

Microneedling in the nickel-allergic patient



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Key words: allergic contact dermatitis; cosmetic dermatology; microneedling; nickel allergy.

Microneedling uses sterilized microneedles to repetitively puncture the skin, inducing a wound-healing cascade, which may improve skin appearance.¹ Currently, there are no guidelines regarding prescreening for nickel allergy in patients who undergo microneedling but endorse a possible history of metal allergic contact dermatitis (ACD). Nickel is the most prevalent trigger for ACD, affecting both men and women. Here we present a commentary on the currently available literature regarding nickel ACD and microneedling.

Although microneedling has gained popularity in recent years, metal ACD to microneedles is rarely reported. Microneedling devices approved by the US Food and Drug Administration contain needles commonly composed of surgical stainless steel (SS). SS contains varying amounts of nickel, depending on the grade.¹ Specifically, the authors' microneedling device is composed of 316L alloy (Table I), containing 10% to 14% nickel.¹ Although some devices have titanium-coated needle tips, it is unclear if there is sufficient nickel exposure to induce ACD in sensitized individuals. When testing the microneedling tips of the SkinPen Precision system (Crown Aesthetics) with 2 dimethylglyoxime tests (Nickel Alert [Athena Allergy] and Chemo Nickel Test [Chemotechnique Diagnostics]), twice each, negative results were noted (Fig 1). Additionally, used microneedles were similarly tested to consider the possibility of microneedle breakdown; however, these tests were negative both times. In contrast, a nickel-containing US minted nickel, used as positive control, tested positive.

Abbreviations used:

ACD: allergic contact dermatitis
SS: surgical stainless steel

Table I. Stainless steel composition of medical grade instruments

Stainless steel grade	Composition
304	Iron + carbon, 18%-20% chromium, 8%-12% nickel
316*	Iron + carbon, 16%-18% chromium, 10%-14% nickel, 2%-3% molybdenum
409	Iron + carbon, 10.5%-11.75% chromium, 0.5% nickel
410	Iron + carbon, 11.5%-13.5% chromium, 0.75% nickel
420	Iron + carbon, 12%-14% chromium, 0% nickel
430	Iron + carbon, 16%-18% chromium, 0%-0.75% nickel
440	Iron + carbon, 16%-18% chromium, 0% nickel

Adapted from Boyd and Hylwa.¹

*Stainless steel found in the microneedles used by authors.

A PubMed literature search for the terms “microneedle,” “allergy,” “allergic contact dermatitis,” and “nickel allergy” was performed, revealing 1 report of skin eruption 6 days after microneedling with a Dermaroller device (Derma India) containing titanium-coated tips of stainless steel needles. Patch

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Funding sources: None.

IRB approval status: Not applicable.

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JAAD Int 2022;9:48-9.

2666-3287

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<https://doi.org/10.1016/j.jdin.2022.08.005>



Fig. 1. Microneedling tip with negative reaction using 2 dimethylglyoxime tests, twice each.

testing later revealed a positive nickel reaction.² However, this study was limited in that there was no allergy testing to utilized local anesthetics or antiseptics. Similarly, 2 cases of ACD have been reported after exposure to nickel-containing hypodermic needles.³ In a test of SS ear piercings, SS (316L

alloy) was found to release nickel at a rate of $<0.05 \mu\text{g}/\text{cm}^2/\text{wk}$ and did not elicit ACD in patients with a known nickel allergy.⁴ As it pertains to microneedles, it is unclear if nickel ions are released with use. Our testing of the SkinPen Precision system suggests either a true negative or that the percentage of nickel is too low to detect with dimethylglyoxime testing, which is only 59.3% sensitive.⁵

Given the high prevalence of nickel ACD, a screening question may be of benefit during cosmetic consultations. Further prospective clinical studies are needed to make discrete recommendations given the scarcity of relevant literature investigating this subject. Another approach may be to perform microneedling test spots in patients with patch test-proven nickel allergy to assess whether a cutaneous reaction occurs, though further research is needed.

Conflicts of interest

None disclosed.

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