

Estimation of the Frequency of the Muscular Pain-Fasciculation Syndrome and the Muscular Cramp-Fasciculation Syndrome in the Adult Population

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Summary. A nationwide two-phase survey was carried out of the adult population of the Netherlands regarding fasciculation, muscle pain and muscle cramp. We conducted a population-based telephone interview with 780 Dutch adults, followed by a questionnaire covering more clinical details, filled out by 311 subjects, who had been interviewed by telephone previously. From these data the frequencies of fasciculation (men 50%, women 61%), muscle cramp (men 28%, women 42%) and muscle pain (men 48%, women 60%) in the Dutch adult population in 1988 were estimated. The combined occurrence of frequent fasciculation and frequent muscle cramp as well as of frequent fasciculation and frequent muscle pain was reported only sporadically. Although the muscular pain-fasciculation syndrome and the muscular cramp-fasciculation syndrome represent combinations of common neuromuscular phenomena, their occurrence in the general population proved to be rare. This finding supports their clinical identity as distinct motor unit hyperactivity syndromes rather than mere coincidences of fasciculation, muscle cramp and muscle pain.

Key words: Muscle pain – Muscle cramp – Fasciculation – Prevalence

Introduction

Occasional benign fasciculations are experienced by many healthy persons. In a survey conducted by questionnaire, 70% of a group of medical personnel reported experiencing benign fasciculation, but only a quarter of them reported more than one episode of fasciculation

per month. Eleven out of 539 healthy persons reported the symptom daily [11]. Benign fasciculations are hardly distinguishable clinically or by EMG from fasciculations that occur in lower motor neuron disease. Attempts have been made to distinguish “benign” from “malignant” fasciculation by rate of discharge, shape of potentials or degree of self-awareness by the patient [1, 6, 13].

The term myokymia is applied to a continuous, rippling or undulating muscle twitching in compression or injury of a motor root or nerve. Myokymia is characterized by repetitive bursting or continuous electromyographic discharge, whereas fasciculations are single or occasionally double [6].

In muscle cramp, there is sudden involuntary and painful shortening of muscle, attended by visible or palpable knotting of muscle, often with abnormal posture of the affected joint, and relieved by stretching or massage [12]. It may occur at rest after trivial movement, especially when the muscle is relaxed and shortened, but also after forceful contraction, especially when the muscle shortens. Muscle cramp starts and ends with muscle twitching in different parts of the affected muscle. In most persons it happens rarely, but some people are truly disabled by unusual propensity to cramp [7]. In an inquiry as to the frequency of muscle cramp in 200 normal persons aged 15–80 years with equal numbers of either sex, Hall found that 56% had suffered from cramp. Of those aged 50 or more, 70% had cramp [4]. Norris questioned 121 college students in physical training classes, revealing that 115 had experienced spontaneous muscle cramp at least once. Of these 115, 18 (or 16%) stated that they were awakened from sleep more often than twice per month by muscle cramp, usually of the calf muscles [9].

Spontaneous twitching may occur in the muscles of individuals who are liable to muscle cramp. Other persons have unusually frequent and widespread fasciculations, which may be associated with muscle cramp. Denny-

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Brown was the first to stress the close relations between myokymia, benign fasciculation and muscle cramp [2]. He observed that benign fasciculation tends to occur most prominently in the calf muscles and is commonly associated with repeated muscle cramp. This muscular cramp-fasciculation syndrome has been reported only once to evolve into motor neuron disease with weakness and wasting [3].

Muscle pain is usually a temporary annoyance related to a minor injury, strenuous exercise, or some other easily identified cause. Yet muscle pain is one of the most frequent medical complaints and it occurs in so many different diseases that diagnosis may be difficult [8].

A benign chronic syndrome of troublesome fasciculations accompanied by generalized muscular discomfort and fatigue has been termed the muscular pain-fasciculation syndrome by Hudson [5]. Muscle pain was described most often in the leg muscles, notably the calves. It was usually present in more than one region, increased by muscular activity and diminished by rest. Muscle cramp was not a prominent complaint.

Epidemiological data on fasciculation, muscle pain and muscle cramp are sparse and mostly based upon empiricism. We report a recent epidemiologic survey of the adult population of the Netherlands regarding fasciculation, muscle pain and muscle cramp.

Subjects and methods

Telephone ownership in the Netherlands is universal (data not shown). Although data in a telephone interview study are self-reported, we have evidence that they are reliable [10]. The methods of telephone interview and postal questionnaire were not specifically validated because of difficulty in observing muscle cramp, fasciculation and muscle pain. After a pilot study, estimating the frequency of muscle cramp, fasciculation and muscle pain and indicating the extent of the sample, random sampling of 780 numbers from the telephone directory of the Netherlands was performed by a computer. These numbers were dialed by a single telephone interviewer. When the person, who answered the telephone, was younger than 18 years of age or a foreigner the interviewer would ask for a Dutch adult present. If one was not available, a new randomly drawn telephone number was dialed. Also telephone numbers of businesses, shops, institutions, foundations, corporations, societies and unions were excluded from the survey. In these cases a new randomly drawn telephone number was dialed. When no one answered the telephone, the interviewer continued to call that number at various times of the day and week. In this way nearly all numbers could be contacted. When cooperation was refused by the subject interviewed, a new randomly drawn telephone number was dialed. Less than 5% of the subjects interviewed refused to cooperate. Interviews were made on weekdays from 8.00 a.m. until 21.00 p.m. in the period from 12 November until 5 December 1988. Two hundred and forty men and 540 women were interviewed (median age 44 years). Sampling in this way is inherently biased,

mainly because of an underrepresentation of the working population, who are mostly not at home during office hours. It is likely to overrepresent women, non-working people, the ill and a population of poor functional status. To address this, data were corrected for the sex- and age-distribution of the population of the Netherlands in 1988. This is not sufficient to correct for illness and occupation. All subjects were asked to fill out a detailed questionnaire after the telephone interview. Persons, who agreed to fill out the questionnaire and admitted suffering from muscle cramp more frequently than 20 times a year, received a form. An equal number of subjects, who agreed to fill out the questionnaire but did not suffer from muscle cramp, received a questionnaire as an internal standard. Finally, a random sample of subjects, who agreed to fill out the questionnaire and suffered from muscle cramp less frequently than 20 times a year, also received a form. Eighty-two per cent of the questionnaires (335) were filled out and returned (90 by men, 245 by women). Seventeen questionnaires were filled out by persons other than the subjects interviewed by telephone and 7 were not filled out correctly. A total number of 311 questionnaires was analyzed. Data from the questionnaires were corrected for the age- and sex-distribution of the population of the Netherlands in 1988.

In the telephone interviews and questionnaires, muscle cramp was defined as a sudden involuntary painful muscle contraction, accompanied by hardening of muscle, lasting no longer than 10 min. The telephone interviewer was careful to exclude subjects with other types of muscle or limb pain by repeatedly stressing this definition. Writer's cramp and other occupational cramps probably represent task-specific dystonias and were excluded from the study. Muscle pain was described as pain in the muscles, e.g. occurring after sport or during influenza. Fasciculations were defined as spontaneous visible muscle twitches that occur involuntarily and are not painful.

Frequencies calculated from telephone interviews were corrected for the age- and sex-distribution of the population of the Netherlands in 1988 (F_{int}). Inconsistencies in the answers in the questionnaires were carefully cross-checked.

Sensitivity and specificity of data collection by telephone interview compared with the questionnaires are presented in Table 1.

The low specificity of the telephone interviews, implying many false positive answers, may reflect the difficulty in apprehending the definitions of muscle cramp, fasciculations and muscle pain within minutes.

Real frequencies in the general population (F_{real}) were computed from:

$$F_{int} = F_{real} \times \text{Sensitivity} + (1 - F_{real}) \times (1 - \text{Specificity})$$

Table 1. Data collection by telephone compared with questionnaires

	Sensitivity	Specificity
Muscle cramp	86%	71%
Fasciculation	90%	77%
Muscle pain	90%	56%

Table 2. Frequency of occurrence of muscle cramp, fasciculation and muscle pain in Dutch adults in 1988

	Men	Women
Muscle cramp	28%	42%
Fasciculation	50%	61%
Muscle pain	48%	60%

Table 3. Frequency of combined occurrence in Dutch adults in 1988

	Men	Women
Occurrence of both frequent fasciculations and frequent muscle cramp	0.4%	0.7%
Occurrence of both frequent fasciculations and frequent muscle pain	0%	0.7%

Results

Real frequencies of muscle cramp, fasciculation, muscle pain and combinations of these items, calculated from the telephone interviews, are presented in Tables 2 and 3. Fasciculations, muscle cramp and muscle pain are called frequent when the subjects interviewed reported them more often than 50 times in 1988. The occurrence of frequent fasciculation may be underrepresented, because it is well known that some persons are unaware of fasciculations.

Discussion

The muscular pain-fasciculation syndrome and the muscular cramp-fasciculation syndrome both represent clusters of common neuromuscular signs and symptoms. Their clinical delimitation is based upon empirical grounds [2, 5]. Careful neurological examination fails to reveal any abnormality other than the spontaneous muscular activity. Fasciculation and muscle cramp may be induced by mild voluntary contraction of a predisposed muscle and during occlusion of the circulation after application of an inflated cuff around an extremity for ten minutes.

In the muscular cramp-fasciculation syndrome, electromyography showed single polyphasic potentials accompanying each muscle twitch, resulting from the spontaneous propagation of abnormal impulses in the peripheral termination of motor nerve fibres. In the muscular pain-fasciculation syndrome, electrophysiological and light microscopic studies pointed to signs of muscle fibre denervation. Neither syndrome is entirely understood from a physiological point of view; there is no therapy directed to a cause.

The question arises, whether these syndromes represent mere coincidences of fasciculation, cramp and muscle pain or are distinct neuromuscular disease entities in subjects prone to motor unit hyperexcitability. In order to answer this question, data are required on the occurrence of both syndromes in the general population. After

a two-phase nationwide epidemiologic survey, we estimated the frequencies of fasciculation, muscle cramp and muscle pain as well as combinations of these items in the adult population of the Netherlands in 1988. The high frequencies of these items in both sexes agree with empirical data from earlier investigations (Table 2) [4, 9, 11]. The reported high frequency of muscle pain may reflect the current epidemic of fibromyalgia and myalgic encephalomyelitis [14].

Most subjects reporting fasciculations, muscle cramp and muscle pain experience them only seldom. Weekly complaints were reported by 1–2% of the adult population (data not shown). Combinations of weekly fasciculations and muscle cramp or of weekly fasciculations and muscle pain are exceedingly rare (Table 3). Although benign fasciculation, muscle cramp and muscle pain may be considered as nothing unusual in otherwise healthy adults, the muscular pain-fasciculation syndrome and the muscular cramp-fasciculation syndrome are rare and incapacitating, highlighting them as distinct neuromuscular syndromes.

Further investigation of subjects suffering from these extreme forms of "benign" neuromuscular hyperexcitability may eventually produce further insight in the pathogenesis of these phenomena.

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