

# The trend of nickel allergy from a Scottish tertiary referral centre

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The aims of this study were to analyze the change in trend of allergic contact dermatitis (ACD) from nickel in a single tertiary referral centre. In 1982 and 1997, 800 and 860 patients were patch tested, respectively. The frequency of positive reactions to nickel from our centre was 16% in 1982 and 22% in 1997. In both years, the vast majority of patients developed the eruption below 30 years of age. However, the commonest age of onset in 1982 was in the 11–20 year age group, while in 1997, this was 1 decade later, in the 21–30 year age group. In 1997, we noted a much higher female preponderance (F:M=13:1) than in 1982 (F:M=6:1). There was no change in male prevalence but a slight increase in female prevalence in 1997. The rate of atopy in patients with nickel ACD showed an increase from 23% in 1982 to 33% in 1997. Nickel was thought to be a contributory factor in causing occupational dermatitis in 27% of patients in 1982 and 24% patients in 1997. Of these, hairdressing in 1982 and nursing in 1997 were the commonest occupations. In 1982 and 1997, respectively, 40 (5%) and 37 (4%) patients were positive to nickel alone, while 89 (11%) and 150 (18%) patients showed positive reactions to other allergens in addition to nickel. In both the years, the hands were the main sites of involvement. However, in 1997 there was an increase in the number of patients presenting with face and neck involvement.

**Key words:** allergic contact dermatitis; contact allergy; nickel; age of onset; atopy; occupational; hairdressing; nursing; cobalt; Myroxylon Pereirae; fragrance mix. © Munksgaard, 2000.

*Accepted for publication 11 January 2000*

Allergic contact dermatitis (ACD) from nickel is well-reported and the prevalence thought to be increasing (1). Nickel ACD is reported to be commoner in the younger age groups, in females and in non-atopic individuals. The hands have been reported to be the commonest affected sites in patients with nickel dermatitis (1). However, there are no studies analyzing the trend in nickel ACD over a protracted time course, from a single centre.

The aim of this study was to assess the change in trend of nickel ACD in 2 years, 15 years apart, from a single Scottish tertiary referral centre.

## Patients and Methods

All patients referred to the Contact Dermatitis Investigation Unit (CDIU) with suspected ACD in the years 1982 and 1997 were identified. A full history, including patient demographics (MOAHL), symptoms, site of onset and main affected sites, was noted. Patch test results, including number and type of allergens and the final diagnoses, were recorded.

Patch testing was carried out by applying standardized allergens in Finn Chambers® secured with Scanpor® tape on the upper back of patients. Tests were performed according to ICDRG guidelines and read on day (D) 3 and D 5 by the same investigator (2).

## Results

800 (307 male and 493 female) patients in 1982 and 860 (191 male and 669 female) in 1997 were patch tested. Overall, 129 (16%) patients in 1982 and 187 (22%) patients in 1997 developed relevant positive patch test reactions to nickel. In both years, 7% of males attending the clinic developed positive patch test reactions to nickel, whereas 22% of females in 1982 and 26% of females in 1997 showed positive patch test reactions to nickel.

The characteristic features of patients with nickel ACD are shown in Table 1. Fig. 1 shows the age of onset of eruption in patients with a positive reaction to nickel, with most patients being under 30 years of age. The list of relevant occupations

Table 1. Characteristics of patients with nickel ACD seen in 1982 and 1997

| Patient characteristics | 1982<br>(n=129) | 1997<br>(n=187) |
|-------------------------|-----------------|-----------------|
| sex ratio (M:F)         | 1:6             | 1:13            |
| age range (years)       | 11–78           | 6–79            |
| mean age (years)        | 33.1            | 35.1            |
| hand dermatitis         | 55 (43%)        | 45 (24%)        |
| atopy                   | 30 (23%)        | 61 (33%)        |
| leg ulcer/stasis        | 0               | 1               |

Table 2. Occupational dermatitis possibly caused by nickel

| Occupations of patients with dermatitis | 1982<br>(n=35) | 1997<br>(n=44) |
|-----------------------------------------|----------------|----------------|
| hairdresser                             | 10 (29%)       | 5 (11%)        |
| caterer                                 | 3 (9%)         | 5 (11%)        |
| cleaner                                 | 0              | 3 (9%)         |
| nurse                                   | 2 (6%)         | 7 (16%)        |
| machinist                               | 2 (6%)         | 3 (9%)         |
| barmaid                                 | 1 (3%)         | 2 (5%)         |
| cashier                                 | 1 (3%)         | 1 (2%)         |
| postal worker                           | 0              | 2 (5%)         |
| shop assistant/retailer                 | 5 (14%)        | 1 (2%)         |
| office worker                           | 2 (6%)         | 1 (2%)         |
| bakery worker                           | 1 (3%)         | 0              |
| seamstress                              | 1 (3%)         | 0              |
| carer                                   | 0              | 1 (2%)         |
| doctor                                  | 0              | 1 (2%)         |
| technicians                             | 1 (3%)         | 1 (2%)         |
| metal worker                            | 3 (9%)         | 2 (5%)         |
| others                                  | 3 (9%)         | 9 (20%)        |

Table 3. Allergens documented in patients with a diagnosis of allergic contact dermatitis

| Allergens                           | 1982 | 1997 |
|-------------------------------------|------|------|
| nickel only                         | 40   | 37   |
| cobalt                              | 45   | 29   |
| other metals                        | 12   | 22   |
| balsam and fragrances               | 17   | 62   |
| medicaments                         | 10   | 21   |
| latex and rubber accelerators       | 17   | 13   |
| colophony                           | 6    | 19   |
| lanolin                             | 1    | 9    |
| PPD                                 | 6    | 6    |
| thimerosal                          | 3    | 12   |
| formaldehyde and formaldehyde resin | 4    | 19   |
| ethylenediamine                     | 12   | 2    |
| parabens                            | 1    | 2    |
| others                              | 6    | 7    |

contributing to nickel dermatitis is shown in Table 2. In 1982 and 1997, respectively, hairdressing and nursing were the commonest affected occupations.

The list of relevant allergens causing dermatitis in the 2 years studied is given in Table 3. Nickel was thought to be the only relevant allergen in 40 (5%) patients in 1982 and 37 (4%) patients in 1997. 109 (84%) patients with positive reactions to nickel

Table 4. The site of onset of eruption and main affected site during the course of disease

| Sites       | Sites of onset  |                 | Main affected sites |                 |
|-------------|-----------------|-----------------|---------------------|-----------------|
|             | 1982<br>(n=129) | 1997<br>(n=234) | 1982<br>(n=135)     | 1997<br>(n=261) |
| hands       | 51              | 53              | 69                  | 63              |
| wrists      | 11              | 6               | 9                   | 6               |
| arms        | 6               | 18              | 5                   | 20              |
| trunk       | 8               | 14              | 9                   | 12              |
| abdomen     | 1               | 2               | 1                   | 2               |
| legs        | 6               | 15              | 6                   | 14              |
| feet        | 3               | 6               | 3                   | 9               |
| genitalia   | 1               | 6               | 1                   | 8               |
| perianal    | 0               | 2               | 0                   | 4               |
| neck        | 5               | 32              | 5                   | 38              |
| face        | 14              | 33              | 14                  | 36              |
| eyelids     | 5               | 8               | 4                   | 9               |
| ear         | 2               | 3               | 2                   | 3               |
| scalp       | 0               | 0               | 0                   | 2               |
| perioral    | 0               | 2               | 0                   | 3               |
| oral mucosa | 2               | 30              | 2                   | 29              |
| lips        | 4               | 4               | 5                   | 3               |

in 1982 and 153 (82%) in 1997 gave a history of intolerance to metallic items including jewellery.

The site of onset of eruption and main affected sites during the course of disease are shown in Table 4. In both years, the hands were the commonest affected sites.

## Discussion

This study confirms the increasing frequency of nickel ACD reported by others (1, 3–7). We found a 6% increase in the overall frequency of nickel ACD from a single tertiary referral centre. Our data also confirms that nickel allergy is commoner in women.

The early age onset of nickel ACD has been well documented in the literature (8–13). Highest incidence and prevalence of nickel ACD has been noted in the age group 10 to 19 years (9). We have also noted similar results, with most of our pa-

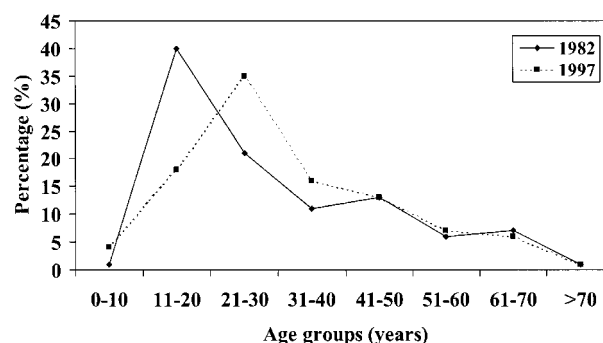


Fig. 1. Age of onset of eruption in patients with allergic contact dermatitis from nickel.

tients being in the 11–20 year age group in 1982 and 21–30 year age group in 1997.

The influence of atopy in nickel allergy has been controversial. Previous clinical studies have shown a reduced rate of sensitization to common allergens in atopic individuals (13–15). This is thought to be due to suppressed cell-mediated immunity in atopic dermatitis, resulting in decreased capacity to express contact dermatitis (16–17). However, we have noted an increasing prevalence of atopy in patients with nickel dermatitis. This is similar to previous reports (18–21). The exact significance of this is unclear but may be associated with an overall increase in prevalence of atopy in the community.

Nickel has been considered to be an occupational allergen for many years (22). In a recent report, Shah et al. noted that nickel was a probable occupational allergen in 22.8% patients who had been patch tested (23). They found hairdressing to be one of the most common occupations in their patients with nickel dermatitis. In our study, nickel was a possible occupational allergen in 22% (1982) and 27% (1997) of the patch tested population. Hairdressing and nursing were the commonest occupations associated with nickel dermatitis in 1982 and 1997, respectively.

In this study, 16% of patients in 1982 and 18% of patients in 1997 had no history of intolerance to metals, which may represent latent sensitivity. Cronin noted a 20% negative history of metal intolerance on direct questioning after patch testing (24). However, higher figures have been noted when the question of intolerance was raised before patch testing (25).

Concomitant positive reactions to cobalt on patch testing were recorded both in 1982 and 1997 in patients with a positive reaction to nickel, a feature which has been observed in the past (26–27). We encountered a significant rise ( $p < 0.001$ ) in positive reactions to balsam and fragrances in 1997, in addition to nickel on patch testing. Previous studies have also reported an increasing trend in sensitivity to fragrance compounds (4, 5, 26, 28).

The hands remained the site of onset and main affected site in both years. However, in 1997, a significantly higher ( $p < 0.001$ ) number of patients had involvement of the face and neck. This may be explained by the significantly higher yield of positive reactions to fragrances in 1997.

This study from a single centre shows an increase in prevalence of atopy in the nickel ACD population. It also confirms previous reports of female preponderance and an increase in frequency of nickel ACD. In addition, there was no change in the prevalence of nickel ACD in males but a

slight increase in females in 1997. We have also noted that in 1997, the age of onset was 1 decade later than in 1982.

### Acknowledgements

This work was presented as a paper in the Contact Dermatitis session of the Annual meeting of the British Association of Dermatologists in Edinburgh 1999.

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