CASE REPORT

Occupational contact allergic dermatitis in dentistry

Profesionalni alergijski kontaktni dermatitis u stomatologiji

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Abstract

Introduction. Dental professionals may be at increased risk of developing occupational allergic diseases specially to methacrylates that can permeate protective disposable gloves.

Case report. We presented a case of occupational allergic contact dermatitis in a 28-year-old dental technician. The patient had complained of itching and cracking of fingers for 6 months. The dermatitis improved over weekends. Skin erythema and scaling were present with primarily involvement of the fingertips. Patch testing with dental series gave positive vesicular reaction to methyl methacrylate. Follow-up after 6 months of allergen avoidance showed a complete regression of dermatitis.

Conclusion. Methacrylates serve as bases for acrylic resins which are used in prosthetics. Methyl methacrylate as a small molecular acrylate can permeate thin protective disposable gloves. Using adequate personal protective equipment, like nitrile rubber gloves, is the most important preventive measure in this occupation. Health practitioners should recognize possible occupational hazards in dentistry and implement appropriate preventive measures to protect health of workers.

Key words: dermatitis, contact; hand; occupational exposure; methyImethacrylate; dentistry.

Introduction

Occupational skin diseases are among the most frequent work-related diseases in industrialized countries. They are often chronic, affect mostly workers in their prime working age and the impact on the individual and society is considerable. Contact dermatitis is the most common occupational skin disease 1,2.

Dental personnel are increasingly exposed to a large number of sensitizing chemicals, and may be at increased risk of developing occupational allergic diseases 3–5. Dental professionals often assume that skin reactions on their hands are due to gloves, ie they assume that they have latex allergy 6.

Case report

A 28-year-old female had been treated for eczema without success. The patient had worked as dental laboratory technician for 10 years, in a municipality health care centre. Her work had involved making of acrylic prostheses. Irritant factors included mechanical friction and wet work. She performed her tasks in a small workroom that had no mechanism for control of air pollution, and she wore disposable medical examination gloves regularly.

There are numerous chemical hazards in prosthesis production: solvents, mineral acids, gases and vapors released during polymerization, as well as dust coming from plaster, metal alloys, ceramics and acrylic resins. Also, the meas-
measurement in a dental laboratory revealed concentrations of methacrylate monomer up to 2.4 times higher than maximal allowable concentration (MAC), which 410 mg/m is in our country 3, 6.

The patient had complained of itching and cracking of fingers for 6 months, and had been treated for eczema for 4 months (ointment mometasone furoate, Solcoseryl gel) prior to her admission to our Institute. The patient had no significant medical history. Her dermatitis improved over weekends. Physical examination revealed skin erythema and scaling. The fingertips were primarily involved (Figure 1).

Patch tests were applied to the back for 48 h. Readings were made after 48 h and 72 h according to the – to +++ scale recommended by the International Contact Dermatitis Research Group. Patch testing after 48 h and 72 h gave positive vesicular reaction (+++) to methyl methacrylate. Patch tests to other allergens of dental series (potassium dichromate, cobalt nitrate, nickel sulphate, formaldehyde, hexamethylene tetramine, epoxy resin, phthalic anhydride, mercury precipitate, colophony, balsam of Peru, benzoyl peroxide, tinctura benzoica, ethylene glycol, copper sulphate, benzocaine, hydroquinone) were negative. Complete blood cell count, urinalyses, pulmonary function tests and chest radiography were within normal limits. Pulmonary function tests and chest radiography were done due to exposure to air pollution at workplace.

Occupational allergic contact dermatitis was confirmed in the presented dental technician. Avoidance of allergen was strongly suggested to the employer. After that, the patient has started to work as a dental nurse. The prognosis was favorable. Follow-up after 6 months showed complete regression of the dermatitis.

Discussion

Effective treatment of occupational skin disease requires a complete and accurate diagnosis. Methacrylates are frequently used in dentistry (fillings, coating of teeth and in prosthetics, in dental plates and dentures). Methyl methacrylate as the residual acrylic monomer in the self-cured portion of denture may be present in concentrations sufficient to cause reactions on the skin and the oral mucosa in sensitized individuals (stomatitis, burning mouth syndrome) 7, 8. Also, methyl methacrylate is found in bone cement and adhesives 9–11.

Glues and artificial nails are a relatively common occupational source of sensitization to methacrylates and acrylates in addition to dental restorative materials 12, 13. Recently, the number of cases of contact allergic dermatitis among beauticians specialized in sculpting artificial nails, as well as in their clients has increased 14, 15.

In studies reporting patch test results, the prevalence of contact allergy to methyl methacrylate have been reported to be about 1% 16, 17. Reports on occupational contact dermatitis in dental personnel showed that acrylates caused allergy in 22% and 25% of all examined patients in Sweden and Poland, respectively and allergy to methyl methacrylate was detected in 15% and 9% of patients respectively 18, 19. In 55 dental laboratory technicians with suspected occupational skin disease in Germany, methyl methacrylate as allergen was identified in 16% 20.

Procedures to minimize risk should be planned and implemented. Risk perception is an initial step in developing procedures to minimize occupational risks 21. Regular medical surveillance of workers is important for detection of occupational dermatoses. Engineering control of air pollution in the workplace and use of personal protective equipment are the most important measures for the prevention of skin diseases in this occupation 6.

Thin disposable medical examination gloves are used regularly as protective personal equipment. Dental technicians often omit to wear personal protective devices, because they impede their precise work operations 6. Even when these protective gloves give good protection against microbes, as well as most skin irritants or allergens, small molecular acrylates can permeate them quite rapidly. To prevent acrylate allergy, which may lead to a change of occupation,
direct skin contact should be avoided. It is important to develop no-touch techniques to avoid skin exposure to these chemicals. Also, protection can be improved by using nitrile rubber gloves or double gloving. Instructing workers about the safety regulations and environmental hazards reduces workers’ unsafe behavior.

**Conclusion**

There is an ever-growing need for health practitioners to be aware of the work processes in dentistry, to recognize possible hazards, and to implement appropriate preventive measures to protect the workers’ health.

**References**