

INCIDENCE OF CONGENITAL DISLOCATION THE HIP IN SHIRAZ

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ABSTRACT

During an eight month prospective study, 8240 newborns were examined for detection of congenital dislocation of the hip from Oct. 23, 1991 to June 22, 1992.

On first examination we found 1302 neonates (158/1000 live births) to have abnormal hips; 1063 (81.6%) were prone to subluxation (subluxatable), 218 (16.81%) prone to dislocation (dislocatable), 17 (1.3%) were dislocated and 4 (0.3%) were teratologic.

The newborns with abnormal hips were followed in a neonatal OPD held for this purpose. After the sixth month of life 1272 (97.7%) of the neonatally unstable hips had resolved spontaneously, leaving 30 hips with true congenital dislocation (3.6/1000 live births).

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INTRODUCTION

Screening programs for congenital dislocation of the hip (CDH) arose from the discovery of simple clinical tests which, when applied to neonates, detected abnormalities which were thought to be precursors of later disease.^{1,4,6,12,22} Neonatal testing for CDH became widely adopted under the assumption that treatment beginning at this stage would produce a better functional outcome than could be achieved by diagnosis and treatment at a later stage.^{5,6,8,11,16,21,22}

Typical dislocation of the hip can be subdivided into three types; the dislocated hip, the dislocatable hip, and the subluxatable hip.^{3,5,6,9,11,14}

Teratologic dislocation of the hip is characterized by

association with other severe malformations (such as arthrogryposis, myelomeningocele, etc.). At birth the dislocation cannot be reduced by Ortolani's maneuver.^{2,8,10,12,15,17}

In the dislocated hip the femoral head is completely out of the acetabulum, riding superolaterally, but can be reduced by Ortolani's test at birth. In the dislocatable hip the femoral head is in the acetabulum but can be easily displaced out of it by Barlow's provocative test. The subluxatable hip is passively displaced partially out of the acetabulum.^{3,5,8,15,17,19,21}

Dysplasia is a pathological term encompassing abnormalities of the acetabulum, or femoral head and neck; it may be recognized radiologically in clinically apparently normal hips.^{4,5,12,15}

Diagnostic tests

The signs of CDH, and hence the methods of examination vary with the age of the patient and the severity of the

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condition.^{2,3,6,12,21}

In the early weeks of life usually the only abnormality present is hip instability which may be detected by Ortolani and Barlow's maneuvers. This method of examination is of particular value in the neonatal period up to the age of 3 months.^{2,3,6,12,17,19,20,22}

In examinations for CDH it is essential that the infant be undressed from the waist downwards. The examiner's hands should be warm, the examination gentle and the baby relaxed. The infant is placed supine on a firm examination table or mattress and should be quiet and not crying. Examine one hip at a time.^{3,8,17}

Ortolani's test is carried out with both knees nearly fully flexed and the hips nearly at right angles. The middle finger is placed over the greater trochanter and the thumb on the medial aspect of the thigh. Both thighs are carried into mid-abduction. Forward pressure behind the greater trochanter is exerted by the middle finger of one hand, while the other hand holds the opposite femur and pelvis stable.^{3,8,17,19,20}

If the femoral head is felt to slip forward into the acetabulum the hip has been dislocated. Barlow's test is carried out with the same basic grip on the legs, but the thigh is adducted about 15 degrees. Palm pressure is applied in posterior and lateral directions against the lesser trochanter by the thumb. If the femoral head is felt to slip out over the posterior lip of the acetabulum and back again after the pressure is released, the hip is dislocatable; if no movement is felt, the hip is stable. In the subluxatable hip the femoral head is not completely displaced out of the acetabulum.

In borderline cases it is best to position the tested hip in a more unstable position (greater adduction and less flexion) in order to ensure that the hip is not dislocatable.^{3,5,8,17,19,20}

Radiography

Radiographs are misleading in the newborn. They are often reported as being normal, while actually the hip is clinically abnormal. Thus the diagnosis of CDH is made clinically.^{3,7,8,10,11,16,20,21}

PATIENTS AND METHODS

A total number of 8240 newborns were examined at two university hospitals (Zinabieh and Hafez) and one public health maternity unit (Shooshtari) during an eight month period beginning on Oct. 23, 1991 and ending on June 22, 1992. Each newborn was examined by an orthopedic resident during the first twenty-four hours after birth. Each newborn suspected of having any abnormality in the hip by Ortolani and Barlow maneuvers was seen and examined by the senior consultant in the first CDH OPD in at most one week after the initial screening procedure.

Routine roentgenograms of newborns found to have abnormal hips were taken, but the diagnosis of those with

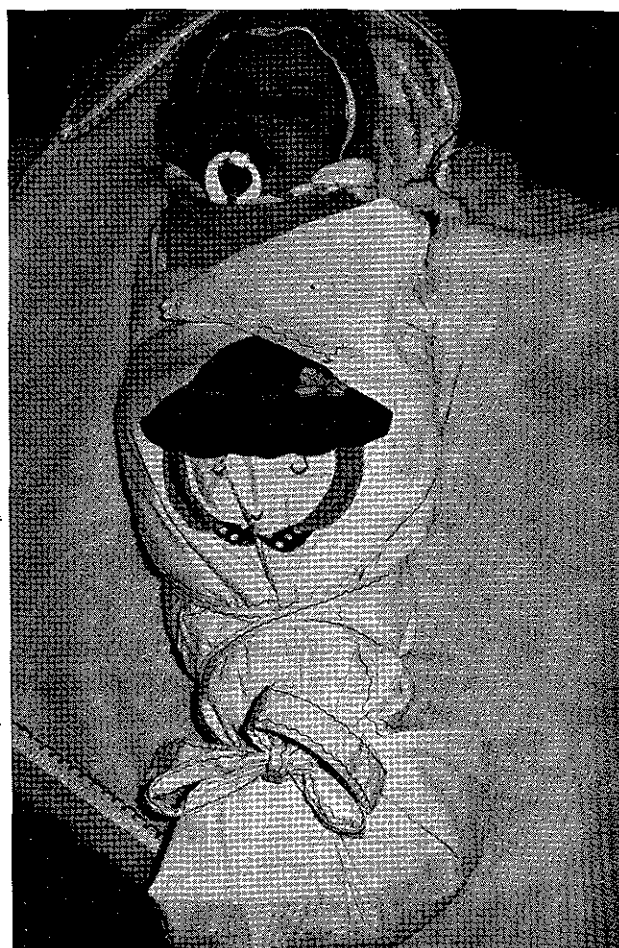


Fig. 1. Popular Iranian infant wrapping (ghondagh).

Table I. Definitions by which hip ratings were performed.

Subluxatable:	The femoral head can be passively displaced partially out of the acetabulum by Barlow's test.
Dislocatable:	The femoral head is in the acetabulum but can be displaced out of it by Barlow's test.
Dislocated hip:	The femoral head is completely out of the acetabulum and can be reduced by Ortolani's test.
Teratologic:	The femoral head is completely out of the acetabulum and cannot be reduced by Ortolani's test.

abnormal hips was based on the interpretation of clinical examinations using Barlow's and Ortolani's tests only.

For all newborns examined data were collected regarding the name of the mother, unit number, sex, weight, head circumference, length, ratio of upper to lower extremities, maternal history (including age, gravida, type of delivery).

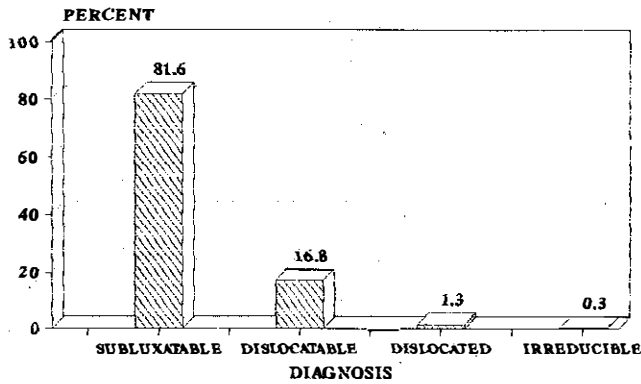
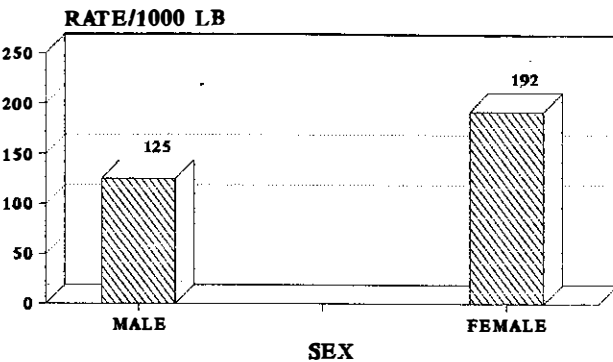
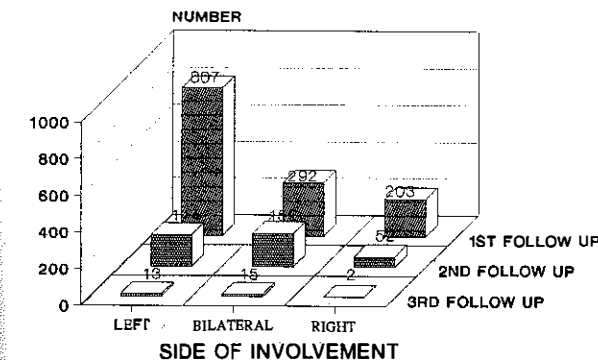


Fig. 2. Diagnosis made by clinical examination in 1302 newborns with CDH.



sex difference is statistically significant ($\chi^2 = 68.93$, $p < 0.0001$).

Fig. 3. Incidence rate of congenital dislocation of the hip according to sex distribution.



Difference among three levels of two variables is statistically significant ($\chi^2 = 78.5$, $p < 0.001$).

Fig. 4. Frequency of hip involvement by side in 1302 newborns with CDH.

and consanguinity), the presence or absence of CDH in the family, and the presence or absence of any other congenital abnormalities. Each hip was designated as stable (normal), subluxatable, dislocatable, dislocated or teratologic. Ratings were given for each hip as shown in Table I. Each newborn with an abnormal hip was again examined monthly.

Table II. Birth order and relative frequency of abnormal hips.

Birth order	No. affected	Relative frequency of CDH (%)
1	413	31.7
2	232	17.8
3	148	11.4
4	143	11
5	129	9.8
6	85	6.5
7	74	5.7
8+	78	6

The study also intended to find out the prevalence and association of CDH with Iranian traditional infant wrapping (ghondagh), a state in which the lower limbs remain in an extended and adducted position. Therefore, no suggestions were made regarding the type of clothing and no treatment was initiated for any newborn during the first three months of life (Fig. 1).

All patients with abnormal hips were examined monthly and if needed biweekly or weekly and data collected. However, for simplification, the measurements will be presented for only three examinations; the first examination, after 3 months and finally after 6 months.

RESULTS

During the study 8240 newborns were examined in the first day of life. There were 1302 abnormal hips: subluxatable hips, 1063 (81.6%); dislocatable hips, 218 (16.8%); dislocated hips, 17 (1.3%) and irreducible hips (teratologic), 4 (0.3%) (Fig. 2), in 518 males and 784 female newborns with an overall incidence of 158/1000 live births. The incidence was 125/1000 live births in the male and 192/1000 live births in the female newborns (Fig. 3).

The right hip was involved in 203 cases, the left hip in 807 cases and both hips in 292 cases ($P < 0.001$) in the first examination (Fig. 4). These figures dropped to fifty-two, 144 and 152 in the second follow-up, and to two, 13 and 15 in the final follow-up, respectively.

The methods of delivery of the affected newborns were as follows:

Normal vaginal delivery	1280	(98.3%)
Vaginal breech delivery	8	(0.6%)
Cesarean section for any reason	14	(1.1%)

The birth order of the affected newborns was as shown in Table II and Fig. 5.

The overall incidence of abnormal hips according to the mother's age was analysed. The highest rate was found in those less than twenty years old (167.8/1000) and the lowest among those more than forty years old (152/1000) (Fig. 6).

The incidence of CDH was also worked out statistically

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Table III. Associated musculoskeletal abnormalities in newborns with abnormal hips.

Type of Musculoskeletal Anomaly	no.
Calcaneovalgus	41
Clubfoot	4
Cerebral palsy	2
Arthrogryposis	2
Down's syndrome	6
Polydactyly	2
Torticollis	2

for variables such as weight (Fig. 7), height (Fig. 8) and head circumference (Fig. 9).

The upper and lower extremity heights were also measured for all the newborns and their ratios depicted as 1, less than 1 and more than 1. The incidence of CDH by the ratio of upper to lower extremities is shown in Fig. 10.

Associated musculoskeletal abnormalities in 1302 affected newborns are shown in Table III.

DISCUSSION

Clinical examination by a skilled examiner is a valuable method of diagnosis of CDH in newborns. X-rays cannot detect dislocatable hips and ultrasound has the potential for over-diagnosis.^{3,8,12,17,19,20}

The studies published have occasionally been performed by physiotherapists, nurses or pediatricians; an orthopedic surgeon is a more capable examiner for this study.^{3,8,12}

Much controversy surrounds the significance of simple clicks. Some authors regard it as normal while some found that 10% of children with clicks would ultimately have CDH.^{9,12,14}

We considered clicks to be a "pathologic finding" in hip joints and included those infants who had persistent clicks in our study.

The incidence of CDH is reported to be as low as 0.07/1000 by Von Rosen and as high as 188.5/1000 in Island Lake region (Manitoba, Canada). Different factors are reported to influence the incidence of CDH, mostly age of the infant at the time of the examination, genetic factors, type of delivery, sex of the newborn, birth order of the newborn and experience and training of the examiner.^{2,6,9,10,19,20}

Time of examination

Of the 1302 newborns with abnormal hips in the first examination, 348 were still abnormal after 3 months and only 30 were still affected in the final examination (Table IV). This indicates that 97.7% of abnormal hips underwent spontaneous resolution with no treatment. The pattern of resolutions are shown in Table V.

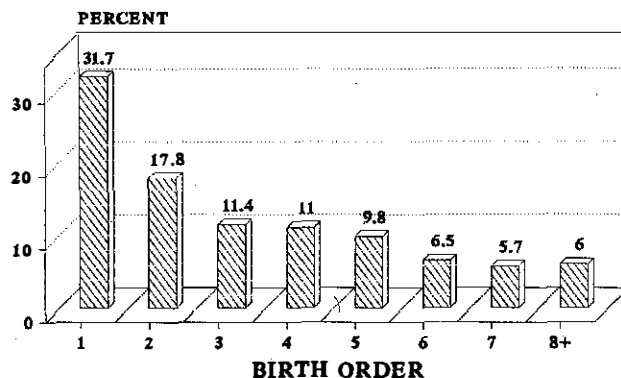
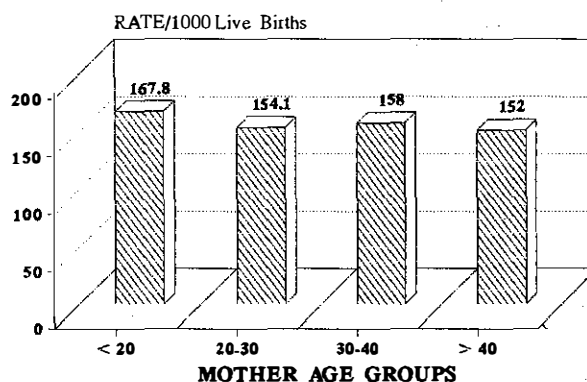
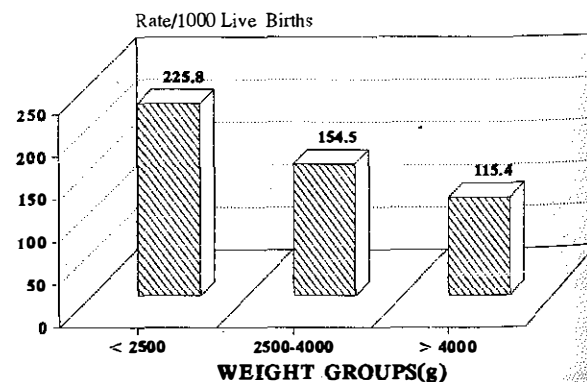


Fig. 5. Relative frequency of CDH according to birth order in 1302 newborns.



Differences are not statistically significant ($\chi^2 = 1.99$).

Fig. 6. Incidence rate of CDH by mother's age group in 8240 newborns.



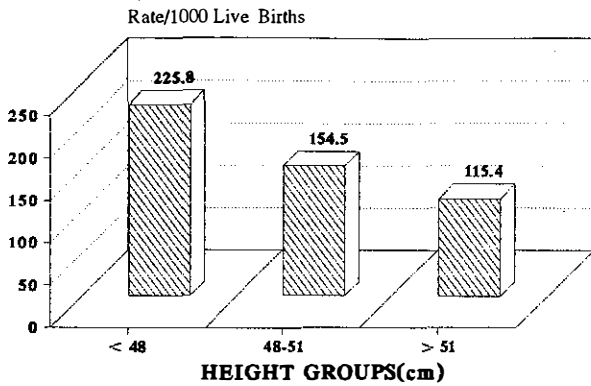
Differences are statistically significant ($\chi^2 = 24.82$, $p < 0.0001$).

Fig. 7. Incidence rate of CDH by weight group in 8240 newborns.

Sex of the newborn

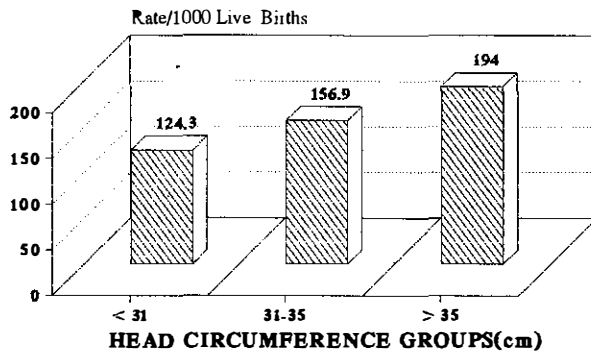
The female preponderance of unstable hips in newborns has been recognized by many observers.^{2,3,6,7,15,17,20}

This was also the case in our study, as there were 783 female newborns with abnormal hips as opposed to 519 male newborns.



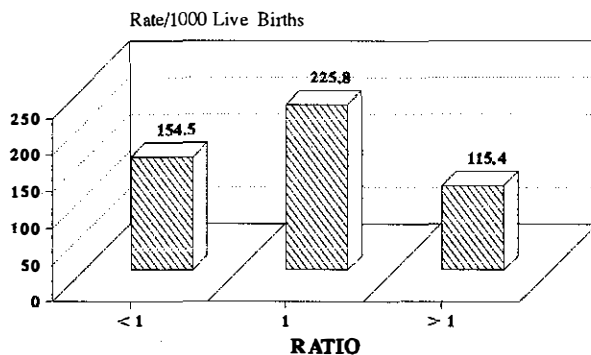
Differences are statistically significant ($\chi^2 = 8.16, p < 0.02$).

Fig. 8. Incidence rate of CDH by height group in 8240 newborns.



Differences are statistically significant ($\chi^2 = 6.43, p < 0.05$).

Fig. 9. Incidence rate of CDH by head circumference group in 8240 newborns.



Differences are statistically significant ($\chi^2 = 43.27, p < 0.000001$).

Fig. 10. Incidence rate of CDH by ratio of lower to upper extremities in 8240 newborns.

Type of delivery

The increased incidence of CDH in newborns with breech presentation and those delivered by cesarean section is well known.^{18,19} We too had a high incidence of abnormal hips in those born with breech delivery (275/1000) and those born by cesarean section (236/1000)

Table IV. Incidence of hip abnormalities concerning the time of examination.

Examination Condition	1st	2nd	3rd
Subluxatable	1014	241	2
Dislocatable	267	91	13
Dislocated	17	12	11
Irreducible	4	4	4
Total	1302	348	30

Table V. Percent of spontaneous resolutions of different stages of hip abnormality.

Type of abnormality	% Resolution
Subluxatable	99.8%
Dislocatable	94%
Dislocated	14.3%
Teratologic	0%

Birth order

The increased incidence of unstable hips in first-borns has been recognized by many authors.^{2,3,7,8,15,17,20} We found an incidence of 31.7% in primigravidas and 6% for those with 8 or more deliveries (Fig. 5).

Side involved

The left hip is involved much more commonly than the right.^{2,3,7,8,15,17,20} We also had similar findings. Of the 1302 newborns with abnormal hips, 807 (62%) had the left side, 203 (15.6%) the right and 292 (22.4%) both sides involved.

At the last examination thirty patients remained with true CDH; 15 (50%) had bilateral involvement, 13 (43%) had left side and 2 (7%) had right side involvement.

Infant wrapping

Some researchers have shown that infant wrapping has no significant effect on increasing the rate of CDH, but many do not believe this.^{1,7}

In this study we advised mothers to continue Iranian wrapping (ghondagh) and did not see any increased risk of true CDH, even in newborns with abnormal hips who were wrapped in hip extension and adduction.

We also found a relationship between the height of the newborns and frequency of abnormal hips. Abnormal hips were most common in those with heights less than 48 cm (225.8/1000). The newborns between 48 and 51 cm had 154.5/1000 abnormal hips and those measuring more than 51 cm had 115.4/1000 abnormal hips ($P < 0.02$).

The relationship of abnormal hips and weight of the newborns was also statistically significant. Those weighing less than 2500 grams had 225.8/1000 abnormal hips, those between 2500-4000 grams had 154.5/1000 and those more

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than 4000 gramshad 115.4/1000 abnormal hips ($P < 0.0001$). Some researchers in a study from the New York Hospital have also observed the association of abnormal hips with increased weight.²²

The incidence rate of abnormal hips and different head circumferences were also determined. The incidence rate in those with head circumferences of less than 31 cm was 124.3/1000, those between 31 and 35 cm 156.9/1000 and those more than 35 cm, 194/1000 live births.

There were 59 newborns with abnormal hips and other musculoskeletal abnormalities (Table III). The most common abnormality associated with abnormal hips was calcaneovalgus (93.14%). Arthrogryposis was found in two and cerebral palsy in the other two of the four newborns with teratologic dislocation.

In summary, congenital dislocation of the hip (CDH) must be regarded as an important health problem, leading to arthritis, pain, loss of mobility and limb shortening. Unstable hips can be diagnosed in newborns with simple methods.

Great strides have been made towards eliminating CDH as a crippling disorder. We should strive to educate our colleagues and members of the nursing staff on the importance of diagnosing CDH in the first few days of life.

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