Cutaneous effects of daily application of hyaluronic acid dissolving microneedles: a pilot case study

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Introduction

Anti-aging treatment options

Invasive

Ablative lasers

Chemical peels

Non Invasive

Topical products

Microneedles

(+ Effective

(- Office appointments

(+ Home use

(- Expensive

(+ Cheaper

(- Prolonged recovery

The cutaneous effects of daily application of dissolving hyaluronic acid through the initiation of a post-traumatic inflammatory cascade, resulting in improved cosmesis. Given the risk of skin infection caused by the recirculation of microneedles, we propose the use of dissolving microneedles as a novel alternative.

Objective

To investigate the cutaneous effects of daily application of dissolving microneedles composed of hyaluronic acid.

Methods

Microneedles made of hyaluronic acid were administered once daily to a marked region on the flexor surface of a healthy volunteer’s forearm over a two-week duration.

Evaluate:

1. Roughness Parameter
2. Dermal Signal Intensity
3. Epidermal Thickness

2-min application

At baseline, 2-week and 4-week post treatment

Dissolving microneedles

High-definition optical coherence tomography (HD-OCT)

Results

Roughness Parameter (Ra). Marked region of the subject was imaged three times using the HD-OCT to generate the average roughness parameter.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Baseline</th>
<th>2-week post treatment</th>
<th>4-week post treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roughness</td>
<td>3.3 ± 0.2</td>
<td>2.5 ± 0.2</td>
<td>2.4 ± 0.3</td>
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<tr>
<td>Epidermal Thickness (µm)</td>
<td>49.7 ± 7.3</td>
<td>64.9 ± 8.1</td>
<td>30.6 &lt;0.001</td>
</tr>
<tr>
<td>Dermal Signal Intensity (pixels)</td>
<td>273.2 ± 43.7</td>
<td>224.8 ± 28.4</td>
<td>17.7 &lt;0.001</td>
</tr>
</tbody>
</table>

- During the treatment period, the subject did not report major adverse reactions.
- Treatment with hyaluronic acid dissolving microneedles was associated with reduced skin surface roughness, increased epidermal thickness and increased dermal compactness.
- Reduction in dermal signal intensity was known to be associated with increased homogeneity of dermal components, which suggested increased collagen content.
- Further studies can be conducted to evaluate the anti-aging utility of such microneedles.

Conclusion

This pilot data indicated that treatment with hyaluronic acid dissolving microneedles was associated with reduced skin surface roughness, increased epidermal thickness and increased dermal compactness, suggestive of anti-aging effects.

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References