Original Article

The Outcomes of Modified Millard Technique Versus Tennison-Randall Technique in Unilateral Cleft Lip Repair: A Comparative Trial

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Abstract

Background: This study aimed to use anthropometric measurements taken pre- and post-operation to evaluate quantitative assessment of modified Millard technique compared with Tennison-Randall technique in unilateral cleft lip (UCL) repair. **Materials and Methods:** Prospective randomised controlled study recruited infants scheduled for UCL repair. Infants aged 2–6 months, either complete or incomplete deformity. A total of 68 patients were randomised in 1:1 ratio to undergo either modified Millard technique (Group I) or Tennison-Randall technique (Group II). **Results:** Group I had significantly longer operative time than Group II (85.7 ± 7.4 vs. 68.7 ± 8.8 min, respectively; $P < 0.001$). Group I has less post-operative wound infection, wound dehiscence and wound scarring than Group II, but Group II has less post-operative lip notch. In Group I, greater increases in post-operative horizontal lip length and vertical lip height were observed, compared to Group II, without statistically significant difference. Group I showed a greater reduction in nasal width and total nasal width than Group II, without statistically significance. Group II had a greater increase in philtral height. However, only post-operative Cupid's-bow width was significantly different between two groups ($P = 0.041$). **Conclusion:** Overall results demonstrate no significant differences between modified Millard technique and Tennison-Randall technique.

Keywords: Millard technique, Tennison-Randall technique, unilateral cleft lip

Introduction

One of the common congenital malformations in the head and neck is cleft lips. The prevalence of cleft lip is about 1:1000 of live birth; it also more common in boys and tends to present on the left side with a 6:3:1 ratio of left to right to bilateral.[1,2] Many facial malformations, including cleft lip, are linked with environmental, maternal, and genetic factors, such as exposure to teratogen drugs, including isotretinoin, alcohol, or anticonvulsants.[3,4] Similarly, some habits or diseases during pregnancy increase the risk of the cleft lip as smoking, pregestational and gestational diabetes, and specific nutritional deficiencies.[5,6] Cleft lip associated with more than 200 genetic syndromes,[7] including CHARGE syndrome (CHD7), velocardiofacial syndrome (TBX1, COMT), and Apert syndrome (FGFR2).[8] Cleft lip and palate occurs due to defects in cartilage, soft tissues, or bone in the cleft area.[9] This defect can affect the patients' health and social status, as it involves appearance, hearing, speech, and cognition. Therefore, a prompt repair is needed to prevent these harmful outcomes.[10]

Nowadays, the most commonly used techniques in managing unilateral cleft lip (UCL) are Millard's rotation advancement and Tennison Randall's triangular flap repairs.[11] These techniques have been employed numerous times and have proven to be effective; nevertheless, the scope of application, scar size, restoration speed, and impact on the nasolabial folds should all be taken into account.[12] Because it can statistically reveal the level of deformity existing, clinical investigation and anthropometry are the best tools to assess healed UCL and nasal morphology.[13]

The success of UCL repair depends on patient satisfaction and measurement of the vital outcome of the repair.[14-16]

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The anthropometric analysis is performed to compare the normal (non-cleft) and abnormal (cleft) sides preoperatively and postoperatively.[17,18] Anthropometric measurements have two methods; direct and indirect methods. The gold standard is direct anthropometry, but it needs experience and a cooperative patient. Two-dimensional (2D) photography can be used to acquire indirect anthropometry, but it requires picture normalization and calibration for linear measures. 2D photography is ideal for determining proportions and angles.[19] 3D photography, on the other hand, allows photos to be processed and analyzed using software that comes with 3D camera systems. Therefore, many investigators prefer the 3D technique, especially in children. This study aimed to use anthropometric analysis by anthropometric measurements taken pre- and post-operation to evaluate the quantitative assessment of the modified Millard technique compared with the Tennison-Randall technique in UCL repair.

Materials and Methods

The study protocol was approved by the local ethics committee. The legal guardians of eligible patients signed the written informed consent prior to enrolment.

Study design and patients

We conducted a prospective randomised controlled study that recruited infants scheduled to undergo UCL repair through the period between June 2018 and February 2020. Infants were included if they aged between 2 and 6 months and had UCL deformity, either complete or incomplete. Infants with or without associated cleft palate were included. We excluded infants with recurrent UCL, median cleft lip, and/or patients with major congenital anomalies or syndromatic cases. Besides, age-matched control subjects were recruited from the outpatient clinics.

Eligible patients were randomised in 1:1 ratio using a computer-based randomization software to undergo either modified Millard technique (Group I) or Tennison-Randall technique (Group II).

Preoperative assessment

Preoperatively, all patients underwent formal history taking, clinical examination, and routine laboratory investigations. Then, the cleft lips were captured in a formal standardized technique using a digital camera (45× optical zoom, 20 MP, 720p movies with ultra-wide angle, canon power shot sx430 camera). The photographer then imported pictures into Adobe Illustrator_CC_2019_v 23 for analysis. The photographs were used for preoperative assessment of anthropometric measures. The pre and postoperative anthropometry reference points are shown in Figure 1. From each individual, we obtained four parameters listed in Table 1.

Surgical technique

All infants were operated under general anaesthesia and were placed in supine position with the table into reverse trendlenburg position. All surgical operations in Group I were performed by one surgeon, whereas patients in Group II were operated upon by another surgeon.

In the modified Millard technique, points (nasal and Vermilion border points) and lines (rotational and advancement flap lines and mucosal lines) were drawn [Figure 2a and b].

Then, we cut the submucosal layer and created three flaps: Advancement flap, rotational flap, and c flap. The orbicular muscle was dissected and freed from the columellar base on the non-cleft side and from the alar base on the cleft side. Using a vicryl 5–0, we sutured the anterior nasal floor; then, using vicryl 4–0, we sutured the alar base and muscle.

Then, we cut the submucosal layer and created three flaps: advancement flap, rotational flap, and c flap. The orbicular muscle was dissected and freed from the columellar base on the non-cleft side and from the alar base on the cleft side. Using a vicryl 5–0, we sutured the anterior nasal floor; then, using Vicryl 4–0, we sutured the alar base and muscle. Using Vicryl 6–0, we sutured top of philtral column with point a, the peak of Cupid's bow, and tip of c flap with alar base. The suturing of mucosal lip was carried out using a Vicryl 5–0. Whenever needed the philtral column had a back cut above the white roll with an advancement triangle from the lateral element (first modification on Millard's technique). Furthermore, vermillion z-plasty took place at the wet-dry border to augment the medial element (second modification on Millard's technique).

In the Tennison-Randall technique, points (nasal and Vermilion border points) and lines (skin triangle flap lines and mucosal lines) were drawn [Figure 2c and d]. Then, we cut the submucosal layer and created equilateral triangle flap and releasing incision. The orbicular muscle was dissected and freed from the columellar base on the non-cleft side and from the alar base on the cleft side. The suturing of the anterior nasal floor, alar base, and muscle followed the same principles of the modified Millard technique. The cutaneous repair was done by suturing the top of philtral column, the peak of Cupid's bow, point a, the line between the top of philtral column and the peak of Cupid's bow with b-8 and 3-a with b-a [Figure 2d].

Study's outcomes

The primary outcome in the present study was the difference in the postoperative anthropometric measures between the modified Millard technique and the Tennison-Randall technique. While the secondary outcomes include the differences in operative time, postoperative complications, and postoperative satisfaction of the parents.

Statistical analysis

All statistical analyses were performed using the SPSS version 22.0 for Windows. Continuous data were expressed as mean (± standard deviation) and categorical data were described as percentages. The change in the anthropometric measures postoperatively was assessed using the paired *t*-test. While the difference in age, anthropometric measures, and operative time between the study's groups was assessed using independent *t*-test. The association between categorical

variables was assessed using the Chi-square test. $P < 5\%$ was considered statistically significant.

Results

A total of 68 patients were randomly allocated in 1:1 ratio to the study's groups. There was no significant difference between the two groups regarding the age at operation (4.7 ± 1.1 in Group I vs. 4.4 ± 1.2 in Group II, respectively; $P = 0.63$). The majority of patients were males in both groups ($P = 0.6$). The distribution of site of deformity ($P = 0.84$) and left-deformity type ($P = 0.27$) was comparable between both groups. Preoperatively, the mean horizontal lip length and vertical lip height were shorter, and the mean nasal width was wider in on the cleft sides than on the non-cleft sides and compared with those of the control. These comparisons indicate statistically significant differences [Table 2].

Notably, Group I had significantly longer operative time than Group II (85.7 ± 7.4 vs. 68.7 ± 8.8 min, respectively; $P < 0.001$). Concerning postoperative complications, there was no incidence of wound infection in Group I, compared to three events in Group II ($P = 0.147$). Similarly, we did not record any occurrence of wound dehiscence in Group I, compared to two events in Group II ($P = 0.311$). Wound scarring occurred in 14 (41%) patients in Group I and 15 (44%) patients in Group II ($P = 0.749$). The incidence of lip notch was 44% ($n = 15$) in Group I and 26% ($n = 9$) in Group II ($P = 0.168$). In general, Group I has less post-operative wound infection, wound dehiscence and wound scarring than

Table 1: The starting and ending points of each anthropometric parameter

Parameter	Starting point	Ending point
Cleft side		
Vertical lip height	Alar base	Peak of Cupid's bow
Horizontal lip length	Peak of Cupid's bow	Commissure
Nasal width	Alar base	Midpoint of the columella
Total nasal width	Alar base on the cleft side	Alar base on the non-cleft side
Non-cleft side		
Vertical lip height	Midpoint of the columella	Peak of Cupid's bow
Horizontal lip length	Peak of Cupid's bow	Commissure
Nasal width	Midpoint of the columella	Alar base

Table 2: Pre-operative characteristics of the included patients

	Group I ($n=34$), n (%)		Group II ($n=34$), n (%)	P
Age (months)				
Range	2-6		2-6	0.633
Mean±SD	4.7±1.1		4.4±1.2	
Sex				
Males	21 (62)		19 (56)	0.600
Females	13 (38)		15 (44)	0.709
Site				
Right	16 (47)		15 (44)	0.840
Left	18 (53)		19 (56)	0.812
Type				
Complete	20 (59)		15 (44)	0.274
Incomplete	14 (41)		19 (56)	0.306
	Group I	***P***	**Group II**	***P***
Vertical lip height (mm)				
Cleft	8.0±1.4	*P*1: <0.001	7.9±1.4	*P*1: <0.001
Non-cleft	12.3±1.4	*P*2: <0.001	11.3±1.4	*P*2: <0.001
Control	11.3±0.7		11.1±0.6	
Horizontal lip length (mm)				
Cleft	11.4±2.4	*P*1: <0.001	12.8±3.8	*P*1: <0.001
Non-cleft	15.7±2.5	*P*2: <0.001	16.8±3.9	*P*2: <0.001
Control	16.1±1.8		17.0±1.6	
Nasal width (mm)				
Cleft	18.9±1.8	*P*1: <0.001	17.1±1.8	*P*1: <0.001
Non-cleft	12.2±2.02	*P*2: <0.001	11.2±1.7	*P*2: <0.001
Control	10.1±1.01		9.8±0.8	
Total nasal width (mm)				
Cases	31.4±3.6	<0.001	28.4±3.2	<0.001
Control	20.2±2.02		19.6±1.6	

SD: Standard deviation



Figure 1: Pre- and Post- operative anthropometry reference points. Point 1: alar base, cleft side, Point 2: alar base, non-cleft side, Point 3: midpoint of the columella, Point 4: peak of Cupid"s bow, cleft side, Point 5: peak of Cupid"s bow, non-cleft side, Point 6: commissure, cleft side, Point 7: commissure, non-cleft side. Point 8: lowest point of Cupid"s bow

Table 3: Operative time and post-operative complications in the two groups

	Group I (n=34), n (%)	Group II (n=34), n (%)	P
Operative time			<0.001
Range	70-95	60-90	
Mean±SD	85.7±7.4	68.7±8.8	
Early complications			
Wound infection			
No	34 (100)	31 (91)	0.147
Yes	0	3 (9)	
Wound dehiscence			
No	34 (100)	32 (94)	0.311
Yes	0	2 (6)	
Late complications			
Wound scarring			
No	20 (59)	19 (56)	0.749
Yes	14 (41)	15 (44)	
Lip notch			
No	19 (56)	25 (74)	0.168
Yes	15 (44)	9 (26)	

SD: Standard deviation

Group II, but Group II has less post-operative lip notch than Group I [Table 3].

The mean vertical lip height increased significantly in Group I (from 8.0 ± 1.4 to 14.4 ± 1.3 mm) and Group II (from 7.9 ± 1.4 to 13.1 ± 2.1 mm) after the operation, with a $P < 0.001$. Similarly, the mean horizontal lip length increased significantly in Group I (from 11.4 ± 2.4 to 17.3 ± 2.4 mm) and Group II (from 12.8 ± 3.8 to 15.2 ± 3.8 mm) after the operation, with a $P < 0.001$. In the Group I, greater increases in post-operative horizontal lip length and vertical lip height were observed, compared to Group II; however,

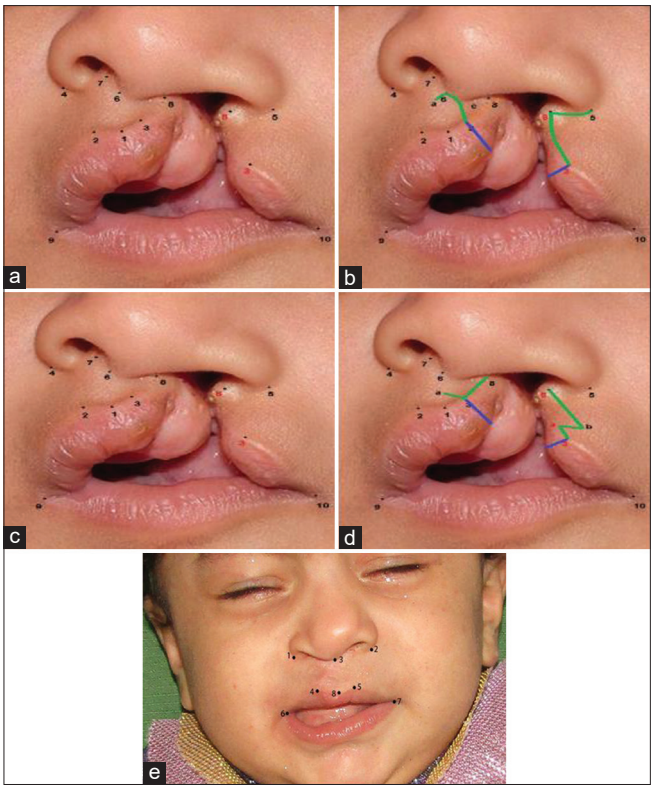


Figure 2: (a and b) Millard's Preoperative points and lines, (c) and (d) Tennison-Randall preoperative points and lines, (e) postoperative result after using Millard technique

without statistically significant difference (P value[a] = 0.72, P value[a] = 0.342 respectively). On the other hand, the mean nasal width and total nasal width decreased significantly in Group I and Group II after the operation, with a $P < 0.001$. Group I showed a greater reduction in nasal width and total nasal width than the Group II; again, without statistically significant difference. Meanwhile, the Group II had a greater increase in philtral height. However, only post-operative Cupid's-bow width was significantly different between the two groups ($P = 0.041$), Table 4.

Concerning satisfaction, 41% and 39% of the patients in Group I were happy and satisfied, respectively compared to 23% and 48% in Group II ($P = 0.04$ and $P = 0.38$).

Discussion

The main goal of cleft lip repair is to create a perfectly symmetrical lip and nose. The more symmetrical the face appears, the more attractive it to the general public.[20] Thus, when evaluating the results of any facial surgery, the look and symmetry of the nasolabial region are also considered one of the essential factors.[16,20-23] Moreover, cleft lip repair aims to restore lip function with minimal scar.[24-26] Consequently, in the mid-20th century, numerous methods were developed, which were categorised into quadrangular flaps, triangular flaps and strategies for rotational advancements.[27,28] Tennison-Randall and Millard rotation-advancement procedures are the two most

Table 4: Results of pre- and post-operative measurements of the cleft side in both groups

	Group I	*P*	Group II	*P*	*P*[a]
Vertical lip height (mm)					
Pre-operative cleft side	8.0±1.4	<0.001	7.9±1.4	<0.001	0.342
Post-operative cleft side	14.4±1.3		13.1±2.1		
Horizontal lip length (mm)					
Pre-operative cleft side	11.4±2.4	<0.001	12.8±3.8	<0.001	0.72
Post-operative cleft side	17.3±2.4		15.2±3.8		
Nasal width (mm)					
Pre-operative cleft side	18.9±1.8	<0.001	17.1±1.8	<0.001	0.13
Post-operative cleft side	11.6±1.8		10.7±1.6		
Total nasal width (mm)					
Pre-operative cleft side	31.4±3.6	<0.001	28.4±3.2	<0.001	0.14
Post-operative cleft side	22.3±3.5		20.6±3.3		
Philatral height (mm)					
Pre-operative cleft side					0.53
Post-operative cleft side	10.9±2.7		11.3±1.3		
Cupid's-bow (mm)					
Pre-operative cleft side					0.041
Post-operative cleft side	11.3±1.6		10.5±0.5		

[a]*P*-value of the difference in the post-operative values between Groups I and II

popular techniques for UCL repair. Due to its reliability and high predictability, the Tennison-Randall triangular technique is the most extensively utilized approach.[27] In addition, the vertical lip contraction was observed to be reduced with Tennison-Randall's triangular technique. However, it may produce scars that violated the philtrum.[29] On the other hand, the purpose of the Millard rotation-advancement approach was to address the limitation of the Tennison-Randall technique.[30] The majority of post-operative studies on UCL and palate looked at lip morphological symmetry.[31] However, in this study, we have compared between modified Millard technique in comparison to Tennison-Randall techniques in terms of pre-operative and post-operative anthropometric measurements.

Our finding showed that the modified Millard technique was associated with significantly shorter operative time than the Tennison-Randall technique ($P < 0.001$). Regarding the pre-operative measurements, patients in both groups were associated with reduced total nasal width, horizontal lip length, and vertical lip height in the cleft side compared with the non-cleft or control group ($P < 0.001$). Adetayo *et al*.[12] and Chou *et al*.[32] reported similar findings and suggested that patients with UCL have lip tissue hypoplasia on the cleft side. Cleft deformity reflects varying degrees of embryological failure and the ultimate outcome of growth and development impairment.

Postoperatively, both techniques were associated with increased horizontal lip length and vertical lip height and reduced total nasal width ($P < 0.001$). However, when comparing the cleft side with the non-cleft or control group, there were no significant differences in terms of vertical lip height and horizontal lip length, but in the Tennison-Randall technique, the nasal width in the cleft side was higher than non-cleft side and control group ($P = 0.024$). This suggests that UCL repair using the Tennison-Randall and modified Millard techniques is effective and can give hope to parents and patients. The current findings are similar to those of Hakim *et al*.[33] and Bilwatsch *et al*.[34] who investigated the efficacy of Millard's and Tennison-Randall procedures. They reported that the lip and nasal measures had improved. Bilwatsch *et al*. also reported improvements after the Tennison-Randall approach.[34]

When comparing both techniques in terms of post-operative outcomes, we found that there were no significant differences regarding vertical lip height ($P = 0.34$), horizontal lip length ($P = 0.72$), nasal width ($P = 0.137$), total nasal width ($P = 0.142$) and philatral height ($P = 0.53$). However, a significant difference was observed in both techniques in terms of cupid's-bow ($P = 0.041$). In UCL repair, Cupid's bow has been demonstrated to be broader than controls. In contrast, Adetayo *et al*. and Bilwatsch *et al*. showed comparable results of both the Tennison-Randall group and control groups in terms of Cupid's bow.[12,34] Bilwatsch *et al*. highlighted the role of the Tennison-Randall technique in preserving Cupid's bow by reducing the peak in the cleft margin.[34] Another study also showed that the Millard technique is more effective than the Tennison-Randall technique in preserving Cupid's bow.[35] The difference between reported findings can be attributed to the variation in the post-operative assessment time.

Regarding satisfaction scores, there was no statistically significant difference between both techniques, and the majority of parents are happy and satisfied in both groups (subjective assessment). This high rate of satisfaction can be explained by the lower rate of complications and the high efficacy rate of both techniques. There was no substantial difference between both groups regarding the complications in terms of early complications such as wound infection and wound dehiscence or late complications such as wound scaring and lip notch.

Conclusion

The overall results of this study did not demonstrate any significant differences between the modified Millard technique and the Tennison-Randall technique. Therefore, both techniques might be employed for UCLs, given the strength and weakness of each technique. Furthermore, the best approach to evaluate the corrected UCL is the clinical examination and anthropometry since they can reveal the present abnormality degree.

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Conflicts of interest

There are no conflicts of interest.

References

1. McInerny T, Adam H. American Academy of Pediatric Textbook of Pediatric Care. Elk Grove, IL: American Academy of Pediatrics; 2017. p. 3247.
2. Parker SE, Mai CT, Canfield MA, Rickard R, Wang Y, Meyer RE, *et al.* Updated National Birth Prevalence estimates for selected birth defects in the United States, 2004-2006. Birth Defects Res A Clin Mol Teratol 2010;88:1008-16.
3. Jones MC. Facial clefting. Etiology and developmental pathogenesis. Clin Plast Surg 1993;20:599-606.
4. Willhite CC, Hill RM, Irving DW. Isotretinoin-induced craniofacial malformations in humans and hamsters. J Craniofac Genet Dev Biol Suppl 1986;2:193-209.
5. Margulis AV, Mitchell AA, Gilboa SM, Werler MM, Mittleman MA, Glynn RJ, *et al*. Use of topiramate in pregnancy and risk of oral clefts. Am J Obstet Gynecol 2012;207:405.e1-7.
6. Correa A, Gilboa SM, Besser LM, Botto LD, Moore CA, Hobbs CA, *et al*. Diabetes mellitus and birth defects. Obstet Anesth Digest 2009;29:40-1.
7. Wong FK, Hägg U. An update on the aetiology of orofacial clefts. Hong Kong Med J. 2004;10:331-6.
8. Burg ML, Chai Y, Yao CA, Magee W 3rd, Figueiredo JC. Epidemiology, etiology, and treatment of isolated cleft palate. Front Physiol 2016;7:67.
9. Kirschner RE, LaRossa D. Cleft lip and palate. Otolaryngol Clin North Am 2000;33:1191-215.
10. Mossey PA, Little J, Munger RG, Dixon MJ, Shaw WC. Cleft lip and palate. Lancet 2009;374:1773-85.
11. Li L, Liao L, Zhong Y, Li Y, Xiang L, Li W. Variation trends of the postoperative outcomes for unilateral cleft lip patients by modified Mohler and Tennison-Randall cheiloplasties. J Craniomaxillofac Surg 2016;44:1786-95.
12. Adetayo AM, Adetayo MO, Adeyemo WL, James OO, Adeyemi MO. Unilateral cleft lip: Evaluation and comparison of treatment outcome with two surgical techniques based on qualitative (subject/guardian and professional) assessment. J Korean Assoc Oral Maxillofac Surg 2019;45:141-51.
13. Nollet PJ, Kuijpers-Jagtman AM, Chatzigianni A, Semb G, Shaw WC, Bronkhorst EM, *et al.* Nasolabial appearance in unilateral cleft lip, alveolus and palate: A comparison with Eurocleft. J Craniomaxillofac Surg 2007;35:278-86.
14. Christofides E. Evaluation of unilateral cleft lip repairs and the evolution of a new technique based on experience and research. J Plast Reconstr Aesthet Surg 2009;62:50-5.
15. Abdurrazaq TO, Micheal AO, Lanre AW, Olugbenga OM, Akin LL. Surgical outcome and complications following cleft lip and palate repair in a teaching hospital in Nigeria. Afr J Paediatr Surg 2013;10:345-57.
16. Asher-McDade C, Roberts C, Shaw WC, Gallager C. Development of a method for rating nasolabial appearance in patients with clefts of the lip and palate. Cleft Palate Craniofac J 1991;28:385-90.
17. Gibson RS. Principles of Nutritional Assessment. USA: Oxford University Press; 2005.
18. Mulliken JB, Burvin R, Farkas LG. Repair of bilateral complete cleft lip: Intraoperative nasolabial anthropometry. Plast Reconstr Surg 2001;107:307-14.
19. Israili ZH, Hernández-Hernández R, Valasco M. The future of antihypertensive treatment. Am J Ther 2007;14:121-34.
20. Enquist M, Arak A. Symmetry, beauty and evolution. Nature 1994;372:169-72.
21. Al-Omari I, Millett DT, Ayoub A, Bock M, Ray A, Dunaway D, *et al.* An appraisal of three methods of rating facial deformity in patients with repaired complete unilateral cleft lip and palate. Cleft Palate Craniofac J 2003;40:530-7.
22. Atack NE, Hathorn IS, Semb G, Dowell T, Sandy JR. A new index for assessing surgical outcome in unilateral cleft lip and palate subjects aged five: Reproducibility and validity. Cleft Palate Craniofac J 1997;34:242-6.
23. Johnson N, Sandy J. An aesthetic index for evaluation of cleft repair. Eur J Orthod 2003;25:243-9.
24. Strauss RP, Ramsey BL, Edwards TC, Topolski TD, Kapp-Simon KA, Thomas CR, *et al.* Stigma experiences in youth with facial differences: A multi-site study of adolescents and their mothers. Orthod Craniofac Res 2007;10:96-103.
25. Hunt O, Burden D, Hepper P, Johnston C. The psychosocial effects of cleft lip and palate: A systematic review. Eur J Orthod 2005;27:274-85.
26. Lovegrove E, Rumsey N. Ignoring it doesn't make it stop: Adolescents, appearance, and bullying. Cleft Palate Craniofac J 2005;42:33-44.
27. Demke JC, Tatum SA. Analysis and evolution of rotation principles in unilateral cleft lip repair. J Plast Reconstr Aesthet Surg 2011;64:313-8.
28. Arosarena OA. Cleft lip and palate. Otolaryngol Clin North Am 2007;40:27-60, vi.
29. Millard DR Jr. A radical rotation in single harelip. Am J Surg 1958;95:318-22.
30. Kim HY, Park J, Chang MC, Song IS, Seo BM. Modified Fisher method for unilateral cleft lip-report of cases. Maxillofac Plast Reconstr Surg 2017;39:12.
31. Jing J, Chen X, Shi B, Wang Y, Mou Y, Lu Y. Preoperative analysis of upper lip in patients with upper cleft lip/palate before lip repair. Ann Transl Med 2021;9:698.
32. Chou PY, Luo CC, Chen PK, Chen YR, Samuel Noordhoff M, Lo LJ. Preoperative lip measurement in patients with complete unilateral cleft lip/palate and its comparison with norms. J Plast Reconstr Aesthet Surg 2013;66:513-7.
33. Hakim SG, Aschoff HH, Jacobsen HC, Sieg P. Unilateral cleft lip/nose repair using an equal bows/straight line advancement technique – A preliminary report and postoperative symmetry-based anthropometry. J Craniomaxillofac Surg 2014;42:e39-45.
34. Bilwatsch S, Kramer M, Haeusler G, Schuster M, Wurm J, Vairaktaris E, *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;34:253-62.
35. Sameh E, Amr S, Ashraf E. Evaluation of primary unilateral cleft lip repair: A proposed scoring system. Egypt J Surg 2009;28:4-7.