Scheme for the Assessment of Deformities in Dupuytren's Disease

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The need for an objective assessment of the lesions in Dupuytren's disease seems essential to the establishment of a prognosis and the evaluation of surgical results.

The methods which have been proposed up to now appear unsuitable for these purposes either because of their complexity or their lack of precision. The method we propose here has been used in the study of several hundred cases and has proved satisfactory. The two main factors in functional deficit and operative difficulties are the severity of the digital contracture and the scattering of lesions in the hand. Our system of evaluation uses numbers and is based on these two factors.

Original Method

The hand is divided into five parts or rays, each formed by a digit and the corresponding zone of the palm. For the four fingers, as far as the aponeurosis is concerned, each palmar ray includes the pretendinous band, the adjacent part of the middle palmar aponeurosis, and the corresponding portion of the interdigital palmar ligament. For the thumb, the ray also includes the fascia of the thenar eminence and the first web space. The aponeurotic lesions in each of these five areas (palmar and digital) are represented by a number between 0 and IV:

Stage 0 corresponds to an aponeurotic lesion (nodule or band) with no contracture.

Stages I to IV correspond each to an increase of 45 degrees in the overall extension deficit of the finger. This deficit can be measured by

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determining the angle which the dorsum of the hand makes with the dorsal aspect of the middle phalanx of the finger (Fig. 1).

A more accurate method, especially when there is marked contracture, consists of adding the extension deficit at each of the finger joints. For the thumb, it is necessary to add the deficit in opening-out of the web space as well as the contracture of the metacarpophalangeal and interphalangeal joints. Theoretically, the range of deformity possible for each digit lies between 0 (complete extension) and 200 degrees (finger digging into the palm). In this range, we have chosen the following stages which correspond to increasing difficulty in surgical correction:

Stage I Overall contracture between 0 and 45 degrees
Stage II Overall contracture between 45 and 90 degrees
Stage III Overall contracture between 90 and 135 degrees
Stage IV Overall contracture greater than 135 degrees

The number describing each finger may be supplemented by letters which give important prognostic indications. The letter D (for digital) indicates that the lesions are primarily digital: if it accompanies stage 0, the nodule is digital in location; if it accompanies stage I or II, the

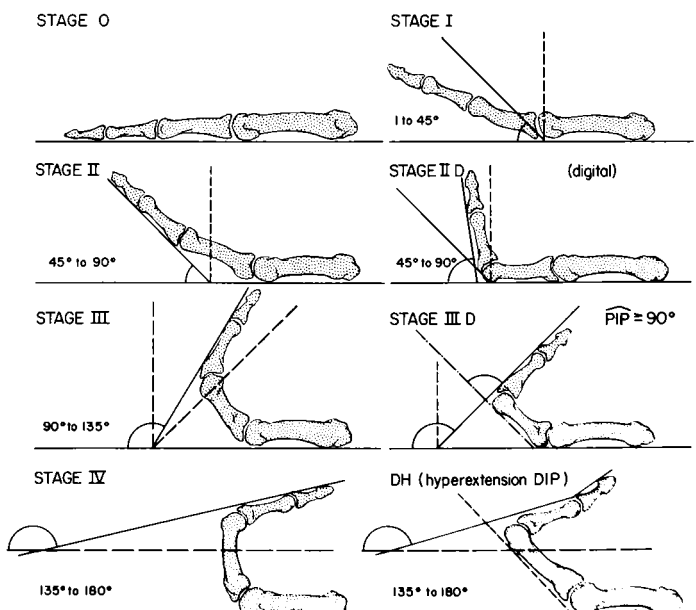

Figure 1. Scheme of classification of the deformities in Dupuytren's disease. D, digital lesion; P, palmar lesion; H, hyperextension of the distal interphalangeal joint.

contracture is more marked at the proximal interphalangeal joint; and if it accompanies a stage III or IV, the contracture of that joint is 90 degrees or more.

The letter P (for palmar) indicates that the lesions are primarily palmar. If it is associated with a stage 0, the band or nodule is palmar. If there is a fixed deformity, it is situated at the metacarpophalangeal joint. The letter H (hyperextension) indicates those cases in which the terminal phalanx is fixed in hyperextension. Finally, absence of lesion and of contracture is indicated by the minus sign "–".

The results, for each finger, are then rearranged, starting conventionally with the little finger. So, the entire hand can be represented by a five-membered formula, numbers or minus sign completed, if necessary, by letters.

Thus, this coding system produces a sort of numerical picture of each case. Its prognostic value is limited since the formula fails to make any mention of the state of the skin, but adding this factor would tend to make the formula cumbersome. This formula, however, is difficult to use for a statistical study. Consequently, we have simplified it by using the number of the most retracted finger followed by the sign "t" if more than one finger is involved. But this simplification does not take into account the spread of the lesions.

Proposed New Method

More recently, we have adopted a new method which has enabled us to review more easily 200 cases. Since the five factors of the formula express the extent of the disease and each of the factors expresses the degree of contracture present, we felt that it would be reasonable to express the overall state of the hand by the sum of all the factors of the formula. We have assigned the value 0.5 for a lesion without contracture (stage 0).

Thus it becomes possible to represent any case of Dupuytren's contracture by a single number between 0.5 (a single nodule without deformity) and 20 (the five fingers contracted to stage IV).

The numerical formula is determined prior to surgery, and permits a classification of cases according to their severity. This numerical summary of the case also allows an appreciation of the evolution of the disease by establishing a relationship between the "number" and the number of years elapsed since the onset of the disease. When the formula is again worked out postoperatively and the result compared with the preoperative figure, it is possible to evaluate the improvement for each finger. A new numerical summary is obtained by adding up the factors of the new formula and this forms the basis of a system for the objective classification of results. (See Figures 2 to 5.)

The difference between the preoperative total and the postoperative total represents the total benefit gained by surgery. The ratio between the preoperative total and the absolute gain represents the percentage of lesions removed or relative gain. In the ideal case in which surgery has effected a complete correction of the deformity, the formula will be 5 minus signs (–). The total is thus 0, the absolute gain is equal to the preoperative number and the relative gain is 100 per cent.

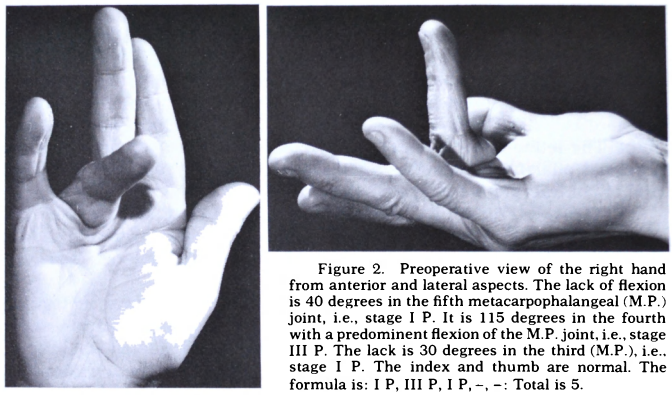

Figure 2. Preoperative view of the right hand from anterior and lateral aspects. The lack of flexion is 40 degrees in the fifth metacarpophalangeal (M.P.) joint, i.e., stage I P. It is 115 degrees in the fourth with a predominent flexion of the M.P. joint, i.e., stage III P. The lack is 30 degrees in the third (M.P.), i.e., stage I P. The index and thumb are normal. The formula is: I P, III P, I P, –, –: Total is 5.

For each case which has undergone surgical correction, a "Coefficient of Improvement" (C.I.) is worked out as follows. If "x" is the preoperative number and "y" the postoperative number,

$$\text{C.I.} = \frac{x - y}{x}$$

Thus, for a patient in whom the deformity has been completely corrected:

$$y = 0 \text{ and C.I.} = \frac{x}{x} = 1$$

and the gain is 100 per cent.

For a case of complete surgical failure:

$$x = y \text{ and C.I.} = \frac{x - x}{x} = 0$$

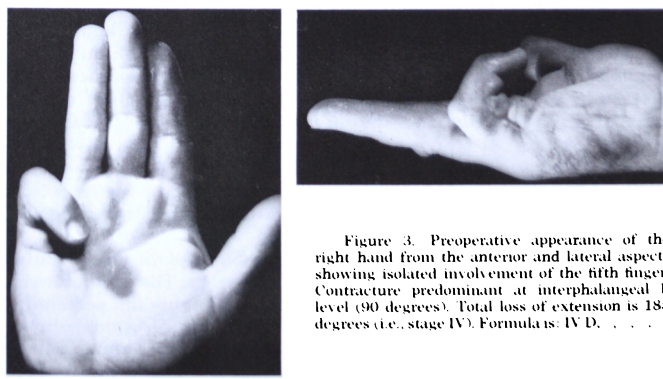

Figure 3. Preoperative appearance of the right hand from the anterior and lateral aspects showing isolated involvement of the fifth finger. Contracture predominant at interphalangeal P level (90 degrees). Total loss of extension is 185 degrees (i.e., stage IV). Formula is: IV D, . . .

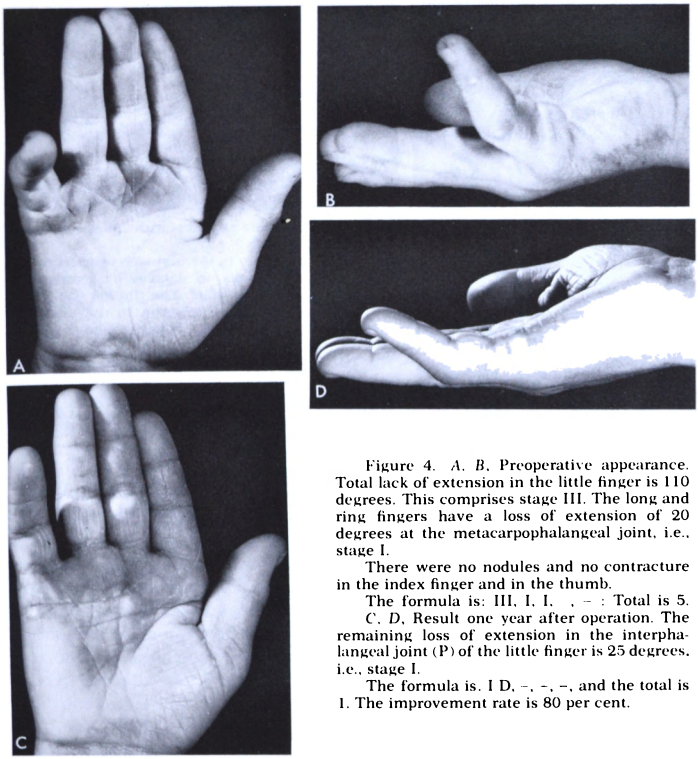

Figure 4. *A, B*, Preoperative appearance. Total lack of extension in the little finger is 110 degrees. This comprises stage III. The long and ring fingers have a loss of extension of 20 degrees at the metacarpophalangeal joint, i.e., stage I.

There were no nodules and no contracture in the index finger and in the thumb.

The formula is: III, I, I, , – : Total is 5.

C, D, Result one year after operation. The remaining loss of extension in the interphalangeal joint (P) of the little finger is 25 degrees, i.e., stage I.

The formula is. I D, –, –, –, and the total is 1. The improvement rate is 80 per cent.

In other words, by calculating the ratio between pre-existing lesions and residual lesions, one gets a range of values between 0 (complete failure) and 1 (complete cure), which represent, to the nearest decimal point, the percentage of lesions removed by surgery.

When C.I. = 1, the deformity has been totally eliminated and the gain is 100 per cent. When C.I. = 0.50, only 50 per cent of the deformity has been removed; when C.I. = 0.75, three-fourths or 75 per cent of original deformity has been corrected.

Admittedly this objective classification of results does not take into account three factors which deserve special mention when present, i.e., the necessity to amputate a finger, the necessity to perform arthrodesis of an interphalangeal joint, and finally the persistence of joint stiffness following a complication. In spite of its apparent rigidity, this system allows a critical analysis of results which can be very instructive. Optimism on the part of the surgeon, or even on the part of the patient, will allow some therapeutic faults to be overlooked as the state of the hand

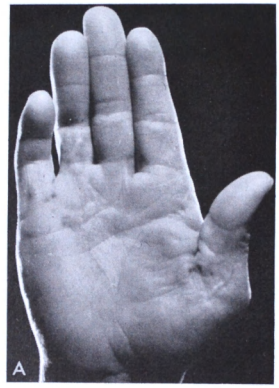

Figure 5. Recurrence with involvement of the thumb web.

A, Contracture in the first web restricts opening so that it lacks 45 degrees by comparison with the opposite side. The thumb lacks 50 degrees of complete extension in the metacarpophalangeal joint. Total deficit for the thumb is 95 degrees, i.e., stage III.

B, Total lack of extension of the fifth interphalangeal joint (P and D) is 60 degrees, i.e., grade II; of the fourth interphalangeal (P1) is 35 degrees, i.e., grade I. Third and second fingers are normals. Total formula is: II D, I D, –, –, III.

and its functional capacity are evaluated in a more subjective manner. The system also permits an accurate long-term follow-up of the evolution of the disease.

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