

Contact allergy in male construction workers in Sao Paulo, Brazil, 2000–2005

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There are no recent data on allergens in the construction industry in Brazil; apparently there were no changes in allergenic substances. The objective of this study was to identify sensitization to allergens in adult males working in the construction industry. A cross-sectional study with adult males submitted to patch tests from May 2000 to December 2005. Out of 169 male patients, 83 were construction workers. The five most frequent allergens among the construction workers were potassium dichromate (57%), carba-mix (34.9%), cobalt chloride (30.2%), thiuram-mix (27.9%) and neomycin (19.8%). There is a significant sensitization to potassium dichromate, cobalt, carba-mix, and thiuram-mix, demonstrating that cement and rubber gloves of personal protection equipment still account for allergic contact dermatitis in construction industry workers.

Key words: allergic contact dermatitis; metals; occupational; patch test; rubber chemicals.
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Allergic contact dermatitis in construction industry workers is one of the most frequent occupational dermatoses found in almost any country (1).

The most important allergenic substances for these workers are potassium dichromate (chromium), cobalt chloride (cobalt), and rubber components used in personal protection equipment (PPE), such as carbamates ('carbass'), mercapto-benzothiazoles ('mercaptos'), or thiuram group substances ('thiurams') (1). Furthermore, new additives such as resins were been introduced in the construction industry and became new sensitization sources (1, 2).

The prevalence of allergy in the construction industry varies according to the region studied (1). These differences are related to the natural occurrence of ore allergens in cement manufacturing, significant variability of industrial processes, use of medical and cosmetic products by workers or habits from each region or country studied (3).

There are no recent data on allergens in the construction industry in Brazil; apparently there have been no changes in allergenic substances, contrary to what is happening in more socially and economically developed countries, where the use of ferrous sulfate has been adopted to decrease

sensitization to chromium and precautions have been taken in rubber manufacturing (1, 4–6).

Objective

To identify the main allergens in construction workers seen at the Outpatient's Clinic of Skin Allergy and Occupational Dermatoses, Department of Dermatology, *Universidade Federal de São Paulo-Escola Paulista de Medicina (UNIFESP-EPM)*. To verify if chromium and rubber allergens from PPE are still the main allergens in these professionals seen at this clinic.

Methods

We conducted a cross-sectional study analyzing the medical records of all patients seen for the first time by the Group of Skin Allergy and Occupational Dermatoses, Department of Dermatology, *Universidade Federal de São Paulo-Escola Paulista de Medicina (UNIFESP-EPM)*, from May 2000 to December 2005, who were submitted to patch tests with the standard series of the Brazilian Contact Dermatitis Research Group (GBEDC) (3).

The substances used in the standard series are supplied in polypropylene syringes by the FDA – Allergenic Laboratory (Rio de Janeiro).

FINN CHAMBER tapes made by Epitest (Finland) were used to conduct the tests and each tape had 10 aluminum chambers.

The first reading was made after 48 hr (30 min after removing the tape) and the second reading was after 96 hr.

The reading criteria were established by the International Contact Dermatitis Research Group (3).

Sensitization to allergens comprised in the GBEDC standard series was analyzed in male construction workers.

Results

The study assessed 86 construction workers (construction worker group). In the study period, 596 patients were patch tested; in that, 184 were male. Seventeen male patients were excluded from analysis due to poor compliance.

Table 1 shows the patch test data among construction workers. The 5 most frequent allergens among the construction workers were potassium dichromate (57.0%), carba-mix (34.9%), cobalt chloride (30.2%), thiuram-mix (27.9), and neomycin (19.8%).

Table 1. Patch test data among construction workers with the standard series of the Brazilian Contact Dermatitis Research Group

Substance	%
Potassium dichromate 0.5%	57
Carba-mix 3%	34.9
Cobalt chloride 1%	30.2
Thiuram-mix 1%	27.9
Neomycin 20%	19.8
Paraphenylenediamine 1%	17.4
Thimerosal 0.1%	16.3
Ethylenediamine 1%	11.6
Nickel sulfate 5%	10.5
PPD-mix 0.4%	9.3
Mercapto-mix 2%	8.1
Nitrofurazone 1%	8.1
Formaldehyde 1%	7
Quinoline-mix 6%	5.8
Balsam of Peru 25%	4.7
Propylene glycol 10%	4.7
Quaternium 15.1%	4.7
Colophony 20%	3.5
Parabens-mix 15%	3.5
Fragrance-mix 8%	3.5
Epoxy resin 1%	3.5
Benzocaine 5%	2.3
Antraquinone 2%	1.2
<i>p</i> -tert-butylphenol formaldehyde resin 1% ^a	1.2
Lanolin 30%	1.2
Promethazine 1%	1.2
Turpentine 10%	1.2
Kathon CG 0.5%	0
Hydroquinone 1%	0
Irgasan 1%	0

^aDiluted in water. The other substances are diluted in petrolatum.

Discussion

The construction worker group had a high frequency of chromate and rubber allergy. Neomycin is not an important allergen in the construction industry, but it is a topical medicine frequently used in Brazil as self-medication, mainly by people frequently exposed to superficial traumas, such as construction workers.

Due to the high frequency of allergic contact dermatitis in construction workers, poor prognosis of these conditions, difficulty in avoiding chromium present in several industrial and domestic products and to the tendency of occupational dermatitis caused by chromium to become chronic, some prevention measures should be adopted, such as suitable PPE (not made of rubber), and a legislation to instruct diminishing the amount of hexavalent chromium in cement (7–10). The addition of ferrous sulfate reduces hexavalent chromium to trivalent chromium, which is less soluble, has a lower skin penetration rate, and rarely causes sensitization. Studies from other countries showed that this practice greatly decreases the incidence of contact dermatitis to cement (1, 4–6).

Mix composition

(a) Diphenylguanidine 1%, zincdibutyldithiocarbamate 1%, zincdiethyldithiocarbamate 1%; (b) *N*-cyclohexylbenzothiazyl-sulfenamide 0.5%, morpholinylmercaptobenzothiazole 0.5%, dibenzothiazyl disulfide 0.5%, mercaptobenzothiazole 0.5%; (c) butyl 3%, ethyl 3%, propyl 3%, benzyl 3%, methyl 3% parabens; (d) eugenol 1%, isoeugenol 1%, geraniol 1%, cinnamaldehyde 1%, cinnamyl alcohol 1%, α -amylcinnamaldehyde 1%, absolute oak moss 1%, hydroxycitronellal 1%; (e) *N*-isopropyl-*N*-phenyl-paraphenylenediamine 0.2%, *N*-*N*-diphenyl-paraphenylenediamine 0.2%; (f) clioquinol 3%, chlorquinaldol 3%; (g) tetramethylthiuram monosulfide 0.5%, tetramethylthiuram disulfide 0.5%.

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