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Case description: Contracture scar as a complication of burns – current clinical management strategies

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ABSTRACT

Post-burn scars transforming into contractures represent a major clinical concern and a challenge for today's medicine. They often result in numerous complications, including physical impairment, and have a tendency to recur, which requires individualizing every patient's therapy and often implementing surgical interventions to regain function. This case report presents a female patient who developed extensive scarring on both hands following a burn injury. The predominant contracture affected the index and thumb of the right hand, with limited wrist mobility. Surgical excision of the scar tissue followed by intermediate-thickness skin grafting and matrix dressing resulted in almost complete restoration of hand function and a satisfactory cosmetic outcome. This case illustrates one of several clinical strategies for managing post-burn contractures. Treatment choice depends on the location and severity of the contracture, mobility of surrounding tissues, and the individual needs of the patient, highlighting the importance of personalized medical care.

Keywords: contracture, scar contracture, burns

1. INTRODUCTION

Every year, 300,000 people die as a result of severe burns. Millions more suffer from the mutilations and disabilities resulting from burns. Burns and associated deaths are more common among people of lower socio-economic status. Survivors can develop contractures of their burn wounds, leading to reduced mobility and reduced opportunities for an active life. It is often associated with stigma and limitations in social life (Peck et al., 2009). The incidence of pathological scarring after burn injury ranges from 30% to 91% (Mirastschijski et al., 2015), with wound depth and total burn area being predictive factors for the development of severe scarring (van der Wal et al., 2012). A contracture is a pathological restriction of skin mobility resulting from damage to its structure. It is caused by the proliferation of fibrous scar tissue that pulls on the healthy skin, causing it to tighten. The phenomenon results in a significant reduction in joint mobility, deformity, and disability (Issa et al., 2021). Because of this, affected patients may experience difficulties in daily functioning, are often marginalized, and may face barriers

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accessing education and finding work (Peck et al., 2009). Once formed, contractures are a significant clinical problem due to their tendency to recur. In the treatment of such scars, surgical intervention may be crucial in achieving satisfactory functional and aesthetic results, but it is also important in improving the patient's self-esteem (Terziqi et al., 2021).

2. CASE REPORT

The Clinical Department of Plastic, Reconstructive, and Burn Surgery admitted a 30-year-old female patient with post-burn contracture of the fingers of her right hand on an elective basis for scar treatment. The contracture had developed as a result of a hot oil burn approximately eight months earlier. The patient had scar contractures of both hands, more pronounced on the right upper limb, with a clear contracture on the index finger and thumb. The scar was hypertrophic and inflamed (Figure 1).

Figure 1: hypertrophic and inflamed

The ulcerations covered the wounds on both hands. The patient was admitted to the ward in good general condition, with no chronic treatment and no complaints from other organs or systems. She reported pain from scar contractures. Due to the local condition and limitation of function, the patient fulfilled the criteria for treatment.

In the first stage of conservative treatment of the scar, the patient underwent a lipotransfer to the scar lining. Under infiltration anesthesia, the surgical team harvested the patient's fat from the abdominal region and obtained fat cells of approximately 20 ml. It was then injected into the crestal area of the left hand (12 ml) and the palmar region of the right hand (5 ml) while simultaneously undercutting the scars from the base. The team injected Diprophos into the wound and applied a dressing. The patient, when discharged home, was clinically stable and in good overall condition. Recommendations consisted of: daily pressure massage, disinfection of the wounds, application of Flucinar preparation once every 3 days, and continued use of pressure gloves.

A follow-up examination revealed a non-satisfactory effect considering the mobility range after conservative treatment, and as a result, surgery was indicated. Four months later, the next stage of treatment was implemented. The team excised the scar tissue of the right hand causing the contracture. A 10x7.3x1.2 cm fragment of the skin covered with ulcerations went for histopathological examination. After the procedure the patient regained extension and full range of motion of the index finger and improved wrist mobility. An intermediate thickness graft was harvested from the right thigh. After achieving hemostasis, a collagen matrix was applied to the wound bed, and an intermediate-thickness skin graft was fixated to it, using single sutures. The team applied a sterile wound dressing and immobilized the hand with a plaster splint (Figure 2 and 3).

Figures 2 & 3: graft fixated with single sutures

Figures 4 & 5: hand function had returned to normal

During the first few days, the patient, following medical advice, kept the limb in elevation. On the third day after the procedure, the patient was discharged from the hospital in good general health. Histopathology revealed extensive fibrosis with areas of vitrification and keloid-type hypertrophy with loss of skin appendages and superficial ulceration, along with slight inflammation.

The medical recommendations included continuing rehabilitation, lubricating the scar, conducting compression massage, and wearing compression gloves to maintain mobility and prevent recurrence. At 14 days, the doctor removed the sutures and conducted a medical follow-up. Routine healing of the matrix and skin graft was observed, with minor residual wounds managed conservatively with dressing changes. Six weeks after the surgery, during inspection, the wound was fully healed, and the graft did not show any signs of complications. The hand function had returned to normal (Figures 4 and 5).

3. DISCUSSION

Burn scars are a significant clinical problem, affecting a growing number of patients due to increased survival after extensive burns (Mody et al., 2014). Their incidence varies by age, burn depth, and delay in treatment. Contractures most commonly follow flame burns, especially in children and women, and are often located in the cervical spine and upper limbs. The most common cause is a lack of physiotherapy and delay in surgical treatment with skin grafting. Less commonly, contractures result from trauma, infection, immobilization, or closure of growth plates in children (Téot et al., 2020).

Clinicians most frequently report burns to the dorsal side of the hand. The involvement of the interdigital spaces impairs unrestricted finger movement. Grishkevich (2011) described three types of first interdigital space contractures—marginal, medial, and total—most commonly caused by scar folding. Local trapezoidal flaps, alone or combined with skin grafts, are recommended, as they can achieve tissue elongation of up to 100–200%.

Surgical excision and grafting remain the most effective interventions despite the risk of hypertrophic scarring and recurrence (Mody et al., 2014). Full-thickness grafts contain the epidermis and the whole dermis. Intermediate-thickness grafts include the epidermis and only a part of the dermis, and to take them, a dermatome is required. Graft thickness is not a significant determinant of postoperative mobility (Mann et al., 2001). Alternatives include skin substitutes and local flaps (Fufa et al., 2014). Z-plastic is another technique often used to release tension in scars, and it often requires using skin grafts. Fractional CO_2 laser treatment is an adjunctive therapy characterized by a low recurrence rate, recognized for its safety, and possessing a non-invasive nature. Tissue expansion is rarely used due to cost (Buja et al., 2015).

Rehabilitation is critical to maintaining range of motion. It should begin during healing and continue for up to two years. Over 90% of patients undergoing dedicated rehabilitation regain function in affected joints. Lee et al., (2017) demonstrated that children in intensive rehab required fewer contracture release procedures. Nonetheless, recurrence remains common, especially in severe cases (Karakol and Bozkurt, 2021). Early referral to burn centers and prompt care reduce long-term costs. From an economic perspective, treatment of sequelae like deformities generates highest costs than procedures provided during an early intervention (Mirastschijski et al., 2015).

4. CONCLUSION

Effective burn treatment must prioritize recovery of function and mobility. Nevertheless, a patient's satisfaction with an aesthetic outcome is key to satisfactory functioning in society. Deferred intervention could result in severe functional disability. Individualized surgical treatment and long-term rehabilitation are both fundamental for achieving a satisfactory therapeutic outcome. This case highlights the importance of surgical treatment in managing scar contractures and underscores the need for prompt intervention and ongoing care to prevent recurrence.

Author's Contributions

Adrianna Truszyńska Zawisza, Julia Nosko – study design, data analysis, drafting the initial version of the manuscript.
Natalia Sioch, Julia Krotofil – data collection, statistical analysis, manuscript revision.
Piotr Jasek – data collection, editing
Wojciech Jasek – scientific supervision, content consultation, final editing of the manuscript.

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Informed consent

The patient consented to the publication of photographs. Written & Oral informed consent was obtained from participant included in the study.

Ethical approval

Not applicable.

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Conflict of interest

The authors declare that there is no conflict of interest.

Data and materials availability

All data of this study are available upon reasonable request from the corresponding author.

REFERENCES

1. Buja Z, Arifi H, Hoxha E, Duqi S. Surgical treatment of burns sequelae. our experience in the Department of Plastic and Reconstructive Surgery, Pristina, Kosovo. Ann Burns Fire Disasters 2015;28(3):205-9
2. Fufa DT, Chuang SS, Yang JY. Prevention and surgical management of postburn contractures of the hand. Curr Rev Musculoskelet Med 2014;7(1):53-9. doi: 10.1007/s12178-013-9192-9
3. Grishkevich VM. First web space post-burn contracture types: contracture elimination methods. Burns 2011;37(2):338-47. doi: 10.1016/j.burns.2009.11.001
4. Issa M, Badawi M, Bisheet G, Makram M, Elgadi A, Abdelaziz A, Noureldin K. Skin Graft Versus Local Flaps in Management of Post-burn Elbow Contracture. Cureus 2021;13(12):e20768. doi: 10.7759/cureus.20768
5. Karakol P, Bozkurt M. Recent strategic approach in postburn extremity scars and contractures. J Plast Surg Hand Surg 2021;55(3):153–161
6. Lee JO, Herndon DN, Andersen C, Suman OE, Huang TT. Effect of Exercise Training on the Frequency of Contracture-Release Surgeries in Burned Children. Ann Plast Surg 2017;79(4):346-349. doi: 10.1097/SAP.0000000000001071
7. Mann R, Gibran NS, Engrav LH, Foster KN, Meyer NA, Honari S, et al. Prospective trial of thick vs standard split-thickness skin grafts in burns of the hand. J Burn Care Rehabil 2001;22(6):390–2. doi: 10.1097/00004630-200111000-00007
8. Mirastschijski U, Sander JT, Zier U, Rennekampff HO, Weyand B, Vogt PM. The cost of post-burn scarring. Ann Burns Fire Disasters 2015;28(3):215-22
9. Mody NB, Bankar SS, Patil A. Post burn contracture neck: clinical profile and management. J Clin Diagn Res 2014;8(10):NC12-7. doi: 10.7860/JCDR/2014/10187.5004
10. Peck M, Molnar J, Swart D. A global plan for burn prevention and care. Bull World Health Organ 2009;87(10):802-3. doi: 10.2471/blt.08.059733
11. Téot L, Mustoe TA, Middelkoop E, Gauglitz GG, editors. Textbook on Scar Management: State of the Art Management and Emerging Technologies. Cham (CH): Springer; 2020
12. Terziqi H, Sopjani I, Gjikolli B, Muqaj G, Mustafa M. Algorithms For Management Of Post-Burn Contracture In Upper Extremity In Children. Ann Burns Fire Disasters 2021;34(2):192-198
13. van der Wal MB, Vloemans JF, Tuinebreijer WE, van de Ven P, van Unen E, van Zuijlen PP, Middelkoop E. Outcome after burns: an observational study on burn scar maturation and predictors for severe scarring. Wound Repair Regen 2012;20(5):676-87. doi: 10.1111/j.1524-475X.2012.00820.x