

Hand eczema guidelines based on the Danish guidelines for the diagnosis and treatment of hand eczema

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Summary

Background. Classification of hand eczema has traditionally been based both on aetiology and clinical appearance. For 20% of cases, the aetiology is unknown.

Objectives. To suggest a classification based on well-defined aetiology as well as on predefined clinical patterns and on the dynamics of hand eczema.

Methods. Literature studies and discussions among members of the Danish Contact Dermatitis Group.

Results. Criteria are given for the aetiological diagnoses of allergic contact dermatitis of the hands, irritant contact dermatitis of the hands, protein contact dermatitis of the hands, atopic hand eczema and aetiologically unclassifiable hand eczema. Six different clinical patterns are described and illustrated. Suggestions for general treatment principles are given.

Conclusion. Operational guidelines for the diagnosis and treatment of hand eczema are described.

Key words: aetiology; dynamics; hand eczema classification; morphology.

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Introduction

Disease classification facilitates the organization of medical knowledge and clinical experience. A lack of exact definitions can lead to imprecise registration of clinical experience. As a consequence, it may not be possible to reproduce the results of clinical trials. Thousands of patients may have been treated, but imprecise collective experience makes it impossible to accurately estimate prognosis and treatment outcomes. This is also true for hand eczema.

This guideline for the definition and classification of hand eczema was written by the Danish Contact Dermatitis Group at the request of the Danish Dermatological Society. The final version of the guideline was subjected to a hearing among all members of the Danish Dermatological Society, and it was accepted as the official guideline at the annual meeting of the Society in April 2010.

The following is a short version of the guideline.

Definition of Hand Eczema

Hand eczema is an inflammatory skin disorder, clinically characterized by erythema, infiltration, hyperkeratosis,

oedema, and vesicles. Secondary signs may be scaling, hyperkeratotic areas, fissures, erosions, and bacterial infections, chiefly with *Staphylococcus aureus*. In addition to the hands, the wrists and the forearms are often involved. Hand eczema is common, with a 1-year prevalence of approximately 10% in the adult population (1–5).

Hand eczema is typically a dynamic condition extending over years, and its morphology may vary over time, both clinically and histologically. Erythema, oedema and vesicles are characteristic of acute eczema, whereas infiltration, hyperkeratosis and fissures are seen in chronic eczema. Hand eczema generally begins as acute eczema and then passes into a phase with chronic changes, sometimes with periods of acute eruptions. Other types are predominantly monomorphous, such as hyperkeratotic palmar eczema. Important symptoms in hand eczema are itching and pain if there are fissures.

Recent attempts to classify hand eczema include the suggestions of Diepgen et al. (6). They based the classification on a combination of aetiology and morphological signs, but no actual definitions were given.

Identifiable Causes of Hand Eczema

- Significant exposure to irritants, for example wet work, intensive exposure to mineral oils, or friction
- Exposure to contact allergens in sensitized persons
- Exposure to proteins, for example occupational handling of foodstuffs
- Atopic constitution: atopic dermatitis and, less importantly, atopic mucous membrane symptoms

Hand eczema may have one or more of the above causes. Details are given below.

Skin contact with irritants

Skin contact with irritants can occur, for example, through wet work, intensive use of gloves, contact with mineral oils or organic solvents, and friction. These are known risk factors for hand eczema, especially among patients with atopic dermatitis (7, 8). It is important that the exposures be described and quantified, as there is at present no other means of defining the diagnosis of irritant contact eczema.

Contact allergy detected by patch testing

Contact allergy detected by patch testing is a well-established cause of hand eczema in sensitized persons. This may be of particular significance in specific occupations. Contact allergy may also occur in private life and be related to leisure activities. Contact allergy is only a risk factor if there is ongoing or previous exposure of the hands to the allergen concerned (9, 10) (see below).

Systemic allergic dermatitis (also referred to as 'systemic contact dermatitis') may appear as acute or recurrent vesicular hand eczema, if the patient ingests substantial amounts of a chemical substance or natural product for which the patient has a positive patch test reaction. The condition is rare, and, for example, the amount of nickel usually ingested in food does not trigger a reaction (11, 12).

Skin contact with proteins

Skin contact with proteins, for example during occupational handling of foodstuffs, is also a well-known cause of hand eczema. Protein contact dermatitis may be underdiagnosed among exposed non-professionals. Contact reactions to proteins are typically of an urticarial type, and last from 0.5 to 2 hr. Characteristic symptoms among persons who react to foodstuffs are burning, stinging, and itching, seconds to minutes after contact with the foodstuff in question (13). Eczema may develop on repeated exposure. Protein contact may lead to eczema without a preceding urticarial reaction. The underlying immunological mechanisms are poorly elucidated. Immunoglobulin E (IgE) is undoubtedly involved in some reactions. Among patients with protein contact dermatitis, there is an overrepresentation of patients who had atopic dermatitis in childhood (14, 15).

Atopic dermatitis

Atopic dermatitis in childhood and, less importantly, atopic mucous membrane symptoms are well-documented risk factors for the development of hand eczema in adulthood (16–19). Atopic dermatitis in childhood is also generally linked to a poor prognosis of hand eczema, with regard to both severity and duration. Filaggrin mutations may be of significance. Persons with atopic dermatitis probably have the same risk of contracting contact allergy as the background population (20).

Diagnosis of Patients with Hand Eczema

The medical history of the patient should include the following:

- Family history; past medical history
- Asthma or rhinitis
- Previous or current atopic dermatitis
- Psoriasis
- Previous diagnoses of allergy
 - Type I allergy, prick test, specific IgE
 - Type IV allergy
- Previous hand eczema or other types of eczema

- Time of onset and relation in time to any previous exposures
 - Exposures at home and during leisure activities
 - Exposures at the workplace
- Course of hand eczema
 - Acute, chronic, intermittent, cyclic
 - Severity (sick leave, change of work, etc.)
- Previous and/or current treatment for hand eczema

Physical examination and clinical classification

Hand eczema is, in general, a polymorphous clinical condition, typically with morphological change over time. The significance of the physical changes in relation to endogenous/exogenous eczema has not yet been well defined; that is, there is no clear link between morphology and aetiology.

At the first consultation, the extent and physical signs of the hand eczema should be described. In addition, the clinical type of the hand eczema should be noted. During the course of treatment, possible variations of the clinical type should be noted.

We propose the following clinical types:

- Chronic fissured hand eczema
- Recurrent vesicular hand eczema
- Hyperkeratotic palmar eczema
- Pulpitis
- Interdigital eczema
- Nummular hand eczema

Chronic fissured hand eczema. This is defined as dry eczema, usually with scaling and possibly with hyperkeratotic areas and fissures, with a limited number of vesicles on

the sides and palmar aspects of the fingers or on the palmar aspects of the hands. This morphology is typically seen in hand eczema that lasts from months to years (Fig. 1).

Recurrent vesicular hand eczema. This is defined as recurrent eruptions of vesicles on the palms and/or on the sides of the fingers, and possibly also on the palmar aspects of the fingers and around the fingernails. Eruptions may occur at intervals of weeks or months. The eruptions may be so frequent that the eczema presents as chronic eczema. The eczema may also be present on the plantar aspects of the feet. The history of the patient gives information about the eruptive nature of this type of hand eczema (Fig. 2).



Fig. 1. Chronic fissured hand eczema.



Fig. 2. Recurrent vesicular hand eczema.

Hyperkeratotic palmar eczema. This is defined as well-demarcated hyperkeratosis on the palms, possibly extending to the palmar aspects of the fingers. There may be fissures. This type of eczema is distinguished from psoriasis by not being inflammatory and by having no psoriasiform scaling. It does not evolve into psoriasis. There are no accompanying nail changes. There are no vesicles at any time. This eczema can also be seen on the plantar aspects of the feet. This type of eczema is most common among middle-aged men (21) (Fig. 3).

Pulpitis. This is defined as hyperkeratotic eczema on the fingertips, possibly with fissures extending under the nails, especially on the thumbs and middle fingers, but it may affect all fingers; vesicles may occasionally be seen (Fig. 4).

Interdigital eczema. This is defined as eczema in the proximal part of the interdigital spaces with erythema and scaling. Vesicles are rarely seen (Fig. 5).



Fig. 3. Hyperkeratotic palmar eczema.



Fig. 4. Pulpitis.



Fig. 5. Interdigital eczema.



Fig. 6. Nummular hand eczema.

Nummular hand eczema. This is located on the dorsal aspects of the hands or fingers. The well-circumscribed lesions are characterized by erythema, keratosis, vesicles, and possibly oozing. Nummular eczema is frequently secondarily infected with *S. aureus* (Fig. 6).

Diagnostic Procedures

Diagnostic procedures should be based on the patient's case history, and the temporal relationship between the eruptions of hand dermatitis and possible exposures in the home and in the workplace.

After exposure has been mapped, all patients with hand eczema should be examined for contact allergy by patch testing and, if relevant, by prick testing.

Initial mapping of exposure

Review of the personal and occupational exposures to irritants and allergens must be tailored to the individual patient. Exposure to irritants and allergens should be quantified (type, frequency, and duration), and this should be supplemented by reviews of products, data sheets, etc., and, when relevant, contact with manufacturers and employers and visits to workplaces.

Patch testing

All hand eczema patients should be patch tested with the European baseline series as a minimum (22).

In selected cases, skin care products, topical medications and gloves that have been used by the patient should be included in the test.

Furthermore, based on the patient's exposures, testing with selected chemical substances or series should be considered. For some occupations, a general knowledge of exposures has led to recommendations or suggestions for test series. This is, for example, the case for hairdressers.

Other products and items, for example cutting oils and plants, should be considered for testing if there has been a relevant exposure.

It is important not to test with products or concentrations that are strong irritants, corrosive, or sensitizing. Textbooks or review articles should be consulted for patch testing recommendations.

The patch test should be read on day 3 or day 4 and, ideally, also on day 7. With only one reading, about 20% of the truly positive reactions are lost (23, 24).

Assessment of the outcome of the patch test should be based solely on morphological criteria. The patient can be said to have contact allergy if one or more reactions to an allergen fulfil the following criteria:

- + : Erythema, homogeneous infiltration
- ++ : Erythema, homogeneous infiltration and vesicles
- +++ : Erythema, homogeneous infiltration and confluent vesicles

Great care must be taken when reading the test reactions. This is especially true if testing is carried out with substances not included in the European baseline series, the patient's own products, natural products, and chemicals for which there is no published experience.

The test system used should be noted in the patient's medical record, as the various test systems are not fully harmonized with regard to the composition of the individual allergens or their biological activity.

Prick testing

A prick–prick test with fresh foodstuffs (e.g. fish, meat, or vegetables) or a prick test with standardized allergens (e.g. natural rubber latex proteins) can be performed. A prick test is positive when it causes an oedematous papule with a diameter > 3 mm. Both a negative and a positive control should be included (25). In order to detect a possible atopic component of the hand eczema, a prick test with a panel of inhalation allergens may be performed. Hand eczema patients with occupational exposure to latex gloves should be examined for latex allergy by prick test and/or radioallergosorbent (RAST) test (26).

Mapping exposure after patch testing

Standards for mapping exposure to contact allergens. Repeated exposures with low concentrations of allergens may be significant. This is relevant for exposure to, for example, liquid soap or cutting oils.

Unless exposure to contact allergens can be excluded, it should be assumed that the patient has been exposed to the allergens that gave rise to positive patch test reactions.

The process of documenting such exposures may include the following procedures:

- Review of product content. This is especially appropriate for exposure to cosmetic products and detergents.
- Review of data sheets, in particular in connection with occupational exposures, for example to paints, glues, and cutting oils.
- Contact with the manufacturer to obtain relevant product compositions and chemicals for patch testing. Typically, a follow-up to the review of data sheets.
- Visit to the workplace if suspected exposure is not revealed by the above.
- Chemical spot tests. Appropriate for nickel, chromi-umate, and cobalt (27).
- Formaldehyde analyses of various products.
- Chemical analyses in specialized laboratories, if relevant.

- Identification of plants and types of wood in collaboration with specialized university institutes.

Particularly in workers' compensation cases, it is important to describe the specific steps taken to exclude/identify possible exposures to allergens.

The mapping of exposure should lead to a conclusion as to whether the contact allergies detected are of current relevance for the hand eczema. The relevance can be proven, probable, or possible.

Standards for mapping exposure to irritants. The exposures to irritants that commonly give rise to hand eczema are, typically, of a repetitive nature, such as:

- Wet work
- Intensive contact with
 - detergents
 - alkaline substances
 - oil products, including cutting oils
 - organic solvents
- Use of gloves
- Mechanical traumas, such as friction.

Working procedures and non-occupational exposures, including leisure activities, should be reviewed in order to quantify exposure to irritants, wet work, and the use of tight-fitting gloves.

The number of hours spent daily with wet hands, the number of times that hands are washed, the number of glove changes and the number of hours spent wearing tight-fitting gloves should be estimated (28, 29).

On the basis of the German standard (30), wet work that can give rise to irritant hand eczema is defined as:

- Wet hands for more than 2 hr in the course of a working day
- Frequent hand washing – often defined as more than 20 times daily
- Use of tight-fitting gloves for more than 2 hr per working day

Exposures to other irritants should be described and quantified.

Aetiological Diagnosis

It is necessary to attempt to classify hand eczema aetio-logically, irrespective of the clinical type (morphology).

The aetiological classification of hand eczema should be based on the mapping of exposure to irritants and allergens and of relevant allergy testing, that is, patch tests and prick testing.

The aetiological classification of hand eczema comprises the following groups:

- Allergic contact dermatitis
- Irritant contact dermatitis
- Protein contact dermatitis
- Atopic hand eczema.

All types should be taken into consideration either alone or in combination.

We suggest that the term 'aetiologically unclassifiable hand eczema' be used if it proves impossible to classify the hand eczema within the above groups. Recurrent vesicular hand eczema and hyperkeratotic palmar eczema will often fit this term.

Criteria for classification

Allergic contact dermatitis on the hands. The diagnosis of allergic contact eczema is made on the basis of:

- A positive patch test reaction
- The ascertained, or probable, exposure to the contact allergen in question

Irritant contact dermatitis on the hands. The development of irritant contact dermatitis depends on the genetic make-up of the individual patient. No test can predict the risk of developing irritant contact dermatitis, and nor can any test predict the reaction of the individual eczema patient to irritants. Nevertheless, it is well-known clinically and experimentally that exposure to irritants gives rise to hand eczema.

The diagnosis of irritant contact eczema is therefore based on:

- significant exposure to known irritants, and
- a temporal relationship between such exposure and the development or aggravation of hand eczema.

Protein contact dermatitis. Protein contact dermatitis is defined as hand eczema involving:

- significant exposure to proteins (foodstuffs, latex and other biological material), and
- a temporal relationship between the exposure to the proteinaceous material and the development or aggravation of hand eczema, and
- a positive prick test reaction to the suspected items or, possibly, detection of specific IgE in serum, and/or
- a positive reaction to provocation with, for example, raw foodstuffs placed directly on lightly eczematized fingers (should be performed only in special cases and only if there is a negative prick test/RAST test result).

Atopic hand eczema. Hand eczema may be seen in patients with atopic dermatitis. The diagnosis is usually based on a personal history of atopic dermatitis, but will often depend on a detailed evaluation of all contributing factors. Atopic dermatitis on the hands may be complicated by one or more of the above-mentioned causes of hand eczema (31).

Aetiologically unclassifiable hand eczema. In approximately 20% of hand eczema cases, there are no irritant or allergic exposures or signs of atopic dermatitis to enable an aetiological classification. For this group of patients, a clinical classification may be made as suggested in the section 'Physical examination and clinical classification'.

The dynamics of the hand eczema, that is, constant activity or repeated eruptions of dermatitis, may also be helpful for further classification of patients with aetiologically unclassifiable hand eczema.

Information

Instruction in skin care

There is clinical and experimental evidence that the use of lipid-rich moisturizing creams can promote healing and prevent new eruptions of eczema (32, 33).

Skin care products are important in the prevention and treatment of hand eczema (34).

Skin care with a moisturizing cream that is as greasy as possible helps to restore the skin's barrier function. The cream should be fragrance-free and contain few substances, such as preservatives, that may cause contact sensitivity.

Patients with hand eczema should be instructed in the use of moisturizing cream as part of the prevention and treatment of hand eczema (35–38).

Alcohol-based disinfectants with glycerin (glycerol) are less irritating to the skin than soap and water (39–41).

It is recommended that written information on hand eczema, including advice on skin care and the use of gloves, be given to all patients with hand eczema.

Information about allergies

If contact allergy to one or more chemical compounds has been documented, it is necessary to determine whether the patient's skin has been exposed to the substances in question.

Patients must be informed about their allergies and of their significance for their eczema, as well as how contact can be minimized or completely avoided. It may

be advisable to help patients review the contents of certain products and their environment, with a view to eliminating allergens.

If there is updated written information about the allergen in question, this should be given to the patient. Cooperation with the employer and the occupational health service is important in avoiding exposure to allergens in the workplace.

Instruction in the use of gloves

The patient should be instructed to use gloves in connection with wet or dirty work at the workplace or at home (42).

There are a number of different glove materials. The choice of glove type depends on what the hands are to be protected against (43). Tight-fitting gloves of latex or vinyl protect against water, soap, and other skin irritants, as well as against micro-organisms. For more specialized functions, there are tight-fitting gloves made from different kinds of artificial rubber or plastics.

The type of glove should be suited to the work to be carried out and the chemical compounds that might make contact with the skin.

Tight-fitting gloves should be used *as long as necessary, but for as short a time as possible*. If possible, thin cotton gloves should be worn under the tight-fitting gloves. Cotton gloves should be changed as soon as they become damp.

If the patient is allergic to glove materials, the patient should be advised as to what type of gloves may be safely worn.

Treatment

The treatment of hand eczema must be tailored to the individual patient. Hand eczema of recent onset should be treated quickly and effectively to prevent chronicity. At the same time, an effort should be made to determine the aetiology of the eczema, and instruction on skin care and prevention should be given as described above.

When treatment is being chosen, the severity of the eczema, whether it is acute or chronic, and its morphology should be taken into account.

A topical steroid is the treatment of choice for hand eczema. As a rule, potent topical steroids are used daily for approximately 1 month, followed by either a treatment-free period or maintenance treatment two or three times a week (44).

The diagram in Fig. 7 presents the general principles for the treatment of hand eczema.

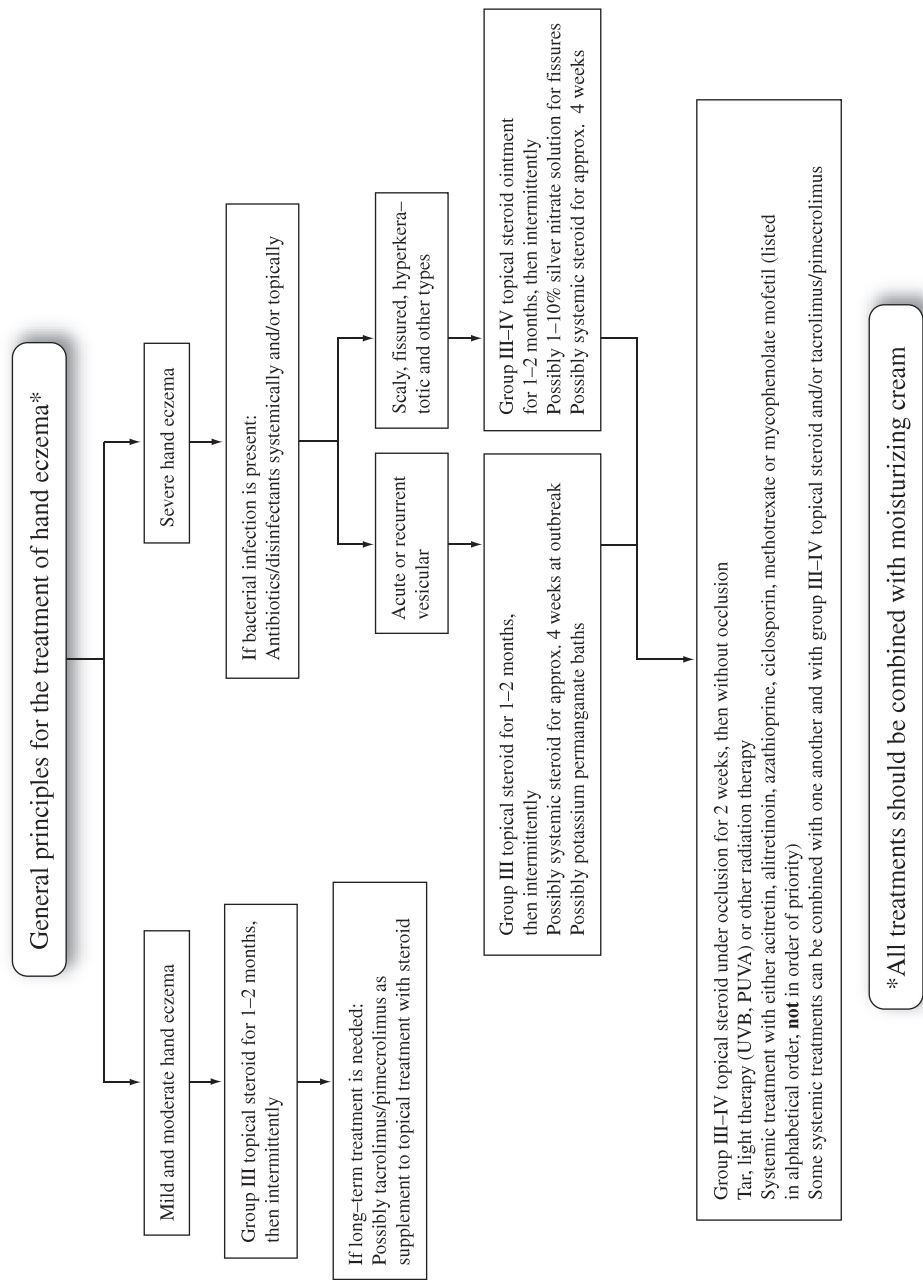


Fig. 7. General principles for the treatment of hand eczema. PUVA, psoralen combined with ultraviolet A; UVB, ultraviolet B.

Work-related Eczema

In Denmark, hand eczema must be reported to the authorities if it is thought to be caused entirely or in part by conditions in the workplace.

Prognosis and Treatment Delay

It has recently been shown that the longer the delay from the onset of hand eczema to the time when the patient is seen by a physician and referred to a dermatologist, the poorer the prognosis of the hand eczema. It is therefore suggested that, if hand eczema has persisted for more than 1 month, the patient should be seen by a dermatologist (45).

Diagnosis and Treatment of Hand Eczema in the Future

There is, at present, considerable research into genetic polymorphisms and mutations that may be linked to the skin's barrier function and to epidermal inflammation. Mutations that have a significant impact on the risk of developing atopic eczema, and probably also certain types of allergic and irritant contact dermatitis, have already been identified. In the future, it is likely that the mapping of exposure to allergens and irritants in combination with the results of genetic studies will provide a basis for an individual classification of hand eczema and for individual advice and treatment.

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