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# PREVALENCE OF DUPUYTREN'S CONTRACTURE AND ITS CORRELATION WITH DEGENERATIVE CHANGES OF THE HANDS AND FEET AND WITH CRITERIA OF GENERAL HEALTH

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**The prevalence of Dupuytren's contracture and its coincidence with degenerative changes in the hands and feet as well as loss of distal pulses, were studied in 574 55-year-old residents of Malmö, Sweden. Dupuytren's contracture occurred in 6% of the subjects studied, predominantly in men. Dupuytren's contracture was more common in men with degenerative changes in the feet and in men with signs of impaired arterial blood flow in the lower limbs.**

**Men with Dupuytren's contracture had significantly less subcutaneous fat tissue, as measured by a triceps skinfold index, than men without Dupuytren's contracture. Other signs of general health, occupational work load or psychosocial factors did not interact with Dupuytren's contracture in the current study.**

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It has been suggested that subjects with diabetes mellitus have a higher incidence of Dupuytren's contracture (Lawson et al, 1983; Noble et al, 1984; Jennings et al, 1989). According to Ling (1963), Dupuytren's contracture is inherited in an autosomal, dominant pattern and there is evidence of a linked inheritance with epilepsy. There is also evidence of a relationship between Dupuytren's contracture and alcoholism with cirrhosis (Wolfe et al, 1956; Bradlow and Mowat, 1986; Attali et al, 1987). An association between Dupuytren's contracture, injury and manual work has been proposed by Bennet (1982), and cigarette smoking appears to be a risk factor (An et al, 1988). Dupuytren's contracture is rare in Negroids but common in Caucasians according to Mennen (1986) and Makhlof et al. (1987). Powell et al. (1986) proposed that Dupuytren's contracture was linked to the presence of a palmaris longus tendon. In a previous study we found a coincidence between degenerative changes of the hands and feet. Women with Heberden's nodes had more physically demanding jobs (Bergenudd et al, 1989a).

The purpose of the current study was to examine the prevalence of Dupuytren's contracture and its coincidence with degenerative changes of the hands and feet, and its relationships with parameters of general health, subcutaneous fat, peripheral circulation, occupational work load and psychosocial factors.

## MATERIAL AND METHODS

The 574 subjects in this study, 319 men (56%) and 255 women (44%), were all residents of the city of Malmö, Sweden, and participants in the Malmö Longitudinal Study (Fägerlind et al, 1979), where background information has been assembled since 1938. Hallgren (1946) devised an intelligence test and examined all third graders in the elementary and private schools in Malmö, a total of 1,542 pupils (834 boys and 708 girls) in 1938. Data on social background factors with the father's level

of education in 1938, the parents' attitude towards educational choice, the subject's own education, unemployment before 1965, dependence on social welfare benefits and income were analysed in 1963-1965 and the results presented by Husén (1969).

In 1983 a questionnaire was distributed by the Institute of International Education, Stockholm, to all participants of the Malmö Longitudinal Study still alive (1,362 out of 1,542). Questions about the degree of job satisfaction, including the latitude for decision-making, their life success, income and social network (relations to family and friends) were included. The questionnaire was answered by 1,070 (70%); of those living in Malmö 755 (91%) answered the questionnaire, 418 men and 337 women.

In the Section of Preventive Medicine, Malmö, continuous health surveys have been undertaken since the early 1970's. In 1983 all 55-year-olds living in Malmö were summoned to a health examination and among them were 830 subjects (455 men and 375 women) who were also participants of the Malmö Longitudinal Study. The general health survey included information on the subject's general physical condition; measurement of pulse rate and blood pressure, evaluation of lung function measured by peak flow and pulmonary vital capacity and estimation of physical fitness based on oxygen uptake, and physical leisure time activity according to a scale (1-4) (Bergenudd, 1989). A number of laboratory tests were undertaken including the measurement of haemoglobin, sedimentation rate, serum concentration measurements of calcium, creatinine, urate, cholesterol and glutamyl-transferase. Diabetes mellitus was registered, and measurements were made of the fasting blood glucose and two-hour glucose loading test. Information was also collected on smoking and alcohol habits, history of coronary heart disease or other cardiac complaints. Skinfold thickness was measured by calipers in the right brachial triceps 5 cm above the elbow. Values were

transformed into a log scale before use (triceps skinfold index) (Edwards et al, 1955).

To this general health survey was added a physical examination with special attention on the occurrence of Dupuytren's contracture. Also, the coincidence with degenerative changes of the hands, including Heberden's nodes and tenderness of the first carpo-metacarpal joints was noted. Coincidence with degenerative foot changes—pes transversoplanus, hallux valgus, hallux rigidus and hammer toes—as well as impaired peripheral circulation were examined by a pulse palpation of the posterior tibial artery and the dorsalis pedis artery. One to three months later a follow-up examination was undertaken by a specialist in orthopaedic surgery to verify the diagnoses.

Information on occupation has been recorded in the Malmö Longitudinal Study from 1942 onwards. The occupational work load was classified as follows:

Group 1: light physical demands (white collar workers) such as teachers, office clerks and housewives.

Group 2: moderate physical work, such as nurses, shop assistants, bakers and workers in light industry.

Group 3: heavy physical demands (blue collar workers), such as carpenters, bricklayers and workers in heavy industry.

Ten of the 574 subjects were not classified because of incomplete information. A minimum of 10 years' exposure to moderate or heavy work was the criterion for groups 2 and 3.

#### Statistical methods

Chi-square test and analysis of variance were applied. Levels of significance of 95% or better were accepted.

## RESULTS

### Occurrence of Dupuytren's contracture and coincidence with degenerative changes of the hands and feet

Dupuytren's contracture was found in 36 subjects (6%), 32/319 men (10%) and 4/255 women (2%). In half of the subjects the contracture was bilateral. In the subjects with unilateral changes nine men and two women had the contracture in their right hand and in seven men and two women the contracture was in the left hand. As we found only four out of the 255 women with Dupuytren's contracture the occurrence among women was considered to be too small for further analysis.

No correlation could be found between Dupuytren's contracture and degenerative changes of the hands (Heberden's nodes or pain in the first carpometacarpal joints). On the other hand, men with Dupuytren's contracture had degenerative changes in the feet significantly more often (pes transversoplanus, hallux valgus, hallux rigidus and hammer toes) ( $P < 0.05$ ) (Table 1).

### General health and peripheral circulation

In men with Dupuytren's contracture distal pulses could be felt less frequently than in men without Dupuytren's contracture ( $P < 0.01$ ) (Table 2). 50% of these subjects without distal pulses also had claudication and were smokers. No relationships were found between Dupuytren's contracture and smoking or alcohol habits, diabetes mellitus including the 2-hour glucose loading test, coronary heart disease, pulse or blood pressure, lung function or body height and weight.

Table 1—Coincidence of Dupuytren's contracture and degenerative changes of the feet in men

	<i>Degenerative foot changes</i>	<i>No degenerative changes</i>	<i>Total</i>
Dupuytren's contracture	5	27	32
No Dupuytren's contracture	15	272	287
Total	20	299	319

$P < 0.05$

Table 2—Coincidence of Dupuytren's contracture and loss of palpable distal pulses

	<i>Non-palpable distal pulses</i>	<i>Palpable distal pulses</i>	<i>Total</i>
Dupuytren's contracture	5	26	31
No Dupuytren's contracture	11	276	287
Total	16	302	318

$P < 0.01$

However, men with Dupuytren's contracture had less subcutaneous fat tissue compared to men without Dupuytren's contracture ( $181 \pm 20$  and  $190 \pm 19$ , respectively) ( $P < 0.05$ ) measured with the triceps skinfold index. In women the triceps skinfold index was  $218 \pm 21$  and  $224 \pm 17$ , respectively. The measurement of creatinine in serum as an indication of kidney function was also significantly lower in men with Dupuytren's contracture compared to men without these changes ( $83 \pm 11$  and  $89 \pm 13$ , respectively) ( $P < 0.05$ ). There were no other differences with respect to general health variables between men with and without Dupuytren's contracture.

### Occupational work load and psychosocial factors

There were no differences in occupational work load, level of job satisfaction, income, rating of life success or in relations to family or friends between the subjects with and those without Dupuytren's contracture of their hands. The parents' attitude to educational choice in 1938 was less favourable for men with Dupuytren's contracture ( $P < 0.01$ ). There was also a difference in the result of their intelligence test in 1938—men with Dupuytren's contracture were less successful in the test but the difference were not statistically significant. The same tendency was seen in men with Dupuytren's contracture in the intelligence test in 1948 but the difference was, again, not significant.

### DISCUSSION

The prevalence of Dupuytren's contracture in the current study is in accordance with that reported by Early (1962), Mikkelsen (1972) and Mackenney (1983).

Men and women with Dupuytren's contracture in this study had less subcutaneous fat tissue measured by a triceps skinfold index. This is in agreement with Flint and McGrouther (1990) who reported a reduced subcutaneous fat pad in the palm of subjects with Dupuytren's contracture. The subcutaneous fat was not measured in the palm of the hand in the present study but is obviously reduced by the same amount as subcutaneous tissue elsewhere in the body. The risk of damaging the palmar fascia with repeated trauma to the hands is probably increased in these subjects due to the reduced amount of shock-absorbing subcutaneous fat in the palm of the hands. The finding of a lower triceps skinfold index indicates that less subcutaneous fat in the hand predisposes to a proliferation of fibrous tissue in subjects susceptible to Dupuytren's contracture. Women have also in general more subcutaneous fat tissue and a lower prevalence of Dupuytren's contracture than men, supporting this hypothesis of a shock-absorbing effect of fat tissue which protects the underlying palmar fascia. There were also more men with a Dupuytren's contracture who had moderate or heavy work load compared with those without Dupuytren's contracture but the differences were not significant. Thus, according to the present study,

environmental factors were at least not directly related to the occurrence of Dupuytren's contracture. The relationship between subjects prone to develop Dupuytren's contracture and degenerative changes in the forefoot and signs of impaired peripheral circulation with loss of palpable distal pulses and claudication (also not previously described) is probably due to biological ageing and/or a sex-linked inheritance, as hormonal differences seem to influence the occurrence of Dupuytren's contracture. However, no coincidence with diabetes mellitus or alcoholism with cirrhosis could be found in the current study, which is in contrast to the findings of Wolfe et al (1956), Lawson et al (1983), Noble et al (1984), Bradlow and Mowat (1986), Attali et al (1987) and Jennings et al (1989) but in accordance with the study by Egawa et al (1990). On the other hand, there were only six of the 574 subjects (less than 1%) with the diagnosis of diabetes mellitus in this population and only 22 subjects admitted to daily intake of alcohol.

In previous studies we have found relationships between locomotor complaints (shoulder, knee and back pain) and psychosocial variables such as education, intelligence and job dissatisfaction (Bergenudd and Nilsson, 1988; Bergenudd et al, 1988; 1989b; Bergenudd, 1989). These factors appear less important in the aetiology of Dupuytren's contracture, as was also found in our previous study on degenerative hand and foot conditions (Bergenudd et al, 1989a).

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