

**Title:** Facial dermatoses in healthcare professionals induced by the use of protective masks during the COVID-19 pandemic.

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The use of face mask is mandatory in many countries in order to prevent transmission of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) during the ongoing COVID-19 pandemic (1,2). In Denmark, it was mandatory to wear face masks at all hospitals during November 2020 to June 2021 (2). However, the increased use of face masks may lead to facial skin complaints. In order to access the nature of these adverse reactions, our department opened for referral of staff from all departments at our hospital if significant skin problems were associated with the use of face masks.

### **Case reports**

A total of 14 healthcare workers were seen from December 2020 to April 2021 (See supporting information). All patients but one underwent extensive patch testing following the recommendations of the European Society of Contact Dermatitis (3). In 10 patients, the final diagnosis was irritant contact dermatitis likely caused by mechanical friction as the face masks were made of coarse fibers (Figure A).

Allergic contact dermatitis was the diagnosis in three patients. In one case the allergy was iatrogenic; the patient's facial dermatitis was treated with topical corticosteroids and she subsequently developed contact allergy to hydrocortisone-17-butyrate. In the following two cases, the allergic contact dermatitis was induced by the face masks.

A surgical nurse with no previous contact allergies developed dermatitis at the nose bridge and periorbital area after exposure to a newly imported brand of surgical masks at work (Figure B). The patch test revealed a strong positive (+2) reaction to nickel sulfate with no other exposures than the surgical mask. The dimethylglyoxime (DMG) test was positive indicating that the metal wire in the surgical mask contained nickel (Figure C). Re-exposure to the mask(s) elicited the dermatitis (Figure B).

A medical doctor working at an infectious disease and COVID-19 department experienced facial erythema after exposure to FFP3 masks at work with clearance of the erythema during time off (Figure D). Patch testing revealed a strong positive (+2) reaction to the FFP3 masks but without any other positive reactions (Figure E). It has not been possible to obtain further information of the components in the FFP3 masks from the producer.

## Discussion

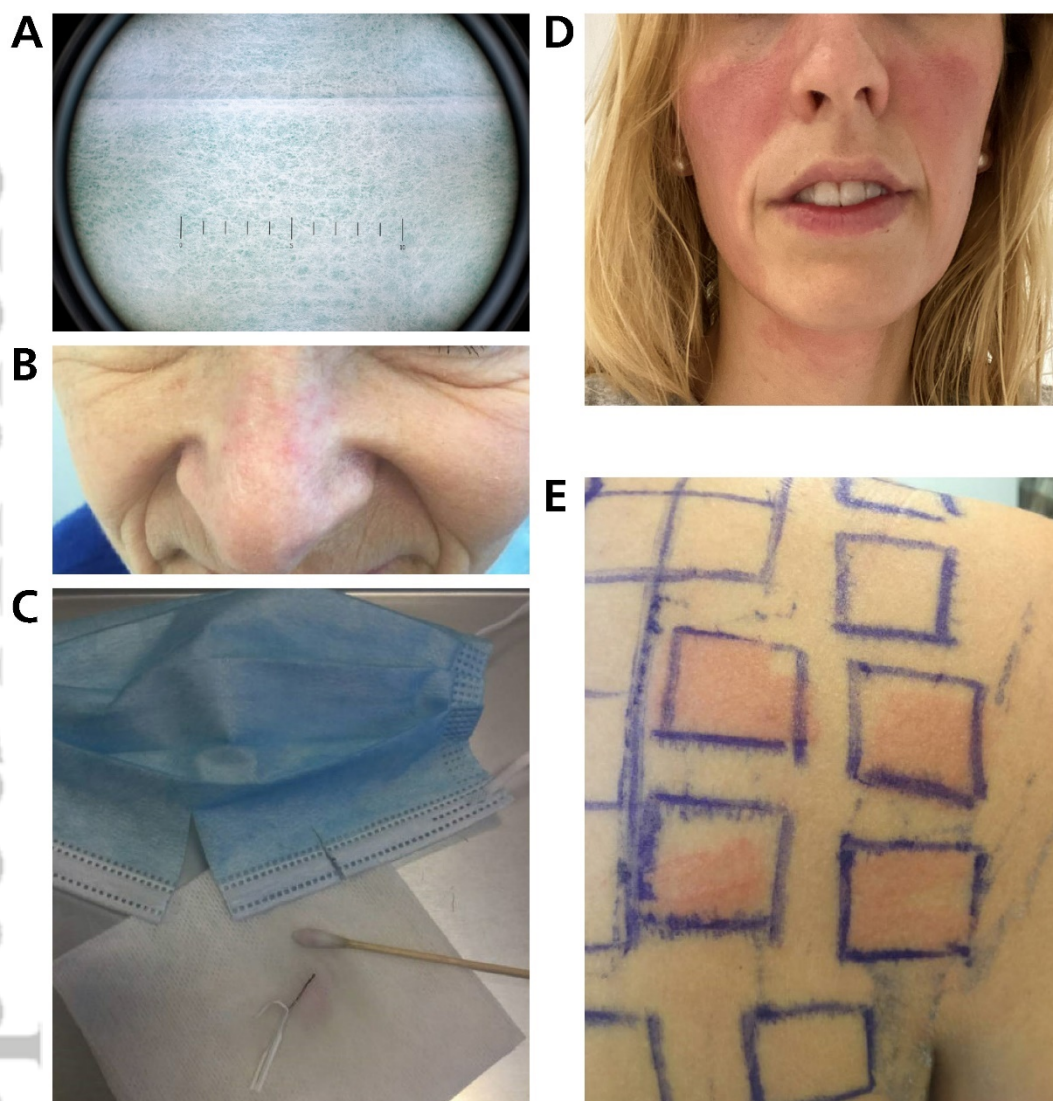
A few reports of facial dermatoses have emerged following the intensified use of facial protective masks (4, 5). To our knowledge this is the first report on likely induction of nickel allergy from the metal tread in face masks. It is easy to overlook this exposure source.

The labelling of medical devices in the EU is unfortunately not as tightly regulated as for example ingredient labelling of medical products and cosmetics (6). This is also exemplified in one of our cases where it was impossible to obtain further information despite that the patient was sensitized to her FFP3 masks. Hence ingredient labelling should be introduced for medical devices such as face masks. Based on these results we recommend a thorough approach in the management of patients with newly developed facial dermatitis due to the use of face masks.

## References

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Figure. Clinical pictures showing the woven fibers in a surgical mask leading to friction dermatitis and allergic contact dermatitis induced by a surgical mask and a FFP3 mask



A. Close-up picture of a surgical mask showing the woven fibers; B. dermatitis at the nose bridge elicited by a surgical mask due to a newly developed contact allergy to nickel in a nurse; C. A positive dimethylglyoxime (DMG) test of the metal wire in the surgical mask (B); D. Facial erythema after exposure to FFP3 masks in a medical doctor; E. Positive patch test results to different parts of two FFP3 masks.