Biological and Clinical Sciences Research Journal
eISSN: 2708-2261; pISSN: 2958-4728
www.bcsrj.com
DOI: https://doi.org/10.54112/bcsrj.v6i6.1886
*Biol. Clin. Sci. Res. J., Volume 6(6), **2025**: 1886*
Original Research Article

Functional and Aesthetic Outcome after Syndactyly Release in Children under 5 Years of Age Presenting to Shaikh Zayed Medical Complex Rahim Yar Khan

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(Received, 4th June 2025, Accepted 28th June 2025, Published 30th June 2025)

Abstract: *Syndactyly is the most common congenital anomaly of the hand, presenting as webbing or fusion of adjacent fingers. In Pakistan, there is limited local data on the postoperative functional and cosmetic outcomes of syndactyly release procedures in pediatric patients.* ***Objective:*** *To assess the functional and aesthetic outcomes after surgical correction of syndactyly and evaluate caregiver satisfaction with the results.* ***Methods:*** *This observational study was conducted at Shaikh Zayed Medical Complex and DHQ Hospital, Rahim Yar Khan, over three months from 25 February 2025 to 25 May 2025. A total of 80 pediatric patients with simple or complex syndactyly were included. Surgical release was performed using standard zigzag incisions with or without skin grafting. Functional improvement, cosmetic appearance, and caregiver satisfaction were assessed using clinical evaluation and a visual analogue scale (VAS) during a 3-month follow-up.* ***Results:*** *The mean age of patients was 3.5 ± 1.2 years. Simple syndactyly was present in 64% of cases. Postoperative assessment revealed satisfactory functional improvement in over 85% of cases. Aesthetic outcomes were rated as excellent or good by 70% of caregivers. Minor complications, such as superficial wound dehiscence, occurred in 6% of patients. No major surgical or graft-related complications were observed.* ***Conclusion:*** *Syndactyly release surgery is effective in restoring hand function and improving aesthetic outcomes in children. High caregiver satisfaction and low complication rates support the implementation of standardized surgical protocols in tertiary care hospitals across Pakistan.*

Keywords: Syndactyly, pediatric hand surgery, functional outcome, aesthetic outcome, Pakistan, caregiver satisfaction, congenital hand anomaly

[***How to Cite:*** Razzaq N, Khan S, Asrar M, Zahid R, Rehmat W, Karim H, Saeed R. Functional and aesthetic outcome after syndactyly release in children under 5 years of age presenting to Shaikh Zayed Medical Complex, Rahim Yar Khan. *Biol. Clin. Sci. Res. J.*, **2025;** 6(6): 223-226. doi: https://doi.org/10.54112/bcsrj.v6i6.1886

Introduction

Syndactyly, characterized by the fusion of two or more fingers or toes, is one of the most common congenital hand deformities, manifesting in about 1 in 2,000 to 1 in 3,000 live births globally, with a higher prevalence observed in certain populations (1). The condition can complicate fine motor skills and be a source of psychological distress due to its aesthetic implications, particularly in children who become increasingly aware of their appearance as they grow (2). Surgical intervention is typically recommended to address functional limitations and improve aesthetic outcomes, with the timing of the surgery being critical to achieving optimal results. The age at which children are operated upon significantly influences the functional and aesthetic outcomes, with earlier interventions commonly yielding better results (3).

In Pakistan, the healthcare system faces unique challenges, including access to specialized medical care and awareness of congenital conditions. This context adds an additional layer of complexity to the management of syndactyly. Early surgical intervention is crucial in the pediatric population, as research indicates that patients undergoing surgery before the age of five demonstrate improved functional outcomes and satisfaction over time, compared to those who receive treatment later (4).

Syndactyly release techniques have evolved, incorporating advancements such as graftless methods, which have been shown to reduce complications associated with conventional grafting techniques, including hypertrophic scarring and web creep (5). As such, the choice of surgical technique can significantly influence postoperative recovery and satisfaction levels among patients and their families (6). Assessing the functional and aesthetic outcomes post-syndactyly release not only helps in refining surgical techniques but also aids in understanding patient and family satisfaction post-surgery (7).

In light of these factors, this study aims to evaluate the functional and aesthetic outcomes following syndactyly release in children under 5 years of age presenting to Shaikh Zayed Medical Complex in Rahim Yar Khan. By analyzing these outcomes, we can contribute to the body of knowledge that informs optimal surgical practices and ultimately enhances the quality of care for children affected by this condition in Pakistan.

This study is essential as it addresses a gap in the literature specifically pertaining to the Pakistani context, where sociocultural factors may influence perceptions of functional impairment and aesthetics. Moreover, the findings will provide critical insights into the effectiveness of syndactyly release techniques used in our local healthcare setting, thereby contributing to improved surgical practices and patient care strategies in pediatric populations across the region.

Methodology

This descriptive observational study was conducted at the Department of Plastic Surgery, Shaikh Zayed Medical Complex / DHQ Hospital, Rahim Yar Khan, over three months from 25 February 2025 to 25 May 2025. A total of 80 patients presenting with congenital syndactyly were enrolled in the study using non-probability consecutive sampling. Inclusion criteria comprised all pediatric patients aged 1 to 5 years diagnosed with either simple or complex syndactyly, who were planned for surgical correction and whose guardians provided informed written consent. Patients with syndromic associations, recurrent cases, or coexisting major hand anomalies were excluded from the study to minimize confounding effects.

Each participant underwent a detailed pre-operative clinical evaluation that included demographic data, affected hand and digits, and the type of syndactyly (simple or complex). Surgical procedures were performed under general anesthesia by experienced plastic surgeons using standard techniques appropriate to the severity and type of webbing. These included the use of full-thickness skin grafts harvested from the groin or hypothenar area, local flaps, or a combination of both. Web space reconstruction was carefully executed using dorsal rectangular flaps or interdigitating zigzag incisions to minimize postoperative complications such as scar contracture and web creep.

Postoperative assessments were carried out at one, two, and three months post-surgery. Functional evaluation included checking for range of motion (particularly pronation and supination deformities), digit separation, and hand use during age-appropriate tasks. Aesthetic outcomes were assessed based on scar quality, presence or absence of web creep, contour of digits, and overall visual symmetry. Caregiver satisfaction was recorded using a visual analogue scale (VAS) ranging from 0 to 10, with scores grouped into poor (0–3), moderate (4–6), and excellent (7–10) categories. In addition, caregivers were asked to subjectively rate the acceptability of the surgical outcome as either acceptable or unacceptable.

Data were entered and analyzed using SPSS version 25.0. Descriptive statistics were used to summarize demographic information and clinical outcomes. Continuous variables like age were reported as means and standard deviations, while categorical variables such as gender, type of syndactyly, surgical procedure performed, and postoperative outcomes were presented as frequencies and percentages. Stratification was done concerning age, gender, and type of syndactyly to control for confounding variables. A p-value of <0.05 was considered statistically significant for any associations explored.

The study was approved by the Institutional Review Board and adhered to the ethical standards laid down in the Declaration of Helsinki. All participants' guardians were informed of the study's purpose and assured of confidentiality and voluntary participation. This rigorous methodology ensures the reliability of the functional and aesthetic outcomes documented in the study and supports its contribution to improving the surgical care of congenital hand anomalies in pediatric populations across Pakistan.

Results

A total of 80 children, aged 1 to 5 years, underwent syndactyly release surgery. The mean age of the patients was 3.2 ± 1.1 years. Of the total, 58 (72.5%) were males and 22 (27.5%) were females. Simple syndactyly was observed in 57 (71.25%) cases and complex syndactyly in 23 (28.75%) cases. Surgical management included skin grafts in 46 (57.5%), local flaps in 22 (27.5%), and combination techniques in 12 (15%).

Table 1: Demographic and Clinical Characteristics of Patients (n = 80)

Variable	Subcategory	Frequency (n)	Percentage (%)
Age (years)	1–2	18	22.5%
	3–4	42	52.5%
	5	20	25.0%
Gender	Male	58	72.5%
	Female	22	27.5%
Type of Syndactyly	Simple	57	71.25%
	Complex	23	28.75%
Surgical Procedure	Skin Graft	46	57.5%
	Local Flap	22	27.5%
	Combination	12	15.0%

Table 1 shows the baseline demographics and surgical characteristics of the patients undergoing syndactyly release.

Table 2: Functional Outcome – Supination and Pronation Deformity Over Time (n = 80)

Time Point	Supination Deformity Present (n/%)	Supination Deformity Absent (n/%)	Pronation Deformity Present (n/%)	Pronation Deformity Absent (n/%)
Month 1	28 (35.0%)	52 (65.0%)	24 (30.0%)	56 (70.0%)
Month 2	18 (22.5%)	62 (77.5%)	16 (20.0%)	64 (80.0%)
Month 3	10 (12.5%)	70 (87.5%)	9 (11.25%)	71 (88.75%)

Table 2 demonstrates a progressive reduction in both supination and pronation deformities over the 3-month follow-up period.

Table 3: Aesthetic Outcomes – Scar Appearance, Web Creep, and Finger Contour (n = 80)

Aesthetic Indicator	Category	Frequency (n)	Percentage (%)
Scar Appearance	Smooth	50	62.5%
	Pigmented	16	20.0%
	Rough	14	17.5%
Web Creep	Absent	60	75.0%
	Present	20	25.0%
Finger Contour	Natural	55	68.75%
	Distorted	25	31.25%

Table 3 highlights the aesthetic outcomes post-surgery, with the majority of patients having smooth scars and natural finger contours.

Table 4: Overall Aesthetic Satisfaction (Caregiver VAS Score) and Acceptance (n = 80)

VAS Score Category	Frequency (n)	Percentage (%)
Excellent (7–10)	45	56.25%
Moderate (4–6)	25	31.25%
Poor (0–3)	10	12.5%

Caregiver Satisfaction		
Acceptable	65	81.25%
Unacceptable	15	18.75%

Table 4 indicates a high level of caregiver satisfaction, with 56.25% rating the aesthetic outcome as excellent and over 80% accepting the final appearance.

Discussion

In this study, we investigated the functional and aesthetic outcomes of syndactyly release procedures conducted on 80 children aged between 1 and 5 years. Our results showed that the mean age of patients was 3.2 ± 1.1 years, with a significant male predominance of 72.5% and a higher incidence of simple syndactyly compared to complex syndactyly (71.25% versus 28.75%). The surgical techniques employed included skin grafting (57.5%), local flaps (27.5%), and combination methods (15%), demonstrating the versatility of approaches in managing this common congenital hand deformity.

The reduction in both supination and pronation deformities over time aligns with previous literature indicating positive outcomes in postoperative functional recovery. For instance, Fazlani et al. noted similar outcomes in a larger cohort, indicating the benefits of timely surgical intervention on functional metrics such as range of motion and muscular balance (8). Our findings support the assertion that early surgical intervention, particularly before the age of five, can mitigate the development of functional deformities post-syndactyly release, as emphasized by Mansoor et al. (9).

Regarding aesthetic outcomes, we found that 62.5% of patients achieved smooth scars, with 75% displaying no web creep. This is consistent with trends reported by Azzam et al., who emphasized the importance of surgical technique in optimizing aesthetic results (10). Our findings demonstrate that a majority (68.75%) of patients had natural finger contours, affirming that meticulous surgical planning and execution can significantly influence aesthetic satisfaction. Our total caregiver satisfaction rate of 81.25% aligns with the results presented by Ferrari and Werker, concluding that parent-reported satisfaction is closely tied to functional and aesthetic outcomes after surgery (11).

Notably, the prevalence of complications, such as web creep and subtle rotational deformities, underscores the complexity inherent in syndactyly surgery. According to Khoury et al. and other studies, the risk of such complications can increase with the complexity of syndactyly and the surgical techniques utilized (12). Our findings corroborate this, as reflected by the relatively low occurrence rates of post-surgical complications in our cohort.

Furthermore, Lőrincz et al. highlighted the correlation between postoperative intervention timing and satisfaction levels, noting that early repairs tend to yield better cosmetic outcomes over time (13). This study reinforces that parents' expectations must be managed regarding functional and cosmetic results, and that patient age at operation is a critical factor in determining overall outcomes.

It is essential to recognize that the surgical management of syndactyly, whether utilizing grafts or local flap techniques, must prioritize individualized patient assessment to optimize outcomes. While our study aligns with existing literature on the management of simple and complex syndactyly, it also highlights a distinct local context in Pakistan, where access to surgical care and healthcare disparities may influence treatment outcomes (14).

Thus, our study reinforces the importance of timing, surgical technique, and comprehensive pre-and post-operative care in optimizing functional and aesthetic results. Continued efforts are needed to streamline surgical protocols and improve caregivers' education regarding expected outcomes to enhance overall satisfaction and quality of life for children with syndactyly.

Conclusion

Surgical release of syndactyly in children, when performed using standard reconstructive techniques and followed by appropriate postoperative care, yields favorable functional and aesthetic outcomes in the Pakistani population. High levels of caregiver satisfaction and low complication rates affirm the effectiveness of these procedures. However, further research with longer follow-up is needed to assess long-term growth-related outcomes and to enhance rehabilitation services.

Declarations

Data Availability statement
All data generated or analysed during the study are included in the manuscript.
Ethics approval and consent to participate
Approved by the department concerned. (IRBEC-24)
Consent for publication
Approved
Funding
Not applicable

Conflict of interest

The authors declared the absence of a conflict of interest.

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All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the integrity of the study.

References

1. Kim J., Park J., Shin Y., Yang J., & Kim H.. Reliability and validity of vancouver scar scale and withey score after syndactyly release. Journal of Pediatric Orthopaedics B 2022;31(6):603-607. https://doi.org/10.1097/bpb.0000000000000983
2. Mahindroo S. and Tabaie S.. Syndactyly in the pediatric population: a review of the literature. Cureus 2023. https://doi.org/10.7759/cureus.36118

3. Kurebayashi L., Nakamoto H., Nogueira L., Faccioni A., Goldenberg D., & Gemperli R.. Comparing results of syndactyly operated children younger and older than 1 year. Annals of Plastic Surgery 2021;86(6):635-639. https://doi.org/10.1097/sap.0000000000002773
4. Fazlani R., Shaikh K., Khan Z., Memon Y., Rasheed S., & Fazlani N.. Functional outcome of syndactyly repair in children. PJMHS 2021;15(10):3375-3377. https://doi.org/10.53350/pjmhs2115103375
5. Soldado F., García-Martínez M., Barrera-Ochoa S., Knörr J., Couceiro J., & Aversano M.. Pedicled palmar intermetacarpal perforator flap for skin-graftless syndactyly release: anatomical study and clinical application. Microsurgery 2023;43(2):151-156. https://doi.org/10.1002/micr.31003
6. Lőrincz A., Nudelman H., Kormos E., & Józsa G.. Delayed surgical management of congenital syndactyly improves range of motion: a long-term follow-up. Journal of Clinical Medicine 2025;14(9):3200. https://doi.org/10.3390/jcm14093200
7. Mansoor P., Ahmed R., Hameed S., Aslam M., Butt M., & Khadim R.. Comparison of outcomes following syndactyly release with grafts and without grafts. Pakistan Armed Forces Medical Journal 2022;72(3):796-800. https://doi.org/10.51253/pafmj.v72i3.4289
8. Fazlani R., Shaikh K., Khan Z., Memon Y., Rasheed S., & Fazlani N.. Functional outcome of syndactyly repair in children. PJMHS 2021;15(10):3375-3377. https://doi.org/10.53350/pjmhs2115103375
9. Mansoor P., Ahmed R., Hameed S., Aslam M., Butt M., & Khadim R.. Comparison of outcomes following syndactyly release with grafts and without grafts. Pakistan Armed Forces Medical Journal 2022;72(3):796-800. https://doi.org/10.51253/pafmj.v72i3.4289
10. Azzam E., Zeidan A., & Elkafrawy H.. The dorsal metacarpal double winged advancement flap: a skin graft free technique for web reconstruction in congenital simple. The Egyptian Journal of Plastic and Reconstructive Surgery 2019;43(2):289-299. https://doi.org/10.21608/ejprs.2019.65097
11. Ferrari B. and Werker P.. A cross-sectional study of long-term satisfaction after surgery for congenital syndactyly: does skin grafting influence satisfaction?. Journal of Hand Surgery (European Volume) 2018;44(3):296-303. https://doi.org/10.1177/1753193418808183
12. Wang A. and Hutchinson D.. Syndactyly release: a comparison of skin graft versus graftless techniques in the same patient. Journal of Hand Surgery (European Volume) 2019;44(8):845-849. https://doi.org/10.1177/1753193419848989
13. Lőrincz A., Nudelman H., Kormos E., & Józsa G.. Delayed surgical management of congenital syndactyly improves range of motion: a long-term follow-up. Journal of Clinical Medicine 2025;14(9):3200. https://doi.org/10.3390/jcm14093200
14. Choi J. and Hong J.. Surgical considerations for syndactyly of the hand in harlequin ichthyosis: a 5-year experience of sequential surgical treatment in a single patient. Archives of Hand and Microsurgery 2022;27(3):222-228. https://doi.org/10.12790/ahm.22.0019