

**STUDY ON IMPACT OF SKIN REHABILITATION MASSAGE THERAPY ON
IMMATURE SCAR IN BURN VICTIM**¹*Dr. Nikita Rolekar and ²Dr. Sidharth Misra¹M.B.B.S., M.S. (General Surgery), M.Ch. (Plastic Surgery), Assistant Professor and Consultant Plastic Surgeon.
²M.B.B.S, Extern.***Corresponding Author: Dr. Nikita Rolekar**

M.B.B.S., M.S. (General Surgery), M.Ch. (Plastic Surgery), Assistant Professor and Consultant Plastic Surgeon.

Article Received on 10/08/2023

Article Revised on 31/08/2023

Article Accepted on 21/09/2023

ABSTRACT

In burn patients, 2nd and 3rd degree burns give rise to immature scars on healing in recovery phase. The aim of this study is to assess the impact of skin rehabilitation massage therapy on immature scars with parameters like scar quality, pain and itching. This randomized controlled trial study included 100 burn patients treated in our hospital from April 2020 to April 2022. Age group of 18yrs to 70 yrs included and **Group 1** was treated according to the routine management while **Group 2** was treated with skin rehabilitation massage therapy. The patients in both the groups were assessed by two tools. **Tool 1:** Visual Analog Pain Assessment scale. **Tool 2:** Patient and Observer Scar Assessment Scale (POSAS). Results were assessed only after 6 weeks and 3 months. 94% of patients had worse pain in group 1 and 20% in group 2, 34 % in group 1 and 66% in group 2 had painless, supple, more regular thin scar after 6 weeks and 3 months, 6 months of intervention. Skin rehabilitation massage therapy is a cost effective, easily implementable so it is crucial to start the therapy early to reduce the pain, improve the scar quality and preventing the hypertrophic scar and contracture amongst the burn survivors.

KEYWORDS: Immature burn scar, Skin rehabilitation massage therapy, Scar quality.**INTRODUCTION**

Managing burn injuries is extremely challenging because of a wide array of complications that may occur in the resuscitative, recovery and rehabilitative phase.^[1] The recovery phase of a burn injury is characterized by scar tissue formation followed by scar contracture and impairment in daily activities.^[2] Physical scar management is extremely crucial as scars can have a negative impact on the life of burn victims.^{[3][4]} Several studies have shown that skin rehabilitative massage therapy has led to a decline in the scar thickness, pruritus, pain and skin sensitivity along with an increase in scar pliability and range of movement.^[5] Till date the effects of physical scar management are still controversially discussed, and consensus has seldom been reached on the detailed protocol.^[6] This study is an attempt to highlight the impact of skin rehabilitation massage therapy on the immature scars seen in burn victims.

MATERIALS AND METHODS

A randomized controlled trial study on burn patients admitted in the burn unit of Terna Medical College and Hospital was conducted from April 2020 to April 2022. A sample size of 100 patients with 2nd and 3rd degree burns was chosen. Information and sample were divided randomly into two equal groups, 50 patients in each group. Group 1 (Control group) received hospital routine

care for patients with 2nd and 3rd degree burns while the group 2 (Study group) received skin rehabilitation massage therapy in recovery phase. All patients of age group 18-70 years were included in the study excluding Traumatic scar and post surgical scar. Of the total 100 patients, there were 64 males and 36 females.

After admission of burn patient with immature scar, a thorough history and comprehensive examination was done to collect the baseline data. Patient is divided in Group 1 and Group 2. The intervention implemented for group 1 as routine scar care with antibiotic and analgesic drug. Group 2 has received the skin rehabilitation massage therapy on immature scar. This therapy includes circular movements with local pressure of low intensity and frequency over immature scar, along with we used the technique like creating a skin fold (i.e. lifting the scar) gently and carefully mobilizing it. This therapy is implemented over the scar size of 10cm² for 5 minutes 3-4 times a day. Moisturisation / hydration is very important for every scar irrespective of whether massage is indicated and should be encouraged four times a day to prevent any dryness.

After the implementation of the respective therapies for a period of 6 weeks patients in both the groups were evaluated with the tools 1 and 2 (POSAS Observer score) to assess the impact of the interventions implemented on

them. Comparison was done between both the groups to assess the impact of skin rehabilitation massage therapy

on immature scar. Long term result was assessed on follow up of 3 months and 6 months.

Table 1: Patient Distribution Based on Age And Sex.

AGE GROUP	GROUP 1 (Control group)	GROUP 2 (Study group)
18-30	12 (24%)	14 (28%)
30-40	14 (28%)	15 (30%)
40-50	15 (30%)	11 (22%)
>50	9 (18%)	10 (20%)
SEX		
MALE	31 (62%)	33 (66%)
FEMALE	19 (38%)	17 (34%)

TABLE 2: Distribution of patients based on the burn history and body part involvement

	GROUP 1 (Control group)	GROUP 2 (Study group)
DEGREE OF BURN		
2nd degree burn	26 (52%)	27 (54%)
3rd degree burn	24 (48%)	23 (46%)
PART OF BODY INVOLVED		
NECK	21 (42%)	17 (34%)
HAND	12 (24%)	13 (26%)
FOREARM	8 (16%)	13 (26%)
POPLITEAL	9 (18%)	7 (14%)

RESULTS

Out of 100 patients, 50 patients of Group 1 received routine medical care for immature scar and 50 patients of Group 2 had skin rehabilitation massage therapy. 64 males and 36 female were included in our study. Thus, the male to female ratio was 1.77:1.

According to Table 1, 58% of patients in group 1 control group while 52% patients in group 2 study group were of 30-50 years of age group. Also, it was found that

approximately, one third of the patients in the control (38%) and the study group (34%) were females.

According to Table 2, more than half of the patients in the control (52%) and study group (54%) had second degree burns. Around one fourth of the patients in the control (24%) and the study (26%) group had hand involvement while neck involvement was seen in around 42% and 34% of patients in the control and the study group, respectively.

Table 3: Distribution of pain visual analog scale of both the groups.

POSAS OBSERVER SCORE	GROUP 1 (Control group)			GROUP 2 (Study group)		
	6weeks	3months	6months	6 WEEKS	3months	6 months
GOOD SCAR (6-24)	5(10%)	8(16%)	19(38%)	14(28%)	26(52%)	42(84%)
BAD SCAR (25-42)	15(30%)	19(38%)	11(22%)	26(52%)	19(38%)	7(14%)
WORST SCAR (43-60)	30(60%)	23(46%)	20(40%)	10((20%)	5(10%)	1(2%)

Table 4: Distribution of burn scar assessment based on the POSAS observer scale in both the groups after the period of intervention.

PAIN LEVEL	GROUP 1 (Control group)			GROUP 2 (Study group)		
	6 weeks	3 months	6months	6weeks	3months	6months
NO PAIN (0-3)	13(26%)	20(40%)	33(66%)	39(78%)	44(88%)	50(100%)
MODERATE PAIN (4-6)	25(50%)	23(46%)	12(24%)	9(18%)	5(10%)	-
WORSE PAIN (7-10)	12(24%)	7(14%)	5(10%)	2(4%)	1(2%)	-

Table 3 presented the distribution of the pain Visual Analog scale (VAS) of both the groups throughout the periods of the study. It is illustrated that majority of the patients in the control group (50%) and the study group (18%) had moderate pain in 6 weeks and only 24 % patient in control group and 4% patient in study group had worse pain in 6 weeks. The decline in the pain level is evident in group 2 with skin rehabilitative massage

therapy while 24% patient of moderate pain and 10% patient had worse pain even after medical treatment of 6 months. After the period of 6 months, 100% of the patients who received skin rehabilitation massage therapy reported no pain while only 66% of the patients who received routine medical care reported no pain. There was significant difference in the study and the control group regarding pain experience throughout the

periods of study because p-value was <0.05 in both the cases. This suggests that pain level has decreased dramatically for the study group after the application of skin rehabilitation massage therapy.

Based on scar assessment, more than half of the patients in the study group (84 %) and in the control group (38%) had good scar after 6 months of intervention. Only 2% of patients who received skin rehabilitation massage therapy and 20% of patients who received routine medical care reported worst scar even after 6 months of the period of intervention. There was significant difference in the control and the study group with respect to the scar severity because the p-value was <0.05 .

DISCUSSION

Burn injury management requires a multifaceted approach due to the wide array of complications that are linked to burn injuries. The recovery phase of a burn injury involves a complex sequence of physiological interactions to form appropriate scar tissue.^[7] On healing, deep dermal and full thickness burns lead to the formation of immature scars that result in contracture and further impairment in daily activities.^[8,13] In addition, there is a negative influence on the mental health of the victims as well.^{[14][15][16][17]}

Physical scar management in the form of skin rehabilitation massage therapy (SRMT) is extremely crucial to reduce the negative consequences of the immature burn scar.^{[3][4][19]} Based on several studies, massage therapy has led to a decline in scar thickness, pruritus, pain along with an increase in scar pliability.^[5] It has also resulted in faster recovery of patients inflicted with burns.

Scar massage is one of the most commonly recommended treatments in scar management as it beneficial in terms of less tethering scar, reduces pain, hypersensitivity, and itch, it softens the scar and increases pliability, reduces the scar bulk. Scar massage therapy helps in increasing blood flow to that area, releases the hormone like oxytocin, and induces the mechanotransduction aiding remodeling of the scar structure.

According to Cho Y et al, 2014, the age of studied groups ranged from 33-51 years while Parlak GA et al, 2010 conducted their study on the age group of 12-18 years. In our study, the age group that was taken into consideration was 18-70 years.^{[23][24]}

In the study conducted by Parlak GA et al, 2010, 32 subjects received massage therapy while 31 subjects of the control group received routine medical care and there was a significant reduction in the visual analog scale for pain in the group that received the massage therapy.^[24] In addition, Field et al, 2000 conducted a study wherein they compared massage therapy that was done for 5 weeks with the standard therapy.^[25] In our study, the

period of massage therapy was longer and varied based on the degree of burn that is 3 months for second degree burns and 6 months for third degree burns and a significant reduction in the visual analog scale for pain was noted in the group that received skin rehabilitation massage therapy.

Burn scar quality has been studied by Shin T et al, 2012 and they reported an improvement in burn scar quality in 45.7% of the patients who were treated with massage therapy.^[26] According to Patino et al, 1999, there was no significant effect on the scar pliability and vascularity with massage therapy.^[27] In our study, around 84% of the patients reported an improvement in scar pliability and a reduction in vascularity and pigmentation resulting in an overall improvement in scar quality after the application of skin rehabilitation massage therapy.

Skin rehabilitation massage therapy plays a crucial role in the holistic well-being of the burn victims due to its effects on scar quality, pain, and mental health. A fixed protocol must be added to the current regime of burn management.

CONCLUSION

Skin rehabilitation massage therapy is a cost effective and an easily implementable therapy that should be incorporated into the current post burn scar management. It should be started early to reduce the pain and improve the scar quality amongst the burn survivors.

DECLARATION OF PATIENT CONSENT

The authors certify that they have obtained all appropriate patient consent forms. Consent for providing the images and other clinical information in the journal was also included. The patients have been explained that their initials would not be mentioned, and their identity would be concealed although, complete anonymity cannot be guaranteed.

FINANCIAL SUPPORT AND SPONSORSHIP

Nil

CONFLICTS OF INTEREST

There are no conflicts of interest.

REFERENCES

1. Jonason A. Complications of Burn Injury [Internet]. journals.sagepub.com, 1983. [cited 20 June 2022]. Available from: <https://journals.sagepub.com/doi/pdf/10.1177/216507998303100707>
2. Dewey, W. S., Richard, R. L., & Parry, I. S. Positioning, splinting, and contracture management. *Physical Medicine and Rehabilitation Clinics of North America*, 2011; 22: 229–247.
3. Bock O, Schmid-Ott G, Malewski P, et al.. Quality of life of patients with keloid and hypertrophic scarring. *Arch Dermatol Res.*, 2006; 297: 433–438. [PubMed] [Google Scholar][Ref list]

4. Meirte J, van Loey NEE, Maertens K, et al.. Classification of quality of life subscales within the ICF framework in burn research: Identifying overlaps and gaps. *Burns*, 2014; 40: 1353–1359 [PubMed] [Google Scholar] [Ref list]
5. Ault P, Plaza A, Paratz J. Scar massage for hypertrophic burns scarring-systematic review. *Burns*, 2017pii: S0305-4179(17): 30296-6.
6. Zhang Y, Li-Tsang CWP, Au RKC. A Systematic Review on the Effect of Mechanical Stretch on Hypertrophic Scars after Burn Injuries. *Hong Kong Journal of Occupational Therapy*, 2017; 29(1): 1-9. doi:10.1016/j.hkjot.2016.11.001
7. Gurtner GC, Werner S, Barrandon Y, et al.. Wound repair and regeneration. *Nature*, 2008; 453: 314–321. [PubMed] [Google Scholar]
8. Sephel GC, Woodward SC. Repair, regeneration, and fibrosis. In: Rubin E ed. *Rubin's Pathology*. Baltimore: Lippincott Williams & Wilkins, 2001; 84–117. [Google Scholar]
9. Mustoe TA, Cooter RD, Gold MH, et al. International clinical recommendations on scar management. *Plast Reconstr Surg.*, 2002; 110: 560–571. [PubMed] [Google Scholar]
10. Unal, M. The Therapeutic Effects of Conservative Treatments on Burn Scars. In: Kartal, S. P., Bayramgürler, D., editors. *Hot Topics in Burn Injuries* [Internet]. London: IntechOpen, 2017. [cited 2022 Jun 20]. Available from: <https://www.intechopen.com/chapters/57034> doi: 10.5772/intechopen.70833
11. Candy LH, Cecilia LT, Ping ZY. Effect of different pressure magnitudes on hypertrophic scar in a Chinese population. *Burns*, 2010; 36(8): 1234-1241.
12. Armour A, Scott GP, Tredget EE. Cellular and molecular pathology of HTS: Basis for treatment. *Wound Repair and Regeneration*, 2000; 15: 6-17.
13. Tejero-Trujque R. How do fibroblasts interact with the extracellular matrix in wound contraction? *Journal of Wound Care.*, 2000; 10: 237-242.
14. Bell L, McAdams T, Morgan R, et al.. Pruritus in burns: A descriptive study. *J Burn Care Rehabil*, 1988; 9: 305–308. [PubMed] [Google Scholar]
15. Taal L, Faber AW. Posttraumatic stress and maladjustment among adult burn survivors 1 to 2 years postburn. Part II: The interview data. *Burns*, 1998; 24: 399–405. [PubMed] [Google Scholar]
16. Dorfmueller M. Psychological management and after-care of severely burned patients [In German]. *Unfallchirurg*, 1995; 98: 213–217. [PubMed] [Google Scholar]
17. Robert R, Meyer W, Bishop S, et al.. Disfiguring burn scars and adolescent self-esteem. *Burns*, 1999; 25: 581–585. [PubMed] [Google Scholar]
18. Blakeney, P. E., Rosenberg, L., Rosenberg, M., & Faber, A. W. Psychosocial care of persons with severe burns. *Burns*, 2008; 34: 433–440.
19. Roques C. Massage applied to scars. *Wound Repair and Regeneration*, 2002; 10(2): 126-128.
20. Anthonissen M, Daly D, Janssens T, Van den Kerckhove E. The effects of conservative treatments on burn scars: a systematic review. *Burns*, 2016; 42(3): 508–518. <https://doi.org/10.1016/j.burns.2015.12.006>. Epub 2016 Jan 15.
21. Gavroy JP, Poveda A, Oversteyns B, Plantier G, Rouget D, Griffe O, Teot L, Costagliola M, Ster F. Intérêt du "test de vitro pression" dans le suivi des cicatrices de brûlures a partir de 50 observations. *Ann Medit Burns Club.*, 1995; VIII(1).
22. Frasson, D.N., Valange, M., Almeras, I., Izquierdo, M., Ster, G. (2020). Treatment of Immature Scars: Manual Massages. In: Téot, L., Mustoe, T.A., Middelkoop, E., Gauglitz, G.G. (eds) *Textbook on Scar Management*. Springer, Cham. https://doi.org/10.1007/978-3-030-44766-3_25
23. Cho YS, Jeon H, Hong A, Yang T, Yim H, et. al. The effect of burn rehabilitation massages therapy on hypertrophic scar after burn: a randomized controlled trial. *Burns*, 2014; 1–8.
24. Parlak Gürol A, Polat S, Akçay MN. Itching, pain, and anxiety levels are reduced with massage therapy in burned adolescents. *J Burn Care Res.*, May-Jun, 2010; 31(3): 429-32. doi: 10.1097/BCR.0b013e3181db522c. PMID: 20453734.
25. Field T, Peck M, Hernandez-Reif M, Krugman S, Burman I, Ozment L. Post burn itching, pain, and psychological symptoms are reduced with massage therapy. *J Burn Care Rehabil*, 2000; 21: 189–93.
26. Shin T, Bordeaux JS. The role of massage in scar management. *Dermatol Surg*, 2012; 38: 414–23.
27. Patino O., Novick C., Merlo A & Benaim F. Massage in hypertrophic scars. *The Journal of burn care & rehabilitation*, 1999; 20: 268–71; discussion 267.
28. Moyer, C. A., Rounds, J., & Hannum, J. W. A meta-analysis of massage therapy research. *Psychol Bull*, 2004; 130(1): 3-18.