

ULNAR DEVIATION OF THE FINGERS

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Fearnley (1951) has recently reviewed this matter with particular reference to the characteristics of the deformity, but he gives no details of the relative incidence of the characteristics. This paper describes the findings in two series of patients suffering from rheumatoid arthritis; the hands of the first series being affected by ulnar deviation and those of the second series being unaffected.

Aetiology.—As Fearnley has observed, little has been published relating to the aetiology of the deformity, although one hears much speculation about it. Fearnley mentions only two aetiological factors that have been thought important; the following list is perhaps more complete.

(1) *Gravity.*—The proponents of this theory state that ulnar deviation is due to the effect of gravity pulling the fingers downwards when the hand is at rest unsupported and with the forearm midway between pronation and supination. This is a facile explanation, but the following arguments weigh against it:

(i) Observation shows that patients with rheumatoid arthritis rarely rest their hands in the position mentioned. They rest them on the arms of their chairs or on their laps, because they find these positions more comfortable. Only in the late stage of advanced deformity, when the small joints of the hand are painless, do they rest them with the fingers dangling free. Moreover, this theory does not explain why ulnar deviation does not occur in normal hands.

(ii) Unless the stretch reflex is abnormal it will automatically tend to counteract the effect of gravity.

(iii) Abnormal mobility of the metacarpophalangeal (m.c.p.) joints is not necessarily associated with ulnar deviation (Fearnley, 1951).

Discussion of this factor must needs rest at this superficial level, for further relevant information could only be obtained by prolonged study of patients over the period during which ulnar deviation is developing. Technical difficulties would make such a study almost impossible.

(2) *Pressure.*—The proponents of this theory state that the deformity is due to pressure pushing the fingers laterally when patients lever themselves out of chairs. Observation shows that it is truly exceptional for a person with painful, inflamed m.c.p. joints to put any pressure on the fingers if it can be avoided. Such patients lever themselves up, using their forearms (hence the development of rheumatoid nodules on them). Again, it is difficult to see how research into this matter could be carried out successfully.

(3) *Muscle Imbalance.*—In rheumatoid arthritis the small muscles of the hand, including the lumbricals, which are all radial deviators, become wasted; the long muscles can then act unopposed. Kelly (1950) considers this an important factor in the aetiology of the condition. Fearnley (1951) gives a balanced account of this matter and considers that it is unlikely to be the sole factor in causation; a conclusion that few would dispute. It is by no means certain which comes first, the muscle wasting or the ulnar deviation.

(4) *Development of Unilateral Laxity of Capsules of Metacarpophalangeal Joints.*—The proponents of this theory think that the fingers are drawn over to the side where the capsule is tightest. However, it is common experience that the fingers can usually be freely returned to the midline. Hence the fingers cannot be drawn over by fibrosis or anything else.

(5) *Shape of Joint Surfaces.*—This theory assumes that the shape of the joint surfaces causes the fingers to track over in an ulnar direction. It ignores the easily verifiable fact that ulnar deviation may occur in the absence of any demonstrable change in the shape of the joint surfaces.

(6) *Disturbed Function.*—Whillis (1950) thinks that the condition is of functional rather than anatomical origin. Detailed anatomical studies have certainly failed to discover the reason why

ulnar deviation develops. Willis states that normal hand sensation produces a body image in the sensory cortex of the brain and that normal hand function is dependent on a normal body image; if this body image is rendered abnormal by pain or tissue damage, then disturbance of function and later of structure will follow. This theory fits most closely to the observed facts but is difficult to prove. The collection of data which follows was originally designed to throw light on this particular matter, but although much valuable information has accrued, this question has not been answered.

Ulnar deviation of the fingers is in general a condition of insidious onset. Ideally, the problem of its aetiology should be solved by studying its development. However, such an approach would be so time-consuming that any attempt to narrow the problem is welcome. The present study is retrospective, inasmuch as it concerns the comparison of hands affected by established ulnar deviation with hands in which the condition is not present. As such it suffers from all the defects of any retrospective enquiry, but it has thrown some light on the factors responsible for the development of ulnar deviation, though little information relevant to the above theories has been obtained.

Collection of Data

The hands of 74 patients suffering from rheumatoid arthritis were examined in detail. Ulnar deviation was present in one or both hands of fifty patients, who were consecutive cases of the disability seen by me. The other 24 patients were consecutive cases in whom the disability was not present.

The following details were recorded in each case:

- (1) Age and sex.
- (2) Duration of rheumatoid arthritis (patient's statement).
- (3) Duration of ulnar deviation (patient's statement).
- (4) Dominant hand (handedness).
- (5) Hand(s) affected and severity of ulnar deviation.
- (6) Occupation at time of onset of ulnar deviation (and details of work).
- (7) Presence or absence of swelling of m.c.p. joints (clinical assessment).
- (8) Presence or absence of limited extension at m.c.p. joints, and degree of same.
- (9) Change in degree of ulnar deviation on flexion or extension at m.c.p. joints.
- (10) Presence or absence of subluxation of m.c.p. joints (clinical assessment).
- (11) Presence or absence of radiological evidence of damage to m.c.p. joints.
- (12) Presence or absence of displacement of extensor tendons, both at rest and on movement.

- (13) Presence or absence of passive correctability of deviation.
- (14) Presence or absence of arthritic activity at time of examination.

Information was also collected on the presence or absence of associated lesions, and on various subjective and other matters, but the results are not included here because they were found to yield nothing worth recording.

Results

The above data was analysed and tested for statistical significance.*

The results may be summarized as follows:

(1) Both male and female patients with ulnar deviation were older than those without ulnar deviation, but the difference was significant only in the case of the males.

(2) The duration of ulnar deviation correlated with that of rheumatoid arthritis.

(3) There was no correlation between the patient's age and the duration of ulnar deviation.

(4) There was no correlation between the patient's age and the duration of rheumatoid arthritis, although the cases did appear to fall into two groups: short-term and long-term. All the latter had ulnar deviation, and nine out of eleven were women. No other features were specially noticeable about this group of cases.

(5) There appeared to be no correlation between the degree to which the hand was used or the nature of the patient's work and the development of ulnar deviation.

(6) Ulnar deviation occurred most frequently in severe generalized cases of rheumatoid arthritis.

(7) The fingers could passively be returned to the mid-line in 79 of the 89 hands affected, which renders improbable any theory that fibrosis is responsible for drawing the fingers over.

(8) On flexing the metacarpo-phalangeal joints, the degree of ulnar deviation diminished in five hands, remained unchanged in 31, slightly increased in 45, and greatly increased in eight. In other words, there was no consistent change, which renders it improbable that the anatomical genesis is the same in all cases.

(9) The causal and time relationships between the presence of some physical findings and the presence of ulnar deviation cannot be elucidated without further research.

* Owing to lack of space it has not been possible to publish the relevant tables and diagrams, but copies of them have been deposited with the Editors of this Journal, from whom they are available on request.

Summary

The aetiology and characteristics of this disability are reviewed. The theory that it is of functional rather than anatomical origin seems best to fit the observed facts, but is difficult to prove.

The hands of 74 patients with rheumatoid arthritis (50 with ulnar deviation and 24 without) have been examined in detail and the results analysed. No conclusive answer to the question of aetiology could be deduced, but the incidence was highest in patients with severe arthritis of long duration. Tests by flexion of the joints and passive correction indicated that the deformity was unlikely to be due in the first place either to fibrosis or to anatomical considerations.

My thanks are due to Dr. Ernest Fletcher for advice and encouragement and for permission to use his patients for this investigation, to Professor J. Whillis for much help in planning the investigation, and to Dr. John Knowelden for advice about the presentation of the results.

REFERENCES

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Déviation cubitale des doigts**RÉSUMÉ**

On passe en revue l'étiologie et les traits caractéristiques de cette infirmité. L'hypothèse de son origine

fonctionnelle plutôt qu'anatomique semble bien cadrer avec les faits observés, mais elle est difficile à prouver.

On a examiné soigneusement les mains de 74 arthritiques rhumatisants (50 avec et 24 sans la déviation cubitale) et on a analysé les résultats. Il n'a pas été possible d'obtenir une réponse concluante à la question d'étiologie, mais on a appris que cette déviation se trouve le plus souvent chez les malades atteints d'une arthrite grave et prolongée. Des expériences comprenant la flexion des articulations et la correction passive indiquent qu'il est peu probable que la difformité soit due en premier lieu à une fibrose ou à des facteurs anatomiques.

Desviación cubital de los dedos**SUMARIO**

Se pasa en revista la etiología y los rasgos característicos de esta deformidad. La hipótesis de que su origen sea más bien funcional que anatómica parece concordar bien con los hechos observados, pero es difícil de demostrarla.

Las manos de 74 enfermos con artritis reumatoide (50 con desviación cubital y 24 sin ella) fueron examinadas detalladamente y los resultados fueron analizados. No se pudo obtener una respuesta conclusiva a la cuestión de etiología, pero se supo que esta deformidad es más frecuente en enfermos con artritis grave y prolongada. Experimentos de flexión de las articulaciones y de corrección pasiva indicaron que ni una fibrosis ni factores anatómicos podían haberla causado en primer lugar.