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TREATMENT OF CONGENITAL DISLOCATION OF THE HIP IN THE NEWBORN

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Ortolani, in 1937, was the first to describe how congenital dislocation of the hip (c.d.h.) could be diagnosed immediately after birth. Treatment of this condition during the neonatal period, described by v. Rosen (1957), was short-lasting, could be carried out on an outpatient basis, and revolutionized the prognosis. Nevertheless, far from all patients with c.d.h. receive early treatment, even to-day (Tönnis & Kuhlmann 1969).

The present study was designed to investigate for a given period:

(1) whether all newborns in a given area (the county of Funen) have been examined for c.d.h.,
(2) whether all patients suspected of c.d.h. have been referred to the Department of Orthopaedic Surgery in Odense,
(3) whether all cases requiring treatment have been found in the Department, and
(4) what the therapeutic results have been.

MATERIAL

A. *Patients Referred Early*

In 1962 the first newborn infants were referred to the Department of Orthopaedic Surgery, Odense, because of a suspicion of c.d.h. From Jan. 1, 1962, to Dec. 31, 1968, a total of 274 infants were referred within the first 2 weeks of life and another 38 in the age range 2 weeks – 6 months.

Out of these 312 infants 54 per cent were referred from the Obstetrical Department of the Odense Hospital, 36 per cent from non-obstetrical hospital departments or private maternity clinics, and 10 per cent from general practitioners after birth at home.

The examination was in most cases done in the Orthopaedic Depart-

Table 1. Age distribution and side affected.

Boys	Girls	Right	Left	Bilateral
28 *(25 %)*	85 *(75 %)*	28 *(25 %)*	50 *(44 %)*	35 *(31 %)*
113			113	

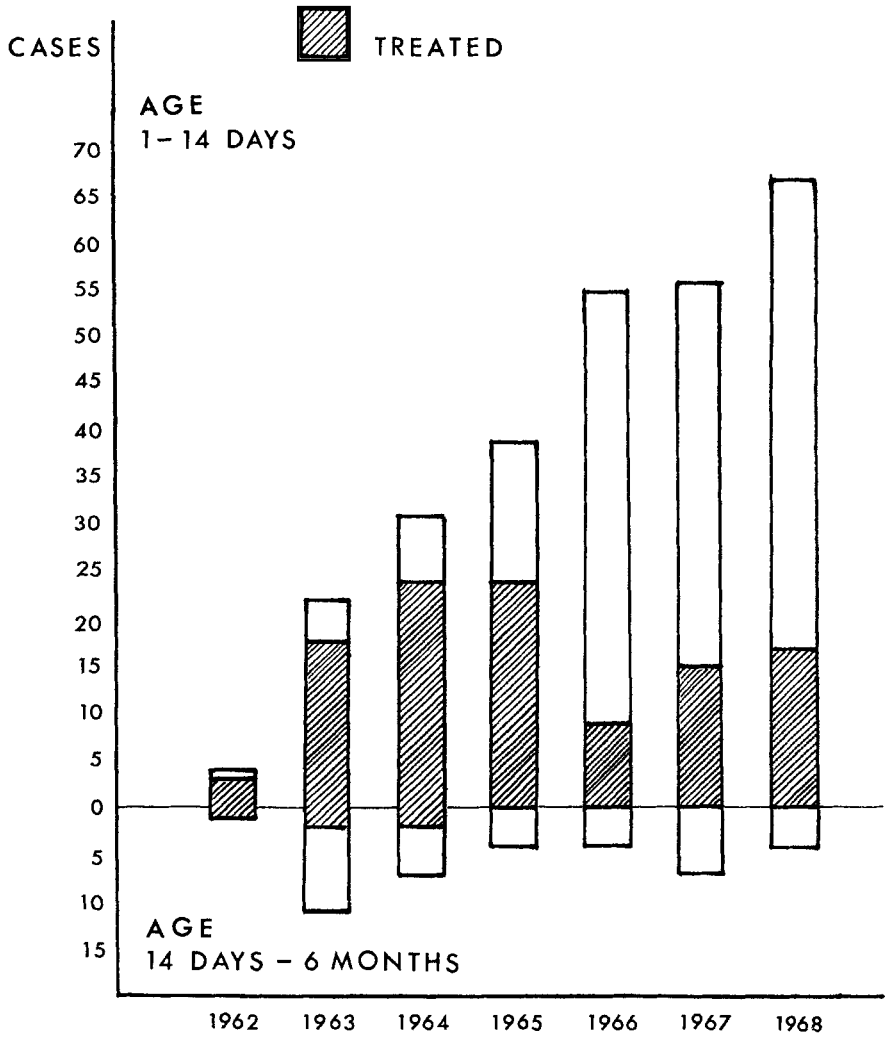

Figure 1. Treated patients in relation to referred patients.

ment within the first week of life. The methods of examination were those described by Ortolani (1948) and Barlow (1962). Great stress was laid on having the infants quiet and relaxed at the examination.

Indication for treatment was found in 113 of the 312 patients. The criteria were as follows: (1) if the hip joint was dislocated with a typical reduction phenomenon, (2) if the hip joint was dislocatable, or (3) if it felt so lax that it was considered subluxatable.

Table 1 gives the distribution by sex and side affected.

The number of treated patients in relation to those referred during each year is listed in Figure 1, which shows that the number of referred patients has increased year by year, whereas that of treated patients, after increasing for a period, fell to a fairly constant level. Only a few infants have been referred between the age of 2 weeks and 6 months, and from 1965 none of them was in need of treatment.

Therapeutic Method

All the patients were treated on an out-patient basis. During the first 3 years of the period the hips were fixed in a Barlow splint after reduction, and as a rule the splintage lasted for 4–6 months. In 1965 a fixed therapeutic regimen was decided upon: As soon as the cord had been shed, on the 4th–5th day, the hip is reduced and fixed in

Figure 2. A newborn with a felt-padded plaster cast in Lorenz' first position ("frog leg" position).

Lorenz' first position, also called the "frog leg" position, in a felt-padded plaster cast (Figure 2). During the application of the cast the hips are held by one of the orthopaedic surgeons. When the plaster gets too tight, about every 3–5 weeks, it is changed, maintaining the position. The cast is worn for 3 months. At the age of 6 months the infant is seen again. If clinical examination at that time does not afford sufficient certainty of a correct position, an X-ray check is done. When the baby can walk, at the age of 12–16 months, it is seen again, and at this follow-up visit all the patients are X-rayed. If the X-rays do not show entirely normal appearances, the patient is seen once or twice a year until the findings are normal.

RESULTS

Out of the 113 infants with 148 hips treated, 96 – with 131 hips – (89%) were clinically and radiologically normal at the age of 1 year. Four infants, with 4 treated hips, had left the area and were not seen. Out of the remaining 13 hips, 4 exhibited slight subluxation. In 2 of these latter cases there was hypoplasia of the epiphysis. All 4 have later become normal without further treatment. In another 8 hips the epiphysis showed hypoplasia or structural changes. Four of these hips have later become normal, whereas 2 are still being checked. The last 2 hips had developed such severe structural changes of the epiphysis that the patients had to be treated by non-weight-bearing in a wheel chair because of avascular necrosis. One has later healed with a perfect result, while the other one is still on out-patient non-weight-bearing treatment. The last one of the 13 hips we consider the only one in which the primary treatment failed and which required further treatment of the dislocation. At the age of 3 days this patient was treated for bilateral dislocation by the application of a Barlow splint. After 9 months' treatment one hip was still clinically dislocated, and this was confirmed by arthrography. The hip was reduced, and the patient was treated in an abduction splint for another 14 months. The hip has remained *in situ,* but there is considerable coxa vara with severe structural changes in the epiphysis.

Of the newborns referred to the Orthopaedic Department, but not treated, none has later presented with dislocation. As our Department is the only one in the area that treats congenital dislocation of the hip, it must be presumed that no patient with c.d.h. has escaped treatment.

B. *Patients Referred Late*

Three boys and 10 girls, born during the period 1962–1968, have been referred with c.d.h. detected after the neonatal period. In 4 the dislocation was bilateral, making a total of 17 dislocated hips. Two of the patients had been born in an obstetrical department, 7 in other hospital departments, and 4 at home. We have not had occasion to check whether the infants born at home had been examined at birth, but in the remaining 9 cases it is apparent from the case records that 7 had had the Ortolani test, but were passed as normal. In other words, the technique of the examination must have been incorrect. The remaining 2 have apparently not had the test. One had hydrocephalus, and the other one was premature, weighing 1500 g, and was placed in an incubator immediately after birth.

The majority of these 13 children were referred to the Department of Orthopaedic Surgery at the age of 1–2 years. Two had severe paraparesis due to myelomeningocele; in one of them the dislocation was bilateral. No attempt was made to treat these 3 dislocated hips. Moreover, the parents of a 2-year-old patient with bilateral c.d.h. did not want to have the child treated. All the other 12 dislocated hips were treated by reduction, closed in 6 and operative in 6. Later, derotation osteotomy was done on 5 hips, 4 of which had primarily had operative reduction, and a Salter pelvic osteotomy on 3 hips, all of which had had primary operative reduction.

The result, after a follow-up period of 1–6 years, is so far good in 9 hips, whereas the remaining 3 hips are dysplastic, subluxated, and one shows avascular necrosis.

DISCUSSION

By far the most important factor is relevant testing of all newborns for c.d.h., the aim being to treat all patients with c.d.h. already a few days after birth. On the other hand, over-treatment should not be performed unnecessarily. Andrén & v. Rosen (1958) have demonstrated that 1 in 1,000 newborns will show radiologically demonstrable dislocation of the hip. However, we share the view of most other authors that X-ray examination is far too uncertain a selection criterion, and from 1964 we have not used X-rays for this purpose, but selected the cases exclusively on the basis of clinical findings.

However, it may be difficult to make this diagnosis and thereby obtain a reasonable incidence of treatment. During the period 1963–65

Table 2. Congenital dislocation of the hip in relation to place of birth. The figures in parentheses indicate the numbers per 1,000.

Place of birth	No. of liveborns	Referred early	Treated early	Detected late
Obstetrical dept.	9,792	170 *(17.4)*	65 *(6.6)*	2 *(0.2)*
Other hospital dept. or priv. maternity clin.	26,578	111 *(4.2)*	45 *(1.7)*	7 *(0.3)*
Born at home	12,464	31 *(2.5)*	3 *(0.2)*	4 *(0.3)*
Total	48,834	312 *(6.4)*	113 *(2.3)*	13 *(0.3)*

we over-treated, as a number of infants with the so-called "ligamentous click" were treated. Like Parkkulainen (1959) we later found that these hips do not require treatment (Sommer 1971).

The reported incidence of treatment has varied within wide limits. According to v. Rosen (1968) the incidence in his area increased during the period 1956–65 from 1.3 to 12.9 in 1,000. Even higher values have been reported by Hiertonn & James (1968), viz. 19 in 1,000, and by Dördelmann & Stuckenson (1969), viz. 36.5 in 1,000. Finlay et al. (1967) have set up a good grouping of the hips of neonates. They found 4 in 1,000 to have dislocated or dislocatable hip joints, and these patients then make up the groups that require treatment. This incidence accords approximately with the number that Emnéus (1968) and Smaill (1968) have found to have a positive Ortolani sign and therefore appears reasonable.

During the 7-year period 1962–1968 a total of 48,834 live infants were born in our area (the county of Funen). A treatment incidence of 4 in 1,000 corresponds to about 28 patients requiring treatment *per annum*. 113 patients treated in the neonatal period corresponds to an incidence of only 2.3 in 1,000. However, the distribution of referred, and thereby of treated patients differs a great deal by place of birth. From Table 2 it is apparent that only infants born in an obstetrical department have been referred and treated in a suitable number of cases. The great majority of the 31 infants born at home were not referred until they were between 2 weeks and 6 months of age, and this indicates that the examination for c.d.h. has not been performed at birth.

Thus, our treatment incidence of only 2.3 in 1,000 is due to failure of referring infants not born in an obstetrical department.

As stated by Jansen & Reimann (1970), treatment by splintage does not guarantee a reduced hip at the end of 3 months. The same is suggested by our one unsuccessful fixation in a splint. Weissmann (1966) found that 50 per cent of the hips were still dislocated after 3 months' treatment when the splint was removed and the hips examined weekly for a tendency to dislocation. This shows how important it is to keep the hip joints securely reduced throughout the treatment period. This security is afforded by fixation in a plaster cast, as also described by Gregersen (1969). All our 64 hips treated in plaster were firmly reduced at the end of 3 months.

Nine good results out of the 12 dislocations receiving late treatment is an acceptable result, and the 2 early and 1 late case developing epiphyseal necrosis which has required non-weight-bearing constitute a low rate of this complication compared with that reported by others (Massie 1961, Dooley 1963, Limbers 1965), viz. between 16 and 50 per cent after late treatment of congenital dislocation of the hip.

CONCLUSION

It is still necessary to make propaganda for examining all newborns for congenital dislocation of the hip and to make sure that all midwives and doctors assisting at childbirths are skilled in this technique, so that patients suspected of the condition may be examined in an orthopaedic department during the first week of life. Early reduction and fixation in plaster in Lorenz' first position ("frog leg" position) for 3 months is a reliable treatment which may be recommended, as it has not been followed by re-dislocations.

SUMMARY

During the 7-year period 1962–1968, a total of 312 infants were referred to the Department of Orthopaedic Surgery, Odense, because of a suspicion of congenital dislocation of the hip, 274 of them within the first 2 weeks of life, and the remainder within the first 6 months. In 113 treatment was found to be indicated because of a positive Ortolani sign or laxity of the hip in Barlow's test. The treatment consisted in most cases in primary fixation in a felt-padded plaster cast in the "frog leg" position (Lorenz 1) for 3 months. Thereafter,

all the hips showed stable reduction. The only complication was avascular epiphyseal necrosis in 2 cases treated by non-weight-bearing. The total treatment incidence among neonates in the area was 2.3 in 1,000, whereas the distribution differed widely according to place of birth. A relevant referral and thereby treatment rate was only obtained among infants born in an obstetrical department. No dislocations were overlooked among the referred neonates. During the same period 13 infants born in the area had 17 dislocations diagnosed at a later age. In 6 the dislocations had not been diagnosed at birth, although the infants had been tested for it. The correct technique of the Ortolani test is presumably as yet too little known outside the specialized hospital departments. 12 of the 17 late cases were treated, 9 with a good result.

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