Effects of Silicone Gel Sheeting on Scar Formation
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Abstract

Problem Addressed:
The treatment of keloids and hypertrophic scars has long been a concern for facial plastic surgeons. Silicone gel sheeting is reported to provide positive outcomes with respect to a reduction in scar hypertrophy and an improvement in color differences. Micropore (3M) tape, a cheaper and more readily available product, has also been reported to reduce scar hypertrophy.

Methods and Measures:
Hypertrophic scar formation was induced in an established rabbit model that parallels human skin. Treatment of the animals’ scars was divided into 3 study groups: silicone gel sheeting, Micropore tape, or no treatment. 56 total scars were treated for 30 days after the complete reepithelialization of the created scars. Photometric analysis was performed on the scars. Scar hypertrophy was analyzed with blinded observers using a visual analog scale.

Results:
Photographic analysis showed there was a statistically significant improvement in scar hypertrophy after use of either silicone gel sheeting (p=0.032) and Micropore tape (p=0.022) when compared with controls. There was no difference between using Silicone Gel Sheeting or Micropore Tape.

Conclusions:
Silicone Gel Sheeting and Micropore Tape are equally effective in the reduction of hypertrophic scarring.

Introduction

The treatment of keloids and hypertrophic scars, which can occur after thermal injury, surgical incision, or other traumatic injury, has long been a concern for dermatologists and plastic surgeons. There are a wide variety of over-the-counter products that claim to improve hypertrophic scarring. Objective testing of many of these products in controlled studies has been limited over the years. Several clinical trials have tried to show the efficacy of such products but the mechanisms of these products are yet still unknown, partly due to the lack of a animal model of hypertrophic scarring. Silicone Gel Sheet (SGS) is the most widely use over-the-counter product to prevent hypertrophic scarring. Micropore paper tape is an inexpensive, readily available product in any clinical setting that has also been used to prevent hypertrophic scarring. We hypothesize that the application of SGS and Micropore paper tape will equally prevent hypertrophic scarring. Proving the efficacy of a cheaper, more readily available product can greatly benefit patients as a whole.

Methods and Materials

Rabbits weighing 2.5 to 3.5kg were anesthetized with ketamine (60mg/kg) and xylazine (5mg/kg). Four full-thickness 6mm diameter punch biopsies per ear down to cartilage using a microsurgical technique. Care was taken to remove the perichondrium overlying the ear cartilage which delays reepithelialization of the defect, supporting hypertrophic scar formation.

All wounds were covered with an occlusive polyurethane dressing (tegaderm). On post-operative day 14, each wound was randomized to receive daily bandage changes with either SGS, Micropore tape, or no bandage at all for 30 days. After euthanization, the scars were harvested and photographed were taken of all the wounds.

Digital photographs of the wounds (Figure 3) were evaluated on a 0-10 analog scale by two independent facial cosmetic surgeons. The evaluators were blinded to what treatment each wound had received.

Results

Data for one way ANOVA are presented in Table 1. The use of Micropore tape (group 1 and 2) showed to have a better cosmetic outcome than its no treatment control (group 3 and 4) (p=0.022). The use of Silicone Gel Sheet (group 7 and 8) also showed to have a better outcome than its no treatment control (group 5 and 6) (p=0.032).

No difference was found between the use of Micropore tape (group 1 and 2) versus the use of Silicone Gel Sheet (group 7 and 8).

Conclusions

Silicone Gel Sheet and Micropore Tape are both effective in the reduction of hypertrophic scarring. We found no greater benefit in the use the more expensive Silicone Gel Sheet over Micropore Tape. This study suggests that the improvement in scar outcomes is a product of the occlusive nature of the products, rather than the properties of the products themselves.

References

4. Borgognoni L. Biological effects of silicone gel sheeting. 2002 Wound Repair Regen 10:118–121

Figure 1. Punch biopsy from scar procedure, 4 per ear.
Figure 2. Day 12 post scar procedure showing hypertrophic scarring.

Table 1. Results of Silicone Gel Sheet and Micropore Tape compared to control.

<table>
<thead>
<tr>
<th>Wound Site</th>
<th>Healing Score</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>5.09</td>
</tr>
<tr>
<td>2</td>
<td>6.02</td>
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<tr>
<td>3</td>
<td>7.03</td>
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<td>4</td>
<td>8.04</td>
</tr>
<tr>
<td>5</td>
<td>9.05</td>
</tr>
<tr>
<td>6</td>
<td>10.00</td>
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Table 2. Healing score from scale of 0-10. Micropore tape=1+2, Control=3+4, Silicone Gel Sheet=7+8, Control=5+6.

Figure 3. Post-mortem healed scars, groups numbered as shown.