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'Ongoing experiences' with the Reciprocator (ARGO Durr-Fillauner Inc, Chattanooga, USA)

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The Reciprocator bracing system can make walking possible for spina bifida patients with a high-lumbar defect level. The orthosis consists of a combination of long leg braces attached to a pelvic girdle. A built-in cable system links flexion and extension in the two hips.

Material and method: A retrospective study was made of 13 spina bifida and two paraplegia patients mobilized with a Reciprocator between 1985 and 1994. The neurological defect level ranged from Th10 to L3. The mean age at fitting was 5.4 years. Items of study were the amount of use per day, the ambulation pattern achieved, orthosis-related problems, user satisfaction and reason to stop with the Reciprocator.

Results: Four children reached the ambulation level of a 'community ambulator' and eight that of a 'household ambulator'; three children did not achieve ambulation.

Subjectively, three patients were highly satisfied, seven were satisfied and five patients were not satisfied. The mean duration of use per day was 2.2 hours, varying from 0 to 7.7 hours. Seven patients had ceased using the Reciprocator because it required excessive physical effort (n=4) or because a wheelchair was found to be easier (n=3). On average, three Reciprocators were worn out, and material problems necessitated numerous repairs.

Conclusions: The Reciprocator can be an important aid for children with spina bifida to learn to walk. Considerable effort is required of the patient and the family and realistic goals should be formulated for each individual patient.

Unilateral hip dislocations and moderate flexion contractures of hip and knee up to 20 degrees do not constitute contraindications. In the long run, most children will come to prefer a wheelchair to the Reciprocator.

The value of the oblique MRI scan in patients with lumbar spondylolytic spondylolisthesis and unilateral radiculopathy

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A comparative study was made of the case records and MRI examinations of 30 patients with lumbar spondylolisthesis and unilateral radicular irritation. The purpose of this study was to determine whether MRI images made at such an angle with the sagittal plane that the emerging nerve root is hit perpendicularly in the foramen (the 'oblique scan') provide more information on the mechanism of radicular compression than the conventional scans made in the sagittal plane.

Method: Of all patients, T1 weighted images were made in the sagittal plane as well as in the oblique plane. Fifteen patients had left-sided and 15 had right-sided radicular irritation. The neuroradiologist was not informed of the clinical aspects. Results: In the sagittal scans, nine of the 15 left-sided and 10 of the 15 right-sided radicular compressions could be diagnosed. In the oblique scan, 12 of the 15 left-sided and 13 of the 15 right-sided radicular compressions were diagnosed correctly. The symptomatic side was confirmed in 63% of the sagittal and 83% of the oblique scans. This difference is statistically significant (McNemar's test). In 19 of the sagittal scans and 21 of the oblique scans, the root was compressed by the disc and not by the arch defect. In one patient, a hernia above the level of the spondylolysis was found.

Conclusion: Oblique MRI scans are useful for the identification of the symptomatic side and the cause of radicular compression in a spondylolysis.

Routine radiological monitoring of the fracture healing during conservative treatment of fractures of the 4th and 5th metacarpal bones is not useful

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Unnecessarily many radiographs are obtained during the conservative treatment of fractures of the 4th and 5th metacarpal bones.

Method: Two retrospective studies were carried out to assess the additional value of the making of follow-up radiographs for the treatment of such fractures. In a pilot study concerning 307 successive fractures, current use of radiodiagnostics was evaluated. Its influence on the management conducted was studied. Between 0 and 9 (mean 1.9) series of radiographs were made per patient. The follow-up radiographs led to a change in management in only two cases. In both cases this had already been expected prior to the making of the radiography, on the basis of clinical examination.

During a supplementary radiological study concerning a selected group of patients with 288 conservatively treated fractures, the question was investigated what relevant information would have been 'missed', if the protocol had included radiographic examination only during the first visit. Only one such case was found, and even then the omission of this radiograph would not have had adverse consequenses for the patient.

Conclusion: No routine radiographs should be made at the follow-up examinations during conservative treatment of fractures of the 4th and 5th metacarpal bones, radiographs should only be made if clinical examination leads to suspicion of a change of position since the previous examination.

In this way the amount of radiological examination can be halved, without adverse effects on the treatment.

The limited usefulness of skeletal scintigraphy in symptomatic knee prostheses

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If after implantation of a knee prosthesis symptoms persist or recur after a symptom-free period, an attempt will be made to establish the cause by means of conventional radiographic examination. This conventional examination will often be supplemented with auxiliary methods such as arthroscopy of the knee joint and skeletal scintigraphy.

Materials and methods: In 27 patients examined by skeletal scintigraphy because of knee complaints after implantation of a total knee prosthesis, the files were studied retrospectively and the management conducted was analysed. Subsequently, the conventional radiographs and the skeletal scintigrams were examined again without information concerning the clinical management. It was then established in which patients the nuclear medical examination had contributed decisively to the subsequent management.

Results: Analysis of the data shows that the scan exerted no influence on the management if no abnormalities had been found at either physical or radiographic examination. This was the case in 37% of the patients. In the patients whose physical examination and/or radiographs did reveal abnormalities, it was found that the radionuclide examination had influenced the treatment strategy in 65% and had not influenced it in 35% of the cases. In addition, distinct correlation was observed between the clinical picture and the radiographic findings on the one hand and an infection on the other. No such correlation was present in the case of detachment. Both observations find confirmation in the literature.

Conclusions: Skeletal scintigraphy plays a limited part in the diagnosis of symptomatic knee prostheses. It may corroborate or refute the diagnosis but in the absence of abnormal clinical and radiographic findings it will rarely lead to a change in the management. If on the basis of the examinations mentioned above a clear suspicion exists, skeletal scintigraphy may provide supplementary information that may support therapeutic intervention. In this connection it should be pointed out that radionuclide examination is more reliable for the diagnosis of infections than for the diagnosis of possible mechanical detachment.

Use of postoperative autotransfusion after total hip and knee arthroplasty

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Homologous blood transfusions entail the potential risks of immunological reactions and transmission of infectious diseases such as virus hepatitis and HIV. Autologous transfusions are therefore to be preferred. The ample amount of blood loss in the postoperative period after total hip and knee arthroplasties may be made suitable for autotransfusion.

Method: In a retrospective study (n=328) the hematological and clinical alterations were evaluated of patients who, after a total hip or knee arthroplasty, had been given a postoperative autotransfusion (n=218 with the Solcotrans Orthopedic Plus system, Media bv, 's-Hertogenbosch, the Netherlands) or a homologous blood transfusion (n=110).

A total of 260 total hip arthroplasties and 68 total knee arthroplasties were carried out in the period 1986–1994 in 70 men and 258 women with a median age of 71 (19–93) years. Homologous postoperative blood transfusions (HPT) were given during the period 1986–1988, while postoperative autotransfusion (PA) was performed during the period 1989–1994. The surgical techniques used were identical throughout the entire period.

The mean hemoglobin concentration and the hematocrit value were determined preoperatively and one day postoper-

atively.

Results: In the PA group the hemoglobin decreased from 8.5 (0.9) to 7.2 (0.9) mmol/L and the hematocrit value from 0.4 (0.04) to 0.35 (0.04) in the HPT group, the hemoglobin decreased from 8.8 (1) to 7.6 (0.9) mmol/L and the hematocrit value from 0.41 (0.05) to 0.36 (0.05) ($p<0.0001$). In the PA group (n=218), the median drain production was 710 ml and that in the HPT group was 627 ml ($p<0.05$); in the PA group, 450 ml (100–1800 ml) of the drain production was reinfused. Per- and postoperative homologous transfusion was done in the PA group in 50 patients (23%) and in the HPT group in 49 (45%) patients ($p<0.0005$). Homologous blood transfusion was performed in both groups in case of hemoglobin concentrations ≤6 mmol/L. In the HPT group, the mean quantity of the homologous blood transfusions was larger (2.2 as against 1.8 U, $p<0.05$).

There was no difference in perioperative temperature variation, and no postoperativ complications were observed that were related to the blood transfusion method.

Conclusion: Postoperative autotransfusion is a safe technique for postoperative blood supplementation after elective orthopedic operations; reduces the use of homologous blood transfusions by 50%.

The Pavlik bandage in the treatment of dislocation of the hip on congenital hip dysplasia

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The treatment of dislocations of the hip in newborn babies with hip dysplasia consists of gradual flexion and abduction of the affected hip, in order to bring about repositioning. Forced repositioning entails the risk of development of necrosis of the head of the femur. The Pavlik bandage is an appliance that meets this requirment of gradualness. A retrospective study was made of the results of treatment with orthosis.

Method: Between 1989 and 1995, 18 children with a mean age of 16 weeks were seen for the first time with dislocation of the hip associated with congenital dysplasia. Five right and ten left hips were involved; in three cases, both hips were affected. Examination revealed stiff restriction of abduction in all cases and a positive text according to Barlow nine times. Roentgenological examination confirmed the dislocation and the angle of inclination of the acetabulum according to the table corrected for age always indicated moderate to severe dysplasia.

All children were immediately fitted with a Pavlik bandage which was adjusted once a week. Previously, three children because of their very early age were treated with a spreading pillow for 2 to 4 weeks to render the hip more flexible.

Results: The Pavlik treatment lasted an average of 6 (2–16) weeks. Complete repositioning was achieved in 13 cases, but in two of these cases the tendency to dislocate persisted. Eleven of the 18 children were subsequently treated with CAMP spreading pants (Basco Health Care, Amsterdam) for an average of 8 (4-14) months. In the other seven children, repositioning was brought about under arthrographic control and with plaster spreading pants. Previously, six of these seven children had been treated in traction for an average duration of 2.5 weeks.

No necrosis of the head of the femur was observed.

Conclusion: The Pavlik bandage is labor-intensive but in a considerable proportion of the cases it may bring about repositioning in a safe way and in a relatively short length of time, so that hospitalization for traction and perhaps repositioning under anesthesia can be avoided.

Registration of infections during 5,245 orthopedic operations

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There is a need for a registration system providing the orthopedic surgeon with the percentages of infection concerning various operations. Such a system makes possible quality control and evaluation of the effect of prophylactic measures. We have been attempting to develop such a registration system since 1983.

Material and method: During the period 1983–1987, data were collected on all patients over the age of 15 years operated and admitted to the department of orthopedics. The hospital hygienist collected the data by daily examination of the patient files and the drugs prescribed in the nursing department, and where applicable, the results of cultures in the bacteriological laboratory. A large number of data per patient were recorded and stored in a database, using a Commodore computer during the first two years, and subsequently, a PC.

Infections were classified as 'deep', 'superficial' or 'other infection' (pneumonia, urinary tract, decubitus). The incidences of these infections were calculated for 10 groups of comparable types of operation.

A statistical analysis was performed by comparing the infected cases with a non-infected group, matched for type of operation, sex and age (Mann-Whitney U test for paired samples; dichotomous variables were compared using the Chisquare and Fisher exact tests).

Results: A total of 5,245 operations, 5,038 of them 'clean' and 207 of them 'unclean', were performed in 4,309 patients in 5 years.

The infection percentages (numbers of infections) at these operations were:

	N	clean %	N	unclean %
deep infection	23	0.5 %	30	14.5 %
superficial infection	23	0.5 %	4	1.9 %
'other' infection	120	2.4 %	63	30 %

The proportion of deep infections among 637 primary clean total hip protheses was 1.2%, that at 135 total knee prostheses 0.8%. The principal risk factors were: duration of pre- and postoperative hospitalization, classification as unclean operation, previous surgery and preoperative use of antibiotics. These factors were significantly different from those concerning non-infected operations, and interrelated.

Discussion: The method used during these first five years of registration was not sufficiently effective. Too many data per patient were collected and processing was greatly delayed because no adequate computers and programming were available at the time. Using the observations during these five years of registration and the even longer period of processing, we have designed and started a different registration method that is free of these inadequacies and can be cost-effective.

Transient osteoporosis and osteogenesis imperfecta—a case report and a review of the literature

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Transient osteoporosis is a rare, self-limiting and painful desease of the hip joint, the etiology and pathogenesis of which are still obscure.

The frequency is highest among adult males and females (particularly, pregnant women in the third trimester of pregnancy). Two groups are distinguished in the literature: the regional group, in which only the hip is affected and the migratory group, in which the knees, the ankles, and/or the feet are also involved. There is a history of complaints about pain with a (sub)acute onset in the affected extremity. An associated injury is virtually never present. Clinical examination reveals few abnormalities except pain during static and functional examination. Radiographic examination shows the image of local osteopenia 4 to 6 weeks after the onset of the symptoms. Skeletal scintigraphy and MRI should be performed to exclude other pathological conditions by a differential diagnosis. Biopsy does not always provide conclusive evidence of the condition. The diagnosis of transient osteoporosis is made by exclusion. Treatment consists of protracted unloading of the affected extremity, if necessary supported with analgetics. The principal complication is a fracture. Clinical and radiographic normalization of the condition can as a rule be observed after 6 to 8 months.

Combination of osteogenesis imperfecta and migratory transient osteoporosis is extremely rare; only seven other cases are reported in the literature. We present the case of a woman aged 48 years with osteogenesis imperfecta in whom a migratory transient osteoporosis was diagnosed one year ago.

Measuring of differences in leg length—a comparison of clinical and orthoradiographic methods in 190 children

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Measuring a leg length difference (LLD) can be done most accurately using roentgenological methods. In daily practice, however, boards or measuring tape are the means most frequently used. The two methods were compared and the importance for evaluation of handicaps was investigated further.

Material: In 190 children who attended our leg length consultation hour for the first time, the LLD was measured successively with boards, a measuring tape and ortho-radiographic examination.

Results: Of the measurements carried out with boards, 95% were within −1.4 and +1.6 cm of the radiographic measurements. This is more accurate than measuring wiht a measuring tape, p=0.002 (F-test).

The predictive values with regard to the localization of the greater LLD, above or below the knee, with use of the measuring tape were 64% and 75%, respectively.

A graph was constructed with which the reliability of a measurement with boards can be easily found.

Conclusion: Nonradiographic methods are inaccurate for measuring LLDs. As the graph shows, in the evaluation of a handicap due to a LLD, a radiographic measurement is indispensable.

Combined anterior and posterior spondylodesis in spinal deformities in one or two stages

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Indications for a combined anterior and posterior spondylodesis are an S-shaped scoliosis, a rigid curvature of the spinal column as in scoliosis in adults and major hyperkyphosis. A circumference spondylodesis provides better fixation and better possibilities of correction.

Method: Between 1988 and 1994, a combined spondylodesis was carried out in 30 patients, 18 times in two stages and 12 times, in one day. Indications were scoliosis in 16 cases, hyperkyphosis in nine cases, a vertebral metastasis in two cases, a vertebral fracture in two cases and a spondylodiscitis in one case. Patient's ages varied from 12 to 61 years (mean 27 years). All patients underwent follow-up examination after an average of 36 months.

Results: The scoliosis group exhibited excellent correction with minimal relapse (correction thoracic 60% and thoracolumbar or lumbar, 65%). In the kyphosis group, 36% loss of correction was observed and fracturing of the osoteosynthesis system occured twice (Rochester Compression

System, De Puy, Warsaw, USA). Loss of correction and fractures of material might probably have been avoided by a longer spondylodesis tract and stronger osteosynthesis material.

Complications were observed in 54% of the patients, mostly minor perioperative problems. No neurological complications were encountered.

Comparison of the operation in one stage with the same operation in two stages shows that the combined intervention is to be preferred with regard to blood loss, duration of anesthesia and total hospitalization costs.

Open repositioning of the hip combined with Salter pelvic osteotomy for congenital dysplasia of the hip

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Open repositioning of the hip combined with pelvic osteotomy according to Salter is controversial in the treatment of congenital dislocation of the hip. The literature suggests an increased risk of avascular necrosis of the head of the femur (5.7% to 37%) when this combination i used. The present study was performed to evaluate the clinical and radiological results of this combined therapy.

Patients and method: Between 1981 and 1991, 38 patients (39 hips) were subjected to the above-named operation; 36 of them (37 hips) could later be evaluated. The mean age at the time of operation was 25 months, the average follow-up period after operation 91 months.

Results: At the clinical evaluation according to McKay's criteria, 36 hips (97%) were classified as good or excellent. At radiographic evaluation according to Severin's criteria, 31 hips (84%) showed a good or excellent result. In three hips (8%) avascular necrosis of the head of the femur according to the criteria of Kalachi and MacEwen was observed. Two patients (5%) exhibited redislocation and had to be operated again.

Conclusion: The above-named procedure is recommended for those patients in whom the diagnosis of dislocation of the hip is made at an age between 18 months and 3 years. Although the combined operation is more difficult technically, it leads to shorter duration of the treatment, without increasing the risks of avascular necrosis or reoperation.

The Schanz subtrochanteric osteotomy for chronic congenital dislocation of the hip—a retrospective study with 11 to 33 year's follow-up

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Young patients with chronic, painful congenital dislocation of the hip confront the orthopedic surgeon with a difficult choice. Implantation of a total hip prosthesis is a difficult operation, particularly in high hip dislocation and in young and active patients problems are to be expected in the long run, in particular aseptic loosening.

Schanz in 1921 described deep subtrochanteric osteotomy as a procedure to bring about support of the pelvis against the femur, which increases the stability of the hip joint, reduces the pain and may lead to a better pattern of ambulation. Although the Schanz osteotomy is described in numerous orthopedic textbooks, results in the longer run have not been published.

Material: Between 1962 and 1982, eight patients with congenital dislocation of the hip were treated in Groningen University Hospital by means of a Schanz osteotomy of the femur. One patient could not be traced so that seven patients (11 hips) were available for follow-up study (six women, one man). The mean age at the time of the Schanz osteotomy was 16 (6–29) years. Prior to the Schanz osteotomy, several other operations had been performed, including a Salter osteotomy, open repositioning and one acetabular roof correction.

The indications for performance of the Schanz osteotomy were pain and a Trendelenburg gait in six patients and an adduction and flexion contracture in one patient. The functional results of the Schanz osteotomy were evaluated with the aid of the Harris Hip Score and the Barthel Index. In addition, patients were asked about knee and back complaints, ability to ride a bicycle and to engage in sports and possible problems of a sexual nature. Female patients were also asked about problems in any pregnancies and/or parturitions after the Schanz osteotomy. Radiographic examination of the pelvis and the ipsilateral knee joint were carried out.

Results: No complications were observed during the immediate postoperative period. The mean Harris Hip Score amounted to 76 (27–97) points. The difference in leg length ranged from 0.5 to 3.0 cm (average 0.9 cm). The Trendelenburg sign was positive in seven hips and negative in four hips. The Barthel Index amounted to 20 points (=maximal) in all patients. The higher the dislocation of the hip, the better the results of the osteotomy.

Only one patient complained of backpain after the Schanz osteotomy. None of the patients complained about pain or instability of the knee joint. There was no valgus position of the knee or gonarthrosis. All patients were able to swim and to ride a bicycle.

Only the two female patients with a bilateral Schanz procedure had problems with sexual intercourse due to restricted abduction in the hip joints.

Conclusion: The Schanz osteotomy is a useful method of treatment for a hip dislocation in a young patient. The long-term results are favorable on average.

Possible tuberculous arthritis of the hip in a child

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When a child of Dutch descent complains of pain in the hip and limps, a tuberculous infection will not be the first possibility to be considered.

Late in 1994, a healthy-looking 7-year-old boy was seen in the outpatient department of orthopedics, with the above-named symptoms for 2 months. He had no fever.

A thorough work-up revealed: a BSR of 64 mm after one hour, a positive technetium scan and a strongly positive Mantoux reaction. No Mycobacterium tuberculosis could be cultured either from the hip punctate or from the gastric juice. However, the DNA probe examination of the gastric juice was positive for tuberculosis.

Tuberculostatic treatment was initiated immediately after the puncture, following which the condition returned to normal without sequelae. An imminent ankylosis of the hip was probably prevented in this way. However, the diagnosis of tuberculous arthritis of the hip could never be proved.

Conclusion: Even in the Netherlands it is necessary to remain alert with respect to tuberculosis. The diagnosis of tuberculous arthritis should be considered in case of unexplained pain in a joint.