

# Etiology of Dupuytren's Disease

**Matthias Rab<sup>1</sup>**

<sup>1</sup>Abteilung für Plastische, Ästhetische und Rekonstruktive Chirurgie, Klinikum Klagenfurt am Wörthersee, Klagenfurt a. W., Austria

Controversy exists about the cause of Dupuytren's Disease (DD). The current literature is filled with contributing factors in the progression of the contracture, but the true cause continues to be elusive.

## Associations and factors

### *Alcoholism*

Even now, the exact role of alcohol in the pathogenesis of DD is not clear. Alcohol consumption has doubled over the last 40 years [1]. The prevalence of DD appears to have increased, but estimated rates after 50 years have not doubled, suggesting that alcohol consumption is unlikely to be the direct cause of the disease. The causal factor seems to be mainly the effect of alcohol on the liver, rather than the direct effect it has on the involved tissue [2].

### *Smoking*

A retrospective study to evaluate the history of smoking in patients treated for DD evaluated 132 patients. The smoking histories of these patients differed significantly from those of controls [3]. Previous studies had demonstrated microvascular occlusion patterns in the diseased tissue taken from DD patients at the time of surgery [4]. Because of the association between smoking and microvascular changes, the authors postulated that smoking may play an important role in the causation or aggravation of DD.

### *Diabetes mellitus*

The incidence of DD among diabetics varies between 1.6% and 32%. The prevalence of diabetes mellitus is increasing, and there is a positive association with diabetes mellitus and DD. In a study of 122 patients with diabetes, the overall incidence of DD was 43% and 18% ( $P < 0.001$ ) in the control group. The study concluded a highly significant association between DD and diabetes [5].

In another study, 109 diabetic patients were evaluated and assessed for joint mobility of the upper extremity, for DD, and for other diabetic problems such as retinopathy. A group of 75 non diabetic patients served as controls [6]. Patients with diabetes showed higher incidence of DD than controls, although this was not statistically significant. Type II diabetic patients had a higher proportion of DD than did the Type I diabetic patients. There was a significant association between DD and limited joint mobility in both diabetic groups. The results of this study may mean that DD is associated with microangiopathy in diabetes.



## ***Epilepsy***

An association between DD and epilepsy has been recognized for some time. The reported incidence varies in the literature from 8% to 57%.

The incidence of DD present in an epileptic population (2 epileptic center) was noted at 41 of 342 patients (center 1 = 12%) and 142 of 373 patients (center 2 = 38%). The incidence in the control group was 89 of 555 (trauma center = 16%). No statistical significant difference was noted for either gender when age was less than 50 years. The severity of DD was significant greater however, in the older-than-50 age group of epileptics as opposed to controls [7]. The incidence of DD appears to be directly related to the number of years epilepsy has been present.

## ***Manual work***

It has been the conclusion of most authors that there is no association between occupation and risk for developing DD [8]. An increased incidence has not been shown in professional golfers, baseball players, tennis players, or professional musicians who apply severe and repetitive stresses to their hands.

However, it has gone so far to associate other musculoskeletal conditions with DD which have an increased prevalence in manual workers. A recent study has concluded that patients with a history of frozen shoulder are eight times more likely to develop DD [9].

## ***HIV infection***

Recent reports have suggested an association between DD and human immunodeficiency virus (HIV). In particular, Bower reported a strikingly high prevalence of DD (36%) among a group of 50 men admitted to hospital for complications of HIV infections [10].

## ***Rheumatoid arthritis***

A history of rheumatoid arthritis has a negative correlation with DD [11]. In a cross-sectional study carried out in 1984 which examined the hands of 392 patients with rheumatoid arthritis, a significant reduced prevalence rate of DD in those with a diagnosis of rheumatoid arthritis, suggesting a genetic protective factor against the disease, was noted.

## **Epidemiology of Dupuytren's Disease**

By looking at the medical literature, it soon becomes apparent that the epidemiology of DD has been previously studied extensively albeit only in limited geographical areas. There has been a much quoted concept of DD being labeled as the "Viking" or "Nordic" disease. Other than the common prevalence of DD in Scandinavia, no objective scientific evidence has been found to support and substantiate the "Nordic" origin of this disease. In addition, with the exception of a high prevalence rate in Northern European communities, no actual genetic factors have implicated DD as having arisen in the Scandinavian population [12].

## ***Population Studies***

Prevalence rates of DD ranged from 0.2% to 56% in varying age groups and depended on methods of data collection. DD becomes more prevalent with increasing age. Men typically present for treatment in their fifth decade, whereas women present a decade later. Although it affects men earlier and more frequently, by the ninth decade of life the relative prevalence between genders is nearly equal. The highest prevalence for males was seen in Bosnia and for females in Canada. The highest prevalence rate (56%) was seen in a study group of epileptic patients [13].

## ***DD in other atypical geographical locations***

DD appears to be most prevalent in Caucasian males, but not necessarily of Northern European extraction. There are several other reported cases of DD around the world: in Africa, in Taiwan, in Bangkok, in oriental communities.

## ***DD and its relationship to age and gender***

DD increases with age.

Despite this, DD has also been recognized in the younger population although the disease is not a common finding in pediatric practice [14]. The presence of DD in children may be secondary to a genetic or environmental influence.

The majority of studies have found that DD is more prevalent in the male population with a male to female ratio of approximately 5.9:1 [15]. There appears to be a significantly stronger genetic element of DD in women with familial cases of the disease predominantly in women [16].

## ***Epidemiology linked to etiology of DD***

Two elements in the etiology of DD clearly continue to stand out:

One is the familial nature of the disease and the other is that DD appears to be an extremely common disorder affecting. The heritable nature of DD has been of great interest, with reports of the disease present in as many as three generations and studies suggesting a possible autosomal dominant inheritance pattern [17]. Possibly the multi-factorial etiology of DD has a strong environmental factor, based on the results published by Finsen in 2002 who found that family members were more likely to develop DD if they were residing in the same geographical area as their diseased relative [18], [19].

The origin and spread of DD is presumed to be from Northern Europe.

The prevalence of sporadic cases of DD around the globe suggests there may be spontaneous genetic mutations causing the disease and that environmental factors may also play a role in the development of the disease.

## References

1. Leon DA, McCambridge J. Liver cirrhosis mortality rates in Britain from 1950 to 2002: an analysis of routine data. *Lancet*. 2006 Jan 7;367(9504):52-6. DOI: 10.1016/S0140-6736(06)67924-5
2. Noble J, Arafa M, Royle SG, McGeorge G, Crank S. The association between alcohol, hepatic pathology and Dupuytren's disease. *J Hand Surg Br*. 1992 Feb;17(1):71-4. DOI: 10.1016/0266-7681(92)90015-T
3. An HS, Southworth SR, Jackson WT, Russ B. Cigarette smoking and Dupuytren's contracture of the hand. *J Hand Surg Am*. 1988 Nov;13(6):872-4. DOI: 10.1016/0363-5023(88)90262-6
4. Kischer CW, Speer DP. Microvascular changes in Dupuytren's contracture. *J Hand Surg (Am)* 1984;9:58-62. DOI: 10.1016/S0363-5023(84)80185-9
5. Noble J, Heathcote JG, Cohen H. Diabetes mellitus in the aetiology of Dupuytren's disease. *J Bone Joint Surg Br*. 1984 May;66(3):322-5. DOI: 10.1302/0301-620X.66B3.6725338
6. Pal B, Griffiths ID, Anderson J, Dick WC. Association of limited joint mobility with Dupuytren's contracture in diabetes mellitus. *J Rheumatol*. 1987 Jun;14(3):582-5.
7. Arafa M, Noble J, Royle SG, Trail IA, Allen J. Dupuytren's disease and epilepsy. *J Hand Surg (Br)* 1992;17(2):221-4. DOI: 10.1016/0266-7681(92)90095-J
8. De la Caffiniere JY, Wagner R, Etscheid J, Metzger F. Travail manuel et maladie de Dupuytren. *Ann Chir Main*. 1983;2(1):66-72. DOI: 10.1016/S0753-9053(83)80084-2
9. Bergenudd H, Lindgärde F, Nilsson BE. Prevalence of Dupuytren's contracture and its correlation with degenerative changes of the hands and feet and with criteria of general health. *J Hand Surg Br*. 1993 Apr;18(2):254-7. DOI: 10.1016/0266-7681(93)90123-W
10. Bower M, Nelson M, Gazzard BG. Dupuytren's contractures in patients infected with HIV. *BMJ*. 1990 Jan 20;300(6718):164-5.
11. Arafa M, Steingold RF, Noble J. The incidence of Dupuytren's disease in patients with rheumatoid arthritis. *J Hand Surg (Br)* 1984;9:165. DOI: 10.1016/S0266-7681(84)80020-0
12. Elliot D. The early history of Dupuytren's disease. *Hand Clin*. 1999 Feb;15(1):1-19, v.
13. Critchley EM, Vakil SD, Hayward HW, Owen VM. Dupuytren's disease in epilepsy: result of prolonged administration of anticonvulsants. *J Neurol Neurosurg Psychiatry*. 1976 May;39(5):498-503. DOI: 10.1136/jnnp.39.5.498
14. Rao GS, Luthra PK. Dupuytren's disease of the foot in children; a report of three cases. *Br J Plast Surg*. 1988 May;41(3):313-5. DOI: 10.1016/0007-1226(88)90117-8
15. Wilbrand S, Ekbohm A, Gerdin B. The sex ratio and rate of reoperation for Dupuytren's contracture in men and women. *J Hand Surg Br*. 1999 Aug;24(4):456-9. DOI: 10.1054/jhsb.1999.0154
16. Matthews P. Familial Dupuytren's contracture with predominantly female expression. *Br J Plast Surg*. 1979 Apr;32(2):120-3.
17. Pierce ER. F--Dupuytren's contractures in three successive generations. *Birth Defects Orig Artic Ser*. 1974;10(5):206-7.
18. Mikkelsen OA. The prevalence of Dupuytren's disease in Norway. A study in a representative population sample of the municipality of Haugesund. *Acta Chir Scand*. 1972;138(7):695-700.
19. Finsen V, Dalen H, Nesheim J. The prevalence of Dupuytren's disease among 2 different ethnic groups in northern Norway. *J Hand Surg Am*. 2002 Jan;27(1):115-7.

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