The clinical signs due to aneurysmal bone cysts are often a palpable tumour in the metaphysis of a long bone with periosteal expansion, pathological fracture and a tendency to recurrences. Malignant transformation after irradiation is an infrequent phenomenon.

In a histological and electronmicrosopic study on patients with aneurysmal bone cysts, the lesion showed various stroma cells (fibroblasts and myoblasts, osteoblasts, histiocytes and multinucleated giant cells) and numerous extravasated erythrocytes in the septae between blood-filled cystic spaces of the lesion. The surface of the cystic vascular spaces was devoid of specialized endothelium, which may explain the haemorrhages often seen in these tumour-like bone lesions. The abundance of cystic spaces surrounded by septae with active fibroblasts and granulation tissue was apparently the main factor leading to the large size of the lesion. The tendency to pathological fractures is explained by the poor degree of mineralization in the osteoid areas. One case with a large aneurysmal bone cyst in the sacrum showed malignant transformation to osteosarcoma 8 years after radiation therapy and several curettages. The other patients treated with bone resection or curettage and bone transplantation are alive after a follow-up period of 4–7 years.

Cost analysis and a forecast of fractures of the proximal femur in the province of Central Finland

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In 1980, 136 patients with fracture of the proximal part of the femur were treated in the province of Central Finland, which has a population of 242 430. The total cost of treating these patients was analysed on the basis of hospital and travelling costs and loss of income. This amounted to $ 367,066 and the cost per patient was $ 2,700. The cost of treating femoral neck fractures by primary prosthetic replacement was twice as high as by internal fixation.

The number of patients increased during the period 1970–1980 by 157 per cent. If the incidence of fractures of the proximal femur continues to increase at the same rate, there will be about 350 patients with this kind of injury in the province of Central Finland in 1990.

A high incidence of scoliotic curvature. A radiological study

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One hundred females, 20–23 years of age, were examined radiologically and clinically. The Cobb methods were used for measuring scoliotic curvatures and spinal rotation.

In 34 per cent no measurable curvatures appeared. Scoliotic curvature of 3–10° was found in 51 per cent and 11–25° in 15 per cent of the x-rays, a total inci-

dence of 66 per cent. Spinal rotation appeared in 86 per cent of the x-rays. In the thoracic area, Th III–IV were most frequently affected and were rotated anticlockwise. In the lumbar area, LIII–IV were rotated either clockwise or anticlockwise. The appearance of rotation. did not correlate with the appearance of scoliosis.

Mild scoliotic curvatures and rotational deformities must be seen as normal phenomena, at least in females. The clinical examination revealed spinal muscle reflex asymmetry, asymmetric hip rotation and back pain problems more often in the scoliotic group.

Internal fixation with the Daap plate in posterior spinal fusions

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The Daap plate was used to secure the posterior spinal fusion in 38 patients. This spider-like, flexible implant is placed longitudinally in the median line with its four 'extremities' around the spinous processes. The clinical material consisted of difficult cases, 23 of the patients having undergone a total of 39 previous operations on the spine. The diagnoses were five cases of spondylitis, two metastases. 15 fractures or fracture-dislocations, nine spindylolistheses and seven degenerative instabilities.

The fusion was cervical in two, thoracic in six, thoracolumbar in 11, and lumbosacral in 19 patients. The procedure was a single segment fusion in six and a multilevel fusion in 32 patients. Anterolateral decompression and/or interbody fusion was done simultaneously with the posterior fusion in five cases.

A radiographically solid fusion was obtained in 87 per cent and a subjective improvement in 68 per cent of the patients. The Daap method of internal fixation can be recommended when posterior spinal fusion needs additional stabilisation, e.g. after laminectomy, in multilevel fusions and in certain types of fracture-dislocations of the cervical and lower lumbar spine.

Treatment of patellar chondromalacia by proximal medialisation

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Forty patients with patellar chondromalacia were treated by proximal medialisation according to Villinger. The patients were re-examined after an average of 2 years (range 14–35 months). The series consisted of 25 female and 15 male patients with a mean age of 37 years.

Thirty-seven patients were treated conservatively before surgery. Nine patients had been operated on before the medialisation, mostly because of lesions on the menisci.

At the follow-up examination, one patient reported a condition worse than before surgery, five patients derived no subjective benefit from the operation, 26 were markedly better and eight were symptomless. The mean duration of sick leave was 6 weeks. Three patients suffered postoperative complications: one had a wound infection, which was controlled by antibiotics, and two suffered postoperative haemarthrosis. The subjective results were worse among those who had undergone earlier surgery ($p<0.05$), but duration of symptoms, earlier conservative treatment or earlier trauma had no influence on the subjective result. As a result of the operation the subjective symptoms of locking and crepitation decreased highly significantly ($p<0.001$), work disability decreased significantly ($p<0.01$), and disability during leisure time decreased almost significantly ($p<0.05$).

With regard to the objective signs, the circumference of the thigh was greater ($p<0.05$) and oedema of the knee joint less ($p<0.001$) than the pre-operative values.

DNA flow cytometry of bone tumours

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DNA distribution in bone tumour specimens was measured by flow cytometry to determine the usefulness of the method in assessing the malignancy of bone tumours. Previous reports on flow cytometry of bladder irrigation specimens have already shown this method to be useful in assessing the malignancy of bladder tumours. Only a few flow cytometric studies on other solid tumours have been published, but the results have not been as good.

Flow cytometric measurements were carried out on 21 bone tumour specimens from 18 patients. All tumours affecting bone were regarded as bone tumours, irrespective of their origin. All specimens contained bone from the area around the tumour. The DNA distribution measurements were performed at the HUCH Transplantation Laboratory with a Becton-Dickinson FACS IV flow cytometer. The results of the

measurements were compared with histopathological, clinical and radiological findings.

Good agreement between histological and flow cytometric findings was found in 18 out of 21 examinations: nine tumours were histologically clearly malignant and the DNA distribution was abnormal, nine other tumours were histologically benign and the DNA distribution was normal. In two instances the tumours were histologically malignant, but the DNA distribution was normal: one of these tumours was a slowly growing chordoma; in the other instance, microscopic examination of the DNA specimen revealed no tumour cells. In one instance, the tumour was considered by the pathologist to be either a benign osteoblastoma or a malignant osteosarcoma with a very low degree of malignancy; the DNA distribution was abnormal.

DNA flow cytometric analysis of bone tumours has not yet proved to be clinically reliable.

Hämeenlinna, May 27–28, 1983

Seat belts and other physical factors in traffic deaths

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The present analysis consisted of 2,645 victims of fatal road accidents who had been examined by autopsy. Pedestrians and cyclists were excluded. The highest numbers of road traffic deaths were found in the younger age groups. Fatal accidents involving heavy vehicles differed from those involving motorcyclists highly significantly ($p<0.001$) in terms of the main cause of death. Head injury (48.6 per cent) was the most common cause of death in all accidents. 74.8 per cent of victims died before the physician arrived, the cause of death in these cases usually being thoracic injury.

Occupants of the rear seat in motor vehicles sustained highly significantly more head injuries ($p<0.001$) than those sitting in the front. Drivers had significantly more chest injuries ($p<0.01$) than other victims. The use of safety helmets would have reduced the number of fatalities in accidents involving motorcyclists. The use of seat belts in motor cars would certainly, or almost certainly, have prevented 36 per cent of fatalities, and possibly a further 12 per cent, i.e. the lives of 1,330 people during the period 1970–79.

Use of carbon fibre for ligament and tendon repair in animals

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Carbon fibre (Surgicraft, Showell) was used to repair equine digital tendons in three cases: two tenectomized superficial flexor tendons and a lacerated long extensor tendon. The implants appeared to produce a cosmetically acceptable, strong and functional tendon. The fibroblasts and collagen fibres organized and aligned themselves in the early stages of healing. They invaded the implant by growing along individual fibres. No inflammatory response was seen.

Eight cases of ruptured anterior cruciate ligaments were replaced in dogs. The carbon fibre was wrapped in a fascia strip. The resulting stability appeared good. The dogs regained full use of the affected leg 6 weeks postoperatively. A bilateral re-rupture was found during the follow-up time of 1 year. The carbon fibre currently available breaks easily on sharp edges and if bent through a wide angle. Long-term evaluation of carbon fibre implantation in the joint cavity and its sequelae is required.

Results from clinical use of carbon fibre in orthopaedic surgery

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Carbon fibre has been used in our hospital in ligament and tendon surgery since February 1982. Seventeen patients were followed up until 12 months after surgery. The operations were as follows: seven knee ligaments, six ankle ligaments, two acromioclavicular joints and two achilles tendons. In all cases the injuries were old and in 13 patients other operations had previously been performed. The lesions of the knee ligaments were combined, so that other than carbon fibre reconstructions were done in four cases. The end results of the knee operations were good or excellent. In the ankle patients the pre-operative anterior instability of the TC joint, as measured using a stress device constructed by us, diminished from 10.8 to 8.3 mm. The end results were good. The acromioclavicular joints became stable and the inveterate long defects of the old achilles tendon ruptures became firm, the power of the foot returned and the end results were classified as good.

Staging of bone tumours

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The TNM (Primary tumour/Nodal involvement/Distal metastases) tumour-staging system was developed by the Union International Centre de Cancer. During the last few years several attempts to stage bone tumours have been published, the latest by Enneking. Our staging system has been developed from these, principally for more accurate staging of primary tumour involvement. Tumour malignancy is graded at a pathological examination. Surgical procedures are described as intralesional, marginal, wide or radical surgery.

Primary tumour (T)

T0	No demonstrable tumour
T1	Intra-osseous tumor
T2	Intra-osseous tumour lesion affecting the cortex, but not infiltrating into the periosteum (as demonstrated in CT and/or removed specimen).

Nodal involvement (N)

N0	No histologically verified metastases to lymph nodes
N1	Histologically verified metastases
NX	Minimum requirements for designation not met

Distant metastases (M)

M0	No known distant metastases
M1	Distant metastases present

Surgical staging

Stage 1A	G1,2	T1	N0	M0
Stage IB	G1,2	T2	N0	M0
Stage IC	G1,2	T3	N0	M0
Stage II A	G3,4	T1	N0	M0
Stage II B	G3,4	T2	N0	M0
Stage II C	G3,4	T3	N0	M0
Stage III	Any G	Any T	N1	M0
Stage IV	Any G	Any T	Any N	M1

Fractures of the proximal femur in Finland, 1980

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In 1980, 2449 patients with cervical fracture of the femur and 1096 with trochanteric fracture of the femur were treated in Finland. The female-male ratio was 3:1 for cervical fractures and 2:1 for trochanteric fractures. The total hospitalization time was 127 668 days. The mean stay in hospital was 37 days for cervical fractures and 34 days for trochanteric fractures. Men under 50 years old had more cervical fractures than women of the same age, but in older age groups the proportion of females was greater. The same was true for trochanteric fractures, although a female preponderance was found only in age groups over 60.

The age-specific incidence was higher for women than for men in both fractures types. About 3/4 of the patients were over 70 years old. The injuries were evenly distributed by months of occurrence. The number of these patients will double within about 17 years if the present trend continues.

Effects of meniscectomy on rabbit knee, as seen by scanning electron microscopy

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The medial menisci of both knees of ten rabbits were removed. The knees of two rabbits which had undergone surgery without removal of the menisci served as controls. The animals were killed 2, 4 or 12 weeks after the operation and the tibial and femoral medial condyles were excised and processed for scanning electron microscopy. Both the femoral and tibial articular surfaces showed marked destruction of the normal smooth surface cartilage structure. The damage was almost exclusively on the weight-bearing articular surfaces. The damage was constant and clearly more pronounced in cases with the 12-week follow-up.

These observations suggest that total meniscectomy is not a harmless operation. It should be done only when the indications for surgery are quite definite and partial meniscectomy is not possible.

Thoracic outlet syndrome – neurological defects and results of treatment by supraclavicular liberation of brachial plexus

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The purpose of the investigation was to evaluate the possibility of using neurological signs to detect the anomalies causing neurovascular compression in the thoracic outlet. Specific motor defects were noted in 63 per cent of the 56 cases investigated. In the presence of a clear bony or muscular vs. ligamentous anomaly, atrophy of the radial part of the thenar musculature associated with a claw deformity in the three ulnar fingers was seen.

The operations performed consisted of the resection of the anomalous structures using a supraclavicular approach. No first rib resections were considered necessary. Excellent to good results were recorded in 85 per cent of the cases after a mean follow-up of 2.4 years.

The findings and the results of treatment suggest that a critical neurological assessment may permit a more detailed diagnosis, which could then be followed by removal of the causative agent. A transaxillary first rib resection might be useful in cases needing re-operation after a thorough supraclavicular exploration or when a transthoracic synpathectomy is needed.

Histochemical changes in the multifidus in lumbar disc herniation

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Multifidus muscle biopsies at levels L IV and L V were taken during operations on 40 consecutive patients for lumbar disc herniation. The biopsies were analysed using an enzyme histochemical method. Atrophy of type 2 (fast) fibres was common, whereas atrophy of type I (slow) fibres was less frequent and milder. Fibre type grouping was very infrequent, indicating that re-innervation had not occurred.

Since selective type 2 fibre denervation is unlikely, the predominant atrophy of type 2 fibres may be due to their selective inactivity. Pain-induced muscle contraction involving mainly type 1 fibres may protect them from atrophy. However, the mechanism of muscle fibre atrophy in general is still a matter of dispute.

In type I fibres core-targetoid and moth-eaten changes were commonly seen, as they are in neurogenic diseases. This suggests incipient denervation, which agrees well with our ENMG findings. Detailed quantitative analysis of the above changes with correlation to the clinical and neurophysiological findings will give information about the prognostic significance of muscle involvement in disc herniation.

Intramedullary compression nailing of the tibia

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Intramedullary compression nailing of the tibia using the Kaessmann device was performed in 50 patients. The indication in most of the cases was a fresh, severely displaced longitudinal fracture at an infra-isthmal site, unsuitable for conventional intramedullary nailing because of rotational instability. In six patients a compression nail was used for non-union of a primarily conservatively treated fracture.

The patients assumed full weight-bearing within 8 weeks on average. The median union time for the 39 compression-nailed, fresh, simple longitudinal or transverse fractures was 13 weeks. In two cases, both with unsatisfactory rigidity of the fixation in open comminuted fractures, deep infection resulted in delayed union. Malunion occurred in four patients.

Intramedullary compression nailing seemed to be a suitable method for treating displaced, unstable infra-isthmal, simple closed or grade I open fractures of the tibial shaft, but unsuitable for comminuted and grade II–III open fractures.

Changes in erythrocyte sedimentation rate and C-reactive protein after total hip replacement

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Elevated ESR values after total hip replacement have been considered to be a sign of deep infection, although ESR is also affected by other clinical conditions. The capacity of rapid alterations in CRP level to reflect the infective process has also been demonstrated reliably in connection with orthopaedic infections.

In the present study, comparison between the behaviour of ESR and CRP in osteoarthritis patients subjected to total hip arthroplasty revealed that normalization of CRP appeared within 3 weeks while ESR was still elevated for up to 1 year postoperatively without any clinical signs of infection. Thus the authors stress the significance of monitoring CRP during recovery after total hip replacement.

The ASIF plate in the treatment of trochanteric fractures

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The subjects investigated consisted of 152 consecutive patients treated for trochanteric fractures using ASIF plate osteosynthesis. One hundred and five of the patients (69 per cent) were women and 47 (31 per cent) were men. The average age of the women was 77 years (18–95) and that of men 61 years (16–88).

In 78 per cent of the cases the fractures resulted from falling over. In 7 per cent of the cases the fracture resulted from a traffic accident; 3 per cent sustained multiple injuries. The mean follow-up time was 8 months.

For the follow-up analysis, the fractures were classified according to the primary X-ray investigations using the Boyd and Griffin, Evans and ASIF methods as follows:

Boyd and Griffin	Evans	ASIF
type 1 26%	type 1 21%	type 1 46%
type 2 41%	type 2 13%	type 2 54%
type 3 11%	type 3 11%	
type 4 17%	type 4 20%	
others 5%	type 5 35%	

Forty-nine per cent of the patients were operated on during the first 5 days after the trauma, and 85 per cent during the first week. In 83 per cent of the cases, the 130° rigid plate was used, and in the remaining 17 per cent the condylar plate. The operation included cancellous bone transplantation in 16 per cent of the cases, most of these fractures being type 4 according to Boyd and Griffin, type 5 according to Evans, and type 2 in the ASIF classification. During the first 8 postoperative months, 95 per cent of the fractures were consolidated and in 87 per cent the osteosynthesis result was excellent. In 5 per cent of the cases the plate used for osteosynthesis was found to be fractured or bent. The Evans classification appears to be the best for primary prognostic evaluation of trochanteric fractures; the ASIF method is also very suitable because of its simplicity. The Evans 4 and 5 type fractures would probably do better if the operation regularly included cancellous bone transplantation.