

Clinodactyly and Brachymesophalangia of the Fifth Finger

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The term clinodactyly is applied to a curvature of the extended finger and, in the case of the fifth finger, this curvature is always towards the fourth. A slight curving in this direction is normal and earlier workers have restricted the use of this term to cases of marked inclination, determined on a basis of subjective judgement. By brachymesophalangia is meant a shortness of the shaft of the middle phalanx. Schmid & Junker (10) have suggested a definition of brachymesophalangia based on measurements of phalangeal shaft length. Other workers have subjectively assessed the length of the middle phalangeal shaft relative to the lengths of the other phalangeal shafts in the digit and the size of the hand and have used their judgement to determine the amount of shortness necessary for the application of this term. During this investigation similar subjective methods have been followed before the term brachymesophalangia has been used.

Many have accepted without question the statement by Smith (11) that marked clinodactyly of the fifth finger, associated with a shortness of its middle phalanx, is present in nearly every mongoloid. The literature, however, contains few investigations of this alleged relationship in either mongoloid or normal children.

Review of Literature

Reports of the incidence of clinodactyly in mongoloids vary between 34.6% and 78.8% (Table 1) after the omission of the small series examined by West (15). The incidence of clinodactyly in normal children has been reported as 19.5% (15) and 5.2% (2) (Table 1). It is probable that much of this variation is due to the lack of a precise determination of normal limits and an application of terms based upon subjective criteria.

Clinodactyly could occur at either or at both the interphalangeal joints of the digit. There is no information in the literature concerning the common site of clinodactyly except the observation of Thursfield (13) that clinodactyly of the fifth finger in mongoloids occurred at the distal interphalangeal joint.

Brachymesophalangia of the fifth finger has been reported in 62 of 100 mongoloids (3) and in 10 of 700 normal individuals (12). Hefke (3) reported clinodactyly in 43 of 62 mongoloids in whom brachymesophalangia was present in the same digit. Because this is a higher incidence of clinodactyly than in the general group of mongoloids he studied, he concluded that these conditions are often associated. Opinions that clinodactyly and brachymesophalangia tend to occur in combination have also been expressed by Pol (8) for mongoloids and by West (15) for normal children.

It has been stated that clinodactyly increases with age in mongoloids (1, 15) although this is denied by Øster (7). Hefke (3) claimed that brachymesophalangia became less marked in mongoloids with advance in age.

In the present study an attempt has been made to evaluate the possible association between clinodactyly and brachymesophalangia in the fifth fingers of both mongoloid and normal children.

Material and Methods

The selection of 192 mongoloid and 120 normal children has been described elsewhere (9). Observations have been made on serial dorso-palmar radiographs of the left hand of these children taken at regular intervals over a four year period. Only those radiographs have been utilized in which the fingers were extended fully and abducted slightly from each other. Clinodactyly and brachymesophalangia of the fifth finger have been identified in a mixed sequence of mongoloid and normal children by the same observer using subjective criteria similar to those of other workers.

Findings and Discussion

At all ages studied, clinodactyly was more common in mongoloid than in normal children (Table 2). Combining both sexes and all ages, the incidence was

55.2 % for mongoloids and 32.5 % for normal children. These findings are similar to those reported previously for mongoloids, but are higher than those reported previously for normal children (Table 1). Such observations do not justify the claim of Smith (11) that "this curve of the little finger occurs to a greater or less degree in nearly every case of mongol idiocy".

Clinodactyly occurred most commonly at the distal interphalangeal joint in mongoloids, which is in agreement with the observation of Thursfield (13). In normal children, however, it was slightly more common for both the proximal and distal interphalangeal joints to be involved (Table 2). This difference between the mongoloid and the normal children in the site of clinodactyly occurred even in those in whom the fifth middle phalanx was of the usual length and, consequently, it could not have been dependent upon the marked difference between the mongoloid and normal children in the incidence of brachymesophalangia. In both mongoloid

TABLE 1. *The recorded incidence of clinodactyly.*

Author	Number examined	Number with clinodactyly	% with clinodactyly
<i>Mongoloid children</i>			
West (1901)	9	1	11.1
Muir (1903)	26	9	34.6
Thursfield (1921)	26	13	50.0
Orel (1927)	26	33	78.8
Hefke (1940)	100	43	43.0
Benda (1949)	*	*	36.2
Engler (1949)	*	*	40.0
Øster (1953)	504	252	50.0
Levinson <i>et al.</i> (1955)	50	34	68.0
<i>Normal children</i>			
West (1901)	605	118	19.5
Engler (1949)	500	26	5.2

* Not recorded by author.

TABLE 2. *Males/Females.*

Chronological age in years	Total children	Site of clinodactyly			Percentage with clinodactyly	No. with brachymesophalangia
		Proximal interphalangeal joint only	Distal interphalangeal joint only	Both interphalangeal joints		
<i>Mongoloid children</i>						
0-2	7/9	0/0	4/4	0/0	57.1/44.4	3/5
2-7	46/46	2/2	14/19	5/1	45.7/47.8	10/9
8+	37/47	4/4	12/28	6/1	59.5/70.2	11/14
Total	90/102	6/6	30/51	11/2	52.2/57.8	24/28
<i>Normal children</i>						
2-7	60/60	1/2	7/9	14/6	36.7/28.3	2/2

and normal children, clinodactyly at both the proximal and distal interphalangeal joints of an individual was more common in males than in females.

Brachymesophalangia was much more common in the mongoloid (27.1 %) than in the normal children (3.3 %) (Table 2). This is lower than the incidence reported for mongoloids by Hefke (3) but is similar to that reported for normal children by Stettner (12). No case of absence of the fifth middle phalanx was observed among either the mongoloid or the normal individuals.

When mongoloid and normal children of similar age were compared (Table 3) it was found that clinodactyly occurred

more commonly in the mongoloid (47.2 %) than in the normal children (32.5 %). However, clinodactyly associated with a middle phalanx of normal length was observed with almost equal frequency in both mongoloids (25.0 %) and normal children (29.2 %). In all children in whom brachymesophalangia was noted clinodactyly was present also with the exception of three mongoloids. The fact that these conditions sometimes occur independently is contrary to the report of Smith (11). Brachymesophalangia associated with clinodactyly was present in 22.2 % of the mongoloid children under the age of 8 years but in only 3.3 % of normal children of comparable age.

TABLE 3. *Findings in children aged less than 8 years.*

Conditions	Mongoloid		Normal	
	No.	%	No.	%
Clinodactyly without brachymesophalangia	27	25.0	35	29.2
Clinodactyly with brachymesophalangia	24	22.2	4	3.3
Brachymesophalangia without clinodactyly	3	2.8	—	—
Neither clinodactyly nor brachymesophalangia	54	50.0	81	67.5
Totals	108	100.0	120	100.0
Total clinodactyly	51	47.2	39	32.5
Total brachymesophalangia	27	25.0	4	3.3

The serial records of both mongoloid and normal children show a remarkable stability for each individual in both the site and the degree of clinodactyly and the extent of brachymesophalangia. However, brachymesophalangia became slightly less common as older groups of mongoloids were considered. These findings are in agreement with those of Øster (7) but are contrary to those of West (15) and Brousseau (1) concerning clinodactyly and those of Hefke (3) in regard to brachymesophalangia.

Conclusion

A consideration of the above findings leads one to conclude that there are two types of clinodactyly of the fifth finger. This is best illustrated by reference to the findings on mongoloid and normal children of comparable age (Table 3). In some children with clinodactyly the fifth middle phalanx is of normal length. This type of clinodactyly occurs with approximately equal frequency in both mongoloid and normal children, although the common site of such clinodactyly is different in the two groups. In other children, clinodactyly of the fifth finger is associated with brachymesophalangia and this type is much more common in the mongoloid group (22.2%) than in the normal group (3.3%).

There is a similar marked difference between the mongoloid (25.0%) and the normal groups (3.3%) in the incidence of brachymesophalangia. The brachymesophalangia was combined with clinodactyly in all but three of these children. It is suggested that brachymesophalangia should be used in the diagnosis of suspected

mongolism and that, if this is done, the recording of clinodactyly provides no additional information that is diagnostically useful.

Summary

1. Serial radiographs of the hands of 192 mongoloid and 120 normal children extending over four years have been used to investigate the frequency of clinodactyly and brachymesophalangia in the fifth finger and their changes during growth.

2. The incidence of clinodactyly in the mongoloid children was similar to that recorded in the literature but the incidence in the normal children was higher than that recorded previously. Clinodactyly with a middle phalanx of the usual length occurred with almost equal frequency in both mongoloid and normal children. There was a marked difference between the two groups of children in the incidence of clinodactyly associated with brachymesophalangia.

3. It is suggested that brachymesophalangia is a more important physical sign of mongolism than clinodactyly. Considering children under the age of 8 years, it was present in 25.0% of the mongoloid group and 3.3% of the normal group and was almost always associated with clinodactyly.

4. The incidence of clinodactyly did not vary with age but brachymesophalangia was slightly less common among older mongoloids.

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