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Meswak, a novel allergen

SALVADORA PERSICA is a shrub with white branches, locally known as *araak*, belonging to the family Salvadoraceae (1). It is widely distributed, especially in the Middle East, Africa, the Indian subcontinent, and the southern and western mountainous regions of Saudi Arabia. The plant is used as a decoction for the treatment of splenomegaly, rheumatism, tumors, and renal stones by folk medicine practitioners. However, the most important use of the plant is the use of the stem and roots by Muslims as toothbrushes, known as *meswak*. Antibiotic, anti-inflammatory, and mildly hypoglycemic effects of the plant have been reported (4).

In this paper, we present the first reported allergic reaction to *S. persica*.

■ *Clinical history*. A.K., a 52-year-old man, has had allergic rhinitis for the preceding 20 years, and bronchial asthma for the last 3 years. He has a strong family history of atopy. Two of his children and his mother have allergic rhinitis and bronchial asthma.

The patient was started on immunotherapy (IT) with locally relevant inhalant allergens; he showed remarkable clinical improvement, and symptomatic treatment was reduced.

In July 1995, the patient complained of severe pruritus of his gingiva immediately after using the *meswak* toothbrush. He also noticed redness and severe pruritis of the skin underlying his breast pocket, where he keeps his *meswak*. He had a large area of dermatitis with erythema and induration on the left breast. His gingiva was violaceous red in color with significant edema.

■ *Diagnostic methods*. Skin prick test (SPT) was performed with a panel of 10 allergens, 1:20 w/v concentration in 50% glycerin (Hollister-Stier Pharmaceuticals, Spokane, WA, USA), and a crude saline extract of *meswak*. Normal saline and 50% glycerin were used as negative control, and histamine sulfate 1 mg/ml as positive control. The reactions were read after 15 min. A reaction half the size of the histamine wheal (2+) was considered equal to histamine (3+); one larger than histamine or with pseudopods scored 4+. *In vitro* total and specific IgE was performed on the patient's serum with the Immuno-CAP system (Pharmacia Diagnostics, Sweden). A 48-h patch test with crude extract was performed by chopping and grinding the *meswak* stick and soaking it in normal saline for 30 min.

A 1/5 w/v extract in saline of dry *meswak* dust was coupled to activated Immuno-CAP. No signi-

Meswak (Salvadora persica) *is widely used in Arabic folk medicine, especially as a chewing stick serving as a toothbrush. This is the first reported case of IgE-mediated allergy to* meswak *with possible cross-allergenicity with latex.*

Table 1. Results of skin prick test (SPT) and Immuno-CAP to various allergens

Antigen	SPT	Immuno-CAP class	
Histamine control	3+		
Saline, glycerin control	0		
Dust mite (*Dermatophagoides farinae*)	2+	2	
Bermuda grass	4+	5	
Timothy grass	4+	4	
Lamb's-quarters (*Chenopodium*)	4+	4	
English plantain	4+	5	
Russian thistle	4+	6	
Wing scale (*Atriplex*)	4+	6	
Mesquite (*Prosopis*)	4+	5	
Acacia	4+	5	
Date pollen (*Phoenix dactylifera*)	4+	4	
Meswak (*Salvadora persica*)	3+	6	4+ patch

ficant background of normal or high IgE sera was found.

■ *Cross-reactivity between* meswak *and latex.* Five patients who were known to be allergic to latex were also tested with *meswak* Immuno-CAP and latex Immuno-CAP. The patient's serum was tested with *meswak* Immuno-CAP and latex Immuno-CAP.

■ Serum IgE was 1296 μg/l (normal 12–1200 μg/l). The patient had large (4+) immediate SPT reactions to grass, weed, *Prosopis*, and date tree pollens (Table 1). SPT with crude extract of *meswak* was scored 3+ and the patch test was scored 4+ with a large area of erythema measuring 4.5 × 4.5 cm with induration of 30 × 30 mm in diameter after 48 h. *In vitro* ImmunoCAP was strongly positive to *meswak* and multiple pollens. The patient's serum showed strong reactions to *meswak*, latex, acacia, and mesquite (*Prosopis juliflora*) tree pollen by Immuno-CAP (Table 2).

■ *Meswak* is used several times a day by Muslims in many countries, especially Saudi Arabia and the rest of the Middle East to brush their teeth. The chewing stick is taken mostly from the root of the plant *S. persica*. It is reported to keep the gums and teeth in perfect condition. Several components have been extracted from the stems and roots of the plant; these include flaronoids, tannins, sterols, β-sitosterol, and elemental v-monoclinic sulfur (5, 6). In addition, foliar ash, silica, calcium, wood phosphorus, potassium, glucotropaeolin, and resin have also been isolated (4). Several reports from the dental literature confirm that *meswak* is effective in reducing gum disease, dental caries, and plaque formation. Extracts of *S. persica* were shown to inhibit both *Candida* and bacterial flora in the mouth (7–10).

Table 2. Cross-reactivity between *meswak* and latex by Immuno-CAP

Serum	*Meswak* Immuno-CAP (kU_A/l)	Latex Immuno-CAP (kU_A/l)
2980	<0.35*	0.4
2981	<0.35	3.5
2982	0.5	3.5
2983	<0.35	3.6
2984	1.5	18.9
A.K. (patient)	21.5	4.0

Our patient, who is an atopic, showed both immediate reaction by SPT and delayed reaction (late phase) by patch test to *meswak* extract, with very strong specific reaction *in vitro*, as shown by Immuno-CAP test, to both *meswak* and latex. The patient had no history of allergic reaction to latex. It is interesting to find that 2/5 patients with positive history of allergic reaction to latex react to *meswak* with no history of exposure to the plant. This finding suggests the probability of cross-reactivity between *meswak* and latex, a phenomenon which needs detailed study in the future.

We have been unable to find any reference or reports on allergic reaction to *meswak*. Although we consider this to be the first report of allergy to *S. persica*, we believe that there have probably been many other cases of allergic reactions to this plant because it is so widely used.

Key words: allergy; *araak*; *meswak*; *Salvadora persica*; toothbrush.

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