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EDITOR: A. ALHO

THE HISTORY OF TREATMENT OF CONGENITAL DISLOCATION OF THE HIP JOINT IN FINLAND

Fabian Langenskiöld Lecture

L. E. Laurent
Orthopaedic Hospital of the Invalid Foundation, Helsinki

THE ORGANIZATION OF CEREBRAL PALSY TREATMENT AND CEREBRAL PALSY ORTHOPAEDICS IN FINLAND

Seppo Autio
Children's Castle Hospital, Helsinki

Medical care in Finland is carried out at three levels: (1) the basic level (local health centres, etc.), (2) the intermediate level (central hospitals), (3) the highest level (university hospitals). The role of the local centres in the care of cerebral palsy (CP) patients concerns early diagnosis and supportive treatment at home. The role of the central hospitals involves more advanced follow-up and treatment on an outpatient basis. The university hospitals see to ward treatment (rehabilitation units) and special examinations and treatment, including orthopaedics. At present, there are rehabilitation units in Helsinki and Kuopio.

The consideration of an orthopaedic procedure involves several factors, such as, mental function, developmental stage, treatment of other disturbances (e.g., speech disorders), the nature and severity of the motor abnormality and, especially, adequate scope for preoperative and postoperative treatment. Because a competent team is required in such a consideration, and because a sufficient number of cases is needed to get adequate experience, it is suggested that operations be performed in two or three centres (Helsinki, Kuopio, Oulu). The operations should be performed by orthopaedic surgeons in centres with facilities for proper preoperative and postoperative treatment.

THE NEUROLOGICAL MECHANISM OF SPASTICITY

Seppo Autio
Children's Castle Hospital, Helsinki

CP syndromes can be classified as follows: *Spastic forms* (hemiplegia, "double" hemiplegia, tetraplegia or quadriplegia, and diplegia); *Extrapyramidal forms* (dyskinetic type, dystonic type, ataxia, and tremor); *Mixed forms* (primarily spastic and primarily extrapyramidal).

Orthopaedic treatment is mainly indicated in the spastic forms, which make up 60–80 per cent of all CP syndromes.

The basis of spasticity is a UMN lesion leading to a disturbance in the inhibitory and facilitatory system which normally regulates the muscular tonus via the α and γ neurone system at the muscular-spinal level. This disturbance is followed by a muscular imbalance. In the lower limb the spasticity is manifested in the extensor muscles, the plantar flexors of the ankle and toes being physiologically extensors, and in the adductors of the hip. In the upper limb the spasticity appears in the adductors of the shoulder, the flexors of the elbow, wrist and fingers, and the pronators of the forearm. From the orthopaedic point of view it is important to keep in mind that one cannot essentially change the basic disturbance by a peripheral operation. However, one can improve the motor function of a limb by changing the muscular imbalance and by making more normal patterns of movement possible.

THE SCOPE OF PHYSIOTHERAPY IN THE TREATMENT OF CP

Castor Lindqvist
Orthopaedic Hospital of the Invalid Foundation, Helsinki

When brain damage is diagnosed or even strongly suspected in a newborn or older child

physiotherapy has to be kept in mind as the most essential long-term treatment. Its aim is to stimulate the child to move and play, at the same time preventing as much as possible, the development of wrong moving habits. At school age emphasis is laid upon training of more demanding motor skills. Well planned and executed training also provides a basis for evaluation for other types of therapy, use of appliances and surgery.

THE PLANNING OF OPERATIVE PROCEDURES IN CEREBRAL PALSY

S. Ryöppy
Surgical Department, Children's Hospital, University of Helsinki

To achieve satisfactory results it is important for the orthopaedic surgeon to be able to work in a team consisting of paediatricians, neurologists, psychologists, physiotherapists, occupational therapists, etc. He must also have knowledge of the different types of CP. Operative treatment must be adapted to fit the integrated and comprehensive rehabilitation plan. Physiotherapy and the operative procedures have the same basic goals: to prevent and correct deformity, and gain optimum function. The planning of operative procedures is best based on careful, detailed serial evaluations, documented as a motion picture. Information to the parents on the chances of improvement and on preoperative and postoperative care should preferably be given by the surgeon. The parents should understand the limitations of the operative procedures and the surgeon should understand that a positive and cooperative attitude on the part of the parents is extremely important, especially during the postoperative period, which is often long and emotionally difficult for the patient.

Operative procedures are seldom indicated under the age of 4 years except when there are signs of subluxation of the hip. The correction of several problems at the same stage may cause unexpected effects. In bilateral problems the same functional entity is corrected simultaneously. Postoperative physiotherapy must be continued until the patient has attained the new mode of function.

SURGERY IN THE SPASTIC UPPER EXTREMITY

Kauko A. Solonen
Orthopaedic Hospital of the Invalid Foundation, Helsinki

A survey was given of the requirements in preoperative evaluation and selection of patients with cerebral palsy involvement of the upper extremity. Certain surgical procedures which may be useful in selected deformities related to muscle imbalance, contracture, spasticity, and joint instability were described.

SURGICAL TREATMENT OF THE LOWER LIMB IN SPASTIC CHILDREN

Kalevi Österman
Orthopaedic Hospital of the Invalid Foundation, Helsinki

In 1959–76 a total of 347 spastic children were treated surgically. The clinical diagnoses were as follows: monoplegia 7, diplegia 116, triplegia 10, tetraplegia 81 and hemiplegia 133 patients.

Equinus deformity of the ankle combined with varus or valgus deformity of the foot was treated by means of tendo Achillis lengthening, neurotomy or a Silverskiöld operation. Lengthening or tenotomy of the posterior tibial tendon or toe flexors was included in cases of varus deformity. Transfer of the tibialis anterior tendon or toe extensor tendon was needed in some cases. Grice arthrodesis or peroneal tendon transfer or tenotomy was performed in cases where correction of valgus deformity was required.

The spastic flexion deformity of the knee was usually corrected by Egger's procedure and extension contracture by releasing the rectus insertion. Adduction contracture was treated by adductor myotomy or by total or anterior resection of the obturator nerve. Internal rotation was corrected by using gluteus myotomy or femoral osteotomy. In secondary or functional knee flexion deformity the treatment was directed towards relieving hip contracture.

Several operations over a long period were performed in many cases. Functional results were better in hemiplegics than in other groups. Usually no surgical correction of deformities was needed before the age of 4 but it was started if fixed and progressive deformities prevented the child from using the limbs.

EARLY DETECTION AND TREATMENT OF CONGENITAL DISLOCATION OF THE HIP

S. Ryöppy
Surgical Department, Children's Hospital, University of Helsinki

Since v. Rosen's finding (1958) that CDH could usually be prevented by early treatment, the difficulty has lain in the creation of an effective system for the detection of CDH.

The effectiveness of the early diagnosis of CDH in the Helsinki area, during the years 1966–75,

was investigated by analyzing all cases diagnosed later than 1 month after birth. Among 152,800 live births the incidence of instability of the hip was 10 per thousand. The diagnosis was made too late in 91 cases, corresponding to 0.6 per thousand live births, with an annual variation between 0.35 and 0.84 per thousand. During the 10-year period there was no statistical decrease in cases diagnosed late. If it is assumed that 80 per cent of instable hips become stable spontaneously, there would have been about 300 cases of luxated hip which did not receive early treatment. Thus, in spite of this positive development the present level of early detection of hip instability cannot be considered satisfactory.

The reasons for delay in the diagnosis were analyzed. Diagnostic insufficiency was seen at all levels. This means that more effective information and education are needed. On the basis of the results, recommendations were formulated for the medical personnel responsible for the early detection of hip instability.

PES PLANOVALGUS

Veijo Vahvanen
Aurora Hospital, Helsinki

Without structural changes, this deformity can be expressed as physiological or developmental. According to Morley the frequency decreases from 97 per cent in children under 18 months to 4 per cent in children aged 10–11 years. Footprint and photographing techniques are used to document the changes in deformity.

In differential diagnosis the following diseases or anomalies should be checked for: pes calcaneovalgus congenitus, congenital tightness of the Achilles tendon, pes valgus convex congenitus, cerebral palsy, meningomyelocele, polio, rheumatoid arthritis, and anomalies of the tarsal bones such as partial fusions.

The mobile physiological planovalgus deformity in most cases heals spontaneously. If, however, the depression of the talus is severe and the heel is in a marked valgus position, in children over 2 years of age, well moulded shoes or supports are used. A deformity with structural changes may sometimes need operative treatment. Severe flat feet may be operated on at the age of 5–8 years using the method of Grice or Batchelor. In untreated and severe cases of flat feet a triple arthrodesis may be performed after the age of 12 years.

TREATMENT OF OSTEOCHONDRITIS DISSECANS

Kalevi Österman
Orthopaedic Hospital of the Invalid Foundation, Helsinki

Twenty patients were treated by fixation of the osteochondral fragment to its bed using cortical bone pegs. In every case the fragment, consisting of the weight-bearing surface of the joint, was large. In three patients the fragment had been loose in the joint. The operation was performed at the age of 20 years and the follow-up time was 4 years on average. The longest observation time has been 16 years. In every case the fragment healed to its bed and in only one case was reoperation necessary. Eighteen patients walked without a limp and the joint was stable in 19 cases. The clinical result was excellent or good in 73 per cent. The results in cases with a long observation time suggest that this method can prevent secondary osteoarthritis. This operative method is recommended in cases where the fragment is large and consists of the weight-bearing surface of the joint.

ACUTE HAEMATOGENOUS OSTEOMYELITIS AND ARTHRITIS

Sakari Einola
Surgical Department, University of Turku

Staphylococcus aureus was encountered in 70 per cent of a total of 44 cases, while the other infections were caused by alpha and beta haemolytic streptococci, Diplococcus pneumoniae, Haemophilus influenzae, Klebsiella, Aerobacter or Proteus mirabilis. Nine cultures were negative. Specimens for Gram staining, pus and blood cultures were taken before any therapeutic regimen was initiated. Two of the staphylococcus cultures were sensitive to G-penicillin and all other strains to meticillin. Cloxacillin, G-penicillin and erythromycin were the main antibiotics in coccal infections. In gram-negative infections gentamycin and cephalosporines were usually employed, the therapy being chosen according to the antibiogram.

Treatment was given parenterally for a period of 1 to 3 weeks and continued orally for up to 3–4 months, sometimes even to 8 months. In 40 cases surgical intervention was undertaken, in 30 cases combined with local antibiotic lavage. Appreciable sequelae were observed in five cases. Infants under the age of 18 months, with a pre-treatment time lag exceeding 3 days, were most prone to suffer irreparable lesions.

It is concluded that surgical therapy is indicated in all cases in which abscess formation or intra-articular pus is observed. Moreover, surgery is needed in cases where the time lag exceeds 3 days and in cases where intensive parenteral antibiotic therapy has produced no effect within the first 24 to 48 hours of treatment.

RADIOLOGY OF BENIGN BONE TUMOURS IN CHILDHOOD

E. Marttinen
Department of Radiology, Children's Hospital, University of Helsinki

Radiology is not always reliable in differentiating benign bone tumours, but it is an excellent screening method. Sometimes a biopsy is necessary in order to classify the tumour histologically.

An 8-year material of tumour X-rays was presented. Many of the diseases reviewed were not real neoplasms, but their radiological picture resembled that of true neoplasms. The following tumours and tumour-like conditions were presented: benign bone cyst, fibrous cortical defect (non-ossifying fibroma), fibrous dysplasia, aneurysmal bone cyst, exostosis, enchondroma and enchondromatosis, osteoid osteoma, histiocytosis X, haemangioma, lymphangiomatosis, neurofibromatosis, lipomatosis and epidermoidoma.