

Effectiveness of Early Multimodal Rehabilitation with Psychological Intervention on Functional Outcome and Scar Quality in Burn Patients

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Abstract Background: Burn injuries are associated with significant functional impairment, scar formation and psychological distress, which may adversely affect recovery and quality of life. Early rehabilitation combined with psychological support has been proposed as an effective strategy to optimize outcomes in burn survivors. **Objective:** To evaluate the effectiveness of early multimodal rehabilitation combined with psychological intervention on functional outcomes and scar quality in patients with upper limb burn injuries. **Methods:** A single-center prospective cohort study was conducted in 33 patients with upper-limb thermal burns. Participants received an early multimodal rehabilitation program consisting of physiotherapy, occupational therapy, scar management and cognitive behavioral therapy-based psychological counseling. Functional outcomes were assessed using the Cochin Hand Function Scale (CHFS), while scar quality was evaluated using the Vancouver Scar Scale (VSS) at baseline, three months and six months. **Results:** Thirty-three participants completed the study. Functional outcomes improved significantly over the six-month follow-up, with mean CHFS scores changing from 3.2 ± 1.1 at baseline to 5.8 ± 1.3 at three months and 7.4 ± 1.0 at six months (repeated-measures ANOVA, $p < 0.001$). Mean VSS scores decreased from 10.5 ± 2.3 to 4.9 ± 1.5 over the same period ($p < 0.001$). Anxiety reduction averaged $65 \pm 12.4\%$ and rehabilitation compliance reached $78 \pm 10.2\%$ during follow-up. **Conclusion:** Early multimodal rehabilitation combined with psychological intervention may enhance functional recovery, improve scar quality and promote psychological well-being in patients with burn injuries.

Key Words Burn Injury, Upper Extremity, Burn Rehabilitation, Physiotherapy, Cognitive Behavioral Therapy, Scar Management, Vancouver Scar Scale, Prospective Cohort Study

INTRODUCTION

One type of traumatic tissue damage caused by exposure to thermal, electrical, chemical, or radiation is a burn injury. Because of its long-term physical and psychological effects, it continues to be a major public health problem and a major cause of morbidity and mortality globally [1]. Damage to the skin or underlying tissues caused by heat, radiation, electricity, friction, or chemical exposure is called a burn [2]. Burns are categorized by extent using Total Body Surface Area (TBSA) involvement and by depth as superficial, partial-thickness, or full-thickness [3]. The severity of the burns determines the prognosis, course of treatment and rehabilitation requirements.

Every year, burn injuries cause over 180,000 fatalities worldwide, with a greater burden in low- and middle-income nations [4]. Long-term hospital stays, deformity, incapacity and a lower quality of life are all linked to non-fatal burns [5]. Long-term issues, including contractures and hypertrophic scarring, still impact survivors despite improvements in critical care and surgical treatment [6]. Due to work dangers, hazardous cooking methods and overcrowding, India has one of the highest rates of burn injuries [7]. An estimated 6-7 million burn injuries occur in India each year and a sizable percentage of these injuries need medical attention and rehabilitation [8].

Domestic exposure had a greater impact on women, but occupational exposure had a greater impact on males [9].

Burn injuries affect individuals of all age groups, although their epidemiology varies according to age, sex and occupational exposure. Children are more commonly affected by scald injuries, whereas flame and occupational burns are more frequent among adults. Certain occupations, including construction, manufacturing and electrical work, are associated with an increased risk of burn injuries [10-13]. Burn injuries may result from thermal, electrical, chemical, or radiation exposure, with thermal burns being the most common. In developing countries, inadequate safety awareness and preventive measures continue to contribute to the burden of burn injuries [14-18].

Burn severity is primarily determined by burn depth and the percentage of Total Body Surface Area (TBSA) involved, both of which influence treatment planning, prognosis and rehabilitation requirements [19-23]. Severe burns may result in complications such as hypertrophic scarring, contractures and functional impairment, emphasizing the importance of early assessment and comprehensive rehabilitation [21-23].

Because upper-limb burns immediately impact daily activities, functional evaluation is crucial. A validated instrument for evaluating hand function and impairment is the Cochin Hand Function Scale (CHFS) [24]. The Vancouver Scar Scale (VSS) is used to measure the height, vascularity, color and pliability of scars [22]. Complete blood counts, electrolyte analyses and infection markers are examples of laboratory tests; in extreme circumstances, imaging may be necessary [26]. Significant psychological morbidity, such as anxiety, sadness and Post-Traumatic Stress Disorder (PTSD), is linked to burn injuries [21]. Because they lower motivation and compliance, these characteristics have a detrimental impact on rehabilitation results [14]. Thus, early psychological assessment and intervention are critical elements of burn treatment [17]. For burn victims, rehabilitation is essential to improve outcomes. Physiotherapy, occupational therapy, splinting, posture and scar management procedures are all part of early multimodal rehabilitation [16]. Physiotherapy helps strengthen muscles, avoid contractures and preserve joint mobility. Occupational therapy improves everyday life activities and functional independence [5]. By regulating collagen production and encouraging tissue remodeling, scar care treatments such as massage therapy, silicone gel application and pressure therapy enhance scar quality [25].

Cognitive Behavioral Therapy (CBT), counseling and stress management are examples of psychological therapies that improve coping strategies, lower anxiety and increase adherence to rehabilitation programs [15]. Early rehabilitation dramatically improves functional results, shortens hospital stays and improves quality of life, according to recent research [19,26]. Scar management techniques, including silicone therapy, pressure garments, massage and laser therapy, improve scar pliability and reduce hypertrophic scar formation [27]. Nowadays, integrated rehabilitation approaches that combine physical rehabilitation with psychological interventions are considered the standard of care for

optimizing functional recovery, scar outcomes and quality of life in burn survivors [28,29].

Previous controlled studies and systematic reviews have demonstrated that early multidisciplinary rehabilitation, including physiotherapy, occupational therapy, splinting and scar management, is associated with improved functional recovery, reduced contracture formation and enhanced quality of life among burn survivors [16,19,20]. Recent evidence also highlights the importance of integrating psychological support into rehabilitation programs to improve coping, reduce psychological distress and enhance rehabilitation adherence [14,17,28]. However, evidence evaluating the combined effects of structured multimodal physical rehabilitation and psychological intervention on both functional recovery and scar quality remains limited, particularly in prospective cohort studies.

Although burn care has advanced significantly, evidence regarding the combined effects of early multimodal rehabilitation and structured psychological intervention on functional recovery, scar quality and psychological outcomes remains limited, particularly in prospective cohort studies involving patients with upper-limb burn injuries. Most previous studies have evaluated physical rehabilitation or psychological support independently, with limited investigation of their integrated application. Therefore, the primary objective of this prospective cohort study was to evaluate changes in functional recovery among patients with upper-limb burn injuries following early multimodal rehabilitation combined with psychological intervention, as measured using the Cochin Hand Function Scale (CHFS). The secondary objectives were to evaluate changes in scar quality using the Vancouver Scar Scale (VSS) and to assess psychological outcomes, including anxiety reduction and rehabilitation compliance, over the six-month follow-up period.

METHODS

Study Design, Sample Size and Participants

This prospective cohort study was conducted over a period of one year at a tertiary care hospital to evaluate the effectiveness of early multimodal rehabilitation combined with psychological intervention in patients with burn injuries. Sample size was estimated using G*Power version 3.1.9.7 for a repeated-measures ANOVA (within-factor design), assuming an alpha level of 0.05, statistical power of 80%, one study group, three repeated measurements and an effect size derived from previous literature. The minimum required sample size was 30 participants. To account for potential attrition, additional participants were recruited, resulting in a final sample of 33 participants. Written informed consent was obtained from all participants before enrollment in the study. Participants were recruited using a purposive sampling technique. Patients with upper-limb thermal burn injuries who fulfilled the predefined inclusion and exclusion criteria were deliberately selected from the study setting during the recruitment period. Purposive sampling was considered appropriate because the study aimed to evaluate the effects of early multimodal rehabilitation combined with psychological intervention in a specific clinical population with upper-limb burn injuries.

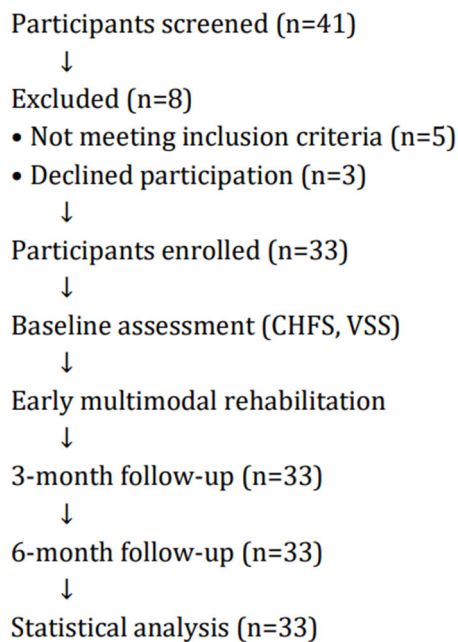


Figure 1: Participant Flow Diagram

This manuscript was prepared and reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement for prospective cohort studies. The participant flow is presented in Figure 1.

Inclusion and Exclusion Criteria

Patients aged between 18 and 60 years with upper limb thermal burns who were willing to participate in the study and provide informed consent were included. Patients with severe comorbid medical conditions, pre-existing psychiatric disorders, cognitive impairments affecting participation, or those who were non-compliant with the rehabilitation protocol were excluded from the study.

Intervention Protocol

The multimodal rehabilitation programme was initiated following medical stabilization and individualized according to each participant's clinical condition and functional status. The intervention was delivered under the supervision of a physiotherapist and occupational therapist for 5 days per week throughout the rehabilitation period. Each session lasted approximately 45–60 minutes and included active and passive range-of-motion exercises, stretching, progressive strengthening, oedema management, positioning, splinting where indicated, functional task-oriented training and Activities of Daily Living (ADL) retraining. Scar management consisted of scar massage, stretching exercises and pressure garment therapy when clinically indicated. Structured psychological intervention included patient education, counselling, motivation, stress management and cognitive behavioural therapy-based strategies to improve coping and rehabilitation adherence. Exercise intensity and functional activities were progressively advanced according to wound healing, pain tolerance, joint mobility and functional performance throughout the follow-up period.

Structured psychological intervention based on Cognitive Behavioural Therapy (CBT) principles was delivered by a qualified clinical psychologist in collaboration with the rehabilitation team. CBT sessions were conducted once weekly for approximately 30–45 minutes and focused on psychoeducation, stress management, coping strategies, anxiety reduction, motivation, goal setting and strategies to improve adherence to rehabilitation. Additional counselling was provided when clinically indicated according to individual patient needs. Occupational therapy interventions focused on upper-limb functional rehabilitation through Activities of Daily Living (ADL) training, hand function exercises, fine motor skill retraining, grip and pinch activities, joint protection techniques, adaptive equipment training where required and patient education to facilitate functional independence during daily activities.

Participant adherence to the rehabilitation programme was monitored using attendance records maintained throughout the study. Compliance with the prescribed home exercise programme was reinforced during follow-up visits and documented by the treating therapist.

Outcome Measures

Outcome assessments were conducted at baseline, three months and six months following initiation of the rehabilitation program. Functional recovery was evaluated using the Cochin Hand Function Scale (CHFS), which assessed the participant's ability to perform hand-related functional activities. Scar quality was assessed using the Vancouver Scar Scale (VSS), which evaluates scar vascularity, pigmentation, pliability and height. Psychological outcomes were assessed using structured clinical observations performed during scheduled follow-up visits by the treating rehabilitation team. Anxiety-related symptoms, including patient-reported emotional distress, fear and treatment-related apprehension, were documented descriptively throughout the rehabilitation period. No standardized psychological assessment instrument was used. Rehabilitation compliance was evaluated using attendance records and adherence to the prescribed rehabilitation programme. Data were analyzed using appropriate statistical methods and a p -value < 0.05 was considered statistically significant.

Assessor Blinding

Outcome assessments were performed by the treating rehabilitation team. Owing to the nature of the rehabilitation intervention, assessor blinding was not feasible; therefore, outcome assessors were not blinded during the study.

Statistical Analysis

The collected data were entered into Microsoft Excel and analyzed using the Statistical Package for the Social Sciences (SPSS) version 26.0. (IBM Corp., Armonk, NY, USA). Descriptive statistics were used to summarise demographic and clinical characteristics of the participants and were expressed as mean ± Standard Deviation (SD) for continuous variables and frequencies with percentages for categorical

variables. Changes in functional outcome, measured by the Cochin Hand Function Scale (CHFS) and scar quality, measured by the Vancouver Scar Scale (VSS), across baseline, three months and six months were analyzed using repeated-measures Analysis Of Variance (ANOVA). Psychological outcomes, including anxiety reduction and rehabilitation compliance, were also analyzed over the study period. Statistical significance was defined as a p -value < 0.05 .

Prior to inferential analysis, the normality of continuous variables was assessed using the Shapiro–Wilk test. The assumption of sphericity for repeated-measures ANOVA was evaluated using Mauchly's test of sphericity. When the assumption of sphericity was violated, the Greenhouse–Geisser correction was applied. Statistical significance was set at $p < 0.05$ for all analyses. For repeated-measures ANOVA, F -values, degrees of freedom, p -values and partial eta squared (η^2) were reported to quantify statistical significance and effect size. All participants completed the scheduled follow-up assessments; therefore, no missing outcome data were observed and no data imputation methods were required.

RESULTS

Demographic Characteristics

A total of 33 patients with upper limb thermal burns participated in the study. The mean age of the participants was 35.2 ± 10.5 years (95% CI: 31.5–38.9 years). Among them, 18 (54.5%) were males and 15 (45.5%) were females, indicating a slight male predominance. However, no statistically significant difference was observed in the gender distribution ($p = 0.62$). The demographic characteristics of the participants are presented in Table 1.

Burn Characteristics

The mean Total Body Surface Area (TBSA) affected by burns was $22 \pm 6.8\%$ (95% CI: 19.6–24.4%). All participants had upper-limb involvement, underscoring the importance of functional rehabilitation and scar management in this population. The burn characteristics are summarised in Table 2.

Functional Outcome

Functional recovery was assessed using the Cochin Hand Function Scale (CHFS) at baseline, three months and six months. A progressive improvement in hand function was observed throughout the study period. The mean CHFS score increased from 3.2 ± 1.1 at baseline to 5.8 ± 1.3 at three months and 7.4 ± 1.0 at six months. Repeated-measures ANOVA demonstrated a statistically significant effect of time on CHFS scores ($F(2,64) = 69892.56$, $p < 0.001$, partial $\eta^2 = 1.000$).

Table 1: Demographic Profile (N = 33)

Variable	Mean $\pm$ SD/n (%)	95% CI (Mean)	p-value
Age (years)	35.2 ± 10.5	31.5–38.9	-
Male	18 (54.5%)	-	0.62
Female	15 (45.5%)	-	-

Table 2: Burn Characteristics

Parameter	Mean $\pm$ SD/n (%)	95% CI (Mean)	p-value
TBSA (%)	22 ± 6.8	19.6–24.4	-
Upper limb involvement	33 (100%)	-	-

These findings indicate substantial improvement in hand-related functional performance over the six-month follow-up period. Detailed CHFS scores are presented in Table 3. Functional recovery is illustrated in Figure 2.

Scar Quality

Scar quality was evaluated using the Vancouver Scar Scale (VSS). The mean VSS score decreased from 10.5 ± 2.3 at baseline to 7.2 ± 1.8 at three months, then to 4.9 ± 1.5 at six months. The reduction in VSS scores was statistically significant ($p < 0.001$), indicating progressive improvement in scar characteristics over the follow-up period. The results are shown in Table 4. Scar quality changes are shown in Figure 3.

Table 3: Changes in Cochin Hand Function Scale (CHFS) Scores

Time	Mean $\pm$ SD	95% CI (Mean)	p-value
Baseline	3.2 ± 1.1	2.8–3.6	-
3 months	5.8 ± 1.3	5.3–6.3	$< 0.001^*$
6 months	7.4 ± 1.0	7.0–7.8	$< 0.001^*$

Statistically significant at $p < 0.05$

Table 4: Changes in Vancouver Scar Scale (VSS) Scores

Time	Mean $\pm$ SD	95% CI (Mean)	p-value
Baseline	10.5 ± 2.3	9.7–11.3	-
3 months	7.2 ± 1.8	6.6–7.8	$< 0.001^*$
6 months	4.9 ± 1.5	4.4–5.4	$< 0.001^*$

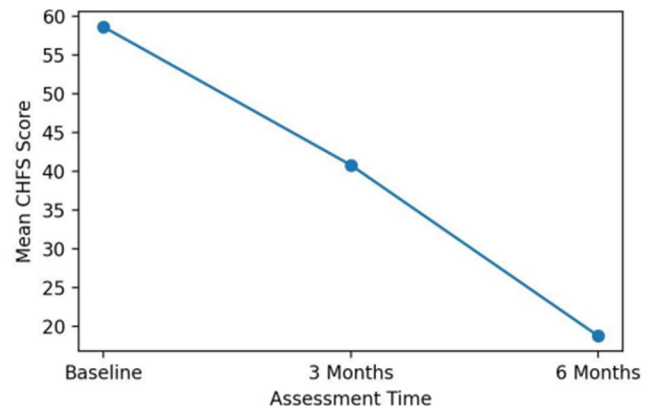


Figure 2: Cochin Hand Function Scale Line Graph

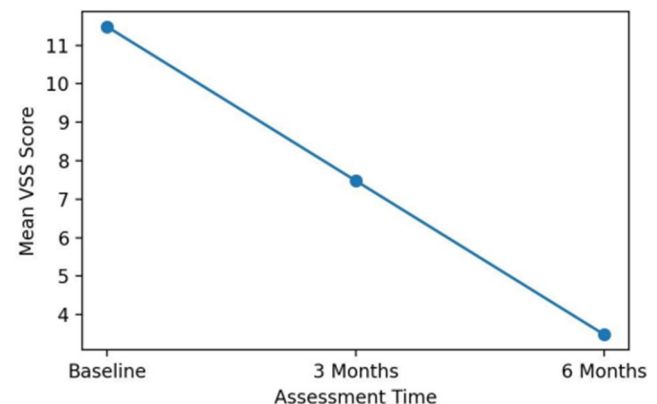


Figure 3: Vancouver Scar Scale Line Graph

Table 5: Psychological Observations and Rehabilitation Compliance

Parameter	Mean $\pm$ SD / %	95% CI (Mean)	p-value
Anxiety reduction (%)	65 $\pm$ 12.4	60.6-69.4	<0.001*
Compliance (%)	78 $\pm$ 10.2	74.3-81.7	<0.001*

Statistically significant at $p < 0.05$

Psychological Outcomes

Psychological assessment demonstrated favorable outcomes following the intervention. Clinical observations indicated a reduction in anxiety-related symptoms during the rehabilitation period. Rehabilitation compliance remained satisfactory, with a mean attendance and adherence rate of 78 $\pm$ 10.2%. Because standardized psychological assessment instruments were not used, changes in anxiety should be interpreted descriptively rather than as quantitatively validated outcomes. Both outcomes were statistically significant ($p < 0.001$), indicating improved rehabilitation participation and adherence during the follow-up period. These findings are presented in Table 5.

DISCUSSION

The present study evaluated the effectiveness of early multimodal rehabilitation combined with psychological intervention on functional outcomes and scar quality in burn patients. The results highlighted the significance of an integrated, early rehabilitation strategy, showing notable improvements in functional, scar and psychological outcomes. A mean age of 35.2 $\pm$ 10.5 years was observed in the demographic profile (Table 1), suggesting that burn injuries primarily affect people in the productive age group. This finding aligns with worldwide epidemiological evidence indicating that residential exposures and occupational exposures put young individuals at greater risk [1,2]. The modest male preponderance (54.5%) is consistent with other research showing that men are more likely to be exposed to electrical and industrial dangers [3]. However, the lack of statistical significance ($p = 0.62$) suggests that, especially in poor nations like India, burn injuries impact both genders fairly similarly [7,8].

A mean TBSA of 22 $\pm$ 6.8% indicated moderate burn severity, according to the burn characteristics (Table 2). Interestingly, every patient had upper-limb involvement, underscoring the vital role of hand function in recovery. Previous research has shown that upper-limb burns significantly hinder everyday activities and require specialized rehabilitation techniques [4,5]. If not properly managed, involvement of functional regions such as the hands increases the risk of contractures and long-term impairment [6]. The substantial increase in functional outcomes, as measured by the Cochin Hand Function Scale (CHFS), is one of the study's key conclusions (Table 3). At six months, the mean CHFS score rose from 3.2 $\pm$ 1.1 at baseline to 7.4 $\pm$ 1.0 ($p < 0.001$).

This illustrates how early occupational therapy and physiotherapy may effectively restore hand function. These results are in line with other research demonstrating that range of motion, muscular strength and functional independence are greatly enhanced by early mobilization

and organized therapy [7,9]. Long-term results depend on sustained functional recovery, as indicated by a consistent increase in CHFS scores over time [10]. The progressive improvement in CHFS scores observed in the present study may be attributed to the combined effects of early joint mobilization, progressive therapeutic exercises, occupational therapy and task-oriented functional training. These interventions may have helped preserve joint mobility, improve muscle strength, reduce contracture formation and restore upper-limb function during the rehabilitation process.

According to the Vancouver Scar Scale (VSS) (Table 4), scar quality also significantly improved. At six months, the mean VSS score dropped from 10.5 $\pm$ 2.3 to 4.9 $\pm$ 1.5 ($p < 0.001$). This decrease suggests that the vascularity, color and pliability of scars have improved. These findings are consistent with other studies highlighting the importance of early scar management strategies, including massage, pressure treatment and silicone application, in reducing hypertrophic scarring [11,12]. To control collagen deposition and promote optimal scar remodeling, early intervention is essential [22,25]. The progressive reduction in VSS scores observed in this study may reflect improved collagen remodeling, enhanced tissue pliability and reduced scar thickness resulting from early scar management and regular therapeutic interventions. These physiological changes may have contributed to improved scar maturation and upper-limb mobility during follow-up. The psychological results (Table 5) provide additional evidence of the efficacy of the combined rehabilitation approach. Clinical observations suggested reduced anxiety-related symptoms and improved rehabilitation engagement during follow-up. However, because standardized psychological assessment instruments were not used, these findings should be interpreted cautiously. Psychological suffering, such as anxiety, sadness and post-traumatic stress disorder, is frequently linked to burn injuries [13].

By reducing patients' desire and commitment, psychological variables might have a detrimental effect on rehabilitation outcomes [14]. The inclusion of Cognitive Behavioural Therapy (CBT) was associated with improved coping strategies and greater engagement in the rehabilitation programme. Previous research emphasizing the significance of psychological intervention in burn rehabilitation supports these findings [15,17]. Improved psychological well-being may also have enhanced patient motivation, confidence and adherence to the rehabilitation programme, thereby facilitating greater participation in therapeutic exercises and contributing to the observed improvements in functional recovery.

This study's findings on the combined impact of psychological and physical therapies emphasize the need for a multidisciplinary approach. All outcome metrics improved among patients receiving integrated treatment, indicating a synergistic effect. This is consistent with the body of research supporting multidisciplinary rehabilitation comprising doctors, psychologists, occupational therapists and physiotherapists [16]. This method guarantees all-

encompassing treatment that considers the mental and physical components of healing.

An early start to rehabilitation is another significant factor contributing to favorable results. Complications such as joint stiffness, muscle atrophy and contracture development can be avoided by initiating therapy during the acute period [18]. Poorer functional results and higher morbidity are linked to delayed rehabilitation [19]. The value of early intervention in burn treatment is further supported by the study's notable improvements in CHFS and VSS scores. These conclusions are further supported by recent research (2020-2025). Research indicates that early rehabilitation improves functional recovery, shortens hospital stays and improves burn patients' quality of life [26]. Promising improvements in scar outcomes have also been demonstrated by advances in scar treatment, including laser interventions and silicone-based therapies [27].

Furthermore, it is becoming more widely acknowledged that psychological therapies are crucial for enhancing long-term healing and lowering post-burn mental health issues [28]. In contemporary burn care, integrated rehabilitation techniques are widely regarded as standard practice [6,29]. Notwithstanding these encouraging results, the study had certain drawbacks. Because of the small sample size (N = 33), generalizability may be limited. Furthermore, comparison with traditional treatment methods is limited by the lack of a control group. It is advised that bigger sample sizes and randomized controlled designs be used in future research to confirm these results [20,21].

The present study has several strengths, including its prospective design, the implementation of a comprehensive multimodal rehabilitation program combining physiotherapy, occupational therapy, scar management and psychological intervention and the use of validated outcome measures such as the Cochin Hand Function Scale (CHFS) and Vancouver Scar Scale (VSS). The repeated assessments conducted at baseline, three months and six months enabled the evaluation of recovery trends over time. However, several limitations should be acknowledged. The relatively small sample size and single-center setting may limit the generalizability of the findings, while the absence of a control group restricts direct comparison with conventional treatment approaches. The follow-up period was limited to six months, preventing assessment of long-term outcomes and psychological outcomes were evaluated using general parameters rather than standardized psychiatric scales. In addition, the use of purposive sampling and recruitment from a single tertiary care centre may have introduced selection bias and limited the generalizability of the findings. The absence of randomization and assessor blinding may have increased the risk of observer bias, while potential confounding variables such as burn severity, individual healing responses and rehabilitation adherence could have influenced the observed outcomes. Psychological outcomes were evaluated without the use of standardized psychiatric assessment instruments, which may limit the objectivity and comparability of these findings. Additionally, variations in patient adherence to the rehabilitation protocol may have

influenced the results. Despite these limitations, the study provides valuable preliminary evidence for the role of early multimodal rehabilitation, combined with psychological intervention, in improving functional recovery and scar quality among burn patients.

From a clinical perspective, the findings support the integration of early multidisciplinary rehabilitation into routine burn care. Even in resource-limited healthcare settings, coordinated physiotherapy, occupational therapy, scar management, patient education and psychological support may improve rehabilitation delivery and optimize functional recovery.

Future research should include multicentre randomized controlled trials with larger sample sizes and longer follow-up periods to improve the generalizability of the findings. The use of standardized psychological assessment instruments, blinded outcome assessment, objective biomechanical measures and patient-reported quality-of-life outcomes is recommended to further strengthen the evidence supporting multidisciplinary burn rehabilitation.

Overall, the findings of the present study provide supportive evidence for the improvements associated with early multimodal rehabilitation combined with psychological intervention among patients with upper-limb burn injuries. Significant improvements were observed in functional outcomes (Table 3), scar quality (Table 4) and psychological outcomes (Table 5), highlighting the importance of a comprehensive multidisciplinary rehabilitation approach. These findings support the integration of early multidisciplinary rehabilitation, including physiotherapy, occupational therapy, scar management and psychological intervention, into routine burn care and are consistent with previous evidence demonstrating improvements in functional recovery, scar quality and overall quality of life following comprehensive burn rehabilitation [6, 22-30].

CONCLUSION

The findings of the present study suggest that early multimodal rehabilitation combined with psychological intervention was associated with significant improvements in functional recovery, scar quality and psychological well-being and rehabilitation engagement among patients with upper-limb burn injuries. Participants' demonstrated progressive improvement in hand function, as evidenced by improved Cochin Hand Function Scale (CHFS) scores, together with marked improvements in scar characteristics, reflected by reduced Vancouver Scar Scale (VSS) scores over the six-month follow-up period. In addition, psychological intervention based on Cognitive Behavioural Therapy (CBT) principles was associated with reduced anxiety levels and improved rehabilitation compliance. These findings highlight the potential value of a comprehensive multidisciplinary rehabilitation approach integrating physiotherapy, occupational therapy, scar management and psychological support into routine burn care. However, given the absence of a control group, the observed improvements should be interpreted with caution. Further multicentre randomized controlled trials with larger sample sizes, longer follow-up periods and standardized psychological assessment tools are warranted to confirm these findings and establish their long-term effectiveness.

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Conflicts of Interest

The authors declare no conflicts of interest.

Funding

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Institutional Review Board Statement

The study was conducted in accordance with the principles of the Declaration of Helsinki. It was approved by the Institutional Scientific Review Board of Saveetha College of Physiotherapy (Approval No: 061/05/2025/ISRB/PGSR/SCPT).

Informed Consent Statement

Written informed consent was obtained from all participants involved in the study.

Data Availability Statement

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

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