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Hand Syndactyly after Single Groin Skin Graft for Burn Contractures and its Release: A Case Report

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Abstract- Quality of life in burn survivors is determined on the basis of functional outcome of hand. After burn injury, deformities are observed in surgical practice and even post burn contracture is one of the common deformities. These deformities are generally managed surgically like release of contracture followed by skin graft or skin flap. In present time variety of operative techniques are accessible for surgeons and even which particular operative technique will be more useful for particular type of deformity that is also decide by surgeon. Present case report deals with a patient of 9 years having complaints of deformed and fused fingers of left hand with loss of movements. Inadequate management and ignorance of parents resulted into severe post burn contractures. Detailed history and examination revealed that contracture release and a left groin full thickness common island grafting for all the fingers was done in a medical college. She was having syndactyly of all four digits as a result of common full thickness skin graft with residual contractures. Two stage surgical interventions were planned to release this acquired syndactyly and the contractures. This two stage surgical intervention culminated in complete correction of the syndactyly along with release of contractures.

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Abstract- Quality of life in burn survivors is determined on the basis of functional outcome of hand. After burn injury, deformities are observed in surgical practice and even post burn contracture is one of the common deformities. These deformities are generally managed surgically like release of contracture followed by skin graft or skin flap. In present time variety of operative techniques are accessible for surgeons and even which particular operative technique will be more useful for particular type of deformity that is also decide by surgeon. Present case report deals with a patient of 9 years having complaints of deformed and fused fingers of left hand with loss of movements. Inadequate management and ignorance of parents resulted into severe post burn contractures. Detailed history and examination revealed that contracture release and a left groin full thickness common island grafting for all the fingers was done in a medical college. She was having syndactyly of all four digits as a result of common full thickness skin graft with residual contractures. Two stage surgical interventions were planned to release this acquired syndactyly and the contractures. This two stage surgical intervention culminated in complete correction of the syndactyly along with release of contractures. It gave better results in terms of structure and function but grafted skin was not matching the palmar skin. Early surgical management of post-burn hand contracture yields better results as it minimizes complications. For better functional outcome of hand, splintage and postoperative physiotherapy are very helpful.

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I. Introduction

Children are commonly affected by burn injuries around the world, majority are under the age of five years[1]. Hand is the common site that affected mostly[2]. Scalds are the most common type of burns, followed by burns resulting from contact with dry hot objects and then electric burns (low voltage) in the order of epidemiology[3]. Out of total body surface, less than 5% hands account but the resulting disability constitutes approximately 57% loss of body functions for the patient[4]. Functional disability is not produced in superficial burns but deep second- degree or third-degree burns may result insignificant disability even after immediate treatment. The most deleterious complications that affect the anatomy, physiology and aesthetic appearance of the affected hand due to post burn contracture. Multiple factors like location of burn, depth of the burn, type and time of management done, post-injury splinting, hand therapy and scar care that determines the severity of burn contracture. Varieties of surgical techniques employed for the release of hand contractures and other deformities. For better outcome, assessment of the damage to the tissue components and design a management plan is necessary from skin deep to underlying bone. The surgical procedures like skin grafting, local flaps, regional flaps, island flaps free flaps and Z-plasty are the treatment option for post burn hand deformities with its own advantages and limitations. For better structural and functional outcome of injured part, supervised physiotherapy should be advised after the surgical intervention. Surgeon must tackle the secondary changes associated to the joints, ligaments, and musculo-tendinous unit for achieving the best functional outcomes by release of contractures and suitable coverage of the soft-tissue defects [5,6]. Restoration to pre-injury quality of life is the definitive aim of the surgical management. Present case report deals with left hand fingers (all four fingers) post burn contractures in a child managed previously by groin full thickness common island graft for all the fingers. Syndactyly as a result of common graft for all digits was released successfully.

II. Case Report

A 9 years old female patient was brought to the outdoor patient department of Shalya Tantra (Surgery) of National Institute of Ayurveda Hospital, Jaipur (Rajasthan), India. She was having the complaints of deformed and fused fingers of left hand with loss of movements for seven and half years. There was a history of severe scald burn injury on palmar aspect of left hand fingers at the age of about one and half years. She was treated initially by a private practitioner for the condition. Inadequate management and ignorance of parents resulted into severe post burn contractures. About 9 months back from the day of reporting to us, she was operated in a medical college however, no records were available with the patient. Detailed history

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and examination revealed that contracture release and a left groin full thickness common island grafting for all the fingers was done in the said medical college. She was having syndactyly of all four digits as a result of common full thickness skin graft with residual contractures. Patient was unable to flex or extend all the fingers however thumb movements were there up to some extent. There was shortening of the middle and ring fingers with slight contracture at the base of thumb along with deformity of the nails. X-rays of the hand did not reveal any bony fusion of the phalanges (Figures 1, 2 and 3). There was no history of any acute or chronic illness. All the hematological and serological investigations were found to be normal. Two stage surgical interventions was planned to release this acquired syndactyly and the contractures. In the first stage, release of fusion between index and middle finger along with release of ring finger & little finger was planned. Planning for the subsequent stage surgical intervention was to attempt the release of fusion between middle and ring finger.


Fig. 1

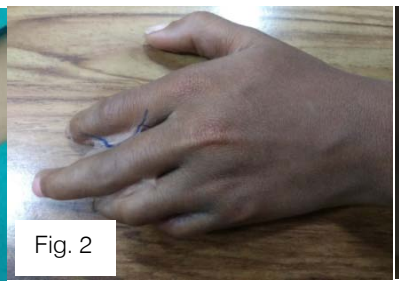
Fig. 2

Fig. 3

Fig. 1-2: Showing full thickness groin skin graft with acquired syandactyly of left hand,

Fig. 3: X ray showing no bony fusion

III. Operative Procedure

Patient and her attendants were well informed about the staged surgical procedures, intra-operative and post-operative complications, hospital stay, rehabilitation and possible outcome after the completion of procedure and treatment. An assent from the child and written informed consent from the parents for the surgical intervention was obtained. First procedure was carried out under general anesthesia and pneumatic tourniquet was applied at mid of the arm. All the precautions regarding tourniquet were followed. In the first sitting operation, release of index finger from middle finger and little finger from the ring finger was done by 'Z'plasty.


Fig. 4


Fig. 5


Fig. 6


Fig. 7

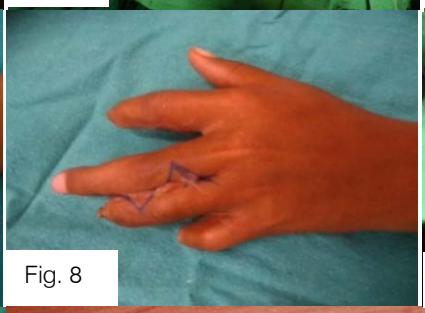
Fig. 8


Fig. 9


Fig. 10

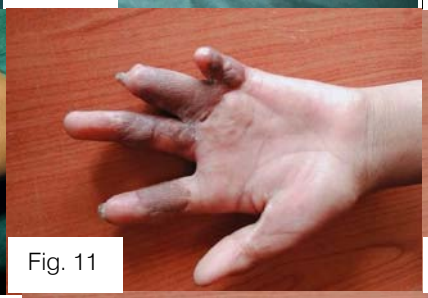
Fig. 11

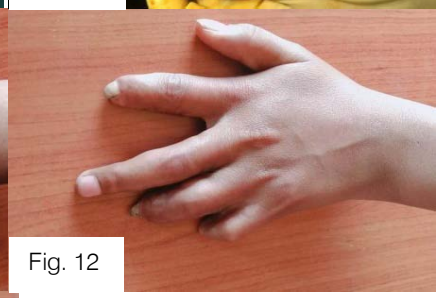
Fig. 12


Fig. 13

Fig. 4-6: 1st sitting of surgery to release acquired syndactyly of the Index finger from Middle finger and Little finger from Ring finger, *Fig. 7-8*: Index and Little finger after release and wound healed. Planned for 2nd sitting of surgery, *Fig. 9*: 2nd sitting of surgery to release syndactyly of middle finger and ring finger by Z shape incision. *Fig. 10*: Release of thumb contracture and final wound closure, *Fig. 11-13*: Wound healed with functional outcome of Left hand.

Web spaces were designed to achieve a complete release between the adjacent fingers (Figures 4, 5 and 6). However, the middle finger and the ring finger were not separated to avoid bilateral neurovascular compromise of the middle and ring finger. Wound closure was done and non-adhesive sterile bandage was applied. Below elbow volar Plaster of Paris slab was applied and instructions related to the same were given. Post operative wound management was done till complete healing was achieved (Figures 7 and 8). Splintage was removed and physiotherapy was advised till second sitting. Second sitting of surgery was carried out under brachial block on 40th day after 1st sitting; wherein separation of middle finger and ring finger was done by 'Z'plasty technique and web space was also designed by a volar flap (Figure 9). In the same sitting, release of contracture at the base of thumb was also carried out (Figure 10). Wound closure was done under minimal tension (Figure 10). Post-operatively below elbow Plaster of Paris (POP) slab was applied. Postoperative wound management was carried out. On some parts of wound between the fingers was having gaping requiring skin grafts but parents of the child refused for same so those parts got healed by secondary intention (Figures 11 and 12). Physiotherapy was continued after removal of splintage. This two stage surgical intervention culminated in complete correction of the syndactyly along with release of contractures,

thereby good structural and functional outcomes were achieved (Figure 13).

IV. Discussion

McCauley on the basis of location, type of contracture and restriction in the range of motion has classified the hand contractures in to four severity grades viz. Grade I- Feeling of subjective tightness without limitation of the range of motion and normal hand architecture. Grade II- Range of motion mildly reduced but without any impact on the routine activities while the architecture remains unaltered. Grade III- Apparent functional and architectural deficit occurs in this grade. Grade IV- Patients with this grade of severity have significant structural and functional loss. McCauley has further sub-classified the Grade III and IV contractures: A: Flexion contractures, B: Extension contractures, C: Combination of flexion and extension contractures[7].

Early and sufficient surgical involvement is most effective treatment to release contracture. When contracture is matured as in the form of scar, next step is to release of burn contracture. Otherwise further contracture formation occurs if interfering with active scar. Studies revealed about 953 pediatric burns cases, that most common injury of hand were commonly occurring in the region of palm and volar aspect of fingers due to contact burns[8]. Deformities related to development of bones and joints are due to prolonged skin contractures that corrected with complex surgical procedure[9]. Bai and Gunasekaran has mentioned that Z plasty is performed to release linear contractures and numerous Z plasties were adopted after split skin grafting[10]. Achauer et al. noted that possibility of reoccurrence is common when surgical intervention performed on immature hypertrophied scar[11]. Present case was of about seven and half years old burn contractures of left hand which the child sustained at the age of one and half year and remained ignored for such a long duration. After seven and half years the treatment was sought from a medical college. In medical college a common full thickness groin skin graft was placed for all the fingers and probably the release of resultant syndactyly was planned for latter stages. After successful groin graft in the medical college patient never went for follow up there for financial reasons as was stated by the parents. After the lapse of nine months they came to our hospital and here the case was managed by surgical release of the syndactyly in two stages. It gave better results in terms of structure and function however the grafted skin was not matching the palmar skin. But to achieve best functional outcome and to observe the recurrence of contractures patient requires a long follow up. There was shortening of index, ring and little fingers may be due to physeal growth arrest.

V. Conclusion

Contractures are most common and crippling squeal of hand burn injury which must be minimized by choosing appropriate prevention and treatment strategies. Early surgical management of post-burn hand contracture yields better results as it minimizes complications like tissue fibrosis, tendon shortening, and joint stiffness etc. Full thickness groin grafts are the best alternatives for skin loss. In case if single graft for more than one finger has been used to cover the raw areas, it should immediately be followed by surgical release of resultant post graft syndactyly in staged manner and physiotherapy.

Declarations

Disclosure of Funding

No funds have been received in support of this work. No benefits in any form have been or will be received from a commercial party related to, directly or indirectly, the subject of this article.

Conflict of interest

The authors declare that they have no conflict of interest.

Ethical approval

This case report does not contain any studies with human participants or animal performed by any of the authors.

Declaration of patient consent

The authors certify that they have obtained consent of the patient and his attendants for the clinical history and images to be reported in the journal while maintaining confidentiality.

References Références Referencias

1. Bayat A, Ramaiah R, Bhananker SM (2010 Nov) Expert Rev Neurother 10(11):1747-59.
2. Gupta RK, Jindal N, Kamboj K (2014) Neglected post burns contracture of hand in children: Analysis of contributory socio-cultural factors and the impact of neglect on outcome. J Clin Orthop Trauma 5(4): 215-220.
3. Argirova M, Hadzhiyski O (2005) Treatment of palm burns in children. Ann Burns Fire Disasters 18(4): 190-193.
4. Engrav LH, Dutcher KA, Nakamura DY. (1992) Rating burn impairment. *Clin Plast Surg* 19:569–98.
5. Bhattacharya V, Purwar S, Joshi D, Kumar M, Mandal S, Chaudhuri GR, et al. (2011) Electro-physiological and histological changes in extrinsic muscles proximal to post burn contractures of hand. Burns 37(4):692–7
6. Saraiya H (2001) Is 20 years of immobilization, not sufficient to render metacarpophalangeal joints completely useless? Correction of a 20-year old post-burn palmar contracture: a case report. Burns 27(2):192–5.

7. McCauley RL (2000) Reconstruction of the pediatric burned hand. *Hand Clin* 16:249–59.
8. Brown M, Coffee T, Adenuga P, Yowler CJ (2014) Outcomes of outpatient management of pediatric burns. J Burn Care Res 35(5):388–94.
9. Buchan NG (1975) Experience with thermoplastic splints in the post-burn hand. Br J Plast Surg 28(3):8193–7.
10. Bai SPL, Gunasekaran R (2019) Post burn flexion contracture of hand: a prospective study. Int Surg J 6:2823-7.
11. Achauer BM, Vander Kam VM (2000) Burn reconstruction. In: Auchauer BM, editor Plastic Surgery: Indications, Operations, and Outcomes, Vol 1. St. Louis: Mosby.