

# Study of Patch Test for Hand and Foot Eczema

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**Abstract:** Eczema is “an inflammatory skin reaction characterized histologically by spongiosis with varying degrees of acanthosis, and a superficial perivascular lymphohistiocytic infiltrate. **Material and Methods:** This is hospital based observational, prospective study was conducted at Tertiary Health Care Centre in Pune for a period of 18 months. By using Indian Standard Series, patch testing was done. The allergen was applied to the back of the patients and reading will be taken on day 2, 4 & 7. **Result:** 12 patients were positive to one or more allergen reflecting a positivity rate of 30%. **Conclusion:** Housewives and workers suffered most from hand and foot eczema and most common allergen was paraphenylenediamine.

**Keyword:** Allergic contact dermatitis, Patch test, Hand and Foot Eczema, allergens

## 1. Introduction

“Eczema” and “dermatitis” are often used synonymously to denote a polymorphic pattern of inflammation of the skin. Eczemas are classified as ‘exogenous’ and ‘endogenous’. In India, study of 300 patients each, in age group of below 17 years and above 60 years, found eczema in 24% and 37% respectively.<sup>1,2</sup> Quality of Life was markedly negatively affected in patients of various types of chronic eczema, and significantly correlated with disease severity. Contact dermatitis is an altered state of skin reactivity induced by exposure to an external agent. Contact dermatitis is highly prevalent representing more than 90% of occupational skin disorders giving good reasons for its relevant socioeconomical impact.<sup>3</sup> According to the mechanism of elicitation, the following types of contact reactions may be distinguished; allergic contact dermatitis, irritant contact dermatitis, phototoxic and photoallergic, immediate type contact reactions or immune contact urticaria.<sup>4</sup> Allergic contact dermatitis is the clinical presentation of contact sensitivity in humans. It represents a type-IV cell mediated reaction. It results from sensitisation of the skin, as a rule, by contact with a non-protein, low molecular weight substance or simple chemical, or other products.<sup>5</sup> Contact dermatitis accounts for 4-7% of all dermatological consultations and for almost half of all reported cases of occupational disease.<sup>6</sup> An estimated 2% to 10% of the general population is affected by hand dermatitis. In these contact dermatitis of hands, more than half of patients (58.5%) had irritant contact dermatitis and 41.5% had allergic contact dermatitis.<sup>7</sup> Eczema of the hands is defined as itching and sometimes burning and painful, swollen, inflamed, vesicular or bullous, rough desquamating eruption of the skin of the hands and fingers. Dermatitis of the feet may result from shoes, footwear, stockings or remedies for ‘athlete’s foot’, antiseptics and antiperspirants. In vivo patch testing in which the skin can process the allergen for presentation remains the ‘GOLD STANDARD’ for evaluation of Contact dermatitis. Joseph Jadossohn is the father of patch testing.<sup>8</sup> In patch testing, the suspected substances are applied to the skin under an occlusive dressing for 2 days and the observed. It remains as the only practical test for demonstrating contact dermatitis.<sup>9</sup> Principle - As

sensitization is the result of antigen specific T lymphocytes, the whole body is affected; and if an allergen to which a patient is sensitized is applied to a small area of normal skin, with sufficient absorption, inflammation results. Therefore, identification and avoidance of the allergen, if implicated, is important in the management and treatment of eczema. Hence patch test becomes an important tool in identification of allergens.<sup>10,11</sup> This test is used to identify positive allergens in sensitized patients. On the basis of this test we can give list of things to be avoided in his/her daily life. This list of avoidance will be helpful to improve patient’s day-to-day life and control of the disease as well.

## 2. Literature Survey

The word “eczema” has an obscure origin. It was first used by Aetius Amidenus, physician to the Byzantine court in the sixth century. A current and acceptable definition of eczema is that it is “an inflammatory skin reaction characterized histologically by spongiosis with varying degrees of acanthosis, and a superficial perivascular lymphohistiocytic infiltrate.

## 3. Methodology and Approach

First the procedure shall be explained to the patient. All antigens will be kept in a correct sequence and each patch test unit will be marked with appropriate numbers in order to avoid confusion as to which antigen will be applied. The back of patient will be selected for patch test (lateral aspect of arm if back was involved). After cleaning the patient’s back with a normal saline and spirit, 2-3mm length of allergen ointment will be inserted in the centre of aluminium chambers taking care no allergen touches to the rim of the fin chamber. Each patch test unit will be applied to the back of patient, 2 patch test on right side & 1 patch test unit on left side of spine. Patient will be instructed not to remove strips and not to wet strips. Patient should be avoid steroids, Antihistamine. 3 weeks prior patch testing. Patches will be removed after 2 days & reading taken on days 2, 4, 7. If only one reading is possible it will be done on day 4. Patch test will be removed 30 min prior to taking a reading.

## 4. Results and Discussion

In our present study, majority of the patients (35%) were in the age group of 31-40 years followed by (27.5%) in the age group of 21-30 years, (25%) in the age group of 41-50 years and (12.5%) in the age group of 51-60 years. The mean age of the patients was  $36.9 \pm 10.08$  years.

Handa S et al<sup>12</sup> found in their study that maximum patient were in the age group 20-40 years (54%) and the mean age of patient was  $38.9 \pm 25.6$  years.

It was observed in our present study, that 12 patients were positive to one or more allergen reflecting a positivity rate of (30%) to the Indian standard series. Mehta MJ et al<sup>13</sup> reported positive result to patch test was seen in 31 patients (51.33%).

In our present study, the most common allergen was Paraphenylenediamine (31.1%) followed by Neomycin sulphate (15.9%), Epoxy resins (10.6%), Fragrance Mix (10.6%), Potassium dichromate (10.6%), Thiuram mix (10.6%), Nitrofurazone (5.3%) and Chlorocresol (5.3%).

Handa et al<sup>12</sup> found that Potassium dichromate was the most common allergen (25%) followed by fragrance mix (16%), nickel sulphate (14%) and PPD (13%). Fragrance mix and paraphenylenediamine (PPD) had showed positive reaction in 15% patients. Fragrance mix is the ingredient of perfumes, deodorant, detergent, and soap. Paraphenylenediamine is commonly used in hair dye, fur dyes, printing etc.

In our present study, (27.5%) patients were housewives while (25%) and (12.5%) patients were worker (hairdresser, tailors, leather workers) and cement worker (masons) respectively, (10%) patients were in the service industry while (7.5%) patients each were labourer and student. (5%) patients each were beautician and farmer respectively.

Handa S et al<sup>12</sup> found most women were housewives (81.8%) and among men, masonry (32.8%) was the most common occupation. Mehta MJ et al<sup>87</sup> found maximum patients in males were belonging to laborer/farmers (30.55%) group whereas among females maximum were (62.5%) housewives.

Housewives are exposed to a lot of domestic wet work and detergent contact during household chores as well as contact with various raw vegetables and spices such as garlic, onion therefore incidence of eczema is much more in higher.

In our present study, maximum cases of positive patch test results were observed in cement workers (masons) (60%) followed by beauticians and farmers (50%), workers (hairdresser, tailors, leather workers) (40%), students (33.3%) and housewives (18.2%).

The prospective observational study of Gajula N et al<sup>14</sup> observed majority (50%) of patients were workers and 32% were housewives. Students accounted for 12% and

unskilled manual labourers for 6%. In a similar study done by Handa S et al<sup>15</sup> on Clinical Patterns and Contact allergens a similar occupational distribution was seen.

Cement workers (masons) are exposed to allergens like potassium dichromate and many other chemicals, with the growing population and urbanization there is more exposure to allergens and therefore increased incidence of hand eczema in cement workers.

## 5. Conclusion

This study was done to evaluate patch test findings in 40 patients of hand and foot eczema.

The findings were as follows:

1. 12 out of 40 patients of hand and foot eczema showed a positive patch test.
2. Most common allergen was paraphenylenediamine followed by neomycin sulphate.
3. Housewives and workers suffered most from hand and foot eczema.
4. Positive patch test was demonstrated more commonly in workers particularly cement workers (masons).

## 6. Future Scope

Patch test is used to identify positive allergens in sensitized patients on the basis of this test we can give list of things to be avoided in his/her daily life. This list of avoidance will be helpful to improve patient's day-to-day life and control of the disease as well.

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