Al-Azhar International Medical Journal

Volume 5 | Issue 6 Article 11

7-1-2024

Section: Plastic surgery

Comparison of the Fisher Anatomical Subunit and Modified Millard Rotation-Advancement Cleft Lip Repairs (Systematic Review)

Tarek Mahmoud Elbanoby
Plastic, Reconstructive and Burn Surgery, Faculty of Medicine for Boys, Al-Azhar University, Cairo, Egypt

Ihab Hamdy Hussein Abdelfattah
Plastic, Reconstructive and Burn Surgery, Faculty of Medicine for Boys, Al-Azhar University, Cairo, Egypt, ihab.hamdy.90@gmail.com

Sherif Hamdeno Yousif
Plastic, Reconstructive and Burn Surgery, Faculty of Medicine for Boys, Al-Azhar University, Cairo, Egypt

How to Cite This Article

Elbanoby, Tarek Mahmoud; Abdelfattah, Ihab Hamdy Hussein; and Yousif, Sherif Hamdeno (2024) "Comparison of the Fisher Anatomical Subunit and Modified Millard Rotation-Advancement Cleft Lip Repairs (Systematic Review)," *Al-Azhar International Medical Journal*: Vol. 5: Iss. 6, Article 11.
DOI: https://doi.org/10.58675/2682-339X.2471

METANALYSIS

Comparison of the Fisher Anatomical Subunit and Modified Millard Rotation-Advancement Cleft Lip Repairs (Systematic Review)

Tarek M. Elbanoby, Ihab H. H. Abdelfattah *, Sherif H. Yousif

Department of Plastic, Reconstructive and Burn Surgery, Faculty of Medicine for Boys, Al-Azhar University, Cairo, Egypt

Abstract

Background: ***Among the most prevalent types of craniofacial congenital disabilities is cleft lip and palate (CLP). Cleft lip and palate (CL/P) occur in 1 in 1,000 live births.***

Objective: ***A systematic review aimed to compare the functional and cosmetic results of the Fisher Anatomical Subunit method to the restoration of the unilateral Cleft Lip with those of the Modified Millard Rotation-Advancement strategy.***

Materials and Methods: ***After removing the duplicates, the search returned 186 results. The titles and abstracts of 173 papers were discarded as irrelevant. Two research were disqualified owing to linguistic barriers, while eight were discarded after a full-length paper review. As a result, we combined data from three investigations.***

Results: ***The anthropometric parameters of the two methods for treating unilateral cleft lips were not statistically significant. However, the Steffensen grading criteria comparison found that Fisher's method was superior to Millard's.***

Conclusions: ***In cases of unilateral cleft lip repair, the Fisher Anatomical Subunit approach yielded more favorable outcomes and fewer adverse ones, as judged by the Steffensen criteria. However, there was no discernible variation in the general appearance of scars.***

Keywords: Systematic Review; Unilateral cleft lip; Fisher; Millard

1. Introduction

The craniofacial malformation known as a cleft lip and palate (CLP) is surprisingly common. About 1% of all live births involve a cleft lip and cleft palate (CL/P).[1] When compared to other birth abnormalities or genetic illnesses, CL/P have a rather high prevalence (61.6%) when they occur alone. Orofacial clefts often occur due to a combination of environmental and genetic factors. There are around 200 genetic diseases associated with CL, such as Apert syndrome (FGFR2), VELOCORTOFAcial syndrome (TBX1, COMT), and CHARGE syndrome (CHD7). [2]

Several factors in the surrounding environment have been linked to CLP. Smoking cigarettes, having prediabetes or gestational diabetes, drinking excessively, and using some anticonvulsants all increase your risk. An increased risk of clefting has been associated with a lack of certain nutrients in the diet, such as folate and vitamins B6 and B12.[3]

Around week 6 of gestation, the two medial nasal processes fuse to form the major palate, philtrum, incisor teeth, and midline of the nose. The lateral nasal process gives rise to the alae and alar base of the nose. Week 6 is crucial for the development of the lateral upper lip, the bulk of the maxilla, and the secondary palate because this is when the maxillary processes on each side of the mouth grow forward and fuse with the medial nasal processes. Facial swellings start to fuse between weeks 4 and 6. Clefts of the face occur when the swellings of the face do not join together properly. [4.5]

Paring the cleft borders and rounding off the incised edges was the standard method of repair up until the 1930s. Unlike in most partial clefts, the normal and cleft sides of a full cleft lip do not have identical vertical heights. Although clever cleft lip treatments have restored vertical height and leveled the Cupid's bow, scars often severely diminish the philtral column's inherent attractiveness. The current benchmark for cleft lip surgery was created by Millard in 1955 and is known as the rotation-advancement technique. To make the scar more symmetrical, Mohler proposed an adjustment to the rotation-advancement correction in 1987.[6]

Accepted 21 June 2024.
Available online 31 June 2024

* Corresponding author at: Plastic, Reconstructive and Burn Surgery, Faculty of Medicine for Boys, Al-Azhar University, Cairo, Egypt.
E-mail address: ihab.hamdy.90@gmail.com (I. H. H. Abdelfattah).

https://doi.org/10.58675/2682-339X.2471

When asked how to address these problems in 2005, Fisher proposed the anatomic subunit approximation. On the "ideal line of repair," Fisher fixes wounds that have formed at the junction of different parts of the body. There is a scar along the nasal sill from rotation-advancement restorations. To alter the prominence of the medial lip, sew a cutaneous triangle over the white roll. This method is better than adjusting Noordhoff's point, which could reduce the transverse length of the lateral lip. However, some surgeons prefer temporary vented stents in each nostril during the early postoperative phase. The objective here is to improve nasal breathing by avoiding the obstruction caused by bloody nasal discharges. Attempts to "mould" the nose by wearing a nasal stent for an extended length of time have been proposed, although this strategy has been received with significant criticism. [6,7,8]

This study aimed to evaluate the aesthetics and efficacy of cleft lip restoration using a hybrid strategy combining the Fisher Anatomical Subunit method and the Modified Millard Rotation-Advancement technique.

2. Materials and Methods

When describing the results of this study, we adhered strictly to the PRISMA (preferred reporting standards for meta-analyses and systematic reviews) criteria.

A research plan was developed by searching PubMed, PLOS, CENTRAL, Scopus, and Clarivate. This investigation aimed to compare the results of cleft lip restorations utilizing the modified Millard rotation-advancement procedures with those using the Fisher anatomical component. The last five years are the only ones that count. Reference lists were reviewed for each search result, and all published systematic reviews. Two of our graduating seniors decided on the article themes and collaborated to settle any disagreements that arose among them. The potential for bias in the included studies (Selection, Attrition, Detection, and Performance bias) was evaluated using the Cochrane risk of bias technique. In the end, data is extracted and reviewed with a particular emphasis on statistics, journal titles, populations served, patient characteristics, and outcomes for both approaches.

In this study, researchers compared the Fisher Anatomical Subunit Method and the Modified Millard Rotation-Advancement Method for cleft lip restoration in terms of their aesthetic and functional effects.

Database searches based on abstracts generated 186 distinct articles after deleting duplicates. We eliminated the need to read the abstracts or titles of 173 articles. After careful consideration, eight articles were rejected, and two were ignored because of language issues. As a result, we combined information from three separate studies. Figure 1 is a flowchart illustrating the methodology used in selecting articles.

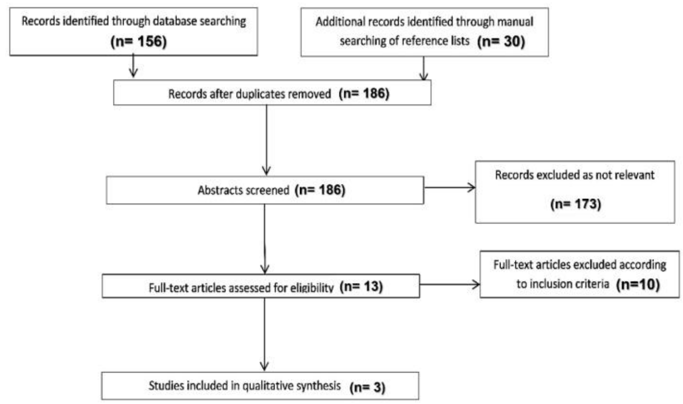

Figure 1. PRISMA flow chart

3. Results

Fisher Anatomical Subunit repair and Modified Millard Rotation-Advancement for the treatment of cleft lips were compared in three studies involving a total of 82 individuals. Table 1 provides a summary of the research.

Table 1. Included studies with total number of included patients

STUDY	COUNTRY	STUDY DESIGN	TOTAL NUMBER OF PATIENTS	FISHER ANATOMICAL SUBUNIT	MODIFIED MILLARD ROTATION-ADVANCEMENT
KWONG ET AL, 2019[14]	USA	RCT	20		
PATEL ET AL, 2019[13]	USA	RCT	22	10	12
ELMAGHRABY ET AL, 2021[15]	Egypt	RCT	40	20	20

Research using the Fisher Anatomical Subunit approach (9.17 ±7.49) and studies using the Modified Millard Rotation-Advancement technique (6.63 ±4.79) did not indicate a statistically significant difference in participant ages (p value > 0.05). Meanwhile, when it came to follow-up, the Fisher Anatomical Subunit method (mean follow-up 36.35 ±23.65 months) and the Modified Millard Rotation-Advancement technique (mean follow-up 42.21 ±17.79 months) did not vary statistically (p value > 0.05).

When comparing Likert scale means using the Fisher Anatomical Subunit Method, no statistically significant difference was found. The Anatomical Subunit Method by Fisher In the Likert Scale Modified Millard Rotation-Advancement Method, the values are 6.91 ±0.13 and 5.60 ±0.14, respectively.

Regardless of the large effect size (1.38), high levels of heterogeneity (I2= 95%, p0.001), and lip height, there was no discernible difference between the two treatments. (I2=0%, p-value=0.68, total effect=0.55) Neither method significantly changed lip width. With an effect size of 0.98 and an I2 of 97% and a p-value of 0.001, there was no statistically significant difference in vermilion height between the two methods. With an overall effect size of 0.8 and an I2 of 97% and a p-value of 0.001, the two methods did not differ significantly with respect to alar base height. With a modest total effect size of 0.4, the two methods seem to produce similar results (Figure-2; I2= 94%, p0.001).

In accordance with the Steffensen criteria, as shown in table (2) below. In terms of the excellent criteria, there was a statistically significant difference between the two approaches, with a total effect size of 2.93 (Figure-3), and no heterogeneity (I2= 0%, p-value= 0.95). According to the mean criteria, there was no significant difference between the two approaches (Figure-4; I2= 0%, p-value= 0.91, total effect = 0.62). The Fisher Anatomical Subunit technique had a bigger overall impact (2.53) and no heterogeneity (I2= 0%, p-value= 1) than the other approach (Figure-5), concerning the subpar criteria, there was a statistically significant distinction between the two methods.

Table 2. Steffensen criteria of the included studies

STUDY	FISHER ANATOMICAL SUBUNIT			MODIFIED MILLARD ROTATION-ADVANCEMENT		
	Good	Average	Poor	Good	Average	Poor
PATEL ET AL, 2019						
	10			12		
WHITE ROLL	10	0	0	11	1	0
VERMILION ROLL	0	5	5	1	4	7
SCAR HYPERTROPHY	7	3	0	8	3	1
CUPID'S BOW	6	3	1	4	5	3
LIP LENGTH	4	5	1	2	4	6
NOSTRIL SYMMETRY	2	4	4	2	3	7
ALAR DOME	2	0	8	1	0	11
ALAR BASE	3	5	2	5	5	2
ELMAGHRABY ET AL, 2021						
	20			20		
WHITE ROLL	18	2	0	17	2	1
VERMILION ROLL	14	3	3	9	6	5
SCAR HYPERTROPHY	18	2	0	13	4	2
CUPID'S BOW	16	3	1	11	7	2
LIP LENGTH	12	5	3	12	4	4
NOSTRIL SYMMETRY	11	5	4	10	5	5
ALAR DOME	12	5	3	8	8	4
ALAR BASE	10	5	5	7	5	8

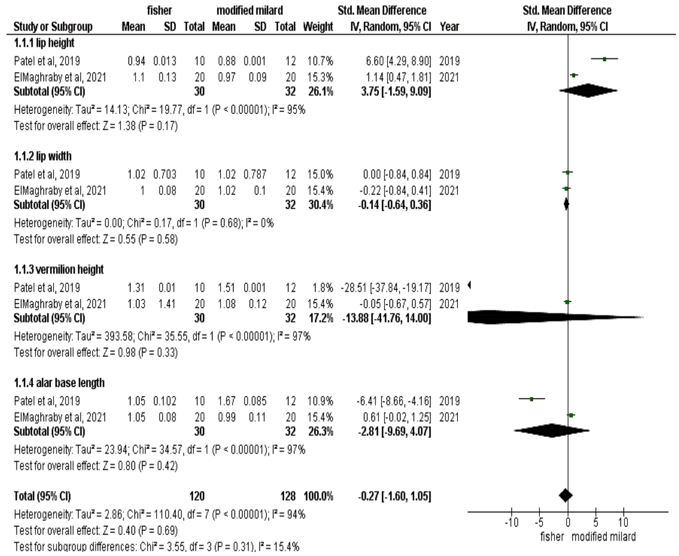

Figure 2. Forest plot for anthropometric measurements of the included studies

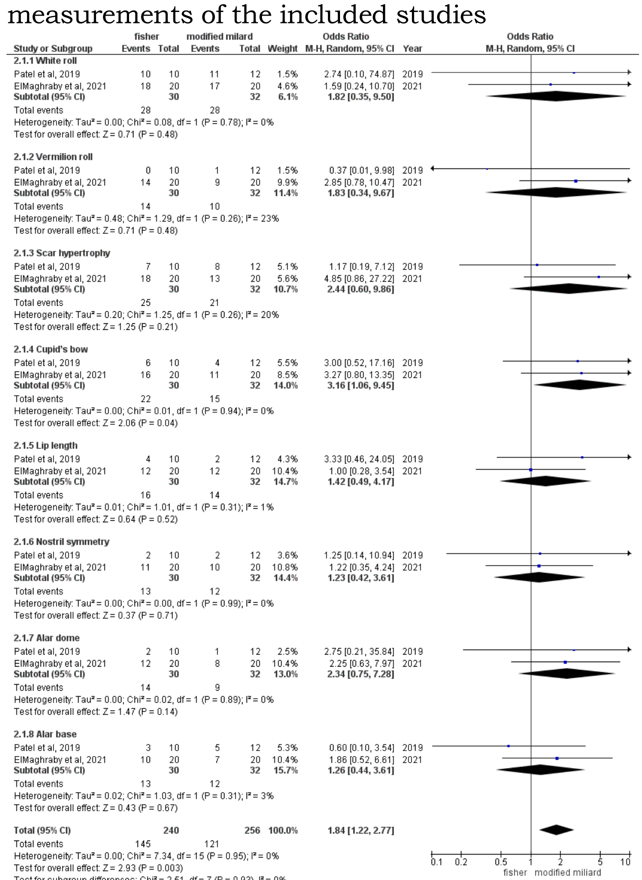

Figure 3. Forest plot for good Steffensen Criteria of the included studies

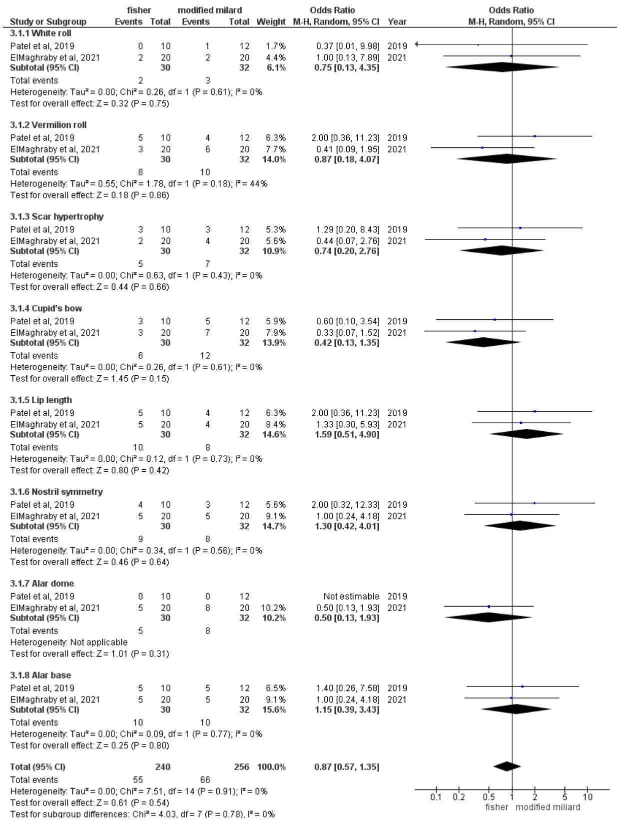

Figure 4. Forest plot for Average Steffensen Criteria of the included studies

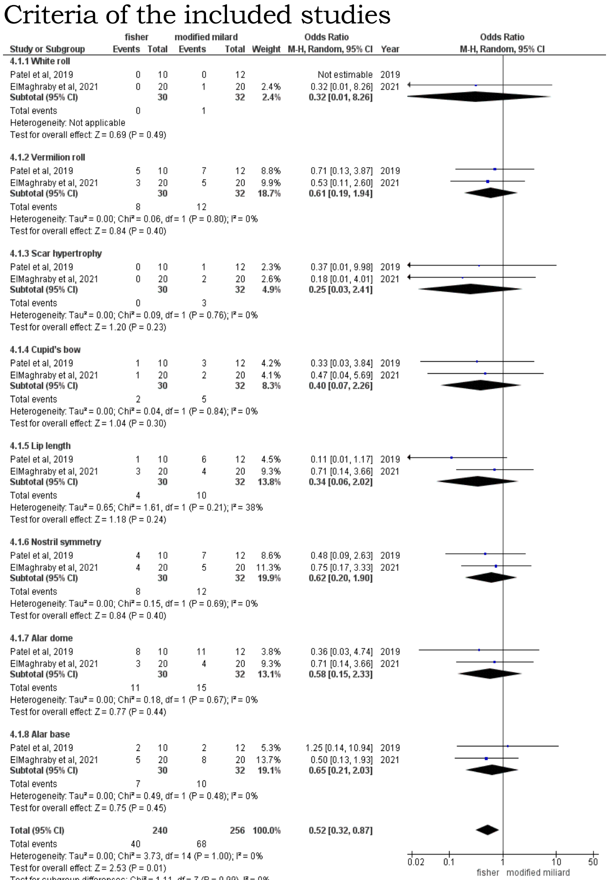

Figure 5. Forest plot for poor Steffensen Criteria of the included studies

4. Discussion

Since its creation by Millard in 1964, the rotation advancement procedure has been the standard of care for correcting unilateral cleft lips.[9] Millard's method allows for the rotation of the philtrum and Cupid's bow without risk of injury. The alar flare and nasal floor breadth are both diminished when the lateral lip moves medially to sustain this rotation. Careful scarring under the nasal rim and on the nasal floor conceals the interdigitations, and the oblique scar follows the philtrum's natural column. [10]

There is minimal tissue waste with the rotation-advancement flap, and it is simple to make secondary corrections if necessary.[11] Fisher introduced anatomical component approximation for unilateral cleft lips in 2005. The rotation incision across the philtral column on the cleft side is eliminated, allowing for a more exact approximation of the lateral and medial lip components at the junctions of the lip and nose anatomical subunits.[12]

Based on prior repairs, the anatomic subunit approximation repair is reliable. A Rose-Thompson lengthening involves angled incisions across the medial and lateral lip components' cutaneous roll, resulting in a smaller inferior triangle than necessary. Noordhoff says placing the inferior triangle over the cutaneous roll maintains roll continuity.[13]

The cutaneous scar on the nose is lessened, and the split side nostril sill is preserved. A symmetrical line should be followed for repair from the base of the nose to the philtral column on the noncleft side, then superolateral along the lip-columellar crease to the nostril sill, beginning at the tip of the cleft side 'Cupid's bow.[13]

Using a unilateral cleft lip as an example, this study compares the Fisher Anatomical Subunit technique to the Modified Millard Rotation-Advancement flap in terms of both aesthetic and functional results. The 82 cleft lip patients who participated in the three trials were given one of two options: the Fisher Anatomical Subunit or the Modified Millard Rotation-Advancement procedure.

The overall mean age for the Fisher Anatomical Subunit method was 9.17±7.49 months and 6.63±4.79 months for the Modified Millard Rotation-Advancement technique.

The overall mean for the Fisher Anatomical Subunit method was 36.35±23.65 months and 42.21±17.79 months for the Modified Millard Rotation-Advancement technique.

Fisher Anatomical Subunit method has a mean Likert scale of 4.99 ±1.92 and Modified Millard Rotation-Advancement technique 4.135±1.465.

The included studies showed no significant change in anthropometric measures between both methods with substantial-high heterogenicity (I2= 94%, p-value= <0.001) and an overall effect of 0.4.

In our assessment, Fisher Anatomical Subunit one performed better, with non-significant heterogenicity (I2= 0%, p-value= 0.95) and a total effect of 2.93. Poor criteria analysis showed a significant difference between both approaches, with Modified Millard having a greater incidence but no heterogenicity (I2= 0%, p-value= 1) and an overall effect of 2.53.

Kwong et al. used eye-tracking technology to compare the aesthetic outcomes of three different cleft lip repair techniques, concluding that Fisher fixes were the most appealing to the human eye.[14]

Patel et al. evaluated Fisher and Millard cleft lip restorations in 24 unilateral cleft lip patients using anthropometric data and the Steffensen Criteria. Qualitative findings were similar across techniques. Despite methodological variations, quantitative evidence reveals that Fisher anatomical subunit results are more reliable.[13]

ElMaghraby et al. found no significant variations in lip height, lip breadth, vermilion height, or alar base length using anthropometric methods.[15] Fisher's group's nose scar is well disguised in the cleft-side nostril sill and does not extend into the philtral column, giving them Steffensen grade winners for scar look.

4. Conclusion

The Steffensen criteria showed that the Fisher Anatomical Subunit technique in unilateral cleft lip repair had more favorable outcomes than poor ones. However, the scar appearance did not vary.

Disclosure

The authors have no financial interest to declare in relation to the content of this article.

Authorship

All authors have a substantial contribution to the article

Funding

No Funds : Yes

Conflicts of interest

There are no conflicts of interest.

References

1. Parker SE, Mai CT, Canfield MA, 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(12):1008-1016.
2. Burg ML, Chai Y, Yao CA, Magee W 3rd, Figueiredo JC. Epidemiology, Etiology, and Treatment of Isolated Cleft Palate. Front Physiol. 2016;7:67.
3. Margulis AV, Mitchell AA, Gilboa SM, et al. Use of topiramate in pregnancy and risk of oral clefts. Am J Obstet Gynecol. 2012;207(5):405.e1-405.e4057.
4. Lee HK, Ismail T, Kim C, et al. Lysine demethylase 3a in craniofacial and neural development during Xenopus embryogenesis. Int J Mol Med. 2019;43(2):1105-1113.
5. Hao Y, Tang S, Yuan Y, Liu R, Chen Q. Roles of FGF8 subfamily in embryogenesis and oral-maxillofacial diseases (Review). Int J Oncol. 2019;54(3):797-806.
6. Marcus JR, Allori AC, Santiago PE. Principles of Cleft Lip Repair: Conventions, Commonalities, and Controversies. Plast Reconstr Surg. 2017;139(3):764e-780e.
7. Fisher DM. Unilateral cleft lip repair: an anatomical subunit approximation technique. Plast Reconstr Surg. 2005;116(1):61-71.
8. Fisher DM, Sommerlad BC. Cleft lip, cleft palate, and velopharyngeal insufficiency. Plast Reconstr Surg. 2011;128(4):342e-360e.
9. Fujimoto H, Morioka D, Akamine S, et al. Three-Dimensional Measurement of the Lateral Lip Element Sacrificed in Primary Repair of a Unilateral Cleft Lip. Ann Plast Surg. 2020;85(2):180-184.
10. Bhattacharya S, Khanna V, Kohli R. Cleft lip: The historical perspective. Indian J Plast Surg. 2009;42 Suppl(Suppl):S4-S8.
11. Costello BJ, Ruiz RL. Unilateral cleft lip and nasal repair: the rotation-advancement flap technique. Atlas Oral Maxillofac Surg Clin North Am. 2009;17(2):103-116.
12. Iliopoulos C, Mitsimponas K, Lazaridou D, Neukam FW, Stelzle F. A retrospective evaluation of the aesthetics of the nasolabial complex after unilateral cleft lip repair using the Tennison-Randall technique: a study of 44 cases treated in a single cleft center. J Craniomaxillofac Surg. 2014;42(8):1679-1683.
13. Patel TA, Patel KG. Comparison of the Fisher Anatomical Subunit and Modified Millard Rotation-Advancement Cleft Lip Repairs. Plast Reconstr Surg. 2019;144(2):238e-245e.
14. Kwong AJ, Kim WR, Lake JR, et al. OPTN/SRTR 2019 Annual Data Report: Liver. Am J Transplant. 2021;21 Suppl 2:208-315.
15. ElMaghraby, Mohamed F., Nasser A. et al., Comparative study between fisher anatomical subunit approximation technique and millard rotation-advancement technique in unilateral cleft lip repair. Alexandria Journal of Medicine. 2021; 57(1): 92-102.