Epidemiology of Dupuytren's Disease

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Introduction

The palmar contracture nowadays associated with Dupuytren's name, had already been described by the Swiss physician Platter (1614) and Sir Astley Cooper (1824) in England before Baron Guillaume Dupuytren made it the subject of his famous lecture on the December 5, 1831 in Paris (Dupuytren 1832, 1834). Despite more than 160 years of investigation, the nature and demography of Dupuytren's contracture are still not entirely clear (Berger et al. 1990).

The prevalence of Dupuytren's malady appears to vary widely in different parts of the word (Early 1962; Strickland et al. 1990). Dupuytren's contracture is virtually confined to Caucasians, mainly of North European extraction, and runs in families (Ling 1963). The digitopalmar fibromatosis is common in Scandinavian countries, frequent in the United Kingdom and Ireland, but less frequent in mediterranean Europe (Egawa 1985; Brouet 1986). Hueston (1987) stated that the disease is almost unknown in Greece and the Middle East.

Egawa et al. (1990) designed a globe with different pale question marks overlying the black-colored continents, pointing to the dearth of information about the epidemiology of Dupuytren's contracture. Consequently, the task of the following presentation is to give a brief survey of the literature concerning geographic and social differences in the prevalence of Dupuytren's disease. Only etiological factors which are of special epidemiological interest will be mentioned.

Dupuytren's Disease Among Caucasians

According to Bunnel (1944) the prevalance of Dupuytren's disease in an unselected American population can be estimated at 1%–2%. In the USA, Dupuytren's contracture is reported to affect mainly whites (Conway 1954). Based on a study among 403 randomly chosen inpatients at a medical and surgical clinc, Rafter et al. (1980) determined an incidence for palmar fibrosis of 17% in an Irish population. In Norway, a skillful examination of hands in a screening programm among 15905 persons was carried out by Mikkelsen

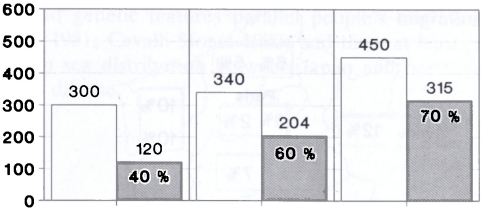


Fig. 1. Survey of blue-eyed Toulonese with Dupuytren's disease (DD). *Left*, control group; *middle*, DD patients, not operated; *right*, DD patients, operated. The *hatched columns* represent the blue-eyed proportion of Toulonese. (From Brouet 1986)

(1972). Dupuytren's contracture was found in 901 individuals, 9.4% of the men and 2.8% of the women. Mackenney (1983) examined 919 patients attending orthopedic clinics in England for evidence of Dupuytren's disease. He determined the male prevalence to be 5% and the corresponding value for females 3.5%. In a thorough study including 80000 patients in Munich, Schnitzler (1935) reported a prevalence of 1.7% with regard to Dupuytren's malady. While the incidence of Dupuytren's disease in a general population of the Federal Republic of Germany can only be estimated, we nowadays may profit from the statistics of former German Democratic Republic. Here we can refer to exact data: Beck (1954) recognized Dupuytren's contracture in 2.39% of the general population of East Germany. If we calculate, based upon the aforementioned figures, the prevalevance of Dupuytren's disease in the reunited Federal Republic of Germany, with 79670000 inhabitants (von Baratta 1991), than at least 1354390 and as many as 1904113 Germans suffer from digitopalmar contracture.

It is interesting that contracture tends to be more prevalent in countries with small homogeneous populations. Dupuytren's fibrosis is seemingly determined by a dominant gene with high penetrance, especially in males; usually men of Celtic or Scandinavian ancestry are affected (Woolridge 1988).

Thus, the prevalence of Dupuytren's disease in mediterranean countries is low; furthermore, the frequency varies from the north to the south. Brouet (1986) pointed at a striking difference concerning the prevalence of Dupuytren's contracture among French Mediterraneans. Due to the Norman invasion of the Mediterranean coast and Sicily in 1066 by the brother of William the Conqueror, there are blue-eyed Toulonese of Nordic stock with a higher incidence of palmar fibrosis and dark-eyed Toulonese with a lower prevalence of Dupuytren's malady. Figure 1 demonstrates a 40% incidence of blue eyes in the control group; the prevalence is impressively increased in patients with Dupuytren's contracture. These ethnic findings are furthermore supported by the geographic distribution of the patients' families. The city of Toulon is situated in the extreme south east of France with a maximal frequency of 17% Comparable but lower percentages are listed for Brittany and Normandy where the invaders also landed (Fig. 2).

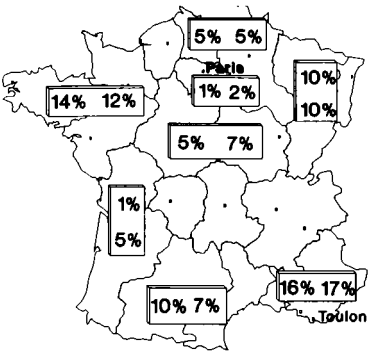


Fig. 2. Distribution of family origin in 650 cases of Dupuytrens disease. Operated patients, n = 250, percentages on *left*; nonoperated patients, n = 400, percentages on right. (From Brouet 1986)

Dupuytren's Disease in Asia

According to Chow et al. (1984) the incidence of Dupuytren's disease in non-Caucasians is low. Palmar contracture appears only rarely in Asian people of pure stock. Concerning the prevalence of Dupuytren's disease on the Indian subcontinent, Srivastavas et al. (1989), in an overview of the available literature, found only ten male cases, three from Pakistan and the remaining seven from North India. Vathana et al. (1990) ascertained a published prevalence of 19 cases of Dupuytren's disease among the Thai population, very few considering that Thailand has 55 million inhabitans. The Commitee on Dupuytren's Disease of the International Federation of Orthopaedists reported only 13 Chinese affected with Dupuytren's malady, while 132 cases of palmar fibrosis were collected from Japan (Vathana et al. 1990). Among the total of 13 142 cases at the Soft Tissue Tumor Registry at the Second Department of Pathology, Kyushu University, Ushijima et al. (1984) found only 42 cases of palmar fibromatoses during their clincopatholgical study. Tsuge (1990) about 80 Japanese patients with Dupuytren's contracture, which he treated over 25 years in private practice as a hand surgeon. Obviously, Japan, with such a low incidence of Dupuytren's contracture, is an unusual geographic area. Ewaga (1985) analyzed a total of 3852 Japanese, ranging from 20 to 95 years old. The mean average age for his group was 62.7 years. All participants in the study lived in the areas of Osaka and Kobe. In all, some 2.9% of males and 0.9% of females were found to have Dupuytren's disease. The author determined that the sex ratio in Japan is comparable to that in northern European countries. Linguistic studies have vividly demonstrated a possible ethnic relationship between the Japanese population and peoples from the region northwest of the

Ural mountains. Linguistic and genetic features parallel people's migration behavior (Cavalli-Sforza et al. 1981; Cavalli-Sforza 1990) and thus, at least in part, explain the similarities in sex distribution between Japan and northern Europe regarding Dupuytren's disease.

Dupuytren's Disease in Blacks

Dupuytren's disease in Blacks, American Indians, and Gypsies is believed to be rare (Zachariae 1971; Makhlouf et al. 1987). However, Yost (1955) reported a prevalence of 2.4% among Afro-Americans based on an analysis of 5062 patients at a large municipal hospital in Brooklyn, New York. These data were ignored for a long time. Since that time, a number of cases in Black men have been described (Furnas 1979; Plasse 1979; Makhlouf et al. 1987), but none of these reports presented scientific and conclusive evidence that the affected individuals were pure Negro stock. Furnas (1979) suspected a small but definite prevalence of Dupuytren's disease even among pure Blacks. Finally, Mennen (1986) examined approximately 6000 Blacks who were hand patients in Pretoria (South Africa) and found only four otherwise normal patients with Dupuytren's contracture, corresponding to a prevalence of 0.0007%. Since none of the "classical" Caucasoid genes occurred in any of the examined black patients, Mennen (1986) claimed that there is no Caucasoid admixture in their backgrounds.

Affliction with Dupuytren's Disease with Progessive Age

Most publications show a comparatively steady increase of Dupuytren's disease with advancing age (Skoog, 1948; James and Tubiana 1952; Millesi 1965). Affliction in early childhood is extremely rare, as demonstrated among others by Berger and Gurr (1985). Conway (1954), for instance, reported that the prevalence was only five men with Dupuytren's disease among one million soldiers, age 21–30 years, during the First World War, The prevalence of Dupuytren's contracture in central Europe in patients <30 years of age ranges from 0 to 5.8%; between 30 and 39 years of age, 2.1%–11.8%; 40–49 years, 12.9%–31.5%; 50–59 years, 24.4%–44.1%; 60–69 years, 16.8%–37.1% and >70 years, 5.2%–14.9% (Geldmacher 1963; Nigst 1971; Stuhler, 1975; Brouet 1986; Forgon and Farkas 1988).

In the UK, Early (1962) determined an incidence of 18.1% for men and 9% for women over age 75. In North America, analyzing a population of the same age, the prevalence among men was 28.7% and 35% for women (Gordon 1964). Among Australians a frequency of 25.6% in men and 20.4% in women older than 60 years was reported by Hueston (1962). The peak prevalence for male Norwegians occurred between 70 and 75 years, whereas women were affected by Dupuytren's disease at a maximum between 85 and 89 years. With regard to peak prevalence, there was a remarkable index shift, pointing to an

approximately 15 years later manifestation of Dupuytren's disease in women than in men (Mikkelsen 1972).

Sex and Digitopalmar Fibrosis

It is not yet known why women are significantly less often affected by palmar fibrosis than are men. Holzrichter et al. (1982) described this phenomenon as "androtropia." Statistics based on a surgical series of Dupuytren's disease demonstrate a much higher frequency in males than in females (Mikkelsen 1972). The male:female ratio, variously reported as approximately 9:1 or 7:1, changes with progressive age to 3.7:1 (Skoog 1948; Berge and Pohl 1988). Statements concerning the sex ratio must be accepted with considerable reserve. Skoog (1948) and McFarlane (1990), for instance, explained that, due to the earlier affliction of males with Dupuytren's disease, they are also operated on more often at an early stage. Thus, due to surgical statistics, the true male:female ratio has probably been overestimated.

Involvement of the Dominant vs Nondominant Hand

Dupuytren's disease was not coincidental to handedness (Hueston 1987). Figure 3 demonstrates graphically the affliction with digitopalmar fibromatosis and involvement of either the right or left hand, or both hands. According to McFarlane (1990), approximately two thirds showed a bilateral affliction with Dupuytren's disease. Data, including those from patients who have undergone surgery, showing that the right hand is predominantly affected actually indicate only that the majority of patients are right-handed and thus handicapped more by Dupuytren's contracture on the right and thus more commonly operated on. However, equal affliction of dominant and nondominant hands does not support a simple traumatic etiology. The relationship between Dupuytren's disease and heavy manual labor is controversial. One of the initiators of this theme of discussion was Baron Guillaume Dupuytren himself (Strickland et al. 1990).

Family History of Dupuytren's Disease Patients

Goyrand (1834) was the first to clearly point out the link between Dupuytren's disease and its familial appearance. A positive family history of Dupuytren's disease is more common in women than in men (McFarlane 1990). Several studies have investigated the role of inheritance in Dupuytren's disease (Fig. 4.) Twin studies showed an equal affliction in both twins compared to a normal population (Jentsch 1937). Ling (1963; n = 832 relatives, n = 50 patients) concluded that there must be a single, presumably dominant, gene in Dupuytren's disease. Thieme (1989) searched for the modes of transmission, rejecting

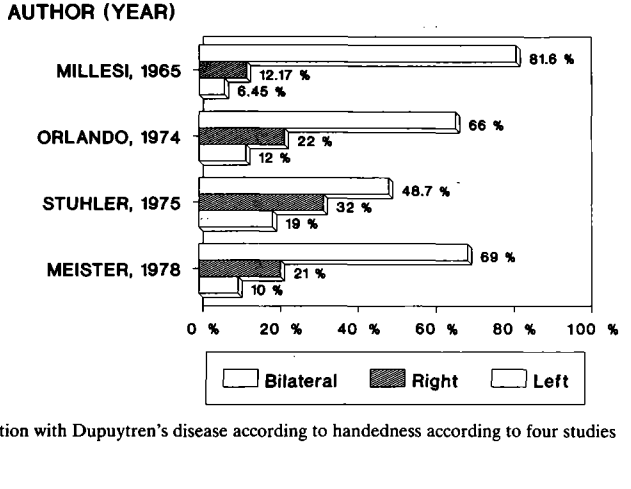


Fig. 3. Affliction with Dupuytren's disease according to handedness according to four studies

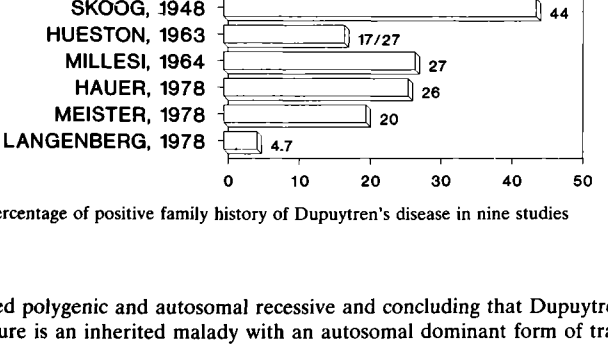


Fig. 4. Percentage of positive family history of Dupuytren's disease in nine studies

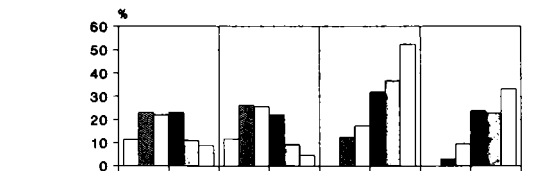
sex-linked polygenic and autosomal recessive and concluding that Dupuytren's contracture is an inherited malady with an autosomal dominant form of transmission (McGrouther 1990). A positive familiy history among Japanese with Dupuytren's contracture showed a similiarly low prevalence, indicating either a mild hereditary expression in Asians or that the etiological factors are other than genetic (McFarlane 1990). The possible mode of inheritance is, however, so irregular that some singular or even multiple inductive factors must act on the genetic predisposition (Zachariae 1970). With regard to surgical treatment and relapses, the prognosis of Dupuytren's disease in individuals is poorer if the family history is positive (Hueston 1963; Millesi 1981).

Dupuytren's Manifestation in Alcoholics

Links between alcohol consumption and Dupuytren's disease have long been recognized (Su 1970). Using a cumulative statistic from data of different authers, Mikkelsen (1972) tried to obtain a positive correlation between alcohol abuse and Dupuytren's contracture. Bradlow and Mowat (1986) also reported, that alcoholics with cirrhosis have Dupuytren's contracture significantly more often than noncirrhotic control groups. It would be worthwhile to determine if liver cirrhosis precedes the onset of Dupuytren's contracture or if it is a secondary disease. In a multinational prosective study McFarlane (1990) searched for a fundamental association between Dupuytren's disease and alcoholism. He found that among his series northern Europeans were overrepresented with respect to alcoholism; the alcoholic group more often had disease and a positive family history, greater incidence of other areas involved and more bilateral affliction. Significantly, he could also show that alcoholics had more extensive disease. Hueston denied a positive relationship between Dupuytren's disease and alcohol consumption because the diagnosis of alcoholism by a surgeon is mainly a subjective one.

Dupuytren's Disease in Epileptics

The correlation between epilepsy and palmar fibrosis remains statistically significant. In general, the coincidence between Dupuytren's contracture and other internal diseases should suggest identical etiological pathways (Fig. 5). With regard to a link between epilepsy and palmar contracture, there are two hypotheses: The first suggests that Dupuytren's disease and epilepsy are linked on a hereditary basis, while the second explains increased palmar fibrosis in



	male	female	male	female
< 20	11.5	11.7	0	0
20 - 29	23.2	26.31	12.5	3.1
30 - 39	22.1	25.73	17.4	9.5
40 - 49	23.15	22.22	32	23.9
50 - 59	11.05	9.35	36.8	22.9
> 60	8.9	4.7	52.4	33.3

Fig. 5. Occurrence of Dupuytren's disease in epileptics by sex and age. *Left columns*, data from Lund (1941); *right columns*, data from Stuhler (1977)

epileptics as secondary to drug treatment. The first suggestion is supported by the fact that palmar contracture is more common in idiopathic than in posttraumatic epilepsy, as could be demonstrated for the region of Lower Saxony (Germany) by Stuhler et al. (1977). The prevalence of palmar fibrosis in epileptics increases with the patient's age and duration of epilepsy (Hurst and Badalamente 1990). James (1985) and McFarlane (1990) could prove by means of age-weighted statistics that the incidence of epilepsy in Dupuytren's surgical patients is approximately six times greater than in the general population. The seizures and locations of Dupuytren's disease in the palma manus of epileptics do not differ from the control (nonepileptics or non-Dupuytren's diseased patients). The ring finger is predominantly involved. For the sake of completeness one should mention that Dupuytren's contracture is not related to the ingestion of barbiturates (Lund 1941; Fröscher and Hoffmann 1983). Why the prevalence of Dupuytren's contracture in epileptics is increased remains unclear.

Dupuytren's Disease Among Diabetics

With regard to the prevalence of diabetes mellitus and Dupuytren's disease a striking difference becomes apparent: There are differing rates depending whether one examines patients suffering from Dupuytren's disease and concomitant diabetes or diabetics who eventually show Dupuytren's contracture (Geldmacher 1970). Surgical studies the on association of Dupuytren's contracture and diabetes mellitus were mainly based on a positive history for clinical mellitus only, ignoring the fact that diabetics with palmar fibrosis rarely need surgery (Lamb 1989). Careful investigations for chemical and latent diabetes mellitus are missing. However, studies among diabetics underestimate the prevalence of Dupuytren's disease mainly due to misdiagnosis, for instance, as diabetic chiropathia (Crisp 1991). According to Noble et al. (1984) the true incidence of Dupuytren's contracture in diabetes mellitus probably thus approaches 40%. The prevalence of palmar fibrosis is not greater in insulin-dependent diabetics than in diet-controlled diabetic patients. Instead, obese diabetics have seemingly more manifest Dupuytren's contracture (Stradner et al; 1987, Hurst and Badalamente 1990). The severity and location in diabetic hands are reported to be atypical. In diabetics a milder type of Dupuytren's disease is described. Concerning diabetic women with Dupuytren's ailment, knuckle pads, nodular forms and tethering without finger contracture are more frequent than in controls. Furthermore, palmar fibrosis is predominantly more radial in diabetic hands (Noble et al. 1984). Sex-dependent differences modifying the incidence of Dupuytren's disease are not more striking in diabetics than in the normal population (Mikkelsen 1972; Hurst and Badalamente 1990).

When analyzing correlations between Dupuytren's disease and concomitant morbidity, surgeons must be aware that patients needing hand surgery because of Dupuytren's contracture represent only a limited percentage of the total

Dupuytren's population. Furthermore, it is noteworthy that the majority of individuals with Dupuytren's disease go through life having had any kind of fasciectomy. Finally, we agree with Flint (1990), who said that Dupuytren's disease seems to be the common endpoint of numerous exacerbating factors – physical, biochemical, or metabolic – rather than due to a single pathologic factor. Further epidemiologic data will lead to fruitful hypotheses and thus aid in elucidating the etiology of Dupuytren's disease.

References

Beck W (1954) Untersuchungen über die Häufigkeit der Dupuytrenschen Kontraktur. Monatschr Unfallheilkd 57:69–82

Berge G, Pohl G (1988) Die Dupuytren-Erkrankung im hohen Lebensalter. Behandlungsstrategien und Ergebnisse. Zentralbl Chir 113:313–317

Berger A, Gurr E (1985) Dupuytren'sche Kontraktur im Kindesalter. Hanchirurgie 17:139–142

Berger A, Flory PJ, Brenner P (1990) Klinik und chirurgische Therapie der Dupuytren-Kontraktur. Unfallchirurg 93:181–185

Bradlow A, Mowat AG (1986) Dupuytren's contracture and alcohol. Ann Rheum Dis 45:304–307

Brouet JP (1986) Etude de 1000 dossiers de maladie de Dupuytren. In: Tubiana R, Hueston JT (ed) La maladie de Dupuytren. Expansion Scientifique Française, Paris, pp 98–105

Bunnell S (1944) Surgery of the hand. Lippincott, Philadelphia

Cavalli-Sforza LL (1990) Stammbaum von Völern und Sprachen. Spektrum Wiss 1:90–98

Cavalli-Sforza LL, Feldman MW (1981) Cultural transmission and evolution: a quantative approach. Princeton University Press, Princeton

Chow P, Luk KDK, Kung TM (1984) Dupuytren's contracture in Chinese. J R Coll Surg Edinb 29:49–51

Conway H (1954) Dupuytren's contracture. Am J Surg 87:101–119

Cooper AP (1824) Dislocation form contraction of the tendon. In: Cooper AP (ed) A treatise on dislocations and fractures of the joint, 4th edn. Longman, Hurst, Rees, Orme, Brown, and Green, London, pp 486–488

Crisp AJ (1991) Connective tissue and joint disease in diabetes mellitus. In: Pickup JC, Williams G (eds) Textbook of diabetes, vol 2. Blackwell, Oxford, pp 753–761

Dupuytren G (1832) Leçons orales de clinique chirurgicale. Faites à Hôtel-Dieu de Paris. Baillière, Paris, pp 1–24

Dupuytren G (1834) Permanent retraction of the fingers, produced by an affection of the palmar fascia. Lancet 2:222–225

Early PF (1962) Population studies in Dupuytren's contracture. J Bone Joint Surg [Br] 44:602–613

Egawa T (1985) Dupuytren's contracture in Japan. Incidental study on outpatients in private practice of general orthopaedics. J Jpn Soc Surg Hand 2:536–539

Egawa T, Senrui H, Horikii A, Egawa M (1990) Epidemiology of the oriental patients. In: McFarlane RM, McGrouther DA, Flint MH (eds) Dupuytren's disease. Churchill Livingstone, Edinburgh, pp 239–245

Flint MH (1990) The genesis of the palmar lesion. In: McFarlane RM, McGrouther DA, Flint MH (eds) Dupuytren's disease. Churchill Livingstone, Edinburgh, pp 136–154

Forgon M, Farkas G (1988) Ergebnisse nach operativer Behandlung der Dupuytren'schen Kontraktur. Handchir Mikrochir Plast Chir 20:279–284

Froscher W, Hoffmann F (1983) Dupuytrensche Kontraktur und Phenobarbitaleinnahme bei Epilepsie-Patienten. Nervenarzt 54:413–419

Furnas DW (1979) Dupuytren's contracture in a black patient in East Africa. Plast Reconstr Surg 64:250

Geldmacher J (1963) Ergebnisse und Erfahrungen bei der operativen Behandlung der Dupuytrenschen Kontraktur. Chirurg 34:451–457
Geldmacher J (1970) Untersuchungen zur Ätiologie der Dupuytrenschen Kontraktur. Handchirurgie Sonderh 1:10–13
Gordon SD (1964) Dupuytren's contracture; plantar involvement. Br J Plast Surg 17:421–423
Goyrand G (1834) Nouvelle recherches sur la rétraction permanente des doigts. Mém Acad (Paris) 3:489
Hauer G, Wilhelm K (1978) Die Dupuytren'sche Palmarfibromatose. MMW 50:1681–1684
Hill NA (1985) Dupuytren's contracture. J Bone Joint Surg [Am] 67:1439–1443
Holzrichter D, Hrynschyn K, Thama G (1982) Dupuytrensche Kontraktur. In: Baumgartl F, Kremer K, Schreiber HW (eds): Haltungs- und Bewegungsapparat-Erhrankungen. Thieme, Stuttgart, pp 331–338 (Spezielle Chirurgie für die Praxis, vol 313)
Hueston JT (1962) Further studies on the incidence of Dupuytren's contracture. Med J Aust 1:586
Hueston JT (1963) Dupuytren's contracture. Williams and Wilkins, Baltimore
Hueston JT (1987) Dupuytren's contracture and occupation. J Hand Surg [Am] 12:657–658
Hurst LC, Badalamente M (1990) Associated disease. In: McFarlane RM, McGrouther DA, Flint MH (eds) Dupuytren's disease. Churchill Livingstone, Edinburgh, pp 253–260
James J, Tubiana R (1952) La maladie de Dupuytren. Rev Chir Orthop 38:352–406
James JIP (1985) The genetic pattern of Dupuytren's contracture and idiopathic epilepsy. In: Hueston JT, Tubiana R (eds) Dupuytren's disease. Churchill Livingstone, Edinburgh, pp 37–42
Jentsch FR (1937) Zur Erblichkeit der Dupuytren's Kontraktur. Erbarzt 4:85
Keen WW (1881) The etiology and pathology of Dupuytren's contracture of the fingers. Philad Med Times 12:370
Lamb D (1989) Dupuytren's disease. In: Lamb DW, Kuczynski K (eds) The practise of hand surgery. Blackwell, Oxford, pp 635–648
Langenberg R (1978) Dupuytren-Kontraktur – partielle Aponeurektomie noch vertretbar? Zentralbl Chir 112:769–773
Ling RSM (1963) The genetic factors in Dupuytren's disease. J Bone Joint Surg [Br] 45:709–718
Lund M (1941) Dupuytren's contracture and epilepsy. The clinical connection between Dupuytren's contracture, fibroma pantae, periarthritis humeri, helodermia, induration penis plastica and epilepsy, with an attempt at the pathogenetic valuation. Acta Psychiatr Neurol 16:465–491
Mackenney RP (1983) A population study of Dupuytren's contracture. Hand 15:155–161
Makhlouf MV, Cabbabe EB, Shively RE (1987) Dupuytren's disease in blacks. Ann Plast Surg 19:334–336
Maurer G (1936) Zur Lehre der Dupuytrenschen Palmarfascienkontraktur und ihre Behandlung. Dtsch Z Chir 246:685–692
McFarlane RM (1990) Dupuytren's disease. In: McCarthy JG (ed) The hand, part 2. Saunders, Philadelphia, pp 5069–5086 (Plastic surgery, vol 8)
McFarlane RM, Botz JS, Cheung H (1990) Epidemiology of surgical patients. In: McFarlane RM, McGrouther DA, Flint MH (eds) Dupuytren's disease. Churchill Livingstone, Edinburgh, pp 201–239
McGrouther DA (1990) Is Dupuytren's disease an inherited disorder? In: McFarlane RM, McGrouther DA, Flint MH (eds) Dupuytren's disease. Churchill Livingstone, Edinburgh, pp 280–281
Meister P, Wilhelm K, Roeckl C (1978) Palmarfibromatose (Morbus Dupuytren). Vergleichende klinisch-pathologisch-anatomische Reihenuntersuchung. MMW 120:93–98
Mennen U (1986) Dupuytren's contracture in the negro. J Hand Surg [Br] 11:61–64
Mikkelsen OA (1972) Prevalence of Dupuytren's disease in Norway. A study in a representative population sample for the municipality of Haugesund. Act Chir Scand 138:695–700
Mikkelsen OA (1990) Epidemiology of a Norwegian population. In: McFarlane RM, McGrouther DA, Flint MH (eds) Dupuytren's disease. Churchill Livingstone, Edinburgh, pp 191–200

Millesi H (1965) Zur Pathogenese und Therapie der Dupuytrenschen Kontraktur. (Eine Studie an Hand von mehr als 500 Fällen). Ergeb Chir Orthop 47:51–101
Millesi H (1981) Dupuytren-Kontraktur. In: Nigst H, Buck-Gramcko D, Millesi H (eds) Handchirurgie, vol I. Thieme, Stuttgart, pp 15.1–15.37
Nigst H (1971) Die Dupuytrensche Kontraktur. Ther Umsch 28:818–821
Noble J, Heathcote JG, Cohen H (1984) Diabetes mellitus in the aetiology of Dupuytren's disease. J Bone Joint Surg [Br] 66:322–325
Orlando JC, Smith JW, Goulian D (1974) Dupuytren's contracture: a review of 100 patients. Br J Plast Surg 27:211–217
Plasse JS (1979) Dupuytren's contracture in a black patient. Plast Reconstr Surg 64:250
Platter F (1614) Observationum, in hominis affectibus plerisque, corpori et animo, functionum laesione, dolore, aliave molestia et vitio incommodantibus, libri tres. Liber primus. König, Basel, pp 137–145
Rafter D, Kenny R, Gilmore M, Walsh CH (1980) Dupuytren's contracture – a survery of a hospital population. Ir Med J 73:227–228
Schnitzler O (1935) Die Bedeutung von Berufs- und Sportschäden bei Morbus Dupuytren. MMW 82:248
Skoog T (1948) Dupuytren's contracture with special reference to aetiology and improved surgical treatment, its occurence in epileptics, note on knuckle-pads. Acta Chir Scand Suppl 139:1–190
Srivastavas S, Nancarrow JD, Cort DF (1989) Dupuytren's disease in patients from Indian sub-continent. Report of ten cases. J Hand Surg [Br] 14:32–34
Stradner F, Ulreich A, Pfeiffer KP (1987) Die Dupuytrensche Kontraktur als Begleiterkrankung des Diabetes mellitus. Wien Med Wochenschr 137:89–92
Strickland JW, Idler RS, Creighton JC (1990) Dupuytren's disease. Indiana Med 83:408–409
Stuhler T, Stankovic P, Ritter G, Schmulde E (1977) Epilepsie und Dupuytren'sche Kontraktur – Snytropie zweier Krankheiten. Handchir Mikrochir Plast Chir 9:219–223
Su CK, Patek AJ (1970) Dupuytren's contracture. Its association with alcoholism and cirrhosis. Arch Intern Med 126:278–281
Tsuge K (1990) Die Dupuytrensche Kontraktur. In: Tsuge K (ed) Atlas der Handchirurgie. Hippokrates, Stuttgart, pp 245–249
Ushijima M, Tsuneyoshi M, Enjoji M (1984) Dupuytren type fibromatosis. A clinicopathologic study of 62 cases. Acta Pathol Jpn 34:991–1001
Vathana P, Setpakdi A, Srimongkol T (1990) Dupuytren's contracture in Thailand. Bull Hosp Jt Dis Orthop Inst 50:41–47
Von Baratta M (ed) (1991) Der Fischer Weltalmanach 1992. Fischer, Frankfurt
Woolridge WE (1988) Four related fibrosing diseases. When you find one, look for another. Postgrad Med 84:269–271
Yost J, Winters T, Fett HC (1955) Dupuytren's contracture. A statistical study. Am J Surg 90:568–571
Zachariae L (1970) The electroencephalogram in patients with Dupuytren's contracture. Scand J Plast Reconstr Surg 4:35–40
Zachariae L (1971) Dupuytren's contracture. The aetiological role of trauma. Scand J Plast Reconstr Surg 5:116–119