

## A New Factor in the Etiology of Chronic Nonspecific Tendovaginitis in the Wrist

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### ABSTRACT

The most frequent sites of tendovaginitis of the dorsal side of the hand are the first and third compartments. In the first compartment, the tendons of *m. extensor pollicis brevis* and *abductor poll. longus* are involved and the disorder is best known under the name de Quervain's disease. In the third compartment, the tendon to *m. extensor poll. long.* is involved and the damage to this tendon usually manifests itself as a rupture. Local chronic irritation is considered to be one of the causes of the damage but it is not known clearly why these disorders primarily occur in middle-aged women. In the present material comprising women above the age of 50, an account is given of roentgenologically observed local bone and joint overgrowths which would appear to favour the development of the above-mentioned chronic, mechanical irritation of tendons and tendon sheaths. These new bone formations are regarded as part of a general growth disturbance which the author is referring to as involuntal acromegaly.

### INTRODUCTION

Among the long-lasting pain conditions of the wrist, stenosing tendovaginitis is very usual. The most common of them, best known under the name de Quervain's disease, was described by the author mentioned as early as 1885 and was localized to the tendon sheaths of *m. abductor pollicis longus* and *m. extensor pollicis brevis*, i.e. the first compartment of the dorsal side of the hand (16). Usually, the diagnosis involves no problems: pain, local swelling and tenderness over the tendons mentioned are typical symptoms. Furthermore, the patient usually reports indirect pain when extending these tendons which is most easily tested by means of ulnar flexion of the wrist with the fingers closed around a maximally flexed thumb—Finkelstein's test (4). At operation, a thickening of *lig. carpi dorsale* and of the sheath is observed. In some cases there is also a local thickening of the tendon itself. Histological examination has revealed fibrosis, hyaline degeneration and cartilage formation both in the ligament and in the sheath. According to most authors, these changes are the result of a chronic, mechanical irritation.

As the tendons run in a shallow groove over the radial styloid it is clear that a bone fragment after a radial fracture can be one of the causes of the disease. As there is no history on direct traumatization in most cases, however, some authors have considered the cause to be periosteal thickening or formation of exostosis on the radial epiphysis, so-called styloiditis (8, 17, 21). Most publications indicate that women are pre-disposed to this disorder and that, usually, women above the age of 50 are involved. The relationship women/men in some series is 10–20/1 and the sex difference thus appears totally convincing (7, 17, 20). The suggestions made to explain this age and sex distribution appear less imposing: high age results in reduced tissue vitality, middle aged women are engaged in monotonous, manual domestic work—"washerwoman's sprain", the tendons run a different course, "the degree of angulation is usually greater in women" (1, 2, 7). The question must be regarded as unanswered.

Changes of the kind, which in cases of de Quervain's disease affect the first compartment, occasionally occur in the third compartment which contains the tendon to *m. extensor pollicis longus*. Usually, these manifest themselves as a rupture of the tendon in question. One of the causes mentioned has been vocational micro-traumata, e.g. "drummer's palsy", previous trauma or tendon disease but in addition to these there is a small group in which the etiology is unknown. The course of the tendon is considered to be of importance in the pathogenesis of the latter cases. Inclosed in the third dorsal tendon sheath, the tendon runs in a narrow oblique groove on the back of the radius. This groove is bordered radially by Lister's tubercle which forms a hypomochlion for the tendon which then runs in a radial direction before its attachment at the end phalange of the thumb. In this shallow groove, the tendon and the tendon sheath would thus be exposed to a chronic irritation which would give

Table I. Review of 6 cases with de Quervain's tendovaginitis

Case No.	Age	Tendo-vaginit sin	dxt	Frontal hyper-ostosis	Heberden nodes sin	dxt	Arthros C.m.c. sin	dxt	Diabetes	Other symptoms	Therapy	Results
1	76		+	+	+	+	++	++	(+ <sup>a</sup> )	Peri-arthrit hum-scap.dxt	Salicyl	+
2	69 (Fig. 1)		+	++	++	++	++	++	+	Carpal tunnel syndrome	Phenyl-butazone	+
3	62		+	+	+	++	+	++	?	Hypo-thyroid	Levaxin Phenyl-butazone	+
4	57 (Fig. 2)		+	(+)	+	++	+	++	-	Hypo-thyroid Carpal tunnel syndrome	Thyroid Cortison Op.	(+)
5	70	+		+	++	+	++	+	+	—	Salicyl	+
6	69		+	++	+	+	+	++	+	Hyper-tension	Salicyl Lasix	+

<sup>a</sup> Indicates a positive glucose tolerance test.

rise to laceration. The fact that this takes place has been shown by a number of observations in connection with radial fracture with remaining bone fragments and rupture of the tendon at the site in question (10, 19). The mechanism remains to be explained, however, as no trauma has been shown and as roentgen does not reveal any fracture. Here, the situation is as remarkable as mentioned above for de Quervain's disease, i.e. rupture of the tendon to m. ext. poll. long. involves women in two thirds of the cases and usually women above the age of 50 (7, 18).

#### The problem

When discussing the etiology of the two previously mentioned diseases, two factors appear to be essential: 1) the local irritation factor and 2) the predilection to women above the age of 50. The latter fact, of course, makes one consider endocrine disturbance. After the menopause there are often signs of a growth disturbance in the form of hyperostosis frontalis interna (H.f.i.), osteoarthrosis, especially in the first carpo-metacarpal (C.m.c.) joint and the distal interphalangeal joints in the form of Heberden's nodes (H.N.) and, frequently, a decreased glucose tolerance, sometimes as a manifest diabetes. The material accounted for in this report has been analyzed with respect to the above-mentioned factors.

#### MATERIAL

As pre-requisites for the diagnosis de Quervain's disease, we required local swelling and tenderness over the tendons of the first dorsal compartment and a positive Finkelstein test (17). In the present material there were 6 such cases. Often one will find cases where this triad is incomplete insofar as the local oedema seems to occur in the acute stage of the disease only. In this connection, patients with local tenderness over the tendon sheaths and a positive Finkelstein test have been regarded as potential de Quervain-cases in the borderline zone between being normal or pathological. In order to gain information on the general appearance of these symptoms, consecutive cases of women above the age of 50, who have visited the medical clinic, have been registered. One series comprising 100 cases was taken from the general clinic where the patients came for a variety of disorders, and is referred to in this connection as "normal cases". Another series comprising 50 cases consists of diabetic patients. The material also includes one case with rupture of the tendon to m. ext. poll. longus.

#### RESULTS

The findings in the 6 cases with complete de Quervain's disease are listed in Table I. The symptoms in the potential de Quervain cases have been registered in the consecutive series and for the "normal cases" the results were: tenderness in 11% and positive Finkelstein tests in 16%. The corresponding figures for the diabetic cases were 30% and 22%, respectively.

Table II. Review of 13 cases with potential de Quervain's tendovaginitis

Case No.	Local tenderness + Finkelstein pos.		Frontal hyperostosis	Heberden nodes	Arthrosis in C.m.c. joint		Dia-betes
	sin.	dxt.			sin.	dxt.	
<i>Normal cases</i>							
1		+	+	+	+	+	(+)
2	+	+	+	+	+	(+)	?
3		+	++	(+)	+	++	(+)
4		+	++	+	+	++	(+)
5		+	+	+	(+)	(+)	(+)
6	+		+	+	+	+	-
7	+		+	+	+	(+)	-
<i>Diabetic cases</i>							
8	+	+	+	+	+	+	+
9	+		+	+	+	(+)	+
10	+		+	+	+	(+)	+
11	+		+	+	+	(+)	+
12		+	++	+	(+)	(+)	+
13	+	+	++	+	+	+	+

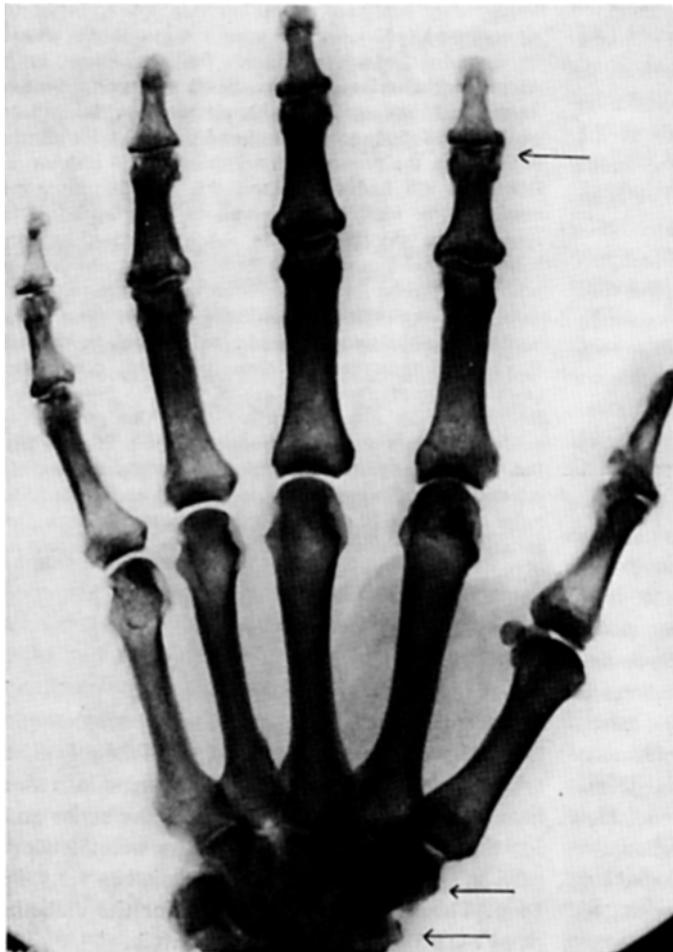


Fig. 1. Case 2. Osteoarthrosis in the first C.m.c. joint, osteophytes on naviculare and multangulum majus and H.N. on the right hand.

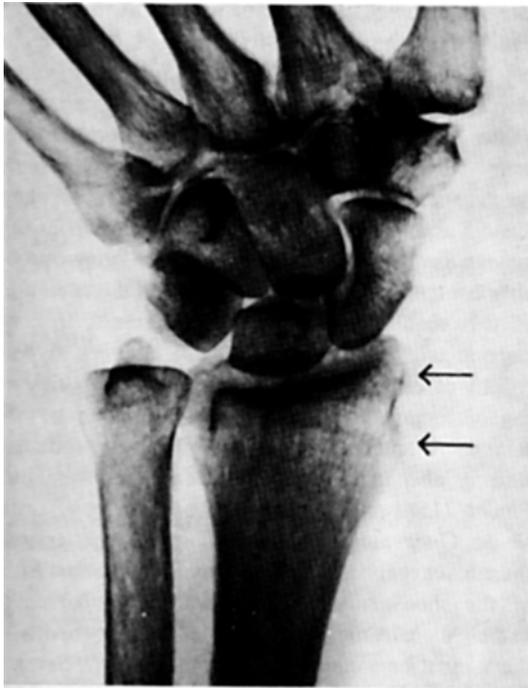


Fig. 2. Case 4. Osteoarthritis in the first C.m.c. joint and osteophytes on proc. styloid. radii dxt.

In the normal series, the number of patients with both symptoms was 11% and in the diabetic cases 22%. From these groups, 7 and 6 patients respectively have been examined in the manner previously described for the genuine de Quervain cases. The results are shown in Table II.

This material includes one case with *rupture of the tendon to m. extensor poll. longus*.

A now 75-year-old woman who, since 1950, has been treated with tiotil for slight thyreotoxicosis has for some months been troubled by prickly pains and numbness in the fingers. These symptoms were always worst at night and improved if she shook her hands. The patient was admitted to the medical department in August 1971. Diagnosis: carpal tunnel syndrome. At examination, there was considerable tenderness over the tendons of the first dorsal compartment and clear atrophy of the thenar musculature, especially on the right side. On her fingers, the patient had slight H. N. Phalen's test was positive bilaterally and Finkelstein's test positive on the right side. The glucose load was positive. It was also found that the patient could not extend the end phalange of her left thumb. This had apparently not worried her too much but she reported that, 7 years ago, while she worked in her garden, she suddenly discovered that it was difficult for her to move the left thumb. Simultaneously she observed "a stretched string" at the location of the tendon to ext. poll. longus. The patient felt no pain and the "string" soon disappeared. Since then, she has had diffi-



Fig. 3. Case 3. 75-year-old woman with rupture of the tendon of m. extensor poll. longus. Osteophytes in the groove for this tendon.

culty in handling certain tools, "most of the time, the hand has been at rest". The patient has never felt that these difficulties have been so severe that she should consult a physician. Roentgen: H.f.i., slight H.N., most pronounced on her right index finger, moderate arthrosis of the first C.m.c. joints, as well as a few osteophytes next to the groove for ext. poll. long. sin. (Fig. 3). The patient was treated with rest, diuretics and butazolidin and improved considerably subjectively. At the time being, the tendon rupture in the patient's left thumb did not call for any medical treatment.

## DISCUSSION

Frontal hyperostosis and osteoarthritis of the first C.m.c. joints and of the distal inter-phalangeal joints in the form of H.N. thus appeared almost constantly in the present selected material comprising women above the age of 50. These women had symptoms which are characteristic of de

Quervain's disease or of rupture of the tendon to ext. poll. long., respectively. Although part of this material comprises known diabetic cases, there is a clear positive correlation with such a disturbance of the carbohydrate metabolism. Previous information with respect to the incidence of H.f.i. in a normal population varies considerably. Most investigations show, however, that these hyperostoses occur almost exclusively in post-menopausal women where they have an incidence of about 20% (5, 9, 11). Among diabetics of the same sex and age, the incidence has been about 30% (11). Many authors are of the opinion that there are good reasons to consider H.f.i. as an expression of an increased activity of the anterior lobe of the hypophysis in connection with involution (5, 11). In patients with frontal hyperostosis, some authors have also found signs of a general growth tendency, among other things an enlargement of the atlas diameter (11) and osteoarthritis of the first C.m.c. joints and of the distal inter-phalangeal joints (6, 11, 12). A similar bone growth and osteoarthritis of the type mentioned above are common in cases of genuine acromegaly. The agreement includes a reduced glucose tolerance, often in the form of manifest but benign diabetes. The introduction of the term *involutional acromegaly* seems to be justified (13). The above-mentioned bone and joint changes by themselves most often cause only slight and spontaneously disappearing troubles. To the extent that adjacent tissues are subjected to pressure, however, the symptoms become more pronounced. In this connection, cranial nerves in shallow bone grooves are in the risk zone. In patients with frontal hyperostosis visual field defects caused by osteophytes in foramen opticum have been observed. After removal of the roentgenologically observed osteophytes there has been quick improvement (3). According to the present author, similar growth changes in the carpal region may contribute to the damage to n. medianus which characterizes the so-called carpal tunnel syndrome (13).

The material presented here shows that bone and joint changes of the type referred to above as involutional acromegaly appear rather constantly in patients with symptoms of de Quervain's tendovaginitis. Considering that the first C.m.c. joint is one of the most frequently used joints in the body, it is likely that osteoarthritis of this joint, perhaps with concomitant subluxation of meta-

carpale I and osteophyte formations in the vicinity can create the chronic irritation of the tendons of the first dorsal compartment. Such an assumption is supported by the corresponding localization of bone and joint changes and de Quervain symptoms which is shown in the tables. The same mechanism with osteophytes on the tuberculum Listeri and protuberances and constriction in the groove for the tendon to ext. poll. longus probably contribute to local irritation and degeneration of this tendon with rupture as a result. In connection with acromegalic growth changes, hypertrophy of bone and periosteum as well as thickening of ligaments and tendon sheaths can be observed. As mentioned before, this is a common finding also in cases of stenosing tendovaginitis. Phalen (15) has stated that "the majority of cases of de Quervain's disease, trigger finger, trigger thumb, carpal tunnel syndrome and periarthritides of the shoulder all have a similar fundamental cause—a chronic, nonspecific tendosynovitis—there must be some etiologic relationship". Several cases, above reported, illustrate this relationship. *Involutional acromegaly appears to be such an etiological factor.*

In treating these diseases it is probably important to observe that there is considerable variation and a tendency towards spontaneous improvement (7). Just as in the case of genuine acromegaly the process seems capable of becoming "burnt out". In acute cases, rest has been used as well as antirheumatic medications and local steroid injections. In order to reduce the formation of oedema, diuretics and thyroid preparations have been used in some cases. If these and similar treatment methods prove to be insufficient, the patient must be subjected to surgery with relief of the pressure on the tendons. In many cases, this has led to immediate improvement of the symptoms but recurrences are not unusual. The uniformity of involutional acromegaly with respect to etiology and the great number of benign symptoms involved would call for a certain degree of conservatism.

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