

de Quervain's Disease

A CLINICAL AND ANATOMICAL STUDY

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In 1892, Tillaux, in the *Traité d'Anatomie Topographique*, referred to an inflammation localized in the groove of the tendons of the abductor pollicis longus and the extensor pollicis brevis characterized by a small tumor and intense pain when the patient moved his thumb. He felt that this condition resulted from fatigue and improved after a few days' rest. Tillaux referred to it as tenosynovitis *crépitante* or *d'ai*.

In 1895, Fritz de Quervain⁶ published five cases of the new entity, which he called *fibröse, stenosierende Tendovaginitis*. In a new publication in May 1912, de Quervain⁷ reported another eight cases, all of them cured by surgical treatment, and offered opinions on the etiology and pathogenesis of the syndrome.

In 1930, Finkelstein reviewed the literature and reported twenty-four additional cases. He felt that chronic trauma should be considered the principal cause of the syndrome. From his work, the author derived the well known Finkelstein sign*, which is considered pathognomonic of the disease. In reality, Finkelstein transcribed the test described by Eichhoff in 1927.

In 1952, Françon and associates described a case of stenosing tenosynovitis in which a very small osseous spicule was present on the surface of the distal end of the radius. They attributed Finkelstein's sign to Soeur.

GENERAL CONSIDERATIONS

De Quervain drew attention to a common disease and its symptoms, studied the etiology, proposed treatment, and, in repeated publications, gave proof that the syndrome is easy to recognize.

Since the disease is more common among persons who perform manual work such as household servants, weavers, typists, or nurses, it forms a medicosocial problem that has a tendency to worsen because of the requirements of modern industrialization.

Eschle and Winterstein cited rheumatic disposition as a cause of tenosynovitis. Later, it was more aptly described as a special reaction of the mesenchymal tissue to various stimuli. There are cases of tenosynovitis included in the clinical picture of rheumatoid disease so that it is not exaggerated to group de Quervain's disease among the collagen diseases.

The unique mobility of the human thumb contributes to the development of the syndrome. In fact, the tendons of the long extensor muscles of the thumb are subject to fairly acute angulations and to traumata due to friction.

It is interesting to observe that man, after having abandoned the quadruped position, began to make more use of his hands. The thumb was the digit that underwent the greatest evolution, constituting, by itself, one of the branches of the pincers that grasp, secure, and manipulate objects. It has a wide function and can be moved in all planes; it can be delicate and gentle, or firm and violent on pressure. It is for this reason that nature endowed the human thumb with more muscles and tendons. In fact, among mammals, some primates excepted, only the

* To demonstrate the Finkelstein sign, the patient is asked to place the thumb within the hand and hold it tightly with the other fingers. An intense pain will be experienced on the styloid process of the radius, exactly at the tendon sheath, when the hand is bent in ulnar adduction. When the thumb is extended, the pain disappears, even if adduction is maintained.

tendon of the abductor pollicis longus or its equivalent is observed. The extensor pollicis brevis is absent. In the Rhesus monkey, there is normally only one tendon for the abductor longus. Occasionally, the tendon may be divided into two bundles, one for the metacarpal and the other for the sesamoid bone⁶. In the *Hylomys*, the existence of a more or less separate extensor pollicis brevis and a tendency to fasciculation of the abductor pollicis longus can be seen. In the *Homo sapiens*, specialization achieved an extraordinary anatomicofunctional richness: the abductor pollicis longus with three to four individual tendons and with multiple insertions and the extensor pollicis brevis with one or more tendons. Nevertheless, one may observe regressive tendencies such as the absence of the extensor pollicis brevis or even of the abductor pollicis longus.

STUDIES ON CADAVERA

The frequent finding, during surgery, of one or more aberrant tendons, as they were called by Bunnell, prompted us to dissect fifty wrists of twenty-seven

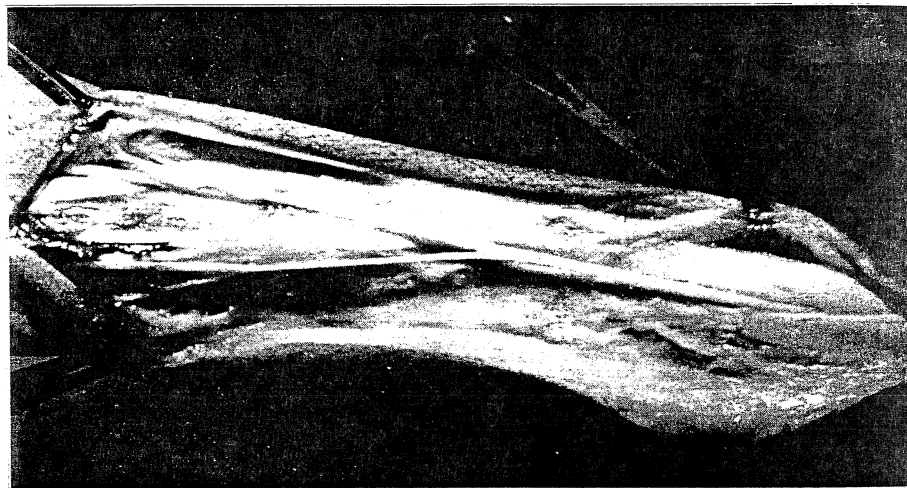


FIG. 1

Dissection showing the superficial radial nerve bifurcated one inch above the first radial canal of the wrist.

fresh cadavera. Twenty were male, and seven were female. There were eight fetal wrists and forty-two adult wrists. A longitudinal incision was made along the lower third of the forearm, the radial region of the wrist, and the radial border of the hand and thumb. Photographs were made of all the dissections, and no artifice was used to enrich the details of the anatomical structures. Although the dissections were fairly extensive, the photographs obtained were limited to the osteofibrous canal. Our attention was mainly limited to the structures which formed the anatomical basis of de Quervain's disease.

The results of the dissections of the cadavera are the following:

1. The superficial radial nerve traversed the radial region of the wrist eighteen times (36 per cent) without subdividing; twenty-five times (50 per cent) bifurcated (Fig. 1), and seven times (14 per cent) trifurcated.
2. Thirty-eight wrists (76 per cent) presented one single osteofibrous groove, and twelve wrists (24 per cent) had a double groove (Fig. 2).
3. In thirty-seven wrists (74 per cent), there was one common synovial sheath for all the tendons; in thirteen wrists (26 per cent), there was one sheath for each tendon.
4. In twenty-nine wrists (58 per cent), three tendons were found (Fig. 3); in twelve wrists (24 per cent), two tendons (Fig. 4); in seven wrists (14 per cent),

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BONE AND JOINT SURGERY

four tendons (Fig. 5); in one wrist (2 per cent), five tendons (Fig. 6); and in one wrist (2 per cent), only one tendon.

5. In twenty-nine wrists (58 per cent), we observed the existence of one accessory tendon; in seven wrists (14 per cent), two tendons; and in one wrist (2 per cent), three tendons.

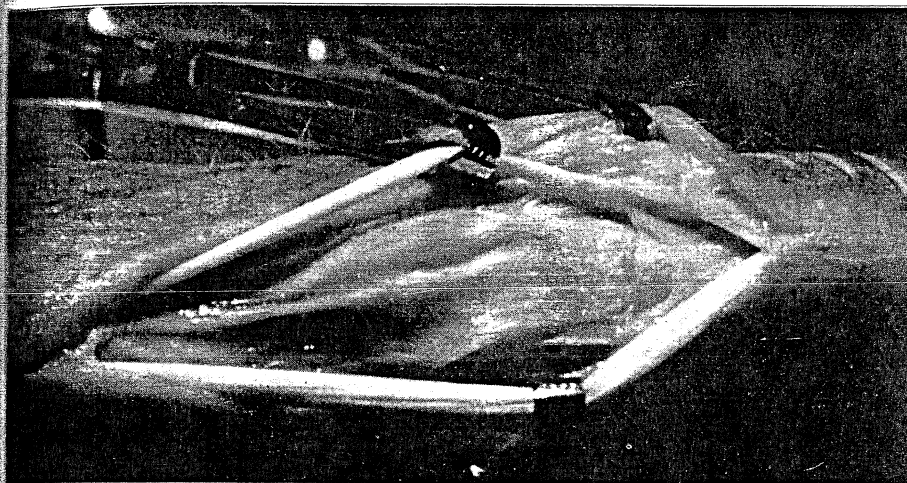


FIG. 2

A double groove is seen, one for the extensor pollicis brevis tendon and the other for the abductor pollicis longus tendon. It is very important, during surgery, to remember the possibility of a double canal.

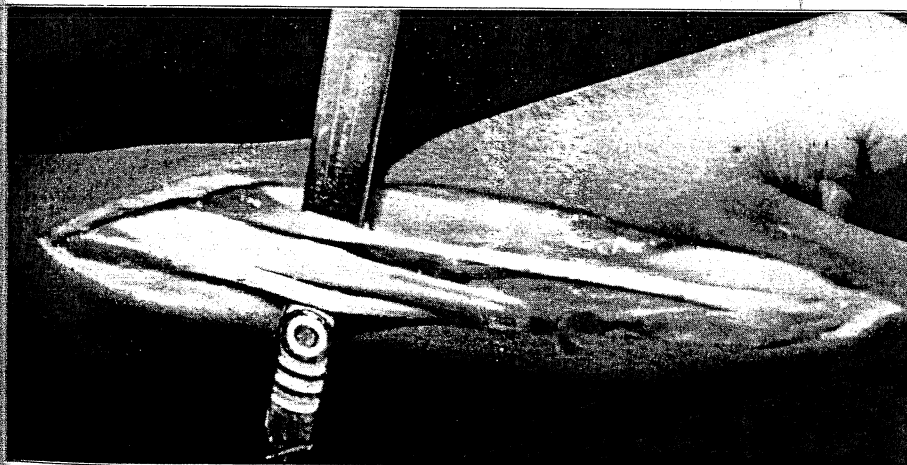


FIG. 3

Three tendons are seen, one for the extensor pollicis brevis and two for the abductor pollicis longus, the principal tendon and its accessory.

6. In twenty-nine wrists (58 per cent), the abductor pollicis longus presented two tendons at the level of the osteofibrous groove; in thirteen wrists (26 per cent), one tendon; in seven wrists (14 per cent), three tendons; and in one wrist (2 per cent), four tendons.

7. In forty-five wrists (90 per cent), the extensor pollicis brevis had one tendon, and in two wrists (4 per cent), two tendons. The tendon was absent in three wrists (6 per cent).

8. The abductor pollicis longus was inserted in thirty-nine wrists into the distal portion of the first metacarpal; in twenty-one wrists, into the greater mult-

angular; in twenty wrists, into the abductor pollicis brevis; in twelve wrists, into the opponens pollicis; in six wrists, into the thenar fascia; in three wrists, into the flexor pollicis brevis; and in one wrist each into the carpometacarpal joint and the proximal phalanx of the thumb.

9. The extensor pollicis brevis was inserted in thirty-eight specimens into the distal portion of the proximal phalanx of the thumb and in nine specimens into the distal phalanx.

There were sixty-four tendinous variations of the abductor pollicis longus in the fifty wrists studied.

From the study, we found that the use of the term *aberrant* or *anomalous* for the accessory tendons found in the first radial groove of the wrist is not exact. The fasciculation observed is the result of the specialized function of the thumb.

ETIOLOGY

In this series, 28 per cent of the patients reported trauma which had occurred three to twelve months prior to examination. Direct trauma was reported twice



FIG. 4

Two tendons, a well developed abductor pollicis longus and a very thin extensor pollicis brevis, are seen.

(6 per cent), and indirect trauma, seven times (22 per cent). In six (19 per cent) of twenty-three cases (72 per cent) there was no well defined trauma, the history disclosing some functional excess.

It is evident that trauma cannot be considered the sole cause of tenosynovitis stenosis. The work of the tendons of the long abductor and short extensor of the thumb in the first osteofibrous canal of the wrist is done under reasonable conditions. The finding that the tendon does not stand more than 2,000 excitations per hour⁵ does not imply that tenosynovitis of the wrist is due to one single cause such as functional excess. When one remembers the tremendous work to which the digital tendons of the concert pianist are subjected one cannot deny the role which trauma, especially repeated trauma, plays. However, trauma does not act alone; it is often associated with a predisposing constitutional factor or connected, at times, with the collagen diseases.

Some of our observations strongly suggest that this predisposing factor plays a very important role. In two patients, we could clearly verify that de Quervain's syndrome foreshadowed the development of rheumatoid arthritis. One of these wrists was even operated on without any benefit (Case 22). Administration of cortisone produced spectacular results in controlling the pain and soon enabled the patient to resume her activities as a nurse (Fig. 7).

OBSERVATIONS

In our study of thirty-two wrists in twenty-nine patients, twenty-seven (84 per cent) of the patients were female, and five (16 per cent) were male. Twenty-six (81 per cent) were white, six (19 per cent) were colored.

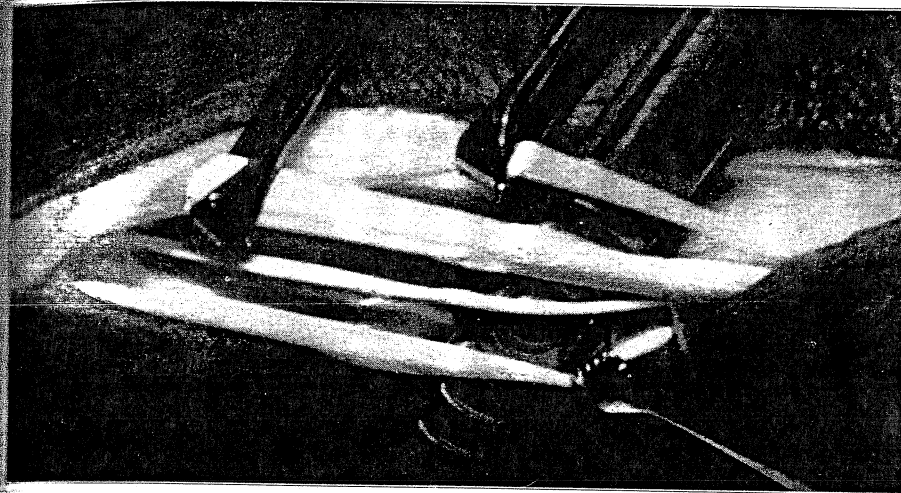


FIG. 5

Four tendons, a very fragile extensor pollicis brevis and a fasciculate (in three bundles) abductor pollicis longus can be seen.

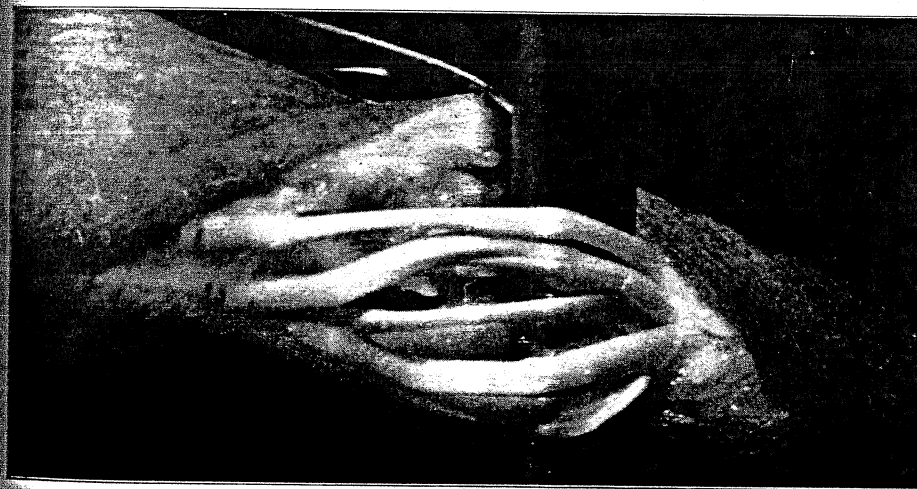


FIG. 6

Five tendons are seen, an extreme fasciculation of the abductor pollicis longus tendon and one bundle for the extensor pollicis brevis.

Sixteen of the patients were engaged in domestic work; five were employed as bookkeeper-typists; four were nurses; and two were weavers and embroiderers. Of the remaining five, there was a policeman, a butler, a workman, a lamp-lighter, and a retired public official. The right side was involved eighteen times (56 per cent) and the left side fourteen times (44 per cent).

Patients between the ages of twenty and twenty-nine years were the most affected (ten wrists). Seven wrists were involved in patients between thirty and thirty-nine years; five in those between forty and forty-nine; six in those between fifty and fifty-nine; two in those between sixty and sixty-nine; and two in those between seventy and seventy-nine years.

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TABLE I
DATA ON TWENTY-NINE PATIENTS WITH DE QUERVAIN'S DISEASE

Case	Sex and Race	Age	Occupation	Trauma	Side	Treatment	Immediate Result (Finkelstein's Sign)	Final Result
1	F, W	30	Domestic	No	R	Conservative	Positive	Lost
2	F, W	44	Bookkeeper-typist	Yes	L	Refused	No test	Cured
3	F, W	30	Domestic	Yes	R	Conservative	Negative	Cured
4	F, W	37	Domestic	Yes	L	Surgery	Negative	Cured
5	F, W	24	Weaver	Yes	L	Conservative	Positive	Cured
6	F, W	27	Domestic	No	L	Conservative	No test	Cured
7	M, W	42	Policeman	Yes	R	Conservative	Strongly positive	Cured
8	F, W	51	Bookkeeper-typist	No	R	Conservative	No test	Cured
9	F, W	24	Domestic	No	R	Conservative	Negative	Lost
10	F, W	25	Domestic	No	R	Conservative	Strongly positive	Cured
11	F, C	66	Domestic	No	R	Surgery	Positive	Cured
12	F, C	35	Nurse	No	R	Conservative	Strongly positive	Cured
13	F, W	71	Domestic	No	L	Conservative	Positive	Cured
14	M, W	27	Lamp-lighter	Yes	R	Surgery	Negative	Cured
15	F, W	54	Domestic	No	L	Surgery	Negative	Cured
16	F, C	26	Domestic	No	R	Surgery	Negative	Cured
17	F, W	50	Typist	Yes	R	Conservative	Positive	Cured
18	F, C	38	Domestic	No	L	Refused	No test	Cured
19	F, W	29	Nurse	No	R-L	Conservative	Negative	Cured
20	F, W	54	Domestic	No	R-L	Conservative	Strongly positive	Cured
21	M, W	27	Butler	Yes	L	Surgery	Negative	Cured
22	F, W	42	Nurse	No	R	Surgery	Strongly positive	Cured
23	M, W	71	Retired public official	No	R	Conservative	No test	Lost
24	F, W	45	Domestic	No	R	Conservative	Strongly positive	Cured
25	F, W	48	Domestic	No	L	Surgery	Negative	Cured
26	F, W	35	Typist	No	R-L	Conservative	Positive	Cured
27	F, C	20	Weaver	No	L	Conservative	Strongly positive	Lost
28	M, C	50	Workman	Yes	L	Surgery	Negative	Cured
29	F, W	60	Domestic	No	R	Conservative	Positive	Cured

The symptoms appeared suddenly in eight wrists, and gradually in twenty-four wrists. Pain was the predominant symptom, and was noted in every patient. Localized pain on the radial border of the wrist was noticed in thirty-one wrists; referred pain in nine wrists; pain radiating to the thumb in twelve; pain radiating to the forearm in ten; and to the forearm and arm in two.

A visible or palpable tumor on the radial surface of the wrist was found in twenty-six. In twenty-three wrists, Finkelstein's sign was strongly positive and in nine, it was positive. Eight patients complained of spontaneous pain, especially severe at night, sometimes interfering with sleep.

A roentgenographic study was carried out on twenty-two wrists. Of these, six appeared normal, eleven had localized osteoporosis, six showed periosteal reaction, two had hypertrophic arthritis, and one had diffuse osteoporosis, and one had atrophic arthritis. In only one patient was the Kahn test positive. Eight patients had a high sedimentation rate (Westergren), between ten and forty-two millimeters in the first hour. Of the thirty-two patients studied with de Quervain's syndrome, seventeen complained of other diseases. Four patients had deltoid bursitis, five had generalized articular pains, two had torticollis, and five patients had miscellaneous conditions such as diabetes or heart disease.

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ry	Negative	Cured
ervative	Positive	Cured
ervative	No test	Cured
ervative	Strongly positive	Cured
ervative	No test	Cured
ervative	Negative	Lost
ervative	Strongly positive	Cured
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ervative	Strongly positive	Cured
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ervative	Positive	Cured
sed	No test	Cured
ervative	Negative	Cured
ervative	Strongly positive	Cured
ry	Negative	Cured
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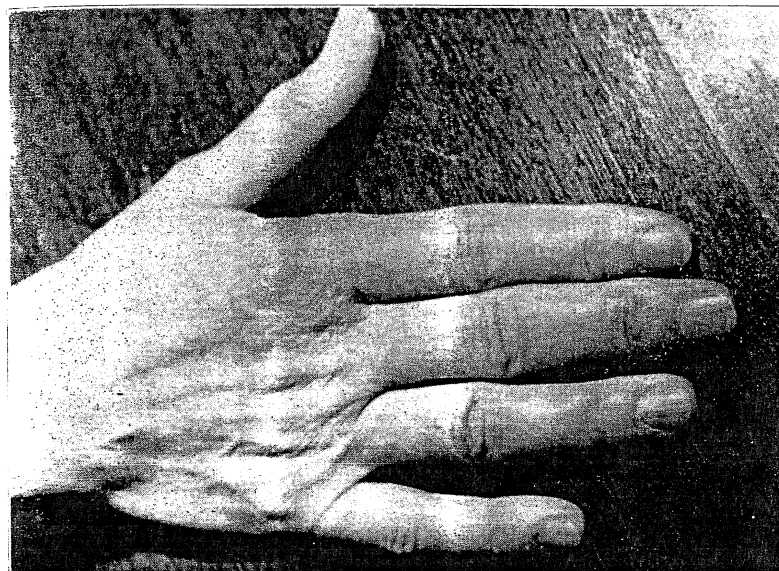


FIG. 7

This patient, a nurse, was operated on without results; the pain was controlled by cortisone.



FIG. 8

This photomicrograph shows fibrosis and slight lymphocytic infiltration. Note the proliferation of endothelial cells of small blood vessels (hematoxylin and eosin, $\times 120$).

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Nine wrists were operated on, and twenty-one were treated conservatively. Two patients refused treatment. Histological sections (Fig. 8) were obtained from eight wrists. Surgical treatment consisted in removing the fibrous covering of the canal located at the distal end of the radius. There were three tendons in the osteofibrous groove in three wrists; once four tendons were found. In five wrists there were only two tendons—one for the abductor pollicis longus and the other for the extensor pollicis brevis.

The conservative treatment consisted in plaster immobilization of the wrist, with the thumb in slight abduction, for a period of from two to six weeks. This

was not always sufficient to control the pain; therefore, an analgesic drug, such as aspirin or phenylbutazone, was simultaneously employed.

Beginning in 1953, the use of hydrocortisone in dosages of twelve milligrams injected locally was begun. At first, the drug was indiscriminately administered; later, after some experience was gained, hydrocortisone was used only in those patients who had a short history of discomfort and in whom the condition was limited to synovitis or to a mild fibrous thickening of the structures surrounding the tendons. It was found that the results were delayed and unpredictable in patients who had had a chronic condition or a conspicuous tumor. In recent patients, local injections of hydrocortisone, analgesic drugs, and plaster immobilization of wrist and thumb afforded results leading to complete relief in an average period of three weeks.

Of the twenty-one wrists conservatively managed, ten were treated by plaster immobilization and analgesic drugs; six, by local injection of hydrocortisone; and five, by local injection of hydrocortisone, plaster immobilization, and aspirin.

For the late results of our series, twenty-five patients (78 per cent), all of whom were treated more than two years previously, were re-examined. A complete cure was observed in all of these patients. It is interesting to note that even the two patients who refused treatment were also free from symptoms.

It is evident that surgical treatment offers quicker and more definite cures than conservative treatment. However, the cure does not depend on the type of treatment instituted. Patients with a strongly positive Finkelstein's sign (Cases 7, 10, 12, and 20) were all asymptomatic on re-examination. One patient with a positive (Case 11) Finkelstein's sign who had been treated surgically was asymptomatic on re-examination.

De Quervain's syndrome runs an apparently cyclical course and tends to be cured completely within a variable length of time, depending upon the general condition of the patient.

CONCLUSIONS

1. De Quervain's syndrome may be considered an occupational disease in many cases.
2. Its cure is very frequently accompanied by a predisposition to rheumatoid arthritis. De Quervain's disease may be an integral part of the clinical picture of rheumatoid arthritis or the collagen diseases.
3. The anatomical findings suggest that the existence of more than two tendons in the radial osteofibrous groove should not be considered abnormal.
4. The phylogenic development of the thumb also forms a plausible motive for the modification of the classic concept of de Quervain's disease.

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