

Occupational Allergic Contact Dermatitis from Epoxy Resin in a Golf Club Repairman

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A golfer presented with facial and hand eczema. He had exacerbations of his hand eczema prior to golf tournaments. Being an authorized golf club repairman, he had been working with a two-part glue containing an epoxy resin (ER) based on diglycidyl ether of bisphenol A (DGEBA) and the hardener diethylenetriamine (DETA) for approximately 4 years before he developed any skin problems. He was patch-tested with the standard, which contains an ER based on DGEBA (DGEBA-R), epoxy (containing DETA), and rubber glove series and had positive reactions to DGEBA-R only. Other work materials (a latex glove, a golf glove made of leather, and part of the handle of his own golf club "as is" and in a methyl tert-butyl ether extract) were tested, with negative results. Allergic contact dermatitis from ER affects the skin by direct contact; the dermatitis is usually localized to the hands and forearms. If the face and eyelids are involved, the dermatitis may be due to exposure to airborne hardeners or reactive diluents, exposure to airborne dust from residual monomers, or ectopic allergic reactions. Our repairman had sandpapered an old glued surface, which may have led to possible airborne dust formation, thus explaining the facial eczema. Therefore, a worker with contact allergy to ER may continue working provided the skin is protected from contamination.

GOLFERS who play under various conditions may acquire a wide variety of dermatologic lesions. Sun, heat, plants, insects, chemicals, and medication may all be implicated.¹ We present a case of a keen golfer who had also worked as an authorized golf club repairman. He had worked for several years until incapacitating hand eczema forced him to stop his golf club repairing business.

Case Report

A 71-year-old keen golfer (handicap of 5.2) presented with a 2-year history of facial eczema that at times made shaving impossible. He later developed eczema between his fingers as well. He had exacerbations of his hand eczema prior to playing in golf tournaments, when he developed deep rhagades, which he covered with tape to ameliorate the condition. Being an authorized golf club repairman, he had been working with a two-part glue containing an epoxy resin (ER) based on diglycidyl ether of bisphenol A (DGEBA) and the hardener diethylenetriamine (DETA) for approximately 4 years before he developed any skin problems. While working, he would remove old glue from

the heads of golf clubs by heating the glue. The shaft, which was to be reused, was abraded with sandpaper to remove old glue before new epoxy glue was applied. This was accomplished by first using a sander to remove the bulk of the glue (Fig 1) and then manually sanding with a fine sandpaper. Surplus new glue was wiped off with bare fingers. He had repaired about 150 clubs per month for at least 4 years.

Three months before presentation, he had again worked with the glue while wearing thin natural rubber gloves. On examination, he had an erythematous scaly dermatitis with vesicles in the palms, between the fingers, and on the dorsal aspects of the terminal phalanges. The clinical appearance suggested an endogenous hand dermatitis. The rest of the body was not affected. The patient was patch-tested with the standard, which contains an ER based on DGEBA (DGEBA-R), epoxy (containing DETA), and rubber glove series, and readings were done on day (D) 3 and D7. He reacted positively (+ at D3, ++ at D7) to DGEBA-R (epoxy resin 1.0% in petrolatum, Chemotechnique Diagnostics, Vellinge, Sweden) only. The result of a prick test with latex was negative. We also patch-tested him with some of his work materials, such as a latex glove, a golf glove made of leather, and part of the handle of his own golf club "as is" and in a methyl tert-butyl ether extract. All yielded negative results. The patient was instructed to stop repairing golf clubs professionally, but he continued to repair his own clubs. Consequently, he

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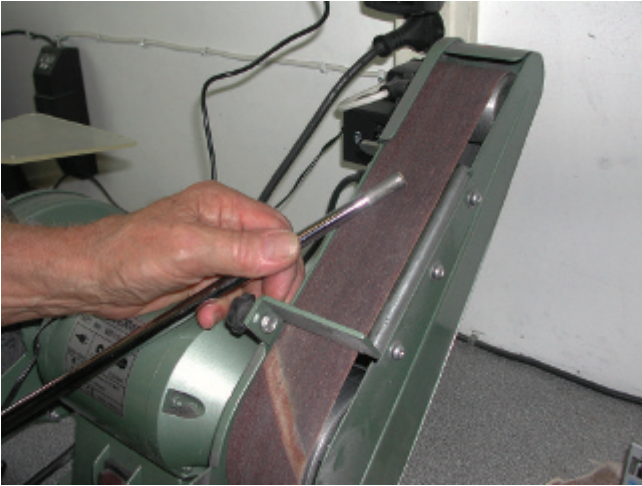


Figure 1. The patient used a sander to remove the bulk of the old epoxy glue and was exposed to dust from the glue.

was exposed to the glue two to three times a year but protected himself with latex gloves and a face shield. Since then, he has been free of facial eczema but continues to have dry hands.

Discussion

Only rarely do golfers acquire contact allergy and dermatitis through their sporting activities. Intimate contact between skin and the club grip, which is usually made of rubber, may cause hand eczema. This may be due to contact allergy to rubber chemicals or chemicals in leather gloves. There has been a report of one golfer with contact allergy to tetramethylthiuram disulfide used as a fungicide.² In that case, cross-sensitivity to rubber chemicals could also be considered. In the present case, no contact allergy to rubber or leather constituents was demonstrated, and the hand eczema was clearly related to the patient's work as a repairman.

ERs and curing agents are the two mandatory components in epoxy resin systems (ERSs). Both ERs and their curing agents are sensitizers in their own rights. Occupational allergic contact dermatitis (OACD) from ERSs is common in industrial work. Construction workers (including carpenters) and ski factory and windmill workers have all been reported to have OACD from ERSs.^{3–5} ER in bowls polish for American bowling balls was implicated in a case of allergic contact dermatitis (ACD) in a bowler.⁶ A golf club repairman's having OACD from an ERS has not been previously reported.

ACD from ER affects the skin by direct contact. Dermatitis caused by ERSs is mostly localized to the hands

and forearms. If the face and eyelids are involved, this may be due to exposure to airborne hardeners or reactive diluents because these chemicals are very volatile compared to ER.⁷ If an ERS is cured at room temperature (like the glue the patient used), residual monomers may be present up to 25% of the time.⁸ A previously sensitized person may therefore develop an ACD when exposed. If dust forms when one is working with such materials, an ACD from airborne allergens may ensue. Our repairman had sandpapered old glued surfaces, leading to possible airborne dust formation. This probably explains the facial eczema he experienced before he began using the face shield. Compared to DGEBA, the hardeners and reactive diluents are very volatile and may cause ACD in a previously sensitized individual when airborne.^{9,10} Face dermatitis due to ERSs might also be caused by ectopic allergic reactions. Whether this applies to our case is, however, unclear. According to our patient, being a semiprofessional repairman led to a higher exposure to the chemicals used for repairing clubs than if he had been a professional, for whom the handling of such chemicals would be more automated. We conclude that a worker with contact allergy to ER may continue working provided that the skin is protected from contamination. Because ERSs penetrate rubber and plastic gloves, protection must be achieved with other types of gloves. A multilayered glove material of the folio type (4H glove) or heavy-duty vinyl gloves may be used in industry when dexterity is not a major issue.^{11,12} In a case involving subway construction workers in Taiwan, it was found that washing off the contactants immediately after ERSs had contaminated the skin was the most effective factor in preventing the development of ACD from ERSs.¹³ This is important if the wearing of gloves is difficult or impossible. On the other hand, if a worker's contact allergy is to a volatile hardener or reactive diluent or if a dusty work environment containing ER is the major problem, it may be impossible for that individual to continue working.

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