



EFFICACY OF CUSTOM MADE PRESSURE GARMENT ON POST BURN HYPERTROPHIC SCAR: A PILOT STUDY

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ABSTRACT Hypertrophic scars, a frequent sequelae, of burn injuries are usually related to the depth of the burns and are characteristically red, raised & rigid requiring up to 2 years to reach maturity. The application of continuous pressure through pressure garment is most common modality used to control hypertrophic scarring. 30 hypertrophic scars in 24 adult patients were studied for its intervention with pressure garment on Vancouver Scar Assessment. The study provides a preliminary evidence on effectiveness of custom made pressure garments in control of scar formation

KEYWORDS : Burn, Scar, Pressure garment

INTRODUCTION:

Hypertrophic scars are frequent sequelae of burn injuries that interfere with work and all other aspects of life. Hypertrophic scars are usually related to the depth of the burns, and to the patient's tendency to form scars. They are characteristically red, raised & rigid and requires up to 2 years to reach maturity. Various factors such as age, race, and wound healing time have been identified as predictors of patients who may be at higher risk for the development of hypertrophic scars. The impact of scarring is so profound that until steps are taken to greatly reduce or eliminate scarring all together, efforts to enhance rehabilitation of burn survivors will remain palliative at best (Engrav,2006)¹

The application of continuous pressure (through garments, orthoses & splints, silicone sheets) is the primary noninvasive modality used to control hypertrophic scarring. The mechanism by which pressure suppresses hypertrophic scarring is unclear, but it has been hypothesized that pressure causes decreased capillary perfusion and decreased tissue oxygenation, resulting in reduced cellular activity and collagen synthesis. Pressure therapy remains a corner stone of scar control.

The general view is that pressure therapy should be started early-preferably two weeks after burn trauma heals. The application of pressure should continue until the scar is soft & is no longer red. Effective pressure in pressure garments have been reported to be more than 24 mm Hg in order to exceed the inherent capillary pressure (Gallagher, 1992).² Current recommendations state that pressure garments should be worn for at least nine months; if scarring recurs, it is necessary to resume it for up to two years. The garment is made of Nylon-spandex blend (Lycra).The thermophysiological properties of the garment provide comfort by maintaining body temperature and moisture output close to their normal levels. The theory behind the use of pressure garment is quite simple and relies on two things;

- Restriction of blood flow to the scar area
- Constant compression to inhibit the growth of hypertrophic scar tissue.

MATERIALS & METHODS:

Sample:

30 hypertrophic scars in 24 adult patients visiting Life Allies Clinic, New Delhi (mean age 25.91±6.36 yrs; Range=16-39 yrs.)

Inclusion Criteria:

1. Age range 15-40 years
2. Both males and females
3. Partial & full thickness burns resulting from thermal and chemical injuries
4. Healed palpable hypertrophic scars on regions of upper

extremity

Exclusion Criteria:

1. Any associated vascular problem
2. Massive burns
3. Patient not willing to participate
4. Infected scars

Design:

Single shot pretest-post test

There is no confirmed standard method for the treatment of hypertrophic scars. Here rises the question as to what criteria to use for the assessment of scars and their monitoring during the treatment process. There is no common agreement regarding the most appropriate tool or tools for the assessment of the lesion & its evolution. The Vancouver Burn Scar Assessment Scale (VBSAS) described by Sullivan et al in 1990 is commonly used and is considered the most reliable (Cohen's kappa =0.5). VSS assesses the 4 physical parameters (Pigmentation, Vascularity, Pliability and Height) of the scar on ordinal scales. Baryza & Baryza (1995)³ reported reliability testing (overall ICC of 0.81) of modified VBSAS.

Procedure:

Patients' verbal consent was taken prior to the participation in the study. They were provided with 2 custom made pressure garments procured from "Life Allies", New Delhi. "One to wash and one to wear". There were 3 stages of data collection; prior to fitting of pressure garment (Baseline assessment), 4 weeks following the initial fitting and at 8 weeks. All the subjects were routinely monitored for garment compliance and precise fit. The method of Baryza & Baryza was adopted to administer the VSS. 2 mm & 4 mm Plexiglass sheet was used for height comparison and blanching the scar for color assessment.

Data Analysis:

The descriptive statistics used in this study were frequencies & median. Ranks were used, however, in the analyses of the data. Wilcoxon signed rank test for paired samples was used to test the statistical significance. (Table 1)

RESULTS:

16.7% of scar were on Arm (Rt.) followed by Forearm (Rt.) 13.3% and Forearm (Lt) 10%. Rest of the scars was mostly evenly distributed on other anatomic regions of the upper extremity. The mean scar age were 7.41±7.20 months; Range=1- 36 month) .The changes in scar parameters are presented in the bar graphs (fig 1, fig 2 fig 3 and fig 4). Median changes of the scores were also calculated and are presented in the comparative bar graph (fig 5)

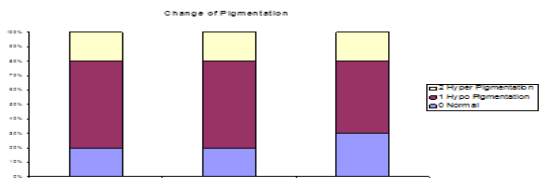


Fig. 1

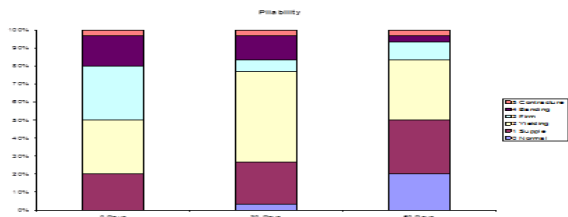


Fig. 2

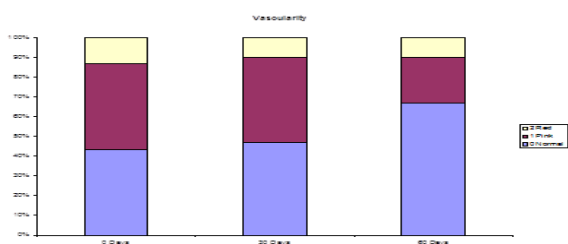


Fig. 3

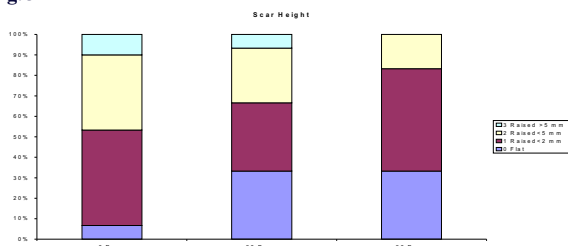
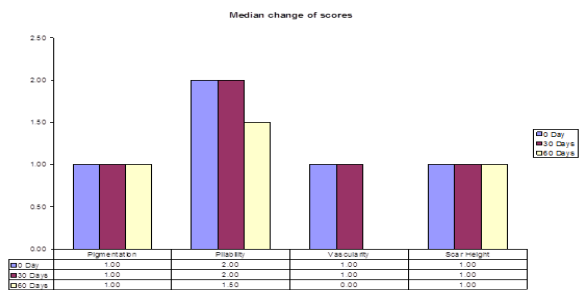


Fig. 4



Wilcoxon signed rank test results:

Table 1

Variable	N	Pre-intervention Vs 1st post intervention		Pre-intervention Vs 2nd post intervention		1st post intervention Vs 2nd post intervention	
		Z-value	p-value	Z-value	p-value	Z-value	p-value
Pigmentation	30	.000	1.000**	-1.732	0.083*	-1.732	0.083*
Pliability	30	-3.207	.001**	-4.564	.000**	-3.900	.000**
Vascularity	30	-1.000	.317***	-2.309	.021*	-2.449	.014*
Scar height	30	-3.357	.001**	-4.264	.000**	-2.333	.020*

*Significant at .05 level
 **Significant at .01 level
 *** Not Significant

Discussion:

In this study, the changes in 'scar pigmentation' were not found to be statistically significant (p>0.05) which owes mostly to the poor reliability of the scoring criteria and also to the subjective nature of the assessment. However, a noticeable 30% of scars were found to be 'normal' after the application of the pressure garment, as compared to the 20% in the baseline assessment. The changes in the 'Vascularity' were not statistically significant in 1st post test result but were significant in the 2nd post test result, (p=.021)

Results were significant for the other two parameters (Pliability p=.00; and Height p=.00). The above results suggest that pressure garments can effectively enhance scar maturation. Most authors agree that custom made pressure garments when compared with other forms of therapy are the most effective in control of scar formation.

Limitations:

- No means of controlling the pressure has been adopted.
- Only one observation and observer may have influenced the results.
- Inclusion of both dominant & non-dominant hands may have influenced the results.
- The findings of this study with relatively small sample cannot be generalized and further studies are warranted applying the more objective means of scar assessment.

Conclusion:

The results suggest that hypertrophic scar significantly improves over time with custom fitted pressure garments when monitored carefully.

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