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The effect of orthopaedic surgery on ambulation of patients with myelomeningocele

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Results of orthopedic surgery in patients with myelomeningocele are often disappointing. The effect of orthopedic surgery on the level of ambulation was studied in 60 patients. They were divided by level of neurologic dysfunction into a thoracic, a high lumbar, a low lumbar, and a sacral group, and by level of ambulation according to Hoffer into community ambulators, household ambulators, nonfunctional ambulators, and nonambulators.

Operations on the vertebral column and hips in 20 patients with a thoracic level of dysfunction led to an improved level of ambulation in 2. Mostly hip and foot operations in 28 patients with a high lumbar level of dysfunction led to an improved level of ambulation in 8. Mostly foot operations in 13 patients with low lumbar dysfunction led to an improved level of ambulation in 3. Mostly foot operations in 9 patient with a sacral level of dysfunction led to an improved level of ambulation in 1.

In 50 per cent of the cases a relapse occurred without effect on the level of ambulation. This level depended on the level of neurologic dysfunction.

Orthopedic operations seldom improve the level of ambulation in this category of patients. The authors advocate a reserved attitude towards orthopedic operations in patients with myelomeningocele.

The reciprocating gait orthosis for patients with myelomeningocele

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Ambulation is difficult for patients with myelomeningocele. The upright position is of psychologic, as well as physical, importance to children. The reciprocating gait orthosis (reciprocator) seems to enhance the chances of children with a lumbar or thoracic level of dysfunction to obtain community ambulatory status and maintain it throughout adolescence.

The coupling of flexion in one hip joint with extension in the other by the cable-controlled hip hinges ensures stability in standing and walking. To function well, however, the reciprocator should meet strict requirements of light weight and balanced construction, optimally positioned cables, and adjustment to preexisting deformities.

Of the first 4 nonambulators with myelomeningocele given a reciprocator, 3 attained community ambulatory status within 6 months.

Physiolysis in spina bifida

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On an average, metaphyseal or diaphyseal fractures in children with spina bifida need only relatively simple immobilization and tend to heal rapidly with abundant callus formation. This does not apply, however, to physeal fractures Salter-Harris type I or II. They contrast sharply with similar fractures in neurologically intact children, which have an excellent prognosis of rapid healing without growth disturbances.

There are obvious differential diagnostic problems in this fracture in spite of its characteristic, bizarre radiographic changes. Complications are common and immobilization and nonweight bearing are required for a long time.

Comparative data from the literature show that slow healing is a characteristic feature of this fracture, particularly if immobilization is inadequate and weight bearing insufficiently restricted. Premature physeal fusion is a frequent complication. This unusual fracture needs rigid immobilization.

Therapeutic results in hip problems associated with cerebral palsy

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Between 1974 and 1983, 65 hips in 41 patients with severe cerebral palsy were treated surgically. Nine patients (14 hips) with impeding scissor spasms were treated by soft-tissue release (adductor tenotomy, excision of the anterior ramus of the obturator nerve, and often psoas tenotomy). The spasms disappeared in all the cases. Spastic subluxation affected 39 hips in 29 patients. In two thirds of these cases, soft-tissue release resulted in stable reduction. When the operation was extended to include a corrective femoral osteotomy, reduction was virtually always achieved and maintained. Complete dislocation was observed in 12 hips (10 patients). Soft- tissue release led to reduction only rarely, but a stable hip joint could be achieved by more extensive surgery.

Treatment of hip dislocation associated with cerebral palsy

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Twelve spastic hip dislocations in 10 patients were treated surgically. Nine patients showed severe tetraplegia and 1 had diplegia. The motor level of these children did not exceed sitting balance.

In all the cases the indication for operation was recent hip dislocation with adduction contracture, resulting in painful and impaired hygienic care. The surgical procedure comprised an open adductor tenotomy, psoas tenotomy, excision of the obturator nerve, and open reduction with derotational varus osteotomy. In 3 instances the femur was shortened as well. The mean age at operation was 7 years.

A multicenter follow-up was performed over a mean period of 3.5 years. This retrospective clinical study revealed that all 10 patients were functioning without pain. The children with unilateral hip dislocation showed better sitting balance. Radiographic examination disclosed a physiologic CCD angle with a normal relationship between the femoral head and the acetabulum.

Results so far have probably been satisfactory because the open reductions were performed exclusively in patients with a very recent spastic dislocation. In these cases the risk of incipient degeneration of the hip-joint cartilage is still minimal.

Organic or myoplastic lengthening of the Achilles tendon in children with infantile encephalopathy?

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The follow-up concerned 85 patients with talipes equinus (149 feet). The mean age at operation was 8 years. Myoplastic lengthening according to Strayer was performed on 49 feet, the remaining 100 being organically lengthened according to Hoke. After myoplastic lengthening, dorsal flexion in the ankle joint diminished from 13 degrees to 4 degrees after an average of 4 years. After organic lengthening, dorsal flexion diminished from 11 degrees to 8 degrees after an average of 30 months. Recurrence of the deformity was observed in 18 cases of the myoplastically and 7 of the organically lengthened group.

Conclusion: Organic lengthening of the Achilles tendon is to be preferred in the surgical treatment of spastic talipes equinus.

Extra-articular talocalcaneal fusion according to Grice

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The follow-up concerned 15 patients with 27 surgically treated feet. Age at operation ranged from 8 to 16 years. The follow-up period averaged 5 years and 7 months. The indication for an operation was an extreme valgus deformity of the foot and a disturbed gait due to a neurologic lesion.

Complications did not develop. The correction in the subtalar joint was maintained. Secondary abnormalities were found in the case of a severely disturbed spastic gait. The results obtained with a corticocancellous tibial bone were not different from those with a fibular graft.

A computer model for simulating hip dysplasia in neonates

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Radiophotogrammetry was used to collect data on the hip muscles in a dissected neonatal specimen. These data were used to construct a computer model of the neonatal hip that, among other things, can be used to simulate hip dysplasia. Several positions of the hip joint, e.g., that before and that after birth, can be simulated and compared in this way. It can thus be shown that disturbance in the balance of the muscles around the hip joint can so alter the direction of the resultant force that this contributes significantly to the multifactorial mechanism involved in the pathogenesis of hip dysplasia or congenital dislocation of the hip.

Two years' experience with ultrasonography according to Graf in congenital hip dysplasia

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In a screening program for congenital hip dysplasia, 200 children were submitted to 293 ultrasonographic examinations (586 hips) using the method and classification introduced by Graf. The examinations were made with a linear transducer of 5 MHz. In 160 instances the ultrasonographic diagnosis could be compared with a radiographic diagnosis. Two investigators experienced in the use of the method were compared in order to determine intraobserver and interobserver variability of angle measurements and classification of 60 ultrasonograms.

The prevalence of congenital hip dysplasia in this selected population was about 30 per cent. When radiographic findings were normal or abnormal according to the criteria of Tönnis & Brunken (80% of our material), ultrasonography proved to have high sensitivity (100%), high specificity (90%), and a high positive (88%) and negative (100%) predictive value. When radiographic findings were dubious (20% of our material), ultrasonography nearly always permitted further classification. Intraobserver and interobserver variability was limited and had no important clinical and therapeutic consequences.

Ultrasonography seems a reliable diagnostic aid in congenital hip dysplasia. It can replace much of the radiographic work otherwise necessary. Radiographic examination should be reserved for severe forms of dysplasia to determine initial values and for follow-up after reduction in a plaster cast and abducting brace.

Because anamnestic and clinical findings are unreliable parameters in the diagnosis of congenital hip dysplasia, it may be useful to submit all at-risk children to ultrasonographic examination to determine the presence or absence of congenital hip dysplasia.

Ultrasonography of the hip in screening neonates

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One investigator screened 407 neonates clinically and ultrasonographically for congenital hip dislocation. Treatment was based exclusively on the results of physical examination. Abnormal ultrasonographic features were periodically checked. Emphasis during ultrasonography was on dynamic examination.

Results: 1) Clinical and ultrasonographic findings were normal in 339 children (678 hips). 2) Clinical findings were normal (stable) in 66 children (108 hips), whereas ultrasonographic findings were abnormal; periodic ultrasonographic and clinical follow-ups were considered necessary. 3) Two hips (1 child) were clinically abnormal (Ortolani/Barlow-positive). The mechanism of dislocation was quite clear on the ultrasonograms. With the hip reduced, ultrasonographic features were not very abnormal on either side. These hips rapidly stabilized. 4) One hip was clinically and utrasonographically abnormal, even after reduction. This hip was still unstable after 10 weeks despite a Pavlik bandage; a synthetic plaster hip spica has been applied. 5) Of the 108 ultrasonographically abnormal, but clinically normal, hips, 84 normalized after 6 weeks without treatment; 21 other hips showed ultrasonographic normalization after 12 weeks. 6) Two hips still showed ultrasonographic instability and mild dysplasia after 12 weeks. These cases are followed further without treatment in view of the still normal clinical findings. 7) One ultrasonographically dysplastic hip at birth developed dysplasia radiographically after 12 weeks.

Conclusions: 1) Ultrasonography visualizes the structure and stability of the neonatal hip. 2) Most hips found ultrasonographically dysplastic at birth normalize spontaneously. 3) The true importance of ultrasonographic screening is yet to be determined with certainty.

Preliminary experience with ultrasonography of the infantile hip: A prospective study of 55 children

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Radiographic and ultrasonographic findings were compared in 55 children with hip pathology at the orthopedic outpatient clinic of the St. Franciscus Hospital, Roosendaal, during the first 6 months of 1985.

Radiographic examination consisted of an AP and a Lauenstein view of the pelvis; the acetabular index was also determined. Ultrasonography was performed independently of radiographic findings using the criteria and classification introduced by Graf.

Of the 110 hips (55 children) initially examined, 85 were both radiographically and ultrasonographically normal. Both radiographically and utrasonographically abnormal were 21 hip joints: "dysplasia" was diagnosed in 11 instances, corresponding to a Type II classification according to Graf in 11 cases. In 10 cases the diagnosis was "dysplasia with lateralization or subluxation," corresponding to Type IIa in 9 cases and Type IIIb in 1. In no case was "dislocation" (corresponding to Type IV) diagnosed. One examination was false-negative and three were false-positive.

The findings warrant no conclusion about sensitivity and specificity. Ultrasonography is a simple and safe (no irradiation) method of reaching diagnoses in infants up to 1 year of age, but it has not (yet) superseded radiographic examination as a supplement to clinical examination of the hip.

The value of arthrography in the treatment of congenital hip dislocation in children

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The aim of this study was to compare the information obtained by arthrography of the the hip with that supplied by a conventional pelvic radiograph and to establish to what extent arthrographic findings play a decisive role in the further treatment of a child with congenital hip dislocation.

In 28 patients with 35 dislocated hips, 45 arthrograms were obtained. The patients were 24 girls and 4 boys who ranged in age from 1 to 41 (mean 14) months. Children with complicated hip conditions were excluded, as were children on whose hips an operation had already been performed. All the arthrograms were obtained between November 1982 and December 1985 using the double-contrast technique and a caudal approach according to Tönnis. The arthrograms were divided into four groups: by age (before or after age 12 months) and by surgical or nonsurgical treatment.

Of the 45 conventional pelvic radiographs, 16 proved insufficient for a correct diagnosis. In infants aged less than 12 months, arthrography yielded more information about the position of the femoral head. Arthrography in children treated by operation permitted assessment of the iliopsoas muscle in all cases in the group older than 12 months; in the group aged less than 12 months, this was not always the case.

The group of infants aged less than 12 months and not treated by operation provided several normal arthrograms, as expected, but also a surprising number of arthrographic lesions, such as a filled acetabular fossa and an inverted labrum.

No correlation could be found between the kind of lesions observed by arthrography and the necessity of open reduction.

The Frejka pillow in outpatient treatment of infants with irreducible hip dislocation during the first 9 months of life

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A follow-up study was performed on infants with irreducible hip dislocation treated during the first months of life. Treatment consisted of application of a Frejka pillow during a 8-week period, followed by an abducting hip splint for 4 months. Radiographs were obtained after 3 months (with the abducting hip splint in position), after 6 months (without splint), after 1 year, and subsequently at least once, which was more dependent on result and age.

Of 61 patients treated during the period 1975–1984, 60 were available for follow-up. The follow-up period was at least 2 years.

Additional treatment was required in 8 patients: closed reduction in 3 and operative treatment in 5 cases (1 open reduction and 4 femoral osteotomies)

Results: There were 22 patients with normal hips, 29 with adequate hips (good centration, but also coxa valga and/or mild dysplasia of the acetabular roof), and 9 with moderate or severe acetabular dysplasia. Complications: necrosis of the femoral head in 1 cases; disturbed ossification in 3 cases.

Conclusion: Treatment with the Frejka pillow gives results equal to those obtained by conventional methods, and therefore we prefer it.

Results of reduction according to Pavlik in the treatment of 47 hip joints

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The Pavlik bandage can be used to prevent extension and adduction of dislocated hip joints. Because other hip functions are not impeded, gradual reduction of the dislocated hip results. This treatment demands intensive supervision and guidance of the infant and the parents.

The Pavlik bandage was used in the outpatient treatment of 40 infants (47 hips) aged up to 12 months during the period 1981 through 1985. Of the 47 hips, 44 showed dislocation at the start of treatment, and 3 showed subluxation. Reduction of 37 dislocated hips (84 per cent) was achieved. In most cases the follow-up after completion of treatment exceeded 2 years. The mean duration of treatment was 3–4 months. After reduction, 50 per cent of the children still showed acetabular dysplasia, necessitating after treatment with an abduction splint during a 3-month period. In seven hips (7 children), reduction was not achieved and traction consequently became necessary. One case of avascular necrosis was observed.

The shelf operation in congenital hip dislocation

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The shelf operation aims at increasing the surface area of a dysplastic acetabulum in order to prevent arthrosis. We perform the shelf operation as introduced by Lucas, modified by Thomas, and later by van der Heyden.

The presentation concerns 28 patients with hip dysplasia-5 of whom had pain- treated with this modified shelf operation. At follow-up over a mean period of 44 (9–137) months, all the patients were free of pain. The radiographic results were excellent according to the criteria of Severin in 24 cases.

The shelf operation as we perform it is a simple extraarticular procedure that does not violate the integrity of the acetabulum and the femoral head. If arthrosis nevertheless develops subsequently, then, arthroplasty of the hip is often easier to perform because of the large acetabular surface area.

The value of radiographic examination in congenital clubfoot

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The aim of this study was to evaluate the correlation between clinical and radiographic results in the treatment of congenital clubfoot. In a prospective study of primary treatment of 57 instances of congenital clubfoot, two radiographs were obtained. For the lateral view the medial edge of the foot was placed as flat as possible on the cassette, and for the anteroposterior view the feet were placed on the cassette in plantar flexion and the x-ray tube was placed at an angle of 30° to the vertical axis.

The radiographic results were compared with the clinical results according to the Wynne-Davies score in all the patients.

Results: The mean lateral TC angle was 28°; only three of the 57 clubfeet showed an abnormal lateral TC angle. The anteroposterior TC angle averaged 21°, and an abnormal value was found in 9 cases. The mean talometatarsal I angle was 10°, and in 16 cases this value was statistically abnormal. In correlation with the Wynne-Davies score, there was virtual uniformity between abnormal clinical and abnormal radiographic results.

Conclusion: Radiographic examination is of essential importance as an aid in determining therapeutic strategies in patients with a congenital clubfoot.

Results of surgical treatment of congenital clubfoot

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The results of 34 operations on 26 clubfeet in 17 patients were studied. The 26 primary operations included an Achilles tendon- lengthening procedure in 8 instances, posterior release in 11, and posteromedial release according to Turco in 7 cases. The operations for recurrence included posterior release with pes adductus correction in 2 cases and posteromedial release in 6 cases. The mean follow-up time after the last operation was 2.3 years. Results were evaluated using the Wynne-Davies score.

Lengthening of the Achilles tendon (8 cases) led to a good result in 3 and to recurrence in 5 cases. Posterior release (13 instances) led to a good result in 5, a moderate result in 4, and recurrence in 4 cases. Posteromedial release according to Turco (13 cases) led to a

good result in 9, a moderate result in 2, and recurrence in 2 cases.

Conclusion: Lengthening of the Achilles tendon proved to be insufficient in the treatment of congenital clubfoot; posteromedial release according to Turco led to good results in 9/13 cases.

Clinical genetic complications in dwarfism

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More than 50 intrinsic skeletal anomalies are known to give rise to dwarfism. A distinction can be made between proportionate and disproportionate dwarfism. Disproportionate dwarfism is nearly always based on skeletal dysplasia and is subdivided into short- trunk dwarfism, in which especially the vertebral column is affected, and short-limb dwarfism.

Although achondroplasia is still regarded as the classical example of short-limb dwarfism, at least 35 other forms are known. Short- limb dwarfism nearly always involves shortening of the ribs, and partly because of this about one third of these cases are incompatible with life: lethal dwarfism. In nearly all the cases of lethal dwarfism, hereditary transmission is autosomal recessive.

Nonlethal forms of short-limb dwarfism are likewise virtually always hereditary: viz., transmission autosomal recessive in about 50 per cent of the cases and dominant in the other 50 per cent. An exact diagnosis is therefore of eminent importance for proper genetic counselling. Possibilities of early prenatal diagnosis have been increasing. An exact diagnosis is also required for the proper management, treatment, and guidance of patients because many forms of short-limb dwarfism are associated with (sometimes serious) complications.

Orthopedic complications in dwarfism

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The relationship between various types of dwarfism and orthopedic complications is discussed with reference to 30 patients treated at Anna Hospital and Leiden University Hospital. These cases were classified on the basis of clinical and radiographic findings, such as achondroplastic, pseudoachondroplastic, hypochondroplastic, metatropic, or Morquio type.

Orthopedic complications are a) in the vertebral column: atlantoaxial instability, kyphosis, scoliosis, and stenosis of the vertebral canal; b) in the hip joint: coxa valga and coxa vara; c) in the knee joint: genu valgum and genu varum; and d) clubfoot.

Patients with dwarfism should be thus classified as early as possible. This facilitates identification of possible subsequent orthopedic complications and accordingly ensures effective orthopedic therapy.

Localized congenital deficiencies of the skeleton of the lower limb

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This study comprised 10 patients with longitudinal terminal anomalies of the knee and leg, classified in accordance with the "classification of congenital limb deficiencies" introduced by Frantz & O'Rahilly. The anomalies were paraxial hemimelia of the tibia (6 instances), paraxial hemimelia of the fibula (4 instances), polydactylism (3 instances), and aphalangia (1 instance).

In the absence of the proximal tibia, therapy consisted of knee reconstruction according to Brown. In the absence of the distal part of the tibia a proximal tibiofibular synostosis was performed. In 2 instances corrective osteotomy of the tibia was required in the absence of the fibula. Exarticulation according to Syme was resorted to in order to cope with an incorrigible abnormal position of the foot.

Therapy should aim at giving the child walking ability at a normal time. Exarticulation is to be preferred to amputation in the treatment of these patients.

Use of free vascularized grafts in reconstructing osseous defects of the limbs in children

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Four patients were treated by reconstruction with a free vascularized graft. Two showed congenital tibial pseudarthrosis, 1 had an adamantinoma of the tibia, and 1 displayed fibrous dysplasia of the proximal femur. In the latter case, the reconstruction was done with the aid of an iliac graft, whereas a fibular graft was use in the other 3 cases.

Reconstruction was successful in all the cases. Digital subtraction angiography revealed a well-functioning anastomosis in 3 of the 4 cases. All the grafts showed

consolidation on the recipient bed 3–6 months after the operation.

This method is to be preferred in reconstruction of large osseous defects of the limbs.

Congenital tibial pseudarthrosis: pathogenesis and therapeutic implications

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Congenital tibial pseudarthrosis has long been known as refractory to treatment. The condition arises from anterior or posterior bowing of the tibia, and the latter never leads to pseudarthrosis. A sclerotic, a cystic, and dysplastic type can be distinguished. Congenital tibial pseudarthrosis occurs in Recklinghausen's disease in 50 per cent of the cases, but this does not imply a more unfavorable prognosis.

Histopathologically, the condition involves aggressive fibromatosis enveloping the bone like a tumor, entering the cortex and affecting the quality of the bone. Within this fibrotic envelope, there are no blood vessels and there is a preponderance of osteoclasts; bone destruction is therefore inevitable. Together, these factors reduce the physical properties of the originally straight bone. In response to muscle forces and gravity the bone bends, breaks, and forms a pseudarthrosis. All the surgical procedures in the past aimed at inserting nonviable corticocancellous bone within the fibrotic envelope, and were bound to fail.

The use of free vascularized fibular graft in a new method of treating congenital tibial pseudarthrosis

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A free vascularized fibular shaft was used in 4 patients with congenital tibial pseudarthrosis. The follow-up averaged 2 (1–4) years. Rapid consolidation with hypertrophy of the graft was observed in 3 patients. In the fourth, this was delayed due to an infection.

Malalignment is a problem; 3 of the 4 patients show a valgus position of the tibia. The results suggest, however, that a cure can be achieved by excision of the pseudarthrosis with the fibrotic envelope and reconstruction with the aid of a vascularized fibular graft.

Infantile coxitis and its sequelae

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Septic coxitis is an easily misunderstood condition that, if not diagnosed in time, causes severe damage to the hip joint that may disable the patient for life.

Eighteen patients who developed coxitis within the first year of life were followed up after 2–25 years. In most cases the coxitis developed hematogenously, but in a few cases it arose in continuity from an osteomyelitis focus.

No correlation was demonstrable between severity of lesion and primary focus, pathogen, or age in months, but the interval between onset of symptoms and adequate surgical and antibiotic therapy proved decisive. A 3-day period was found to be the critical limit.

A study of sequelae revealed relatively frequently subluxation with a change of shape of the proximal femoral end.

In this series, early treatment again proved to be essential. Surgical treatment of sequelae is "salvage surgery."

Ultrasonographic diagnosis of coxitis fugax

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Ultrasonography of the hips has been performed routinely since 1982 in all cases clinically suspected of coxitis fugax. This study comprised 40 children aged 4–8 years. Longitudinal and transverse sections of both hips were examined. Mild to moderate accumulation of fluid in the synovial space was found in all the cases. Reexamination after 14 days revealed that the fluid accumulation had disappeared. In order to exclude incipient Perthes' disease, reexamination after 14 days is indicated in all the cases regardless of complaints and clinical symptoms.

Nuclear magnetic resonance imaging in Perthes' disease

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Nuclear magnetic resonance imaging (NMRI) is a nonionizing method of investigation that makes it poss-

ible to depict any plane desired without changing the patient's position. In order to evaluate this method in Perthes' disease, a pilot study of 8 children with this condition was performed. The NMRI findings were compared with those in children with normal hips. We used an 0.5 T superconducting Philips Gyroscan. T_1-dominated measurements (TR = 550 ms, TE = 30 ms) and T_2-dominated measurements (TR = 1500 ms, TE = 30–100 ms) were performed. At T_1 measurements the necrotic bone gives a low and the bone marrow a high signal intensity. Consequently, optimal definition of necrotic bone can be achieved with the T_1-dominated technique. The coronal plane gives most information on the extent of the necrosis. Supplemental exposures in the transverse and the sagittal plane made three-dimensional imaging possible, and this may be valuable in preoperative planning. In the early diagnosis of osteonecrosis, NMRI is more sensitive than conventional radiography and possibly also more sensitive than scintigraphy. T_2-dominated measurements depict early changes in a dappled pattern.

NMRI can probably give more information on pathologic processes, particularly in early stages. New techniques (chemical shift and fat-field echo) are being developed. Galolinium-DTPA can be used as intravenous contrast medium in combination with fast-field echo to detect perfusion disorders.

Femoral osteotomy in the treatment of Perthes' disease

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Ninety varus osteotomies were performed on 87 children with Perthes' disease at 6 different centers. The follow-up period was 5 (2–10) years. All the hips were grade 3 or 4, and 75 were "at risk." Results were evaluated radiographically applying criteria based on sphericity, containment, and epiphyseal-height loss, 19 measuring methods being used.

Results were good in 63 hips (70%), moderate in 13 (14%), and poor in 14 (16%). Results exclusively on the basis of sphericity were good in 81, moderate in 8, and poor in 11 per cent. In the group with poor results, age at onset averaged 7 years and age at operation averaged 8 years (interval 12 months). Eighteen of the 27 hips with poor or moderate results showed less than 20° varus deviation at operation, and 11 of these had no optimal postoperative containment. Twenty-nine hips developed lateralization during conservative treatment (more than 3 months) with only traction (11), traction followed by the use of a relieving brace (8), containment cast (8), or containment brace (2). Conservative measures thus failed to maintain containment. Of the 29 hips subsequently treated by operation, 7 showed a poor result and 7 a moderate result.

Four factors seem to be important as determinants of a poor result: 1) age at onset of symptoms (mean age 7 years), 2) degree of varus deviation (less than 20°), 3) interval between onset of symptoms and operation, and 4) preceding conservative treatment.

Oblique intertrochanteric osteotomy in the treatment of physiolysis of the femoral head

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An oblique intertrochanteric osteotomy in a single plane was designed for correction in all planes of the deformity resulting from severe slipping of the femoral head with, if necessary, lengthening (or shortening) of the femur. The initial plane of this osteotomy extends anteroposteriorly in a distal direction at an angle of 45° and lateromedially in a proximal direction at an angle of 45°, giving a cut surface in line with the axis of the femoral neck. After internal rotation of the distal fragment, the correction in the femoral neck in all the planes equals the number of degrees of rotation. During this combined movement, the femoral neck rotates on the original axis and consequently the dorsally subsided femoral head is rotated back onto the neck.

The advantages of this osteotomy are peroperative assessability of the correction without need for correction of the osteotomy planes; large area of contact between the osteotomy planes; no shortening; and possibility of length correction.

Preliminary experience with the "Orthofix" in leg-lengthening procedures

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Bastiani's method of metaphyseal limb lengthening by means of continuous callus distraction and secondary dynamic axial compression by unilateral external pin fixation with the "Orthofix" has been employed in The Netherlands during the past 2 years. We report preliminary findings in 16 leg-lengthening procedures thus carried out.

The results were evaluated retrospectively after a follow-up period of 6–24 months. The 16 operation were

performed on 12 patients. The femur was lengthened in 10 and the tibia in 6 cases. Length gain ranged from 22 mm to 80 mm, and the Orthofix remained in situ during an average of 4.5 months.

The reported complications were axis deviations (in 4 cases, necessitating subsequent internal pin fixation in 1 case), transient pin-tract infections (2 cases), transient limitations of knee function, hypesthesia of the foot sole (1 case), and stress fractures following removal of the Orthofix (2 cases).

The advantages of this technique in comparison with conventional leg-lengthening procedures are as follows: only one operation is required, cancellous bone grafts are superfluous, and the hospital stay is short. However, it is important to meet the following requirements: The osteotomy in the femur and tibia should be localized in the proximal metaphysis. Distraction should not be started until callus formation is visible.

Preliminary evaluation of Wagner's leg-lengthening procedure in young children

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Leg lengthening is a stressful procedure, particularly in young children. Longitudinal growth data are indispensable for determination of indications and for planning, and continual evaluation of preliminary results is likewise necessary. Since 1974, a leg-lengthening procedure has been started in 15 children aged 10 years or younger. All the cases involved a marked leg-length difference, usually congenital, with a predicted ultimate difference of 7.5–25 cm. The purpose of treatment was to achieve a readily weight-bearing, orthosis-free leg. This requires more than one procedure, and possible subsequent combination with physiodesis or a shortening osteotomy.

We employed Wagner's technique with a diaphyseal osteotomy. After 2–3 weeks, gradual distraction was started, with exercise therapy to prevent contractures. Spontaneous consolidation of the lengthening defect was relatively rare in these patients. Most patients required an autologous cancellous bone graft with plate osteosynthesis.

Complete weight bearing without aids was possible after an average of 6 months. Problems encountered were plate fistula in 3 cases (cured after removal of the plate) and knee-flexion contracture in 1 case (release). Plate fractures and shaft fractures following removal of the plate occurred only after use of an insufficiently large bone graft and premature plate removal. The most important complication was hip dislocation in 1 case (with ankylosis after reduction).

A final result (readily weight-bearing orthosis-free leg of virtually normal length) has meanwhile been obtained in 4 cases. Preliminary evaluation indicates the following advantages of an early start of a leg-lengthening procedure: marked differences can be effaced, associated deformities can be treated simultaneously, an orthosis becomes superfluous at an early stage, and sometimes growth stimulus is observed.

Results obtained with Phemister's physiodesis in the treatment of leg-length differences

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During the period 1971–1983, 55 patients with leg-length differences were treated by Phemister's physiodesis of the distal femur and/or proximal tibia. The principal causes of leg-length differences included hypoplasia/hyperplasia of one limb, fractures, and vascular malformation. Physiodesis was timed according to Anderson & Green, with at least two radiographic leg-length measurements and determinations of skeletal age. All the patients were followed until skeletal growth was complete. The mean preoperative leg-length difference was 3.2 cm.

Results: One patient needed rephysiodesis in view of imminent valgus deformity. No other complications developed. The mean anisomelia upon completion of skeletal growth was 1.2 cm. Residual anisomelia in 46 patients was less than 1.5 cm; in 9 patients it exceeded 1.5 cm and was recorded as an insufficient result. Insufficient correction could be explained by two factors: 1) nonoptimal planning and calculation (7 patients); 2) insufficient correction of growth by the shorter leg (2 patients):

Conclusion: Phemister's physiodesis is a safe, reliable procedure in the treatment of leg-length differences, provided calculations meet high requirements. At least two preoperative leg- length measurements are required for this purpose.

Spondylodiscitis: A follow-up on 33 patients after 17 years

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Thirty-three patients (22 men and 11 women) were examined 17 years after a childhood diagnosis of spon-

dylodiscitis, in most cases lumbar. Sporadic complaints about the back had persisted in 14 and regular complaints in 6 cases. Unmistakable torsive scoliosis was found in three instances. Anteflexion was restricted in only 2 cases, whereas 14 patients showed restricted retroflexion.

The lateral radiograph revealed an effaced lordosis in 33 per cent of the cases; the AP projection showed a mild curvature in 36 per cent, with 3 cases with torsive scoliosis and a Cobb angle up to 20°. It was found that the earlier diagnosis of spondylodiscitis had been erroneous in 3 patients with Scheuermann's disease.

The apparent restoration of the intervertebral disc in childhood had led to complete fusion in 90 per cent of the cases, giving rise to the features of L5 sacralization. In 19 patients the fusion had led to stenosis of the vertebral canal (10–70%) at the site of the previous disc. In 1 of these cases a laminectomy was performed with a good result. Three patients showed spondylolysis/spondylolisthesis at L5-S1.

Apart from prolonged follow-ups, patients with childhood spondylodiscitis require advice on sports and occupational activities from the orthopedic surgeon.

Osseous lesions resulting from congenital syphilis

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Congenital syphilis is still being diagnosed, as demonstrated by the history of a boy aged 2 months, who was admitted with a painful swollen wrist. The mother was known to have shown positive syphilis tests during pregnancy, but had not been treated. The neonate had shown diminishing syphilis titers.

Radiographs disclosed multiple osseous lesions of the right wrist and the proximal part of the left tibia on the medial side (Wimberger's sign). Syphilis titers were increasing. Congenital syphilis was diagnosed and penicillin medication was started. The osseous lesions disappeared within a few months.

The revascularized fibular graft and its indications

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The disadvantages of conventional bone grafts can be overcome by revascularizing the graft with the aid of microanastomoses. Segments of the rib, fibula, iliac crest, and scapula can be used for this purpose. For large defects of the long bones, the fibula is preferred. Most of the fibula can be isolated on a vascular pedicle through which both the medullary and the periosteal circulation is ensured.

Experimentally, osteocytes and osteoblasts survive transplantation and revascularization without any loss. The limited resistance of these cells to ischemia (3–7 hours) is to be taken into account.

Postoperative checkups of the graft vascularization during the first few days are of great importance. Thrombosis of one of the anastomoses calls for reexploration within 4–6 hours. Scintigraphy provides adequate information on the circulation. It is possible to to transplant a small skin islet (buoy flap) together with the bone graft. Through visual control or with a Laser Doppler flow meter, the vascularization of this skin flap can be assessed and thus, indirectly, the function of the anastomoses.

Orthopedic lesion or conversion?

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A common dilemma for the orthopedic surgeon is the following one: Is an organic lesion involved or is the complex of complaints and symptoms functional? In other words: Is there simulation or conversion?

Simulation is rare, especially in young children; but conversion is not. In the case of conversion a patient cannot cope with an unconscious psychological conflict in any way other than by developing physical complaints and symptoms by way of a compromise "solution." Typical features in such cases are the absence of objective physical lesions, bizarre symptoms, and sometimes an equivocal history. However, it is quite possible that severe secondary lesions develop, e.g., contractures, dystrophy, etc. The patient's mood is euphoric despite the often serious condition.

Surgical treatment in particular promotes fixation or displacement and only intensifies the dilemma.

Intensive cooperation with a children's psychiatric team is the only way to solve these problems. When the child (and the parents) prove to be unaccessible or hardly accessible to psychotherapy or when "medical shopping" behavior has developed, the chance of curing the conversion is small.