

Editorial

FOOTWEAR ALLERGY

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Footwear allergy, a form of contact dermatitis, is a cutaneous inflammation produced by external allergens. Several chemicals coupled with a hot, humid environment within a shoe create an ideal situation for its development¹. The prevalence ranges from 3% in England to 11.7% in India². People of all ages can develop footwear allergy^{3,4,5}. The pattern of allergy conforms to the location of the offending agent in the shoe. Dorsal or volar aspects of the feet are usually affected sparing the instep and flexural creases of the toes. Often symmetrical, but it can be patchy or unilateral¹. It may spread to other areas obscuring the diagnosis. Secondary infection is common. Autosensitization in the form of "id" reaction may occur on the hands or become generalized¹. Purpuric eruption from black rubber boots has been reported³.

Knowledge about shoe and its composition is a prerequisite to evaluate a patient of footwear allergy. It is caused by leather, rubber, glues, dyes or rarely the linings. Dorsal foot allergy points to allergens in the shoe upper made from leather or synthetic materials like polyurethane or neoprene foam. Leather traditionally

is chrome-tanned, exposing the wearer to potassium dichromate. Tanning is followed by oiling, dyeing and finishing which give an attractive but tough outer coat to the leather. All these steps involve chemicals that cause sensitization and footwear allergy. The common rubber allergens are phenolic resins, thioureas, carbamates and additives. Nickel in shoe trim and eyelets may cause dorsal foot allergy³.

Plantar dermatitis is due to the allergens present in the insole, lining or glue which holds these two layers in place. Most of the substances used in shoe upper can also be employed in shoe sole and insole e.g. chrome/vegetable-tanned leather or alternatively neoprene or polyurethane. Fibreboard is another material used particularly in cheaper shoes, exposing patients to a wide range of allergens including adhesives, biocides, leather and rubber chemicals³.

The adhesives, a major cause of footwear allergy, are hot melts, urethane, neoprene and natural rubber (latex). Various substances like p-tert-butylphenol-formaldehyde resin (PTBPF), colophony and epoxy resins impart allergenicity to these adhesives. Counters maintain or give shape to the shoe by stiffening it at the heel or the toe. These contain a number of allergens like adhesives and biocides³.

Various studies on footwear allergy have been conducted in Pakistan but none of them determines the exact prevalence rate. However, Nadeem et al reported that 23.5% of the patients referred for patch testing had a primary footwear dermatitis⁶. The main allergens among these patients were neomycin (34%), nickel (21%) and potassium dichromate (19%). In another study by Rahber et al, glues were identified as the most common sensitizers (34%)

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followed by neomycin (22%), rubber chemicals (14%), nickel (14%) and leather (12%)⁷. Suhail et al conducted a study to define domestic allergens in the shoe industry⁸. They reported a high positivity to rubber chemicals (55%) followed by potassium dichromate (20%). They discovered two new allergens from the local shoe industry which were not present in the European standard or shoe series. These were diphenylguanidine (10%) and polyester resin (5%). This highlights the importance of indigenous preparation of test batteries of chemicals used in local industry.

Patch testing for footwear allergy is performed with chemicals from the standard series, shoe series and pieces of shoe worn by the patient. Recommending substitute footwear is often very difficult and is dependent on knowledge of shoe manufacture in individual countries. This information is often hard to obtain and the chemicals used may frequently change. Studies, determining common allergens by patch testing, may be helpful to the shoe manufacturers in designing products that do not release allergens in sufficient amount to cause reactions in consumers. The manufacturers should provide relevant information as and when required and be prepared to provide the original components for patch testing. The government can help by adopting relevant legislation.

After determining the causative allergens by patch testing, patients with chromate sensitivity are advised to wear shoes made of synthetic material or fabric. Those with adhesive allergy may wear leather shoes that are sewn or stapled rather than glued in place³. Plastic boots and

plastic, cork and charcoal insoles are also available. Patients with footwear allergy may be helped by treating associated hyperhidrosis. With proper evaluation and patch testing, the prognosis of footwear allergy can be considerably improved.

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