



## Original Research Article

# A PROSPECTIVE EVALUATION OF AESTHETIC OUTCOMES FOLLOWING TENNISON–RANDALL REPAIR IN UNILATERAL COMPLETE CLEFT LIP

Shaikh Junaid Ahmed Raziuddin<sup>1</sup>, Aisha Siddiq<sup>2</sup>, Ashwin Shah<sup>3</sup>, Syed Zakaullah<sup>4</sup>, Shereen Fatima<sup>5</sup>

<sup>1</sup>Assistant Professor, Department of Dentistry, IIMSR Medical College and Hospital, Warudi, Badnapur, Jalna, Maharashtra, India.

<sup>2</sup>Professor, Department of Oral and Maxillofacial Surgery, Al-Badar Rural Dental College and Hospital, Naganhalli Road, Kalaburagi, Karnataka, India.

<sup>3</sup>Professor & Head of the Department, Department of OMFS HKES SN Institute of Dental Sciences Ring Road Gulbarga Karnataka, India.

<sup>4</sup>Principal & Professor, Department of Oral & Maxillofacial Surgery, Al-Badar Rural Dental College and Hospital, Kalaburagi, India.

<sup>5</sup>Professor, Department of Oral & Maxillofacial Surgery, Al-Badar Rural Dental College and Hospital, Kalaburagi, India.

Received : 06/03/2026  
Received in revised form : 20/04/2026  
Accepted : 07/05/2026

### Corresponding Author:

Dr Shaikh Junaid Ahmed Raziuddin,  
Assistant Professor, Department of  
Dentistry IIMSR Medical College and  
Hospital, Warudi, Badnapur, Jalna,  
Maharashtra, India  
Email:  
junaidoralmaxfacsurgeon73825@gmail.com

DOI: 10.70034/ijmedph.2026.2.301

Source of Support: Nil,  
Conflict of Interest: None declared

Int J Med Pub Health  
2026; 16 (2); 1809-1813

### ABSTRACT

**Background:** Unilateral complete cleft lip is a common congenital craniofacial anomaly requiring early surgical correction to restore function and achieve optimal aesthetic outcomes. Among various surgical techniques, the Tennison–Randall triangular flap method remains a widely used approach. This study was conducted to evaluate the aesthetic outcomes of unilateral cleft lip repair using both subjective and objective parameters.

**Materials and Methods:** A prospective clinical study was conducted on 10 patients with unilateral complete cleft lip who underwent primary repair using the Tennison–Randall technique. Postoperative evaluation was performed at three months using standardized photographs for overall appearance and scar quality. Statistical analysis was performed using the Mann–Whitney U test and Student’s t-test.

**Results:** Postoperative assessment revealed overall satisfactory aesthetic outcomes following Tennison–Randall repair. Subjective scoring demonstrated favourable appearance and acceptable scar quality across cases. Objective evaluation indicated effective restoration of key lip and nasal features in most patients, particularly with respect to vermilion continuity, lip fullness, columellar position, and nostril symmetry. Nonetheless, certain anatomical regions, notably the Cupid’s bow and nasal alignment, exhibited persistent asymmetry, indicating areas where surgical refinement may be required.

**Conclusion:** The Tennison–Randall technique provides satisfactory aesthetic outcomes in unilateral complete cleft lip repair, with acceptable results in most parameters. However, challenges remain in achieving optimal symmetry of the Cupid’s bow and nasal alignment. Incorporation of both subjective and objective evaluation methods is essential for comprehensive assessment, and further refinement of surgical techniques may improve outcomes.

**Keywords:** Unilateral complete cleft lip; Tennison–Randall technique; aesthetic outcome; nasolabial symmetry; facial symmetry.

## INTRODUCTION

Unilateral complete cleft lip represents one of the most frequently encountered congenital craniofacial anomalies, posing significant

functional and aesthetic challenges. Surgical correction aims to restore anatomical continuity, re-establish muscular function, and achieve optimal facial symmetry. Early techniques such as the stencil method described by Tennison <sup>[1]</sup> and its

subsequent modification by Randall,<sup>[2]</sup> introduced a geometric approach to cleft lip repair. In contrast, the rotation-advancement technique proposed by Millard,<sup>[3]</sup> emphasized tissue mobilization and dynamic reconstruction, contributing to the evolution of modern surgical practices.

Over time, refinements in cleft lip repair have focused on improving aesthetic outcomes, particularly in the reconstruction of the vermilion, philtral column, and Cupid's bow. Techniques described by Noordhoff, Mohler, and Fisher have enhanced the precision of lip reconstruction and contributed to improved symmetry and contour.<sup>[4-6]</sup> Long-term evaluations and modifications of surgical approaches have further highlighted the importance of meticulous technique and individualized treatment planning in achieving favorable outcomes.<sup>[7,8]</sup>

Despite advances in surgical management, cleft lip and palate continue to have a significant global prevalence, influenced by genetic and environmental factors.<sup>[9,10]</sup> The condition results from failure of fusion of facial processes during embryological development, leading to complex deformities involving both the lip and nasal structures. The global burden of craniofacial anomalies underscores the need for standardized treatment protocols and reliable methods for outcome assessment.<sup>[11]</sup>

Evaluation of surgical outcomes has traditionally relied on subjective clinical judgment; however, contemporary approaches incorporate both subjective and objective methods. Tools such as aesthetic indices and visual analog scales provide insight into perceived outcomes, while anthropometric measurements allow quantitative assessment of symmetry and anatomical relationships.<sup>[12-14]</sup> Previous studies have demonstrated that although satisfactory results can often be achieved, residual asymmetries, particularly in the nasolabial region remain a persistent challenge.<sup>[15]</sup>

Advances in imaging techniques, including three-dimensional analysis and standardized photographic evaluation, have improved the accuracy of outcome assessment and enabled better identification of subtle postoperative discrepancies.<sup>[16-18]</sup> Studies evaluating the Tennison–Randall technique have reported generally favourable results; however, difficulties in achieving precise symmetry of specific anatomical landmarks, such as the Cupid's bow and nasal alignment, continue to be reported.<sup>[16,17,19]</sup> In view of these considerations, the present study aims to prospectively evaluate the aesthetic outcomes of unilateral complete cleft lip repair using the Tennison–Randall technique through both subjective and objective assessment methods, with the objective of identifying areas of successful reconstruction as well as aspects requiring further refinement.

## MATERIALS AND METHODS

This prospective analytical study was conducted in the Department of Oral and Maxillofacial Surgery at Al-Badar Rural Dental College & Hospital in Karnataka, India. over a two-year duration. The objective of the study was to evaluate the aesthetic outcomes following primary unilateral complete cleft lip repair using the Tennison–Randall technique.

A total of ten patients diagnosed with unilateral complete complete cleft lip were enrolled in the study after meeting predefined inclusion criteria. Patients were required to be at least 10 weeks of age, have a body weight of 10 pounds or more, and possess a minimum hemoglobin level of 10 g/dL. Patients presenting with bilateral clefts, incomplete clefts, or syndromic conditions were excluded to maintain homogeneity of the study sample.

All surgical procedures were performed under general anesthesia using a standardized Tennison–Randall approach. Preoperative planning involved precise identification of anatomical landmarks and geometric marking of the triangular flap to facilitate appropriate lip lengthening and symmetry. Intraoperatively, careful dissection and reconstruction of the orbicularis oris muscle were carried out, followed by layered closure to restore lip continuity and contour.

Postoperative assessment was performed at three months using standardized frontal and basal photographic records. Aesthetic evaluation was conducted using both subjective and objective methods. Subjective assessment was carried out independently by three observers using a Visual Analog Scale (VAS) to evaluate overall appearance and scar quality. Objective assessment involved anthropometric analysis of six predefined parameters related to lip and nasal symmetry based on photographic measurements.

Statistical analysis was performed using appropriate software. Subjective scores were analyzed using the Mann–Whitney U test, while objective measurements were evaluated using the Student's t-test. A p-value of less than 0.05 was considered statistically significant.

## RESULTS

All ten patients completed the study period and were available for postoperative evaluation. The surgical procedures were uneventful, and no major complications were observed during the follow-up period.

Subjective assessment using the Visual Analog Scale demonstrated generally favourable outcomes across all cases. The mean scores indicated good overall appearance and acceptable scar quality, reflecting satisfactory clinical acceptance of the surgical results.

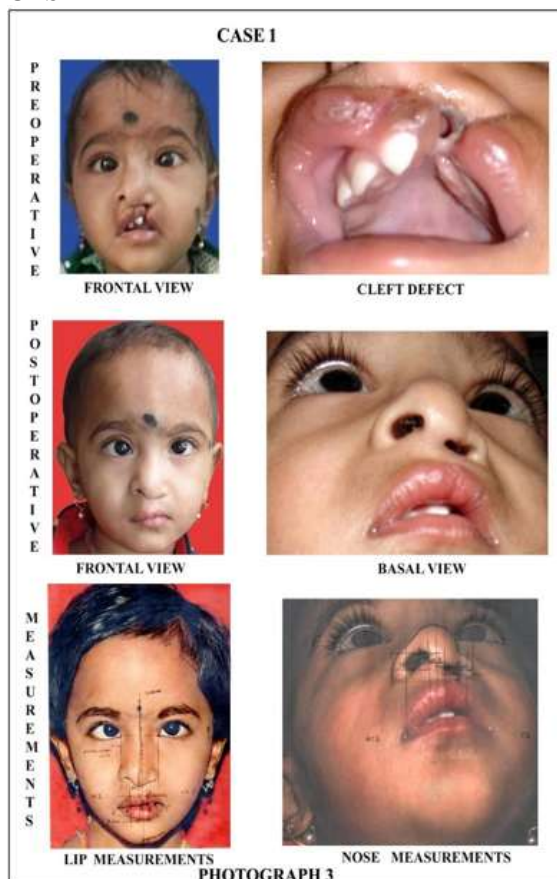
Objective analysis revealed that most nasolabial parameters were effectively restored following repair. Measurements of vermilion continuity, red lip fullness, columellar alignment, and nostril symmetry did not show statistically significant differences, suggesting successful reconstruction of these anatomical features.

However, certain parameters demonstrated measurable deviation. Statistically significant differences were observed in the symmetry of the Cupid's bow and the alignment of the nasal bridge, indicating residual asymmetry in these regions. These findings highlight specific anatomical areas that remain challenging to correct completely using the current technique.

Overall, the results indicate that the Tennison–Randall method provides satisfactory aesthetic outcomes in the majority of cases, although precise symmetry of select landmarks may not always be achieved.

**Figures: Representative cases demonstrating preoperative and postoperative outcomes following unilateral complete cleft lip repair using the Tennison–Randall technique.**

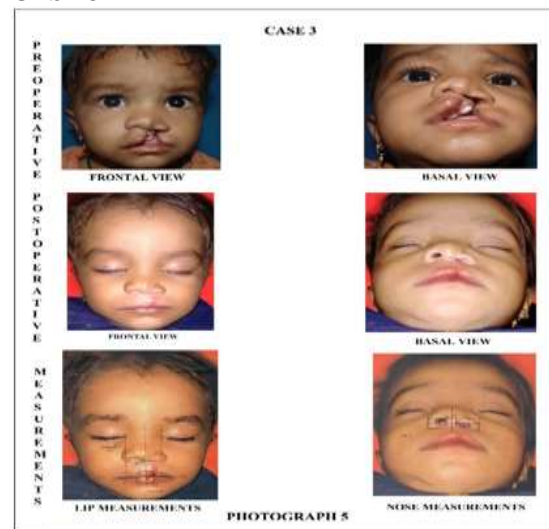
**CASE 1**



**CASE 2**



**CASE 3**



**CASE 4**



CASE 5



## DISCUSSION

The primary objective of unilateral complete cleft lip repair is to achieve optimal functional and aesthetic outcomes by restoring anatomical continuity, muscular integrity, and symmetry of the nasolabial region. Among the various surgical techniques described, the Tennison–Randall triangular flap method remains a well-established approach due to its geometric design and predictable tissue redistribution.<sup>[1,2]</sup> In comparison to the rotation-advancement technique introduced by Millard,<sup>[3]</sup> the Tennison–Randall method provides controlled lip lengthening, particularly useful in managing wider clefts. Subsequent refinements by Noordhoff, Mohler, and Fisher have further emphasized anatomical precision and aesthetic balance in cleft lip reconstruction.<sup>[4-6]</sup> In the present study, subjective evaluation demonstrated favourable aesthetic outcomes, with good overall appearance and acceptable scar quality. These findings are consistent with previously reported outcomes using standardized assessment tools such as aesthetic indices and observer-based scoring systems.<sup>[12,13]</sup> Subjective evaluation remains clinically relevant as it reflects

overall visual perception and patient-centered satisfaction.

Objective analysis in this study revealed that most nasolabial parameters, including vermilion continuity, red lip fullness, columellar position, and nostril symmetry, were restored without statistically significant deviation. These findings support previous anthropometric studies that have shown successful reconstruction of key anatomical landmarks following cleft lip repair.<sup>[14,15]</sup> The ability of the Tennison–Randall technique to achieve satisfactory symmetry in these parameters highlights its effectiveness as a reconstructive method.

However, statistically significant deviations were observed in the symmetry of the Cupid’s bow and the alignment of the nasal bridge. These findings are particularly important, as the Cupid’s bow is a critical aesthetic landmark, and even minimal asymmetry can affect facial harmony. Limitations in achieving precise Cupid’s bow alignment have been reported in previous studies evaluating postoperative symmetry following cleft lip repair.<sup>[16,17]</sup> Similarly, residual nasal asymmetry remains a common finding, as primary lip repair alone may not fully correct associated nasal deformities.<sup>[15-17]</sup>

Advances in imaging techniques, including photographic analysis and three-dimensional assessment, have demonstrated that subtle asymmetries may persist despite clinically acceptable outcomes.<sup>[18,19]</sup> These findings align with the results of the present study, where objective measurements identified specific areas of residual discrepancy that were less apparent in subjective evaluation.

The findings of this study highlight the importance of incorporating both subjective and objective methods in outcome assessment. While subjective evaluation provides insight into perceived aesthetic outcomes, objective analysis offers precise quantification of anatomical symmetry. Together, these approaches provide a more comprehensive evaluation of surgical success.

The limitations of this study include a relatively small sample size and short follow-up duration, which may not fully capture long-term outcomes or growth-related changes. Additionally, the absence of comparison with alternative surgical techniques limits broader generalization of the findings.

Overall, the present study supports the continued use of the Tennison–Randall technique as an effective method for unilateral cleft lip repair, while also emphasizing the need for ongoing refinement to address persistent challenges in achieving optimal symmetry.

## CONCLUSION

The Tennison–Randall technique remains an effective method for primary repair of unilateral

complete cleft lip, providing satisfactory aesthetic outcomes in the majority of cases. The present study demonstrates that key nasolabial parameters, including vermilion continuity, lip fullness, columellar alignment, and nostril symmetry, can be reliably restored using this technique.

Despite these favourable outcomes, achieving precise symmetry of critical anatomical landmarks such as the Cupid's bow and nasal alignment continues to present a challenge. These findings highlight specific areas where further surgical refinement or adjunctive procedures may be beneficial.

The combined use of subjective and objective evaluation methods in this study allowed a more comprehensive assessment of surgical outcomes, revealing both overall clinical acceptability and subtle residual asymmetries. This underscores the importance of incorporating multidimensional evaluation strategies in cleft lip outcome assessment.

Although limited by a small sample size and short follow-up period, the study supports the continued use of the Tennison–Randall technique as a reliable and predictable approach. Future studies with larger cohorts and long-term evaluation are warranted to further optimize surgical outcomes and address persistent asymmetry.

## REFERENCES

1. Tennison CW. The repair of the unilateral cleft lip by the stencil method. *Plast Reconstr Surg.* 1952;9(2):115–120.
2. Randall P. A triangular flap operation for the primary repair of unilateral clefts of the lip. *Plast Reconstr Surg.* 1959;23(4):331–347.
3. Millard DR Jr. A radical rotation in single harelip. *Am J Surg.* 1958;95(2):318–322.
4. Noordhoff MS. Reconstruction of vermilion in unilateral and bilateral cleft lips. *Plast Reconstr Surg.* 1984;73(1):52–61.
5. Mohler LR. Unilateral cleft lip repair. *Plast Reconstr Surg.* 1987;80(4):511–516.
6. Fisher DM. Unilateral cleft lip repair: an anatomical subunit approximation technique. *Plast Reconstr Surg.* 2005;116(1):61–71.
7. Salyer KE. Unilateral cleft lip-nose repair: long-term results. *Clin Plast Surg.* 2004;31(2):191–202.
8. Tse R. Unilateral cleft lip repair: principles and practice. *Semin Plast Surg.* 2012;26(4):145–155.
9. Mossey PA, Little J, Munger RG, Dixon MJ, Shaw WC. Cleft lip and palate. *Lancet.* 2009;374(9703):1773–1785.
10. Dixon MJ, Marazita ML, Beaty TH, Murray JC. Cleft lip and palate: understanding genetic and environmental influences. *Nat Rev Genet.* 2011;12(3):167–178.
11. World Health Organization. Global strategies to reduce the health-care burden of craniofacial anomalies. Geneva: WHO; 2002.
12. Johnson N, Sandy J. An aesthetic index for evaluation of unilateral cleft lip repair. *Eur J Orthod.* 2003;25(3):243–249.
13. Trotman CA, Faraway JJ, Losken HW, van Aalst JA. Functional outcomes of cleft lip surgery. Part I: Study design and surgeon ratings of lip disability and need for lip revision. *Cleft Palate Craniofac J.* 2007;44(6):598–606.
14. Edler R, Abd Rahim M, Wertheim D, Greenhill D. The use of facial anthropometrics in aesthetic assessment. *Cleft Palate Craniofac J.* 2010;47(1):48–57.
15. Heller M, Göz G, Nkenke E, Schwenzler-Zimmerer K. Clinical-anthropometric and aesthetic analysis of nose and lip in unilateral cleft lip and palate patients. *Cleft Palate Craniofac J.* 2011;48(4):388–393.
16. Bilwatsch S, Kramer M, Haeusler G, et al. Nasolabial symmetry following Tennison-Randall lip repair: a three-dimensional approach in 10-year-old patients with unilateral clefts of lip, alveolus and palate. *J Craniomaxillofac Surg.* 2006;34(5):253–262.
17. Iliopoulos C, Mitsimponas K, Lazaridou D, et al. Aesthetic evaluation of the Tennison-Randall technique: a study of 44 cases treated in a single cleft center. *J Craniomaxillofac Surg.* 2014;42(8):1679–1683.
18. Pigott RW, Pigott BB. Quantitative measurement of symmetry from photographs following surgery for unilateral cleft lip and palate. *Cleft Palate Craniofac J.* 2010;47(4):363–367.
19. Russell AJ, et al. Three-dimensional assessment of lip asymmetry after cleft repair. *Plast Reconstr Surg.* 2015;136(5):1046–1053.