OCCUPATIONAL CONTACT ALLERGY CAUSED BY PAO FERRO • BONNY ET AL.

Occupational contact allergy caused by pao ferro (santos rosewood): a report of two cases

Michiel Bonny¹, Olivier Aerts², Julien Lambert², Jo Lambert¹ and Hilde Lapeere¹
¹Department of Dermatology, University Hospital Ghent, B-9000 Ghent, Belgium and ²Department of Dermatology, University Hospital Antwerp, B-2000 Antwerp, Belgium

doi:10.1111/j.1600-0536.2012.12014.x

Key words: erythema multiforme; guitar; pao ferro; tropical wood; woodworker.

Tropical woods can cause both irritant and allergic contact dermatitis, along with mucosal complaints, usually through direct or airborne contact with dust produced during handling of these woods, most often in an occupational context (1).

Case Report 1
A 50-year-old Caucasian male experienced severe vesicular dermatitis of the hands, arms, face, chest and genitals several hours after using pao ferro to build a guitar (Fig. 1). There were no respiratory symptoms. Topical treatment was insufficient to clear the eruption, and a course of oral methylprednisolone was needed. The patient was participating in a guitar-building workshop, and had been exposed to pao ferro on two previous occasions, without any skin complaints. He also worked with glues and other woods (maple, walnut, spruce, and ebony), which caused him no problems. The patient has played the guitar himself since childhood, and had never experienced any complaints previously.

Patch tests were performed with the Belgian baseline series and different woods provided by the patient: East Indian rosewood, African blackwood, Bubinga, black walnut, Honduras rosewood, African ebony, Hondurus mahogany, Amazon rosewood, and santos rosewood (pao ferro). Scrapings of the woods as such were tested at 10% pet. The patch tests were placed on the upper back, and occluded for 2 days with Van der Bend chambers® (Van der Bend, Brielle, The Netherlands) fixed with Hypafix® (BSN Medical, Hamburg, Germany). Readings were performed at D2 and D4 according to International Contact Dermatitis Research Group (ICDRG) guidelines. Patch test results were positive for black walnut (+) and santos rosewood (+++) (Fig. 3).

The piece of wood to which the patient reacted was confirmed by the wood laboratory of the Ghent University bio-engineering department to be santos rosewood (Machaerium scleroxylon).

We diagnosed the extensive eruption of the patient as an allergic contact dermatitis caused by santos rosewood. The positive test for black walnut was less relevant, because this wood was only occasionally used by the patient, and did not seem to cause him skin problems. He was nevertheless advised to avoid contact with both types of wood. Instead, East Indian rosewood, which is the standard in guitar building, could be used.

Fig. 1. Erythematous and vesicular dermatitis in case 1.
Case Report 2

A 30-year-old woodworker developed a widespread itchy skin eruption and dyspnoea a few hours after working with pao ferro. Two months earlier, he had experienced a minor skin rash when working with this wood. The current rash first involved the hands, forearms, and face, and then rapidly became generalized. Strikingly figurate skin lesions (Fig. 2), caused by entrapment of wood dust under his overall suspenders, and even some discrete targetoid lesions were seen during clinical examination. A skin biopsy showed features consistent with erythema multiforme (interface dermatitis and necrotic keratinocytes) but also spongiosis. The patient had to be hospitalized and treated with local and systemic steroids. One month after resolution of the rash, he was patch tested with the European baseline series by Chemotechnique® (Chemotechnique Diagnostics, Vellinge, Sweden) and wood dust of pao ferro filed from a piece of wood brought in by the patient and diluted 10% in pet. Patch tests were placed on the upper back, and occluded for 2 days with Van der Bend chambers® (Van der Bend) fixed with Fixomull® (Smith & Nephew, Auckland, New Zealand) as adhesive tape. Readings were performed according to ICDRG guidelines, and a strong (+++) reaction at D2 and D4 was seen. A biopsy of the positive patch test at D4 was compatible with allergic contact dermatitis. The patient was diagnosed with erythema multiforme caused by contact allergy to pao ferro. Owing to the severity of the rash that he had experienced, the patient discontinued his work.

Discussion

Trees may contain irritants or sensitizers in the bark, wood, or pollen (2). Type I and type IV allergic reactions to wood dust have been observed, the latter being more frequent (1). Woods of tropical origin are more sensitizing than non-tropical woods, as they frequently contain quinones, which are known to be strong sensitizers (2, 3). In cases of contact dermatitis, allergic sensitization

Fig. 2. Figurate eruption in case 2.

Fig. 3. Case 1: pao ferro dust 10% pet (D4).
Contact Dermatitis generally comes from the heartwood (3). The commonly used and trade names of tropical woods are notoriously inaccurate and misleading, as they in no way serve as an indication of botanical origin. Therefore, ideally, a solid sample of the suspected wood should be sent for botanical identification to a wood anatomist, as in case 1 (3).

The clinical features show an airborne contact dermatitis on exposed skin areas in woodworkers. Later, the ankles, axillae, waist, dorsa of the feet and even genitals may become involved, because of accumulation of sawdust in flexural surfaces, owing to loosely fitting clothing or transfer by hands (3–5), sometimes leading to very figurate skin lesions. Rhinitis, conjunctivitis and respiratory symptoms may also occur (2), but are most often result from irritation (1). True erythema multiforme or erythema multiforme-like eruptions (4, 6), as in case 2, and ethmoid sinus adenocarcinoma (3) have also been reported. Contact dermatitis resulting from the solid wood or finished items is less common (2), but might occur when prolonged skin contact with such products occurs. Tropical wood is used in the manufacture of a range of wooden items, such as musical instruments, furniture, tools, and jewellery (4, 7, 8). Contact allergic reactions should not, however, be confused with irritant reactions.

Species of the genera *Dalbergia* and *Machaerium*, which is a substitute for *Dalbergia*, are most frequently used because of their hardness, resistance to fungi, and beauty (3, 4). The heartwood of both *Dalbergia* and *Machaerium* contains sensitizing quinones, called dalbergiones, which are included in the group of neoflavonoids. Each species of these genera has a different profile of dalbergiones (2–5).

Pao ferro is also known as santos rosewood, santos palisander, or xaviuna vermelha. The botanical name is *M. scleroxylon* (4). The major allergen is (R)-3,4-dimethoxydalbergione (Fig. 4), which is the strongest sensitizer among the dalbergiones and occurs only in *M. scleroxylon*, and not in the other *Dalbergia* species. The different sensitizing dalbergiones in *Dalbergia* species, on the other hand, do not occur in *M. scleroxylon*. This is supported by the findings of Rojas-Hijazo et al., who reported on 7 woodworkers with sensitizations to different dalbergiones, but not to (R)-3,4-dimethoxydalbergione (4).

As there is close structural similarity between the different dalbergiones, cross-reactions may occur. Beck et al. reported an allergic contact dermatitis outbreak caused by *M. scleroxylon* in a joinery shop. Patients had positive patch test reactions not only to (R)-3,4-dimethoxydalbergione, but also to other dalbergiones (5). They had probably been exposed to other types of wood, as there was a misnomer concerning the wood type used in that shop.

**Fig. 4.** Chemical structure of (R)-3,4-dimethoxydalbergione.

### References