

Congenital Hip Dislocation and Dysplasia in Southern Chinese

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Summary. *In 1975 we carried out a survey in Hong Kong to locate Chinese children with congenital dislocation of the hip. Analysis of the available records between 1960 and 1975 gave an observed incidence which was at least 10 times less than found in Caucasians. The age and sex distribution, radiographic findings and the left-sided predominance were similar to Caucasians with congenital dislocation of the hip. However, unlike Caucasian children, the Chinese presented with dislocation and not dysplasia.*

The mothers of children with congenital dislocation of the hip were compared with a control group with normal children to assess their use of the "Hong Kong" position, in which the children are carried on the back of their mother with their hips in a position of wide abduction. Since only half of the children in either group were carried in this manner, other factors must be responsible for the low incidence of congenital dislocation of the hip in southern Chinese.

Résumé. *Une enquête a été réalisée à Hong-Kong en 1975 afin de dépister les enfants, d'origine chinoise, porteurs d'une luxation congénitale de la hanche. L'analyse des statistiques précédentes, de 1960 à 1975, montrait que la fréquence de cette malformation était de dix fois inférieure au moins à celle observée chez les Caucasiens. La distribution selon le sexe et l'âge, les constatations radiologiques et la prédominance du côté gauche étaient identiques à ce que l'on observe chez les Caucasiens porteurs d'une luxation congénitale de la hanche. Cependant, à l'inverse des enfants caucasiens, les chinois présentaient une luxation et non une dysplasie.*

Les mères des enfants atteints de luxation congénitale ont été comparées à un groupe témoin,

ayant des enfants normaux, pour évaluer l'utilisation de la «position de Hong-Kong», dans laquelle les enfants sont portés sur le dos de leurs mères, les hanches en abduction forcée. Comme la moitié seulement des enfants de chaque groupe étaient portés de cette façon, d'autres facteurs doivent être responsables de la faible fréquence de la luxation congénitale de la hanche chez les Chinois du Sud.

Key words: *Congenital hip dislocation, Dysplasia*

Congenital hip dislocation and dysplasia are the primary cause of between 25% and 40% of secondary osteoarthritis of the hip in Caucasians [2, 9]. Since congenital dislocation of the hip is rare in southern Chinese [3, 5], any information concerning the aetiology, treatment and prevention of the disorder in this population might be useful in the prevention of osteoarthritis in Caucasians. In particular we wished to ascertain whether the Chinese custom of carrying infants on their mother's backs with the hips in a position of wide abduction was responsible for the infrequent occurrence of dislocation or dysplasia of the hip in Hong Kong.

Material and Methods

The in-patient and out-patient records of the Hong Kong Sandy Bay Children's Hospital between 1960 and 1975 were reviewed for all diagnoses of congenital dysplasia or dislocation of the hip. This 200 bed orthopaedic hospital provides free care for any child with musculoskeletal problems. It serves as the centre of referral for the 1.5 million people of Victoria Island, the 3 million of Kowloon and the New Territories, and the Chinese community of Macao. Children with elective musculoskeletal disorders are automatically referred from the clinics of the 1,200 bed Queen Mary (Government) Hospital. We also sent a questionnaire to every

orthopaedic surgeon in Hong Kong to request details of each patient with congenital dysplasia or dislocation of the hip treated in other hospitals during the previous 5 years. This included the 2,000 bed Queen Elizabeth Hospital on the Kowloon side of Hong Kong. All available radiographs and hospital records were studied to confirm the diagnosis and verify Chinese parentage.

Twenty-four mothers of children with congenital dislocation of the hip from the Sandy Bay Hospital were interviewed by a social worker who was unaware of our interest in abduction splinting and its effect on the disease. The social worker completed a questionnaire on each mother which was designed to determine the age of the child, the age at which it was first carried on its mother's back, the length of time spent in this position each day and an estimate of the total time for which the child was carried in this position during the first 2 years of life. This information was also obtained for all the other children in the family. The social worker also interviewed 73 mothers, selected at random from those attending the well-baby clinics, who were representative of the child-bearing population. Additional information was sought from both groups concerning the order of birth of the children, the age of the parents, the province of origin in China, the economic status and other demographic data.

Results

Fifty-five children were identified as having congenital dysplasia or dislocation of the hip, 41 from the Sandy Bay Hospital, 12 from the Queen Elizabeth Hospital, and 2 from private orthopaedic surgeons. The ages of the children at the time of diagnosis varied between 9 days and 13 years, with a mean of 24 months. Forty-four patients were female and 11 were male, giving a ratio of 4:1.

Radiographic Features

Forty-four of the 55 patients had radiographs which were available for review. Of these 88 hips, 49 were dislocated, 11 were dysplastic, and 28 were normal. Each of these patients had one or more hips dislocated. Dysplastic hips were only seen on the opposite side to a dislocated hip. Sixteen patients had bilateral abnormalities. Five had both hips dislocated, 8 had a dislocation on the left and dysplasia on the right, and 3 had dislocation of the right hip and dysplasia on the left. Seventeen patients had a dislocation of the left hip and a normal right side, and 11 a dislocated right hip with a normal left side. Thirty patients had involvement of the left hip and 14 the right.

Incidence of Congenital Dislocation of the Hip

Figure 1 shows the year of birth for each of the 55 patients. The recorded birth rate for Hong Kong between 1960 and 1975 varied between a high of 115,263 in 1963 and a low of 76,818 in 1971. Between 1968 and 1974 there was an average of just over 5 congenital dislocations of the hip per year (Table 1). Only 7 children were born with a hip dislo-

Table 1. CDH patients/live births in Hong Kong, 1968–1974

Year	CDH/Births	Incidence
1968	5/82,992	0.006%
1969	7/79,329	0.009%
1970	5/77,465	0.007%
1971	4/76,818	0.005%
1972	6/79,053	0.008%
1973	6/80,147	0.008%
1974	5/81,879	0.006%

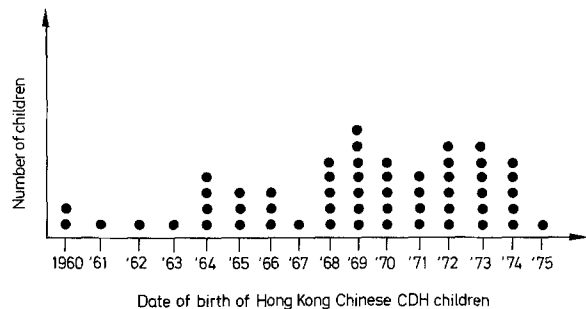


Fig. 1. Year of birth for each of the 55 patients

cation in 1969, the year with the highest number of cases, giving an overall incidence of 0.009%.

Carrying with Abducted Hips

Mothers of children with congenital dislocation of the hip had a total of 66 children (average 3.04), compared with the 73 mothers of the control group who had 124 children (average 1.69). The figure of 3.04 children is not significantly different from the average for urban families in Hong Kong, which is 2.9. The smaller number of children for mothers of the control group is probably related to their attendance at well-baby clinics, since mothers are inclined not to visit the clinics with their later children.

The effect of both birth order and family size were used in a repeated measures analysis, with the dependent variable consisting of the number of hours that a child was carried in each of six different time periods during the first two years of life. When family size and birth order were both considered there was no significant difference in the number of hours of carrying in the abducted position. In general, children in the control group were carried less than either children with congenital dislocation of the hip or their siblings.

Sixty-seven per cent of the children with congenital dislocation of the hip were carried in the position of wide abduction of the hips during the first two years of life, compared with only 54% of the 124 children in the control group. The corresponding figures for the first six months were 41% and 49%, indicating that half of the children in Hong Kong were never carried in this position.

Discussion

Hong Kong has a population of 4.5 million people, over 90% of whom are of southern Chinese origin. There is a rising standard of living with free medical care provided by the government. The sharp drop in the incidence of skeletal tuberculosis in the last 10 years and the virtual elimination of poliomyelitis by vaccination programmes indicate the high standard of medical care. There is no stigma attached to a limp or deformity. Poliomyelitis and tuberculosis of the spine have been common in the past and therefore the parents of infants and children are unlikely to be deterred from seeking treatment, especially with the availability of free medical care.

If the incidence of congenital dislocation of the hip were equal to that of Caucasians we would have expected to find 448 cases each year, that is 0.56% [6, 7] times the average of 80,000 live births. However a more reasonable incidence to use would be 0.09% which was the rate of detection of the disorder in Sweden between 1936 and 1945 [8] before neonatal examination of the hips was introduced. Since neonatal examinations are not performed routinely in Hong Kong this incidence might reflect the dislocated hips which failed to stabilise in the absence of treatment. A rate of 0.09% would predict about 72 established dislocations each year, with a total of 1152 over the 16 years of this survey, yet we only found 55 cases. Even if we only discovered half of the abnormal hips the rate in this Chinese population is still 10 times less than in Caucasians.

The sex distribution of the patients, four females to one male, the left-sided predominance and the radiographic findings in this series suggest that the congenital dislocation of the hip in the Chinese is similar to that seen in Caucasians [1], although it occurs much less frequently.

We did not find any children with dysplasia of the hip without dislocation on the other side, but in Caucasians the majority of the disorders of the hip which present after the neonatal period are dysplasias and not dislocations. Since the children are likely to be brought for treatment if they have symptoms from hip dysplasia, this abnormality must be uncommon in the Chinese. Only 11 of the hips which we reviewed were dysplastic. It appears that in Chinese children the acetabulum will develop normally provided that the hip remains reduced.

The incidence of osteoarthritis of the hip in Hong Kong Chinese is between 5 and 10 times less than in Caucasians [4]. Since from 25% to 40% of osteoarthritis of the hip in Caucasians is related to ab-

normal growth of the joint due to congenital dislocation or dysplasia, the rarity of these disorders in children in Hong Kong is significant.

Half of the Chinese children were not carried with their hips in abduction during the first two years of life. This custom was much more popular 20 years ago when socio-economic conditions were less advanced, but there has been no change in the incidence of congenital dislocation of the hip, suggesting that the adoption of this position is not an important factor. The evidence indicates that the custom does not account for the rarity of the condition in Hong Kong, although it might be a contributory influence.

In contrast to the Hong Kong Chinese, the Japanese have one of the highest rates of congenital dislocation of the hip in the world, with persistence of acetabular dysplasia after treatment. Tanabe et al. [10] estimate that the incidence is 10 times higher than that of Caucasians. The Japanese have the custom of carrying children in a sling on the back of the mother, as do the Chinese, but with the hips of the child held in extension. Since this position is not assumed until the child is able to support its own head at the age of between three and six months, it is unlikely to influence the development of dislocation. The high rate of severe congenital dislocation and the persistence of acetabular dysplasia after treatment suggest that the growth and development of the acetabulum may be an independent process.

The relationship of congenital dislocation of the hip to osteoarthritis is well established. The high frequency of both in the Japanese and their relative rarity in the southern Chinese indicate the importance of investigation of the aetiological aspects of this disorder.

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References

1. Carter, C. O., Wilkinson, J. A.: Genetic and environmental factors in the etiology of congenital dislocation of the hip. *Clin. Orthop.* **33**, 119–128 (1964)
2. Gofton, J. P.: Studies in osteoarthritis of the hip: Part III. Congenital subluxation and osteoarthritis of the hip. *Can. Med. Assoc. J.* **104**, 911–915 (1971)
3. Gunn, D. R.: Squatting and osteoarthritis of the hip. In: *Proceedings of the Annual Meeting of the British Orthopaedic Association, 1963.* *J. Bone Joint Surg. [Br.]* **46**, 156 (1964)
4. Hoaglund, F. T., Yau, A. C. M. C., Wong, W. L.: Osteoarthritis of the hip and other joints in southern Chinese in Hong Kong. Incidence and related factors. *J. Bone Joint Surg. [Am.]* **55**, 545–557 (1973)

5. Hodgson, A. R.: Orthopaedic surgery in the Far East. In: Proceedings of the Annual Meeting of the British Orthopaedic Association, 1963. *J. Bone Joint Surg. [Br.]* **46**, 154 (1964)
6. McKeown, T., Record, G.: *Congenital Malformations*. Ciba Foundation Symposium. London: Churchill 1960
7. Palmén, K. K., Von Rosen, S. S.: Late diagnosis dislocation of the hip joint in children. *Acta Orthop. Scand.* **46**, 90–101 (1975)
8. Severin, A. E.: Frekvensen av luxatio coxae congenital och pes equino-varus congenitus i Sverige. *Nord. Med.* **55**, 221–223 (1956)
9. Stuhlberg, S. D., Harris, W. H.: Acetabular Dysplasia and Development of Osteoarthritis of the Hip. In: *The Hip. Proceedings of the Second Open Scientific Meeting of the Hip Society*, 1974, pp. 82–93. St. Louis: Mosby 1974
10. Tanabe, G., Kotakemori, K., Miyake, Y., Mohri, M.: Early diagnosis of congenital dislocation of the hip. *Acta Orthop. Scand.* **43**, 511–522 (1972)