



EXPLORING EXERCISE PATTERNS AND THE CHALLENGES HINDERING PHYSICAL ACTIVITY AMONG BURN SURVIVORS

Physiotherapy

Dr Janani Arul*

Principal Investigator, Assistant Professor, College Of Physiotherapy, Dayandanda Sagar University, Bangalore 560111 *Corresponding Author

ABSTRACT

Background: Burn injuries result in reduced skin function and skin loss. The impacts of a burn injury depend on the location and degree of damage. Exercise has been demonstrated to be beneficial for burns patients but still there is lack of awareness among burns survivors regarding the exercise program. Research has demonstrated that a well-monitored fitness regimen associated with an improvement in overall physical abilities can reduce the need for surgery and enhance overall quality of life and physical functions. **Objective:** This study aimed to assess exercise behavior in burn survivors and compare pre- and post-injury participation. **Methodology:** The study was conducted at SRM Medical Hospital Kattankulathur and surrounding areas in Chennai, it included 50 individuals with burns ranging from 50 to 80%, for at least three years. Exclusions were severe burns, septicemia, and certain deficits. Participants completed Burn Injury and Exercise Questionnaires and a Psychological and Psychiatric Morbidity Questionnaire. Results indicated higher psychological barriers and less awareness of post-burn exercise programs among those in the depressed and psychologically low category. **Conclusion:** Burn survivors face increased psychological challenges post-injury, impacting exercise participation and awareness of available programs.

KEYWORDS

Burns, Exercise Behavior, Psychological Barriers.

INTRODUCTION

Burns are tissue injuries that can be induced by physical, chemical, or electrical forces. Burns cause skin loss, impaired skin function and reduced physical & functional activities. The severity and location of a burn injury determine its effect. Burns can be caused by any of the following sources: thermal agents, electricity, chemical agents, mechanical agents, cold injuries, or ionizing radiation. Burns are classed based on their depth: first degree, second degree, mid-level or deep second degree, and third degree.

The mortality rate from burn injuries has been gradually decreasing in recent decades, leading to an increase in substantial challenges to burn care hospitals and research centers¹. The process of healing in burn injuries is frequently extensive and complex due to scarring on the skin surface, wound, discomfort, contractures, joint stiffness, and physical deconditioning². Physical deconditioning in severe burn injury is followed by two major causes there are Muscle catabolism and bed rest.³ Exercise is an important component of burn rehabilitation throughout all phases of recovery, as it improves strength, aerobic capacity, and general function in burns patients⁴. Exercise has been shown to be the safest therapy for burn injury patients, with no effect on hypermetabolic response.⁵

Improving general physical function with a supervised exercise program has been shown to increase lean body mass,^{6,7} strength^{7,8,9,10,11}, exercise tolerance, aerobic capacity, pulmonary function and quality of life, reducing the requirement for surgical care.¹² Limited resources and isolation limit access to tertiary burn treatment and rehabilitation institutes. Many burn patients find it challenging to participate in supervised exercise regimens. According to reports, only a small proportion of the general population is aware of the importance of regular exercise, and the percentage remains below the average level in the case of burn injuries.¹³

The term "exercise" refers to physical activity for the aim of fitness or health, and "behavior" refers to behavioral changes related to a specific act so, the term "exercise behaviors" reflects the behavioral changes associated with physical activity undertaken for fitness.¹⁴ The term 'Burns Rehabilitation' states that the psychological pattern, physical and social aspects of an individual and it is more common in burns patients to experience difficulties in any one of the above or to experience all of these areas following a burn injury¹⁵.

Methodology:

Study Design : Non-experimental
Study Type : Observational
study duration : 6 weeks
Sampling Method : Convenient sampling
Sample Size : 50

Study Setting :

SRM Hospital and Research Centre, Kattankulathur, patients in and

around Chennai, Kilpauk medical hospital burn unit.

Exclusion Criteria :

Septicemia, Uncooperative patients, Patient with severe burns above 80%, Behavioural deficit, Cardiac dysfunction, Patients with Burns injury less than 3 years were excluded from this study.

Inclusion Criteria:

Both genders from the age of ten, burns ranging from 50% to 80%, Participants who has burn injury since 3 years.

Outcome Measures

- Burn Injury and Exercise Questionnaire.
- Psychological and Psychiatric Morbidity Questionnaire (PPMQ).

Procedure

The participants were chosen based on the inclusion and exclusion criteria. Participants will receive an explanation of the study. All participants provided informed consent. Participants were requested to complete the first questionnaire, encompassing inquiries regarding burn injuries and exercise. This questionnaire included a series of questions aimed at gathering demographic data such as age, gender, date of burn injury, location of injury on the body, percentage of burn injury, duration of hospitalization, pre-burn injury employment status, and current employment status.

Additionally, participants underwent the administration of the Psychological and Psychiatric Morbidity Questionnaire (PPMQ). This comprehensive questionnaire is divided into six sections designed to elicit psychological and psychiatric information from participants. These sections include inquiries regarding social history, previous history of illness/injury, psychiatric history, circumstances surrounding the burn injury, pain assessment, and staff perspective.

Data Analysis:

The data were collected and was analysed by The Statistical Software Statistical package for social science (SPSS).

RESULTS:

A total of 55 participants were initially included in the study, with 50 completing all aspects. Four participants dropped out citing personal reasons. Before sustaining burn injuries, 48% of participants exercised less than once per week, while 10% exercised once per week, 12% exercised several times per week, 10% exercised most days per week, and 20% exercised every day. Following burn injuries, exercise patterns shifted, with 22% exercising less than once per week, 10% maintaining once-per-week exercise, 24% increasing to several times per week, 10% remaining consistent with exercising most days per week, and 24% continuing to exercise every day according to table 1. This suggests notable changes in exercise habits post-burn injury compared to pre-injury levels, with some participants maintaining consistency

From table 2, psychological behavior with exercise since burn injury was observed. Table 3 revealed that among 27 stressed participants, exercise varied: 7 exercised < once/week, 2 once/week, 6 several times/week, 5 most days/week, and 7 every day. Notably, stressed participants sometimes reduced exercise, with 2 abstaining weekly and none exercising several times/week. Conversely, psychologically low participants (21 total) displayed diverse exercise patterns: 4 < once/week, 2 once/week, 6 several times/week, 4 most days/week, and 5 every day post-burn injury. Table 4 demonstrates significant changes in exercise-related psychological behaviors post-burn injury. Awareness of exercise surged from 42% before injury to 12% during the injury period. Active movements increased from 2% to 18%, while gait training and stretching rose from 8% to 16% and 4% to 50%, respectively. However, the frequency of walking sharply declined from 44% to 4% during the injury period, likely due to injury-related limitations

Table 1: Exercise Prior To Burn Injury And After Burn Injury

S.NO		Prior to Burn Injury	After Burn Injury
1.	Less than once per week	48%	22%
2.	Once per week	10%	10%
3.	Several times per week	12%	24%
4.	Most days per week	10%	10%
5.	Everyday	20%	24%

This table represent the percentage of exercise performed prior & after to burn injury

Table 2: Compliance With The Psychological Behaviour With Exercise Performed Since Burn Injury

S.N	Psychological outcome	Less than once per week	Once per week	Several times per week	Most days per week	Everyday
1	Depressed	7	2	6	5	7
2	Stressed	0	1	0	1	0
3	Psychologically low	4	2	6	4	5

This table represents the frequency of exercise performed since burn injury who are all affected by the psychological outcome.

Table 3: Factors Affected The Ability To Exercise Prior To Burn Injury

S.NO		Prior to Burn Injury	After Burn Injury
1.	Not aware of exercise	42%	12%
2.	Active movements	12%	18%
3.	Gait training	8%	16%
4.	Stretching	4%	50%
5.	Walking	14%	4%

This table shows the factors which affects the patient exercise before and after burn injury

Table 4 Comparing The Psychological Outcome With Exercise Performed Compared To Before And After Burn Injury

S.N	Psychological outcome	Significantly More often	Slightly more often	About the same	Slightly less often	Significantly Less often
1	Depressed	4	3	1	7	12
2	Stressed	0	0	0	2	0
3	Psychologically low	4	7	3	1	6

This table shows the comparison of exercise performed before and after burn injury among affected psychological behaviour

DISCUSSION:

The exploration of exercise patterns and the challenges hindering physical activity among burn survivors sheds light on the complex interplay between psychological factors and physical rehabilitation following burn injuries. Our findings revealed significant shifts in exercise behaviors and compliance with psychological aspects of exercise since sustaining burn injuries. Firstly, prior to burn injuries, a considerable proportion of participants were not aware of exercise as part of their psychological behavior. However, during the burn injury period, there was a notable increase in awareness, indicating a

potential shift in mindset towards the importance of exercise in recovery.

Additionally, the engagement in specific exercise modalities varied before and during the burn injury period. While active movements and gait training saw increases during the injury period, likely due to rehabilitation efforts, the most significant change was observed in the practice of stretching. The substantial increase in stretching exercises during the injury period suggests a heightened emphasis on flexibility and mobility, possibly to address scar tissue formation and functional limitations. Conversely, the frequency of walking, a common form of exercise, decreased drastically during the burn injury period. This decline may be attributed to the physical limitations imposed by burn injuries, such as reduced mobility, pain, and the need for wound care. These findings highlight the multifaceted nature of rehabilitation following burn injuries, encompassing both physical and psychological aspects. While rehabilitation efforts focus on restoring physical function and mobility, it is crucial to address psychological barriers that may hinder exercise participation among burn survivors. These barriers may include fear of pain, body image concerns, and post-traumatic stress disorder (PTSD) symptoms related to the burn injury.

Moreover, the challenges hindering physical activity among burn survivors extend beyond the injury itself. Environmental factors, such as access to rehabilitation facilities and social support networks, play a crucial role in promoting sustained exercise participation and adherence to rehabilitation programs. Limitation: This study concentrates only on the frequency of exercise performance only. This study does not cover any data regarding the duration or intensity of the exercise. Also has less sample size because.

In conclusion, our study underscores the importance of addressing both physical and psychological aspects of exercise rehabilitation among burn survivors. Tailored interventions that integrate psychological support with physical rehabilitation may enhance adherence to exercise programs and ultimately improve functional outcomes and quality of life for individuals recovering from burn injuries. Further research is warranted to explore the long-term impact of exercise interventions on the physical and psychological well-being of burn survivors and to identify effective strategies for overcoming barriers to physical activity in this population. A large number of subjects can be used, and the research can be carried out in all burn units with a broad knowledge of physiotherapy and exercise protocols for burn survivors.

REFERENCES

- Brusselaers N, Hoste EA, Monstrey S, Colpaert KE, De Waele JJ, Vandewoude KH, et al. Outcome and changes over time in survival following severe burns from 1985 to 2004. *Intensive Care Med.* 2005;31:1648–53. doi: 10.1007/s00134-005-2819-9.
- Hart DW, Wolf SE, Chinkes DL, Gore DC, Mlcak RP, Beauford RB, et al. Determinants of skeletal muscle catabolism after severe burn. *Ann Surg.* 2000;232:455–65. doi: 10.1097/0000658-200010000-00001.
- de Lateur BJ, Magyar-Russell G, Bresnick MG, Bernier FA, Ober MS, Krabak BJ, et al. Augmented exercise in the treatment of deconditioning from major burn injury. *Arch Phys Med Rehabil.* 2007;88:S18–23. doi: 10.1016/j.apmr.2007.09.003.
- Farrell RT, Gamelli RL, Sinacore J. Analysis of functional outcomes in patients discharged from an acute burn center. *J Burn Care Res.* 2006;27:189–94. doi: 10.1097/01.BCR.0000020615.59734.
- Herndon DN. *Total burn care.* Philadelphia: WB Saunders Company; 2007.
- Al-Mousawi AM, Williams FN, Mlcak RP, Jeschke MG, Herndon DN, Suman OE. Effects of exercise training on resting energy expenditure and lean mass during pediatric burn rehabilitation. *J Burn Care Res.* 2010;31:400–8. doi: 10.1097/BCR.0b013e3181db5317.
- Cucuzzo NA, Ferrando A, Herndon DN. The effects of exercise programming vs traditional outpatient therapy in the rehabilitation of severely burned children. *J Burn Care Res.* 2001;22:214–208. Paratz JD, Stockton K, Plaza A, Muller M, Boots RJ. Intensive exercise after thermal injury improves physical, functional, and psychological outcomes. *J Trauma Acute Care Surg.* 2012;73:186–94. doi: 10.1097/TA.0b013e31824baa52.[PubMed][CrossRef]
- Paratz JD, Stockton K, Plaza A, Muller M, Boots RJ. Intensive exercise after thermal injury improves physical, functional, and psychological outcomes. *J Trauma Acute Care Surg.* 2012;73:186–94. doi: 10.1097/TA.0b013e31824baa52.
- Suman OE, Thomas SJ, Wilkins JP, Mlcak RP, Herndon DN. Effect of exogenous growth hormone and exercise on lean mass and muscle function in children with burns. *J Appl Physiol (1985)* 2003;94:2273–81. doi: 10.1152/japplphysiol.00849.2002.
- Przkora R, Herndon DN, Suman OE. The effects of oxandrolone and exercise on muscle mass and function in children with severe burns. *Pediatrics.* 2007;119:e109–16. doi: 10.1542/peds.2006-1548.
- Suman OE, Spies RJ, Celis MM, Mlcak RP, Herndon DN. Effects of a 12-wk resistance exercise program on skeletal muscle strength in children with burn injuries. *J Appl Physiol (1985)* 2001;91:1168–75.
- Suman OE, Mlcak RP, Herndon DN. Effect of exercise training on pulmonary function in children with thermal injury. *J Burn Care Res.* 2002;23:288–93. doi: 10.1097/00004630-200207000-00013.
- Celis MM, Suman OE, Huang TT, Yen P, Herndon DN. Effect of a supervised exercise and physiotherapy program on surgical interventions in children with thermal injury. *J Burn Care Rehabil.* 2003;24:57–61. doi: 10.1097/00004630-200301000-00014.
- Oxford: Oxford Press Oxford English Dictionary; 2013.

15. Haskell WL, Lee IM, Pate RR, Powell KE, Blair SN, Franklin BA, et al. Physical activity and public health: Updated recommendation for adults from the American College of Sports Medicine and the American Heart Association. *Med Sci Sports Exerc.* 2007;39:1423–34.