Majalah Ilmiah Fisioterapi Indonesia
Indonesian Scientific Journal of Physiotherapy

Case Reports / Case Studies
ISSN (Print): 2303-1921
ISSN (Online): 2722-0443
Volume 14, Number 2, Pages 330-336 (2026)
DOI: https://doi.org/10.24843/mifi.000001776

Physiotherapy Rehabilitation in Post-Burn Contracture after Skin Graft and Flap: A Case Report

Puput Mardiani[1], Arin Supriyadi[2], Made Pradnya Paramita[3]

[1,2]Physiotherapy Professional Program, Universitas Muhammadiyah Surakarta, Indonesia
[3]Physiotherapist at RSUP Prof. Dr. I.G.N.G. Ngoerah Bali, Indonesia

Corresponding author:
Name: Arin Supriyadi
E-mail: puputmardd@gmail.com

Received 3 April 2026; Revised 10 April 2026; Accepted 11 April 2026; Published 3 May 2026
©2025 The Authors. Published by the Physiotherapy Study Program, Faculty of Medicine, Udayana University, in collaboration with the Indonesian Physiotherapy Association (Ikatan Fisioterapi Indonesia). This is an open-access article distributed under the terms of the Creative Commons Attribution (CC BY) license (http://creativecommons.org/licenses/by/4.0/).

Abstract

Introduction: Burn injuries can lead to post-burn contractures and functional limitations, particularly in the upper extremities. Although surgical reconstruction using skin grafts and flaps restores tissue integrity, physiotherapy is essential to optimize functional recovery.
Objective: To evaluate the effects of physiotherapy rehabilitation on pain, muscle strength, and range of motion in a pediatric patient with post-burn contracture following skin graft and flap reconstruction.
Methods: This case report involved a 6-year-old child with post-burn contracture of the right upper extremity following split-thickness and full-thickness skin grafts and flap reconstruction. The patient received physiotherapy once weekly for three sessions over two weeks, including infrared therapy, scar massage, and therapeutic exercises. Outcomes were assessed pre- and post-intervention using the Numeric Rating Scale (NRS), Manual Muscle Testing (MMT), goniometer for range of motion (ROM), and Vancouver Scar Scale (VSS).
Results: Pressure pain decreased from NRS 3 to 1 (−66.7%), and movement pain from NRS 2 to 1 (−50%). Muscle strength improved from MMT grade 3 to 4. ROM showed modest improvements, including wrist extension (+2°) and elbow flexion (+5°), while VSS remained unchanged (score 10). No adverse events were reported.
Conclusion: Physiotherapy combining infrared therapy, scar massage, and exercise improved pain, strength, and joint mobility but showed limited short-term effects on scar characteristics. Early and sustained rehabilitation is essential to enhance functional outcomes in pediatric burn patients.

Keywords
Burns; Contracture; Skin Transplantation; Physical Therapy Modalities; Range of Motion; Muscle Strength

Introduction

Burn injuries represent a significant clinical problem due to their potential to cause extensive damage to the skin and underlying tissues, including muscles, tendons, and joints. These injuries may lead to long-term complications such as contractures, deformities, and functional limitations, particularly when affecting the upper extremities. Epidemiological data indicate that thermal injuries account for the majority of burn cases, followed by electrical and chemical causes.[1,2]

Post-burn contracture occurs as a result of structural changes in the skin and connective tissues, including fibrosis, collagen disorganization, and reduced tissue elasticity. These changes restrict joint mobility and impair functional performance. The severity of contracture is influenced by several factors, including burn depth, total body surface area affected, anatomical location, and timing of medical intervention.[3,4]

In pediatric populations, burn injuries are particularly concerning due to their impact on growth, development, and functional independence. A large proportion of burn injuries in children occur in domestic settings, with the upper extremities being the most commonly affected region.[5] Functional limitations resulting from contractures may interfere with essential activities such as feeding, dressing, writing, and self-care.[6]

Surgical reconstruction techniques, including split-thickness skin graft (STSG), full-thickness skin graft (FTSG), and flap procedures, are widely used to restore skin integrity and coverage in severe burn cases. However, surgical intervention alone is insufficient to ensure optimal functional recovery. Without appropriate rehabilitation, patients remain at high risk of developing persistent contractures and functional impairments.[7]

Physiotherapy plays a critical role in post-burn rehabilitation by addressing pain, improving tissue elasticity, maintaining joint mobility, and restoring muscle strength. Interventions such as infrared therapy, scar massage, and therapeutic exercises are commonly employed to facilitate recovery. Scar massage has been shown to improve scar pliability and reduce adhesions by promoting collagen remodeling.[8]

Despite the recognized importance of rehabilitation, there remains a limited number of detailed case reports focusing on pediatric patients with post-burn contracture following combined skin graft and flap reconstruction. In particular, evidence describing short-term functional outcomes and the interaction between pain, range of motion, and muscle strength remains scarce.

Therefore, this case report aims to evaluate the effects of physiotherapy rehabilitation on pain, muscle strength, and joint range of motion in a pediatric patient with post-burn contracture following surgical reconstruction. This report also seeks to provide clinical insights into the role of structured physiotherapy interventions in improving functional outcomes in similar cases.

Methods

This study was designed as a single-case report following the CARE (CAse REport) guidelines to ensure comprehensive and transparent reporting of clinical findings, interventions, and outcomes. The study employed a descriptive pre–post evaluation

approach to assess changes in pain, muscle strength, joint range of motion, and scar characteristics following physiotherapy intervention.

The patient was a 6-year-old male diagnosed with post-burn contracture of the right upper extremity following reconstructive procedures, including split-thickness skin graft (STSG), full-thickness skin graft (FTSG), and flap surgery. The patient sustained a burn injury at the age of 7 months due to direct contact with a fire stove. Initial management was inappropriate, as no immediate cooling with running water was performed, and coconut oil was applied instead. The patient was not brought to a healthcare facility immediately after the injury.

From the time of injury until the age of 4 years, the patient continued daily activities with limitations in the use of the right upper extremity and the presence of deformity, particularly an inability to fully extend the arm. At the age of 5 years, the patient underwent staged surgical interventions, starting with STSG in the manus region, followed by FTSG and flap reconstruction in the forearm region in 2025. Following surgery and due to the prolonged delay from the initial injury, the patient developed contractures in the manus and forearm regions, resulting in limited joint mobility and impaired functional performance in daily activities. At baseline physiotherapy assessment, the patient demonstrated reduced muscle strength (unable to tolerate minimal resistance), limited range of motion in wrist flexion–extension and radial–ulnar deviation, difficulty in grasping objects, and pain localized to the wrist region. As a case report, participant selection was based on specific clinical characteristics. The inclusion and exclusion criteria are presented in Table 1.

Table 1. Inclusion and Exclusion Criteria

Criteria Type	Description
Inclusion	Pediatric patient with post-burn contracture; history of skin graft and/or flap surgery; presence of functional limitation in upper extremity
Exclusion	Unstable medical condition; active infection; severe cognitive impairment preventing participation in therapy

As shown in Table 1, the patient met all inclusion criteria and did not present any exclusion conditions, making the case appropriate for rehabilitation intervention and clinical observation. Clinical findings were assessed systematically through inspection, palpation, range of motion measurement, muscle strength testing, and pain evaluation. Initial physiotherapy assessment was conducted to identify impairments and functional limitations.

Clinical findings included restricted range of motion in the wrist and elbow, reduced muscle strength, pain during movement and palpation, and difficulty in performing grasping activities. A structured examination approach was used, including inspection, palpation, measurement of range of motion using a goniometer, muscle strength testing using Manual Muscle Testing (MMT), and pain assessment using the Numeric Rating Scale (NRS). Baseline values were recorded prior to intervention. To clarify the chronological progression of the patient's condition and management, the clinical timeline is summarized in Table 2.

Table 2. Timeline of Clinical Events

Time Point	Event
7 months old	Burn injury due to fire exposure
Childhood (≤4 years)	Development of contracture and functional limitation
5 years old	Surgical interventions (STSG, FTSG, flap reconstruction)
September 2025	Initiation of physiotherapy
T1 (25 Sept 2025)	Baseline assessment
T3 (9 Oct 2025)	Final evaluation after intervention

Table 2 demonstrates that a significant delay occurred between the initial injury and surgical as well as rehabilitative management, which may have influenced the severity of contracture and recovery outcomes. Several standardized instruments were used to evaluate clinical outcomes. The rationale for each instrument is summarized in Table 3.

Table 3. Outcome Measures and Rationale

Instrument	Purpose	Validity and Reliability
Numeric Rating Scale (NRS)	Pain intensity assessment	Valid and reliable for pediatric pain assessment
Goniometer	Measurement of joint range of motion	High intra- and inter-rater reliability
Manual Muscle Testing (MMT)	Assessment of muscle strength	Widely used with acceptable clinical reliability
Vancouver Scar Scale (VSS)	Evaluation of scar characteristics	Standardized tool for burn scar assessment

As presented in Table 3, all instruments selected are widely accepted in clinical practice and have demonstrated adequate validity and reliability for musculoskeletal and burn rehabilitation assessment.

The physiotherapy program consisted of infrared therapy, scar massage, and therapeutic exercises. The intervention was administered once weekly for three sessions over a two-week period. Each intervention component was selected based on its clinical rationale. Infrared therapy was used to reduce pain and improve circulation, scar massage to enhance tissue elasticity and reduce adhesions, and therapeutic exercises to restore muscle strength, joint mobility, and functional coordination. A detailed description of the intervention components is presented in Table 4.

Table 4. Physiotherapy Intervention Protocol

Intervention	Frequency	Intensity	Time	Type	Purpose
Infrared therapy	1×/week	Patient tolerance	10 minutes	Luminous IR	Improve circulation, reduce pain
Scar massage	1×/week	Patient tolerance	7 minutes	Circular, transverse, longitudinal, skin rolling	Improve scar elasticity, reduce adhesions
Therapeutic exercise	1×/week	1×10 repetitions	15 minutes	AROM, resisted exercise, functional training	Improve strength, mobility, neuromuscular control

As shown in Table 4, the intervention followed the FITT principle (Frequency, Intensity, Time, Type) to ensure consistency and reproducibility. The exercise program was progressively adjusted based on patient tolerance, beginning with active range of motion exercises and advancing to resisted and functional hand training (e.g., ball rolling, pinch and grasp, finger-to-thumb coordination).

Outcome measurements were performed at two time points: baseline (T1) and post-intervention (T3). All outcome measures used in this study have been widely validated in clinical and rehabilitation settings, including the Numeric Rating Scale for pain assessment, Manual Muscle Testing for strength evaluation, and the Vancouver Scar Scale for scar assessment.

Data analysis was conducted using a descriptive pre–post comparison approach. Changes in outcome measures were evaluated by comparing baseline and post-intervention values.
Percentage changes were calculated where applicable to provide a clearer interpretation of clinical improvement. No inferential statistical analysis was performed due to the single-case design.

This study was conducted in accordance with ethical principles for human research. As a single-case report based on routine clinical care and without experimental intervention, formal ethical approval was not required in accordance with institutional policy. Written informed consent was obtained from the patient's parents prior to participation and publication of this case report. The patient's identity was anonymized to ensure confidentiality.

Results

A total of three physiotherapy sessions were completed over a two-week period. Outcome measures were assessed at baseline (T1, 25 September 2025) and post-intervention (T3, 9 October 2025). Overall, improvements were observed in pain intensity, muscle strength, and range of motion, while scar characteristics remained unchanged.

Baseline clinical characteristics indicated mild to moderate pain during pressure and movement, reduced muscle strength (MMT grade 3) in the affected upper extremity, and limited joint mobility, particularly at the wrist and elbow. Functional limitations were noted in grasping activities. Changes in pain intensity measured using the Numeric Rating Scale (NRS) are presented in Table 5.

Table 5. Pain Intensity (NRS) at Baseline (T1) and Post-Intervention (T3)

Type of Pain	T1	T3	Absolute Change	Percentage Change
Rest pain	0	0	0	0%
Pressure pain	3	1	−2	−66.7%
Movement pain	2	1	−1	−50%

As shown in Table 5, pressure pain decreased from 3 to 1, representing a 66.7% reduction. Movement-related pain decreased from 2 to 1 (50% reduction), while no change was observed in rest pain. The trends in pain reduction over the intervention period are further illustrated in Figure 1, which shows a consistent decrease in both pressure pain and movement-related pain from baseline (T1) to post-intervention (T3).

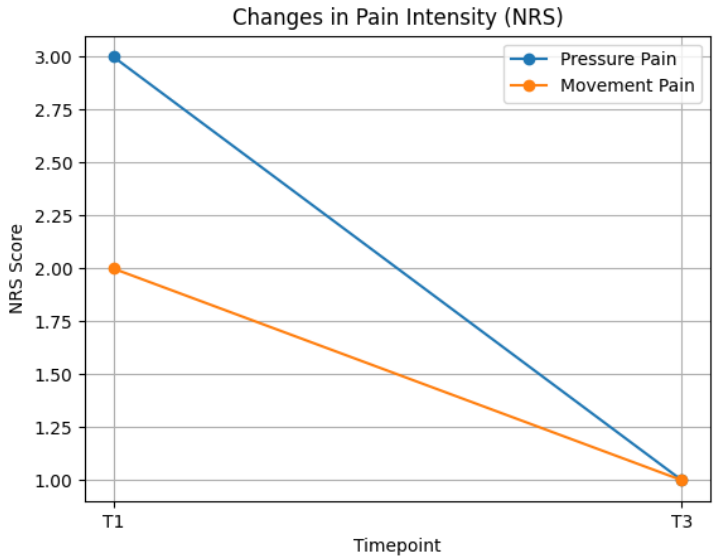

Figure 1. Changes in Pain Intensity (NRS) from T1 to T3

As illustrated in Figure 1, both pressure pain and movement-related pain demonstrated a decreasing trend following the intervention period. Changes in muscle strength assessed using Manual Muscle Testing (MMT) are presented in Table 6.

Table 6. Muscle Strength (MMT) at Baseline (T1) and Post-Intervention (T3)

Region	Movement	T1 (Right)	T3 (Right)	Absolute Change
Elbow	Flexion	3	4	+1
	Extension	3	4	+1
	Pronation	3	4	+1
	Supination	3	4	+1
Wrist	Flexion	3	4	+1
	Extension	3	4	+1

As presented in Table 6, all assessed muscle groups in the affected upper extremity improved from MMT grade 3 to grade 4, indicating a consistent increase of one grade across all movements. The improvement in muscle strength across the intervention period is depicted in Figure 2, demonstrating a uniform increase in Manual Muscle Testing (MMT) grades from T1 to T3.

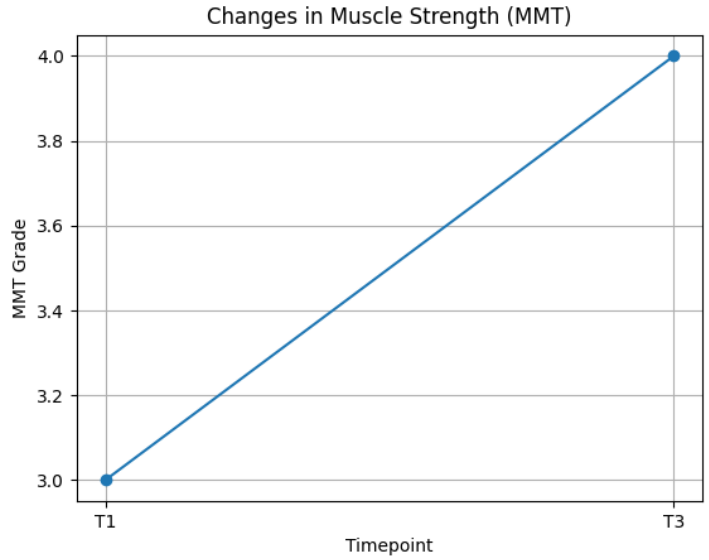

Figure 2. Changes in Muscle Strength (MMT) from T1 to T3

Figure 2 shows a consistent improvement in muscle strength from baseline (T1) to post-intervention (T3). Changes in joint range of motion (ROM) measured using a goniometer are summarized in Table 7.

Table 7. Range of Motion (ROM) at Baseline (T1) and Post-Intervention (T3)

Joint	Movement	T1 (Right)	T3 (Right)	Absolute Change
Wrist	Flexion	15°	15°	0°
	Extension	25°	27°	+2°
	Deviation	Limited	Slight improvement	—
Elbow	Flexion	135°	140°	+5°
	Extension	−5°	−5°	0°

As shown in Table 7, modest improvements were observed in wrist extension (+2°) and elbow flexion (+5°), while no change was noted in wrist flexion and elbow extension. Radial and ulnar deviation remained limited, although slight qualitative improvement was observed. The changes in joint range of motion over the intervention period are illustrated in Figure 3, highlighting improvements in wrist extension and elbow flexion from baseline (T1) to post-intervention (T3).

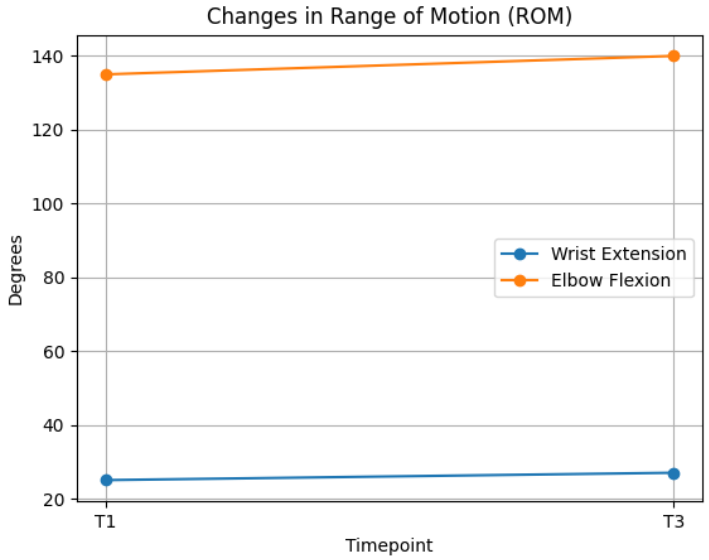

Figure 3. Changes in Range of Motion (ROM) from T1 to T3

Scar characteristics assessed using the Vancouver Scar Scale (VSS) are presented in Table 8.

Table 8. Vancouver Scar Scale (VSS) Scores at T1 and T3

Parameter	T1	T3	Change
Vascularity	1	1	0
Pigmentation	2	2	0
Pliability	5	5	0
Height	2	2	0
Total Score	10	10	0

Table 8 shows that no changes were observed in any scar parameters, with the total VSS score remaining at 10. The comparison of scar characteristics between baseline (T1) and post-intervention (T3) is illustrated in Figure 4, showing no observable changes across all Vancouver Scar Scale (VSS) parameters.

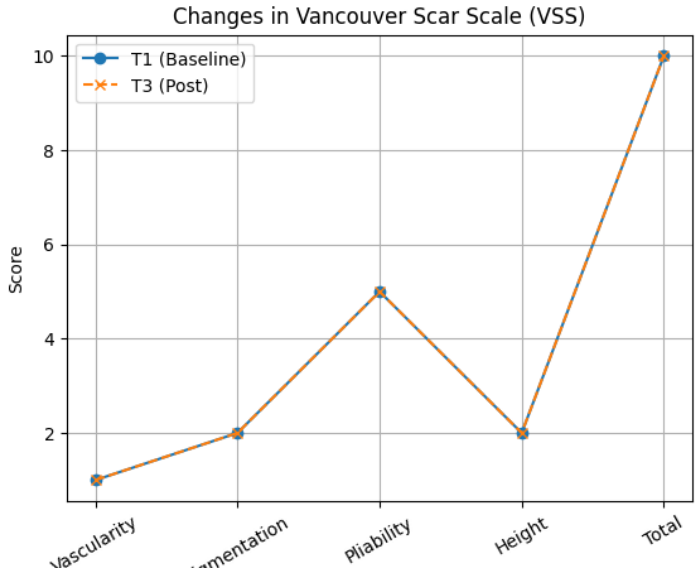

Figure 4. Changes in Vancouver Scar Scale (ROM) from T1 to T3

Overall, the intervention resulted in clinically meaningful improvements across several outcome measures. A substantial reduction in pain intensity was observed, with pressure pain decreasing by 66.7% and movement-related pain by 50%. Muscle strength demonstrated consistent improvement, with an increase of one grade in Manual Muscle Testing (MMT) across all assessed movements in the affected upper extremity.

In addition, joint range of motion showed modest improvements, particularly in selected movements of the wrist and elbow, indicating early functional recovery. However, no observable changes were found in scar characteristics, as reflected by the unchanged Vancouver Scar Scale scores throughout the intervention period. Importantly, no adverse events or complications were reported, suggesting that the intervention was safe and well tolerated by the patient.

During the second week of intervention, the patient demonstrated the ability to grasp objects; however, grip stability remained limited, as objects were frequently dropped. The patient was also able to initiate fine motor tasks, such as drawing simple lines. By the third week, functional improvements became more apparent. The patient was able to grasp objects with improved stability, perform line drawing using a pen, and complete simple functional tasks such as transferring and stacking blocks. However, functional limitations persisted, as the patient continued to rely predominantly on the thumb and index finger for grasping activities. Additionally, the patient was unable to perform more complex hand functions, such as opening a door using finger coordination, and still required assistance from the arm.

Discussion

This case report demonstrates that a short-term physiotherapy program consisting of infrared therapy, scar massage, and therapeutic exercise resulted in measurable improvements in pain, muscle strength, and joint range of motion in a pediatric patient with post-burn contracture following skin graft and flap reconstruction. However, no significant change was observed in scar characteristics within the intervention period.

Pain reduction was one of the most prominent outcomes, with pressure pain decreasing by 66.7% and movement-related pain by 50%. This finding may be explained by the physiological effects of infrared therapy, which promotes vasodilation, enhances local blood circulation, and reduces inflammatory mediators through photobiomodulation mechanisms. These processes contribute to decreased nociceptor sensitivity and improved tissue oxygenation, ultimately reducing pain perception.[9] Previous studies have reported that infrared therapy can facilitate tissue healing and provide analgesic effects in burn rehabilitation settings.[9]

In addition to modality-based intervention, scar massage likely contributed to pain reduction by improving tissue mobility and reducing adhesions. Mechanical stimulation during scar massage enhances collagen realignment, reduces abnormal cross-linking, and improves tissue pliability. This process decreases mechanical stress during movement, thereby reducing pain. Evidence from recent literature indicates that manual scar therapy is effective in improving scar elasticity and reducing discomfort in patients with hypertrophic scars.[8]

Muscle strength improved consistently across all assessed muscle groups, with an increase from Manual Muscle Testing (MMT) grade 3 to grade 4. This improvement suggests enhanced neuromuscular activation and motor unit recruitment. The reduction in pain likely facilitated better voluntary muscle contraction, while progressive therapeutic exercises stimulated muscle adaptation. Previous studies have demonstrated that structured exercise interventions significantly improve muscle strength and functional outcomes in burn patients.[10]

The observed improvements in range of motion, although modest, indicate early-stage recovery of joint mobility. Increased wrist extension and elbow flexion suggest improved soft tissue extensibility and reduced joint stiffness. Scar massage contributes to this process by promoting collagen remodeling and increasing tissue elasticity, while active exercises facilitate synovial fluid circulation and neuromuscular coordination. Prior research has shown that active and progressive exercise programs are essential in restoring joint mobility and preventing long-term stiffness in burn rehabilitation.[11]

Despite these improvements, no significant change was observed in scar characteristics, as reflected by the unchanged Vancouver Scar Scale (VSS) score. This finding may be explained by the maturation phase of scar tissue, during which collagen remodeling occurs gradually over an extended period. In this phase, scar tissue becomes more stable and less responsive to short-term interventions. Previous studies have reported that meaningful changes in scar morphology typically require longer treatment duration and higher intervention frequency.[8]

An important aspect highlighted in this case is the interrelationship between pain, muscle strength, and range of motion. Pain reduction appears to enhance the patient's ability to participate in therapeutic exercises, which in turn improves muscle strength and joint mobility. Conversely, improved strength and mobility may reduce mechanical stress on tissues, further contributing to pain

reduction. This multidirectional relationship underscores the importance of a comprehensive rehabilitation approach that simultaneously addresses multiple impairments.[10]

From a clinical perspective, these findings emphasize the importance of early and continuous physiotherapy following surgical reconstruction in burn patients. Delayed intervention, as observed in this case, may contribute to the development of more severe contractures and prolonged functional limitations. Therefore, integrating physiotherapy as a standard component of post-surgical management is essential to optimize recovery outcomes.

Compared with previous studies, the findings of this case are consistent with existing evidence supporting the effectiveness of combined physiotherapy interventions in burn rehabilitation.[8,10,11] However, this report provides additional insight into pediatric cases involving combined STSG, FTSG, and flap reconstruction, which remain relatively underreported in the literature.[12]

Several factors may have influenced the outcomes observed in this case. First, the prolonged interval between injury and surgical intervention likely contributed to the severity of contracture and limited responsiveness to therapy. Second, the relatively low frequency and short duration of intervention (once weekly for three sessions) may have limited the extent of improvement, particularly in scar characteristics. Third, the maturation stage of the scar may have reduced the effectiveness of mechanical interventions such as scar massage.

This study has several limitations. As a single-case report, the findings cannot be generalized to a wider population. The short follow-up period limits the ability to assess long-term outcomes of rehabilitation. Additionally, functional outcomes related to activities of daily living (ADL) were not assessed using standardized instruments, which restricts comprehensive evaluation of functional recovery.

Future research should investigate longer intervention durations, increased treatment frequency, and the inclusion of standardized functional outcome measures to better evaluate the effectiveness of physiotherapy in post-burn contracture. Studies with larger sample sizes or controlled designs are also needed to strengthen the evidence base and improve clinical applicability.

Conclusion

Physiotherapy rehabilitation combining infrared therapy, scar massage, and therapeutic exercise demonstrated beneficial effects in reducing pain, improving muscle strength, and enhancing joint range of motion in a pediatric patient with post-burn contracture following skin graft and flap reconstruction. Although improvements in functional components were observed within a short intervention period, no significant changes were found in scar characteristics, likely due to the maturation phase of the scar and limited duration of treatment.

These findings highlight the importance of early, structured, and continuous physiotherapy intervention as an integral component of post-surgical management in burn patients. Clinically, a multimodal rehabilitation approach targeting pain, soft tissue mobility, and neuromuscular function is essential to optimize recovery and functional independence. Future studies with longer duration and comprehensive functional outcome measures are recommended to further evaluate long-term rehabilitation effects.

Author Contribution

Puput Mardiani: conceptualization, data collection, intervention implementation, manuscript drafting.
Arin Supriyadi: supervision, methodology design, critical review, and manuscript editing.
Made Pradnya Paramita: clinical supervision, validation of intervention procedures, and data interpretation.

Acknowledgments

The authors would like to thank the patient and the patient's family for their cooperation and willingness to participate in this study.

Conflict of Interest Statement

The authors declare no conflict of interest.

Funding Sources

This research received no external funding.

Ethics Statement

This study was conducted in accordance with ethical principles for human research. As a single-case report without experimental intervention, formal ethical approval was not required based on institutional policy. Written informed consent was obtained from the patient's parents for participation and publication of this case report, including anonymized clinical data.

Patient Perspective

The patient's parents reported that, prior to intervention, the child was unable to grasp objects effectively and relied predominantly on the left hand for daily activities, including eating. Following several physiotherapy sessions, noticeable improvements were observed. The child began to demonstrate the ability to grasp objects, although not yet consistently across all fingers, as objects were occasionally dropped. The child was also able to perform simple tasks such as drawing lines using a pen and eating independently. Despite these improvements, the parents noted that the child still relied mainly on the thumb and index finger during daily activities, indicating that functional recovery, although progressing, remained partial.

References

1. McNamara CT, Iorio ML, Greyson M. Concepts in soft-tissue reconstruction of the contracted hand and upper extremity after burn injury. Front Surg. 2023;10:1118810.
2. Ingram LA, Tomkinson GR, d'Unienville NMA, Gower B, Gleadhill S, Boyle T, et al. Mechanisms underlying range of motion improvements following acute and chronic static stretching: a systematic review, meta-analysis and multivariate meta-regression. Sports Med. 2025;55(7):1449–66.
3. Schouten H, Nieuwenhuis M, van der Schans C, Niemeijer A, van Zuijlen P. Considerations in determining the severity of burn scar contractures with focus on the knee joint. J Burn Care Res. 2023;44(4):810–6.
4. Tayfur B, Charuphongsa C, Morrissey D, Miller SC. Neuromuscular joint function in knee osteoarthritis: a systematic review and meta-analysis. Ann Phys Rehabil Med. 2023;66(2):101662.

5. Mulatu D, Zewdie A, Zemede B, Terefe B, Liyew B. Outcome of burn injury and associated factors among patients at Addis Ababa burn, emergency and trauma hospital: a two-year hospital-based cross-sectional study. BMC Emerg Med. 2022;22(1):173.
6. Joo SY, Cho YS, Lee SY, Seok H, Seo CH. Effects of virtual reality-based rehabilitation on burned hands: a prospective randomized single-blind study. J Clin Med. 2020;9(3):731.
7. Mulya PIM, Tama IPRR, Hamid ARR. Optimizing burn contracture management: a systematic review of surgical techniques and rehabilitation strategies. Indones J Biomed Sci. 2025;19(1):51–61.
8. Di Serio S, Congiu M, Minnucci S, Scalise V, Mourad F. Current physical therapy for skin scar management: a scoping review. J Clin Med. 2025;14(17):5920.
9. Farhina M. The case report on the effectiveness of infrared light on acid burn victim. Case Rep Clin Med. 2022;11(12):527–33.
10. Abonie US, Ackah M, Mudawarima T, Rockson A. Effectiveness of physiotherapist-led exercise interventions for burn rehabilitation: a systematic review and meta-analysis. PLoS One. 2024;19(12):e0316658.
11. Hege AR, Choubisa CA, Kasatwar P. Physiotherapeutic rehabilitation of a patient following an electrical burn: a case report. Cureus. 2022;14(10):e29702.
12. Ciornei B, David VL, Popescu D, Boia ES. Pain management in pediatric burns: a review of the science behind it. Glob Health Epidemiol Genom. 2023;2023:9950870.