

## Pressure therapy for post-burn scars: does it work?

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Several controlled trials have accumulated evidence for the effectiveness of conservative strategies in the treatment of post-burn scars, including compression therapy.<sup>1</sup> Randomized controlled trials using noninvasive instruments have assessed the effect of pressure on the 6 classical clinical parameters of post-burn scars: thickness, pigmentation, vascularity, pliability, color and overall aspect. There is worldwide acceptance for compression therapy and for silicone gel sheets in this specific indication, although question marks remain regarding most appropriate dosage and about working mechanisms. The most common working hypothesis is that pressure would induce ischemia and thus impair further growth of the scar. It is generally accepted that pressure impacts on the realignment of collagen fibers.<sup>2,3</sup> The impact of pressure is most evident of thickness of the scar. The mechanism of action of silicone was postulated as improving skin hydration through occlusion and by reducing fibroblast's activity and collagen for-

mation.<sup>4</sup> This working mechanism supports the effect of silicone on elasticity and redness of a hypertrophic scar.

But how much compression pressure is needed? Data on a prospective study comparing 2 levels of pressure are presented: 20 vs 15 mmHg, during 3 months of pressure treatment in 76 burn scars, using the chromameter to assess redness and high resolution ultrasound (DermaScan™; Cortex Technology, Hadsund, Denmark) to measure thickness. Results of this study show that the higher pressure (20 mmHg) is more effective than the lower pressure (15 mmHg) and that this effect occurs sooner. This is in accordance with other published research which showed that the higher the amount of pressure, the better the effect on decrease of thickness.<sup>5,6</sup> Nevertheless, there was no clear consensus about the minimum effective amount of pressure. Some authors suggested a pressure of at least 15 mmHg, while others recommended pressure of 24 mmHg to overcome capillary pressure. Higher pressure worn for 14 to 23 hours/day was more effective in flattening of burn scars and resulted in thinner scars. A compression pressure greater than 40 mmHg could result in complications such as paresthesia. Baseline selection differences between studies could explain the discrepancy of results concerning erythema (intervention time, time after burn injury, and the patient population: e.g. Asiatic vs Caucasian). Since silicone and pressure therapy had complementary modes of action, it appeared to be evident that their combined application would give complementary results. However a review of the literature yields vari-

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Veins and Lymphatics 2016; 5:5984  
doi:10.4081/vl.2016.5984

able outcomes, most probably due to differences in study selection parameters. Finally, the authors tested what is the pressure added to the effect of silicone sheets, in several types of scars: post trauma, following surgery or burn injury. Results show the value of pressure treatment as a preventive measure against hypertrophy of scars: treated sites are less marked, and early treatment seemed to be more effective than a late start of the same therapy. In their experience, pitfalls of this treatment are the several factors, which interfere with steady pressure: like the anatomical contours e.g., the axilla or the chest, compliance (adherence to treatment), and pressure-loss of the garment. Therefore (=to counteract pressure loss) custom made pressure pads or 3D-fitted inflatable silicone inserts are used to adapt and to maintain pressure values in concave anatomical areas (Figure 1). On the other hand these can limit the mobility when used over a joint, and macerate the skin due to excessive sweating.<sup>7</sup>

Since pressure is more effective if high enough, above 20 mmHg, it is important to regularly check and evaluate pressure garments, using a pressure sensor.<sup>8</sup> Moreover, pressure loss of pressure garments needs to be taken into account. Their advice is to monitor objectively and to adapt pressure treatment if needed in order to maintain the pressure above 20 mmHg (Figure 2).

Sharp *et al.* very recently published a best evidence statement on pressure therapy in the management of hypertrophic scarring.<sup>9</sup>



Figure 1. Combination of pressure device and custom made inflatable silicone insert system in concave anatomical regions.



Figure 2. Monitor the scar and the interface pressure with objective and reliable tools and adjust the pressure therapy when needed.

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