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Scientific/Clinical Article

Self-management strategies used by patients who are hypersensitive to cold following a hand injury. A prospective study with two years follow-up

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ABSTRACT

Study design: Prospective cohort study.*Introduction:* Knowledge of the strategies used by patients with injuries of the hand to manage cold hypersensitivity should guide information given by health-care workers.*Purpose:* To explore the use of cold-associated self-management strategies in patients with severe hand injuries.*Methods:* Seventy patients being cold hypersensitive following a hand injury, reported use of strategies to limit cold-induced symptoms in the injured hand(s) and the severity of cold-associated activity limitations one and two years after surgery.*Results:* The patients used several strategies, including clothing (100%), use of own body (movement/use of muscles to produce heat or massage of the fingers) (94%), and heating aids (48%), but were still limited in valued cold-associated activities two years after surgery. The number of patients staying indoors, using heating aids and hand wear indoors and during summer-time increased with severity of cold hypersensitivity. Patients both implemented and discontinued different strategies after the first year, but for most strategies, the proportions of users were quite stable.*Conclusion:* The most common strategies used to limit cold-induced symptoms in the injured hand(s) were clothing and use of own body. Many patients also seemed to benefit from using heating aids. After one year, a number of patients still experimented in finding the best strategies and were still limited in valued cold-associated activities.*Level of evidence:* 2b.

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Introduction

Cold hypersensitivity implies an abnormally low threshold to elicit cold-associated symptoms and signs and affects the majority

The paper has not been adapted from a presentation at a meeting, but parts of the content have been presented at Norwegian meetings.

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of patients sustaining upper-extremity nerve injuries.^{1–4} Typical symptoms are pain, aching, numbness, weakness, and stiffness and/or the feeling of coldness in the injured hand upon exposure to mildly cold temperatures and short cooling.^{2,5,6} Exaggerated peripheral vasoconstriction, leading to cold skin and a long time to re-warm fingers after cooling, is also common.^{7,8} The symptoms impair hand function and may restrict participation in work and leisure activities.^{9–11} The condition may arise after any tissue injury in the hand, but severe injuries are associated with more severe cold hypersensitivity.^{3,9,12,13}

Supporting patients in developing and maintaining effective self-management strategies is an important part of treatment. Self-management strategies can be defined as strategies individuals use “to manage the symptoms, treatments, physical and psychological

consequences and lifestyle changes inherent in living with a chronic condition.”¹⁴ Symptom-management is a crucial component of self-management for patients who are hypersensitive to cold, in order to decrease discomfort and optimize hand function and activity performance.

Information provided by health care professionals should be based on the best available knowledge, in order to meet the patient’s needs and preferences. Research-based knowledge concerning the strategies people with hand injuries find useful for managing cold hypersensitivity is, however, scarce. One contribution to the field is a qualitative study by Carlsson and colleagues,⁵ who identified a variety of strategies used to manage cold-induced discomfort and to enable activity among 15 adult patients who were hypersensitive to cold following a hand injury. The strategies were grouped by the categories “changing grip pattern,” “influencing the environment,” “using compensatory aids/equipment,” and “using own body,” the latter including placing the cold hand on warm body parts and doing an “active range of motion/exercises.” No other studies seem to address cold-associated strategies as a main topic, but some findings are reported. Gustafsson and colleagues¹⁵ reported the need for warm gloves at work, due to hand injury, in 20 of 95 patients 10 years after the injury. The participants in a qualitative study from Chemnitz and colleagues ($n = 15$) reported the use of gloves during summer and exposure to warm water to help fingers to re-warm, as long as 20–30 years after injury of the median or ulnar nerve.¹⁰ In a study that included 194 patients with injured hands, Irwin and colleagues¹ found that the patients being most cold hypersensitive “avoided going outdoors,” some “wore gloves all the time,” and those with milder symptoms “kept their hands in their pockets.” In a 6–10 year follow-up study by Vaksvik and colleagues,¹⁶ 21% ($n = 13$) of 63 patients who were hypersensitive to cold following replantation or revascularization of fingers used hand warmers, 6% ($n = 4$) used electrically heated gloves, and 17% ($n = 11$) avoided going outdoors.

In the clinical setting of the present study, patients received written information about strategies to limit the symptoms of cold hypersensitivity. Occupational therapists also demonstrated hand wear and heating aids and discussed strategies with individual patients, targeting their specific needs. In the information folder it was stated that “the body produces, clothing preserves, and heating aids add heat”. The folder informed the patient about clothing and different heating aids, and summarized recommendations from previous patients with similar injuries. The information was mainly based on knowledge from normal physiology, research on healthy persons in extremely cold environments, and clinical experiences. Patients’ preferred strategies to manage cold hypersensitivity over time have not been thoroughly investigated. More research is therefore needed to add knowledge to the recommendations given to these patients during the treatment period.

Purpose of the study

The purpose of the present study was to explore the use of self-management strategies to limit cold-associated symptoms in patients with severe hand injuries for the two first years following surgery.

Methods

Design and setting

The study was conducted in a hospital, responsible for all replantation/revascularization procedures, in Norway. The study participants received questionnaires at a clinical follow-up examination 1 year after injury and by mail in January (cold weather conditions) following the second year after surgery (≥ 24 months).

Patients

All patients that met the inclusion criteria and who had undergone primary surgery for a hand injury between August 2009 and January 2011 were invited to take part in a cohort study and 75% (113 patients) of the total population agreed to participate. Inclusion criteria were: age ≥ 18 years, understanding Norwegian, and having undergone surgery for a hand injury involving a) a major nerve at wrist-level or b) at least one volar finger nerve proximal to the distal phalange in combination with tendon and/or bone injury. Patients that returned the questionnaires, answered questions about strategies, and defined themselves as cold hypersensitive, both at the 1 and 2 year follow up, were included for analysis in the present study. The Regional Ethics Committee approved the study, and written consent was obtained from all the participants.

Demographic data and questionnaires

Data about injury, work, and cold exposure at work was collected from patient records. Cold exposure at work was measured by the Potential Work Exposure Scale (PWES)^{17,18} at a clinical follow-up 6 months after primary surgery. All other data was collected by questionnaires, 1 and 2 years after surgery.

For this study, we defined cold hypersensitivity as an abnormally low threshold to elicit symptoms on cold exposure, such as discomfort, pain, numbness/reduced finger-sensibility, stiffness, or color changes in the hand. The patients graded severity on a five-point scale with the following categories: “none,” “mild,” “moderate,” “severe,” and “extreme.”

Strategies to reduce or limit cold-associated symptoms were examined by yes/no responses to listed strategies. The list was based on a combination of items included in the Blond McIndoe Cold Intolerance Symptom Severity questionnaire (CISS)¹ and the strategies described in the information folder developed at our clinic (Table 1). To simplify the text in the present paper, the term “active movement” describes the item “move/use the muscles to produce heat” in the questionnaire. We used 0–10 numeric rating scales (NRS) to assess limitations caused by cold-associated symptoms in work and leisure activities (0 indicating not at all and 10 extremely limited) and the importance of reducing limitations in leisure activities (0 indicating not at all and 10 extremely important). Finally, we asked the patients if they had received (yes) or not received (no or do not remember) information about cold-associated strategies during their hospital stay.

Table 1

Questionnaire items in the Blond McIndoe Cold Intolerance Symptom Severity questionnaire (CISS) (left) and items used in the present study (right)

What do you do to ease or prevent your symptoms occurring? (tick off)	What do you do to ease or prevent your symptoms occurring? (tick off yes/no)
1. Take No special action	–
2. Keep Hand in the pocket	Keep hand in the pocket
3. Wear Gloves in cold weather	Wear gloves in cold weather
4. Wear Gloves all the time	Wear gloves/mittens in the summer Wear gloves/mittens indoors
5. Avoid cold weather/stay indoors	Avoid cold weather/stay indoors Move or use the muscles to produce heat Massage the fingers Use hand warmers in glove or the pocket Use electrically heated glove or mitten
6. Other, please specify	Other, please specify

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