

To Study the Efficacy of Silicone Gel for the Treatment of Hypertrophic Scars & Scars

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Abstract:

Background & Methods: The aim of the study is to study the efficacy of silicone gel for the treatment of hypertrophic scars & scars. A detailed history and clinical examination will be done before enrolling patients in the study. Evaluation of results for all the 50 patients will be done on basis of visual inspection and by comparing serial photography.

Results: In Group A 40.6% patients in comparison to 13.3% patients of Group B shows reduction in the scar size upto less than 2 cm square. Most of the patients in Group A with scar size more than 2 cm square shows reduction in there scar size while patients with increased scar size in Group B do not show any significant size reduction.

Conclusion: Most of the patients were in second and third decade of life. There was no patient below ten years and above forty years of age. Patients in this age group (11-40 yrs) are usually cosmoconscious and used to attend plastic OPD for the treatment of scars. The shortest application period of Silicon in gel was three months and the longest, twelve months. Silicon Gel are having soothing and hydrating effects on scars thereby providing relief from itching. Hence a modern perspective based on points given above is more in line with actual overall cost benefit to the patients with the use of Silicon Gel for the treatment of scars.

Keywords: efficacy, silicone gel, hypertrophic & scars.

Study Design: Observational Study.

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Introduction

Skin is the largest organ in our body. It covers around 1.3 to 2.0 metre square of our body. Skin injury leads to wound formation. Wound can be caused by mechanical, thermal or chemical injuries [1].

The body reacts to an injury by following a series of precisely coordinated steps each aimed at closing and healing the wound. Complete healing is possible in internal organs. But in the case of skin wounds, body can only repair the injury [2]. The opening is first closed with a blood clot. Then it is filled from the inside with connective tissue ultimately resulting in a scar. Thus, a SCAR is the final result of wound healing.

In humans, regeneration of tissues is limited. Only epithelium and the liver actually regrow; most tissues heal by repair, which results in scarring. Wound healing is the summation of a number of processes that follow injury. These include coagulation, inflammation, matrix synthesis and deposition. These are followed by angiogenesis,

fibroplasias, epithelisation, contraction, remodelling and scar maturation. If the wound edges are opposed, healing proceeds rapidly to closure [3]. This is known as healing by first intention or primary healing. If the wound edges are separated, such as when there has been tissue loss, the same biological process occurs, but rapid closure is not possible. In this case, angiogenesis and fibroblast proliferation result in the formation of granulation tissue. This contracts to reduce the wound area and allows epithelisation across its surface to achieve wound closure. This is known as healing by second intention. The process is slower, the actual shrinkage of the wound area may cause a contracture. This will produce a disfiguring scar and may also cause limitation of movement [4-6].

A scar is the inevitable consequence of wound repair. The final phase of wound repair is the process of remodelling and scar maturation. The fibroblasts, capillaries, glycosaminoglycans and immature collagen of granulation tissue and the newly healed wound are replaced by relatively

acellular, avascular scar tissue, composed of matured collagen with scattered fibroblasts. This biological process is manifested by a change in appearance of the scar from a red, raised, firm, contracting, and sometimes itchy area to a pale, flat, softer, static, symptomless plaque of mature scar. The rate at which any given scar passes through this process can vary widely, depending on the age of the individual, the site of the wound, the time the wound take to heal, the direction of the scars and the tension across it [7].

Scar differs from the surrounding skin in terms of their function and appearance. In the beginning they are quite red. But later they turn pale and remain lighter than rest of the skin. Hair follicles, sebaceous glands and sweat glands are not formed in scar tissue. Scar tissue is not replenished as well as other tissues and it contains less water. Scar tissues also contain excessive bundles of collagen fibers.

Skin cicatrices and scars, regardless of the initial cause of their occurrence, always constitute a considerable problem for patients. Prophylaxis therefore has to begin in acute trauma phase, even if this may be a stage when the physician's primary concern is to save the patient's life. Wound care, the type of dressing, and treatment strategies always influenced the formation of post-burn cicatrices and keloids. The full set of procedure applied- physiotherapy, compression and local medication – is of great importance [8].

Material and Methods

Patients attending Department of General Surgery, MGM Hospital, Kamothe Diagnosis of keloid and hypertrophic scar will be based on history, physical and dermatological examination. A sample size of 62 patients will be subjected to a prospective study.

A detailed history and clinical examination will be done before enrolling patients in the study. Evaluation of results for all the 50 patients will be done on basis of visual inspection and by comparing serial photography. Response to treatment will be calculated based on 3 parameters: Reduction in volume of the keloid based on objective assessment of the lesion (flattening, decrease in length and width) using calliper. Presence of itch and pain, before and after treatment. Side effects during and after treatment. Patients with no improvements and worsening will be documented and complications shall be recorded

Inclusion criteria:

Patients with keloid or hypertrophic scar will be included in the study irrespective of the age.

1. Post burn contractures.
2. Wound scars
3. Patients undergoing treatment for scars & keloid.

Exclusion criteria:

1. Neonates
2. Patients taking steroids.
3. Pregnant women.

Result

Table 1: Age incidence of the patients in both the groups

Age In Years	Group A	Group B	Total	Percentage
1 – 10	-	-	-	-
11 – 20	4	9	13	21%
21 – 30	25	17	42	67.7%
31 – 40	3	4	7	11.3%
41 - 50	-	-	-	-
	32	30	62	100%
	32	30	62	100%

In my study most of the patients were in second and third decade of life. There was no patient below 10 years and 40 years of age (Table -2). This is because patients in this age group (11-40 years) are usually cosmopolitan and used to attend surgical opd for treatment of scars.

Table 2: Divisions into subgroups

Groups	Post Traumatic	Post Surgical	Post Burn	Hypertrophic Scars	Keloids	Total
Group A	10	12	4	3	3	32
Group B	7	15	4	2	2	30
Percentage	27.4%	43.5%	8.06%	8.06%	8.06%	100%

These groups are further subdivided into subgroups including Post Traumatic, Post Surgical, Post Burn, Hypertrophic scars and keloids.

Table 3: Comparison of contour in both groups

Groups	Pre Application Status		Post Application Status		Percentage
Group A	Elevated	28	Flat	16	50%
			Reduced	10	31.2%
			No Change	2	6.25%
	Flat	4	No Change	4	12.5%
Group B	Elevated	26	Flat	7	23.3%
			Reduced	8	26.6%
			No Change	11	36.6%
	Flat	4	No Change	4	13.3%

The shortest application period of Silicon Gel was 3 months and longest 12 months. Patients were observed and results were compared at monthly follow-up examinations.

In case group elevated scars shows 16 patients (50%) flattening while in control group this goal

can be achieved only in 7 patients (23.3%). Reduction in scar contour is seen in 10 patients (31.2%) and 8 patients (26.6%) in case and control group respectively. 2 (6.25%) patients in case group in comparison to 11 patients (36.6%) shows no response to treatment.

Table 4: Comparison of size reduction in both groups

Groups	Size (cm square)	Pre- Application Status	Post – Application Status	Percentage (%)
Group A	<2	2	13	40.6 (%)
	2 - 5	20	18	56.2 (%)
	>5	10	1	3.1 (%)
Group B	<2	1	4	13.3 (%)
	2 - 5	18	19	63.3 (%)
	>5	11	7	23.3 (%)

In Group A 40.6% patients in comparison to 13.3% patients of Group B shows reduction in the scar size upto less than 2 cm square.

Most of the patients in Group A with scar size more than 2 cm square shows reduction in there scar size while patients with increased scar size in Group B do not show any significant size reduction.

Discussion

A scar is invariably caused by wound, which may be of mechanical, thermal or chemical origin and gives rise to loss or destruction of tissue. Wound healing commences as soon as damage has occurred. The terminal phase of the wound healing process is characterized by the formation of a tough, stable wound closure-the SCAR.

A scar is the inevitable consequence of wound repair. The final phase of wound repair is the process of remodeling and scar maturation. Scar differs from the surrounding skin in terms of their function and appearance. Scars, regardless of the initial cause of their occurrence, always constitute a considerable problem for patients. Prophylaxis therefore has to begin in the acute trauma phase, even if this may be a stage when the physician's primary concern is to save the patient's life [9].

Surgeons should have an understanding of the process of wound healing to help produce scars that are cosmetically pleasing and do not impair function.

The management of scars has undergone tremendous change during recent years. Many invasive and noninvasive methods has been proposed in the past years for the management of scars Silicon Gel is used in the topical treatment of inflammatory and edematous skin changes as well as systematically to prevent thrombosis. It has been shown to pass through the epidermis into the connective tissue and regenerating actions [10]. It has antiphlogistic, antiallergic, antiproliferating action and it increase tissue hydration as well. It also has a loosening effect on collagen structure.

For the treatment of scars, the anti-inflammatory effect of heparin and its effect on the constituents of the of connective tissue matrix are more important than its known antithrombotic action.

In wound healing and scar formation, mild keratolysis has a softening effect and leads to smoothing of the skin surface and improved scar elasticity by increasing moisture retention capacity. Silicon Gel promotes wound healing; it has an epithelializing effect and increases the tissue's water binding capacity. Furthermore, Silicon Gel has a soothing effect, which relieves the pruritus often associated with scar formation.

Silicon act on the biochemical processes in the developing connective tissue, preventing the formation of hyperplastic scars. These active ingredients enhance swelling, softening and loosening of connective tissue. It exerts softening

and smoothing action on indurated and hyperplastic scar tissue, improving collagen structure. It promotes tissue regeneration and reduces exuberant granulation [11].

With this in mind, a scar management program has been adopted based on the modalities of wound support, hydration, and hastened maturity, all factors gleaned from scientific evidence published over the past 25 years.

In a recent review of the literature, an independent international panel provided evidence-based recommendations concerning scar management, based on a qualitative overview of over 300 published references using standard methods of appraisal. The recommendations focus on the management of hypertrophic scars and keloids, and are internationally applicable in a range of clinical situations [12].

Conclusion

Most of the patients were in second and third decade of life. There was no patient below ten years and above forty years of age. Patients in this age group (11-40 yrs) are usually cosmoconscious and used to attend plastic OPD for the treatment of scars. The shortest application period of Silicon in gel was three months and the longest, twelve months. Silicon Gel are having soothing and hydrating effects on scars thereby providing relief from itching. Hence a modern perspective based on points given above is more in line with actual overall cost benefit to the patients with the use of Silicon Gel for the treatment of scars.

References

1. Hadjiiski, O. et al.: Treatment of superficial burns, post-burn scars, and keloids with Heparin and Allantoin combination gel. *Annals of Burns and Fire Disasters*, Vol. XV, No2, June 2002.
2. Gortelmeyer, R.: Possibilities of scar treatment after thoracic surgery. *Drugs Exptl. Clin. Res.* XXI (5), 199-206 (1995)
3. Navarro, N.: Clinical study of Heparin and Allantoin for the treatment of Scars. 2000, submitted to publication.
4. Prasad, I. Topical Gel Improves Blood Perfusion in Burn Hypertrophic Scars; Abstract presented on the 32nd Meeting of the American Burn Association, Las Vegas (2000)
5. Willital, G. H., Heine, H.: Efficacy of Allantoin Gel in the treatment of fresh scars after thoracic surgery in children and adolescents. *Int. J. Clin. Pharm. Res.* XIV (5/6), 193-202 (1994).
6. Zelenkova, H.: Possibilities of Therapy of Stiae Cutis. Tuan TL, Nichter LS. The molecular basis of keloid and hypertrophic scar formation. *Mol Med Today*.1998;4:19-24.
7. Mercer NS. Silicone gel in the treatment of keloid scars. *Br J Plast Surg.* 1989;42:83-8.
8. Dockery GL. Treatment of hypertrophic and keloid scars with silastic gel sheeting. *J Foot Ankle Surg.*1994;33:110-9.
9. Cruz-Korchin NI. Effectiveness of silicone sheets in the prevention of hypertrophic breast scars. *Ann Plast Surg.* 1996;37:345-8.
10. Gibbons M, Zuker R, Brown M, Candlish S, Snider L, Zimmer P. Experience with silastic gel sheeting in pediatric scarring. *J Burn Care Rehabil.* 1994;15:69-73.
11. Borgognoni L, Martini L, Chiarugi C, Gelli R, Reali UM. Hypertrophic scars and keloids: Immunophenotypic features and silicone sheets to prevent recurrences. *Ann Burns Fire Disasters.*2000;8:164-6.
12. Nikkonen MM, Pitkanen JM, Al Qattan MM. Problems associated with the use of silicone gel sheeting for hypertrophic scars in the hot climate of Saudi Arabia. *Burns.* 2001;27:498-500.