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Occupational allergic contact dermatitis in a basket player due to phenolic resins

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Athletes are potentially at risk of developing dermatitis due to mechanical friction, trauma or sweating¹. Allergic contact dermatitis is seldom reported, and even more rarely, as an occupational disorder.

CASE REPORT

A 33-year-old non atopic man presented with chronic eczema on his palms and finger tips especially on his right hand. The dermatitis had been present for about 5 years and was characterized by worsening and remission in relation to his profession. The patient was a professional basketball player and the skin regions involved were those in contact with the basketball. Patch tests were performed with the Società Italiana di Dermatologia Allergologica Professionale e Ambientale (SIDAPA) baseline series (F.I.R.M.A., Florence, Italy). Patch test chambers (Van der Bend, Brielle, The Netherlands) were applied on the upper part of the patient's back. The readings on day (D) 2, D3 and D4, according to the Italian guidelines², showed a positive reaction only to paratertiary butylphenol formaldehyde resin (PTBP) (+/+/+/+), (Figure 1A). Patch tests were performed with fragments of the patient's basketball (blue outer coating, blue inner coating, black inner coating). The readings showed a positive reaction only to the fragment of the "blue inner coating" (+/+), (Figure 1B).

Dermoscopy showed remarkable erythema, dense polymorphic vessels and vesicles strongly suggestive for allergic contact dermatitis³, (Figure 1C).

High performance liquid chromatography (HPLC) analysis was performed on the basketball. Separation was performed under isocratic reversed-phase conditions by employing a water/methanol 35:65 %(v/v) mixture as mobile phase and a Zorbax SB-C18 150 × 4.6 mm (L × I.D.) column from Agilent (Santa Clara, CA, USA) packed with 5 µm fully porous particles. Flow rate was 1 mL/min, injection volume 5 µL and UV-Vis Diode Array Detector (DAD) was set at 254 nm. HPLC was performed on all the three layers; the presence of the resin was observed only in the blue inner coating to which the patient showed a positive reaction, (Figure 2).

The presence of PTBP in the basketball sample was confirmed by comparison of the chromatographic peaks in the resin extracted from the commercial patch test (reference material) with information in the literature^{4,5} (Figure 2). Both the comparison of retention times and the analysis of the entire UV-Vis 3D-spectrum of identification peaks allow to assess, with reasonable confidence, that these peaks correspond to the same compounds (Figure 3). Other minor signals in the chromatogram of the standard and the basketball sample can be considered a sort of fingerprints of the specific resin. It must be pointed out that the precise composition of commercial resins is most of the time unknown or covered by patent.

DISCUSSION

PTBP belongs to the category of phenol-formol resins. These resins are obtained by polycondensation of phenols (but also of cresol or resorcin) with formaldehyde. Their main use is as adhesives and sensitization derives from contact with clothing, shoes and leather objects (belts, leather bags, watch straps).

Phenol-formol resins, PTBP in particular, are highly allergenic not only due to the presence of formaldehyde but above all for that of the phenolic monomer⁶.

Chemical chromatography analysis demonstrated the presence of PTBP in the fragments of the basketball and the stop-restart test also confirmed the occupational etiological role of PTBP in the basket player.

Occupational allergic contact dermatitis in athletes has been very scarcely reported in the literature. One reported case involved a woman basketball player who developed knee-guard dermatitis⁷. The other involved a young adult who developed allergies to swimming goggles⁸.

Our case could maybe confirm the need for greater awareness of problems of this kind.

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FIGURE LEGENDS

FIGURE 1 (A) Patch test allergic reactions to PTBP at D₃ (++). **(B)** Patch test allergic

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reactions to fragments of the patient's basketball (blue inner coating at D₃ +). **(C)** Dermoscopy of patch test allergic reaction to blue inner coating, performed at D₃, showing erythema, polymorphic vessels and whitish vesicles.

FIGURE 2 Comparison between the chromatograms of the blue inner coating of the basketball (red) and the resin extracted from the patch test (black). The qualitative comparison of the two chromatograms, in the time interval where the resin is expected to elute, shows the presence of the most characteristics peaks of PTBP resins thus confirming the presence of PTBP in the basketball sample.

FIGURE 3 UV-Vis 3D spectra of **(a)** the resin extracted from the patch test and **(b)** the blue inner coating of the basketball.





