JURNAL PLASTIK REKONSTRUKSI

(Jurnal Plastik Rekonstruksi 2018; 2:211-219)

CRANIOFACIAL

MAXILLARY GROWTH EVALUATION OF PATIENTS WITH UNILATERAL COMPLETE CLEFT LIP AND PALATE AFTER TWO FLAP PALATOPLASTY WITH HONEY ORAL DROPS

Prasetyanugraheni Kreshanti.[1], Siti Handayani[1], Forry Fortuna[1*], Julieta Pancawati[2], Amila Jeni Susanto[2], Grace Wangge[3], Alita Indania[4]

1. *Universitas Indonesia, Department of Surgery, Division of Plastic Reconstructive and Aesthetic Surgery, RSUPN Cipto Mangunkusumo, Jakarta, Indonesia*
2. *Orthodontist, Cleft & Craniofacial Center RSUPN dr.Cipto Mangunkusumo, Jakarta, Indonesia*
3. *Southeast Asian Ministers of Educational Organization - Regional Center for Food and Nutrition (SEAMEO-RECFON)/Pusat Kajian Gizi Regional Unicersitas Indonesia*
4. *Faculty of Medicine Universitas Indonesia*

ABSTRACT

Background : Honey given as oral drops significantly precipitate epithelialization of the lateral palatal defects post two-flap palatoplasty by 2.1 times. Honey is believed to reduce wound contraction, scar formation, and would contribute as an important factor that will result in a satisfactory maxillary growth. The aim of this study is to evaluate maxillary growth as the long-term effect of rapid epithelialization of the palates treated by honey oral drops.
Method : This is a case control study consisting of 2 groups; comparing maxillary growth of the UCCLP patients that were and were not given honey as oral drops following their two-flap palatoplasty in 2011-2012. The cephalometric measurements were recorded and the dental cast are evaluated using GOSLON Yardstick method.
Result : This study included a total of 20 patients. Goslon Yardstick type IV are the most frequent GOSLON on both groups (40%) with moderate inter-rater reliability between examiner 1-2 and 2-3 (kappa; 0.583 and 0.512) and substantial between examiner 1-3 (kappa 0.716). Forty-percent of SNA angle in the honey group were considered as normal, while only 20% normal SNA angle were found in the control group.
Conclusion: Honey oral drops following two-flap palatoplasty resulted in satisfactory SNA angle. As the completion of maxillary growth occurs at the age of 20, the results of this study would only serve as a preliminary report. Other measures to support maxillary growth should also be taken into account. Further studies are warranted to discover innovations in surgical technique that may be a major contributing factor in maxillary growth.
Keywords: *Maxillary growth, Two Flap Palatoplasty, honey*

Latar Belakang: Madu yang diberikan sebagai terapi oral mempercepat proses epitelisasi 2.1 kali pada defek lateral palatum pasca *two flap palatoplasty*. Proses epitelisasi yang cepat dapat menurunkan kontraksi luka pada proses penyembuhan luka yang dapat menurunkan formasi skar dan diprediksi akan menjadi faktor penting untuk pertumbuhan maksila yang lebih baik. Tujuan penelitian ini adalah untuk mengevaluasi pertumbuhan maksila sebagai efek jangka panjang proses epitelisasi yang cepat pada palatum yang diberikan terapi oral madu.
Metodologi: Studi ini merupakan studi kasus kontrol yang terdiri dari 2 grup membandingkan pertumbuhan maksila pasien dengan celah bibir dan langit-langit komplit yang diberikan dan yang tidak diberikan terapi madu setelah *two flap palatoplasty* pada tahun 2011-2012. Hasil pengukuran cephalometri dicatat dan dibuat cetakan gigi, kemudian dikategorisasi menggunakan metode GOSLON Yardstick.
Hasil: Follow up dilakukan pada 20 orang pasien. Hasil GOSLON Yardstick tipe 4 merupakan hasil terbanyak pada kedua grup (40%) dengan reliabilitas interrater antara examiner 1-2 dan 2-3 adalah sedang (kappa; 0.583 dan 0.512) dan 1-3 adalah kuat (kappa 0.716). Terdapat 40% SNA normal pada grup madu, sedangkan hanya 20% SNA normal pada grup kontrol.
Kesimpulan: Pemberian madu sebagai terapi oral setelah *two flap palatoplasty* memberikan hasil sudut SNA yang baik. Sebagaimana pertumbuhan maksilla berakhir pada umur 20 tahun, maka hasil penelitian ini tidak menyimpulkan hasil final. Usaha lain untuk memperbaiki pertumbuhan maksila pada pasien sumbing langit-langit perlu dipertimbangkan. Studi lebih lanjut terkait inovasi baru dalam teknik operasi dapat menjadi faktor utama yang berkontribusi dalam pertumbuhan maksila.
***Keywords**: Maxillary growth, Two Flap Palatoplasty, honey*

Received: 15 November 2017, Revised: 17 Desember 2018, Accepted: 21 Desember 2018

ISSN 2089-6492 ; E-ISSN 2089-9734
This Article can be viewed at www.jprjournal.com

INTRODUCTION

In a previous prospective cohort study in our institution, it was revealed that epithelialization occurred 2.1 times faster on the lateral palatal defects on 23 subjects who were given honey oral drops following two-flap palatoplasty compared to 24 subjects who were not given honey drops. The median age of the subjects were 26 months old (87,5% of subjects with UCCLP, while the 12,5% with BCCLP).[1] However, a long term data of these subjects is yet to be obtained. To evaluate whether the rapid epithelialization would affect the maxillary growth of the subjects, a long-term follow up data is required.

The formation of scar on the site of palatoplasty plays a pivotal role in maxillary growth. A faster epithelialization is thought to elicit better maxillary growth as the reduction of wound contraction would lead to fewer scar formation.[2] The role of honey in precipitating epithelialization had been proven from previous studies.[3-11] An experimental study by Haryanto, et al in 2012 demonstrated that honey reduce inflammation and wound contraction. Wound re-epithelialization with Indonesian honey reached 26%, 68%, 69%, and 100% on day 3, 7, 11, 14, respectively.[7] Other factors that may impair maxillary growth include timing of lip surgery, palatal surgery and gingivoalveoloplasty, nutritional status, congenitally missing lateral incisors, and family history of maxilla hypoplasia. [12-13]

In order to discover the long term effect of honey drops and the rapid epithelialization it caused on lateral palatal defect following two flap palatoplasty, we analyzed the maxillary growth of UCCLP patients who underwent palatoplasty with honey oral drops compared to the UCCLP patients without honey oral drops in 2011.

Long-term data of UCCLP patients who were given honey as oral drops for lateral palatal defects following two flap palatoplasty is yet to be established. Therefore data collection is essential to evaluate the maxillary growth of the patients. This study aims to represent the population of maxillary growth whose palatal epithelialization on lateral palatal defects were precipitated by honey as oral drops during healing time following surgery. As a result, the operator of palatoplasty may consider to administer honey drops at the lateral palatal defects following two-flap palatoplasty for better maxillary growth due to its nutritional and antioxidant contents and its effect on immunity stimulation.

Honey was found to lower prostaglandin levels and elevate nitric oxide end products. As prostaglandins and nitric oxide play a major role in inflammation, microbial killing, and aid in healing process, these findings may explain some biological and therapeutic properties of honey, particularly as an antimicrobial agent or wound healer.[9,10,11,32]

Skelettal analysis	
Sagittal analysis	
Maxilla to cranial base	
SNA	82 ± 3°
NA-FH	90 ± 4°
Mandible to cranial base	
SNB	79 ± 3°
Go-Me to FH	24 ± 3°
Chin to cranial base	
SnPg	80 ± 3°
NPg-FH	88 ± 3°
Mandible to maxilla	
ANB	~ + 2°
Convexity at A Point	0 ± 8°
Chin to Mandible	
Pg - NB	3 ± 2 mm
Vertical analysis	
UFH	
LFH	
UFH/LFH	0.9–51.0

Dental analysis		
Maxillary incisor		
U1 to SN	103 ± 6°	102°
U1 to NA	22 ± 6°	20°
Mandibular incisor		
L1 to NB	21 ± 7°	23°
Interincisal relationship		
Overjet	+ 2 mm	+7 mm
Overbite	+ 2 mm	+2 mm
Occlusal plane		
OP-FH	8 ± 4°	10°
Dental Display*		
Repose*	M +2 mm ± 2 mm F +3.5 mm ± 2 mm	F +4.5 mm
Smile*	Full crown + 2 mm gingiva	+3 mm

*Measured clinically

Figure 1. Skeletal Analysis (left). Dental Analysis (right) [33]

Disclosure: *The authors have no financial interest to disclose.*

MATERIALS AND METHOD

This is a case control study which evaluates the long term effect of the previously studied effect of honey given as oral drops to precipitate ephitelialization of lateral defect in two-flap palatoplasty. This study was conducted in Cipto Mangunkusumo Hospital during June-October 2016.[1]

All of the subjects in the previous study who met the inclusion criteria were included. The number of the control group were matched to the total subjects obtained from previous study.

The inclusion criteria for subjects were UCCLP patients given honey oral drops following two flap palatoplasty based on the previous study by Kreshanti et al in 2011 and can be acquired for follow up. The exclusion criterion is patients with abnormal growth and development.

The inclusion criteria for the control group are non-syndromic UCCLP that were not given honey as oral drops for lateral palatal defect following palatoplasty in 2011, normal growth and development, age 6-8 years old or with Cervical Vertebrae Maturation I, and available for follow up.

The exclusion criteria for the control group are patients with syndromic UCCLP and abnormal growth and development. Drop out criteria are subjects who passed away during research and refused to continue the study.

All patients underwent cephalometric x-ray and dental casting. The lateral skull x-ray of each patients were measured based on cephalometric measurement to obtain SNA, SNB and ANB of each patient (Figure2). The dental casts were assessed by two orthodontists and one plastic surgeon using GOSLON Yardstick method.[2,17,18,29] The interexaminer reliability were tested using Kappa test.

In this research, data were processed using SPSS version 20.0. This study was conducted with the approval from Ethical Committee of The Faculty of Medicine, Universitas Indonesia (Approval Number: 575/UN2.F1/ETIK/2016).

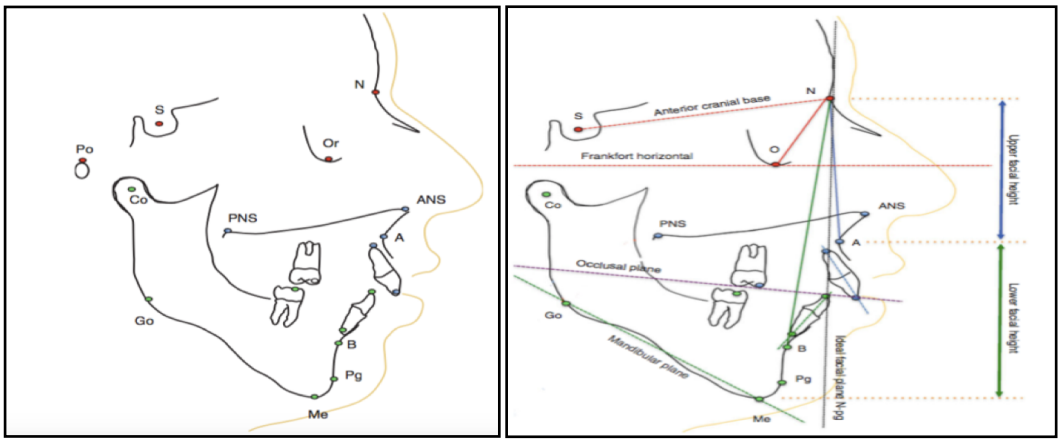

Figure 2. Basic dentofacial skeletal analysis [33]
SNA (Sella-nasion-subspinale), the angle cranium base to point A, normal value is 82±3°. SNB (Sella-nasion-supramentale), the angle cranium base to point B, normal value is 79±3°. ANB (SNA-SNB angle), the angle point A to point B via nasion, normal value 2°±2°. ANS-PNS , the palatal plane.

RESULT AND DISSCUSSION

Characteristic of Subjects and Control Group

There were 10 subjects in each study arm with a total of 13 boys and 7 girls. The median age of each population are 8.5 years for subjects (range 6 years - 10 years) and 11 years for control group (range 9 years-14 years).

The nutritional status is described in table 1. Only 4 out of 10 subjects in the experiment group had normal weight compared to 6 out of 10 subjects in the control group. (Table 1)

	UCCLP with honey drops (n=10)	UCCLP with no honey drops (n=10)
Sex, n(%)		
- Male	7	6
- Female	3	4
Age (year), median	8.5	11
Nutritional status, n(%)		
- Underweight	5	2
- Normal	4	6
- Overweight	1	1
- Obese	0	1

Table 1. Characteristic of subjects and control group

Maxillary Growth Evaluation

We calculated the SNA, SNB, ANB, ANS-PNS (in centimeters) of each group as described in table 2.

	UCCLP with honey drops (n=10)	UCCLP with no honey drops (n=10)
SNA	78.2 (2.6)	77.7 (4.6)
SNB	78.4 (3.9)	80.1 (5.9)
ANB	-0.2 (2.2)	-2.4 (4.2)
ANS-PNS (cm)	4.3 (4.0 - 4.9)	4.5 (3.3 - 5.3)

Table 2. SNA, SNB, ANB, and ANS between UCCLP with and without honey drops

We calculated the proportion of cephalometric data in both groups to be then categorized as less than normal, normal, and above normal as compared to the normal value of cephalometry. (Table 3)

			Subjects		Total
			Non-Honey	Honey	
SNA	Less than normal		7	6	13
	Normal		2	4	6
	Above normal		1	0	1
		Total	10	10	20

Table 3. Proportion of SNA angle between each group

The dental casts were collected and categorized according to The GOSLON Yardstick classification (Figure 6). The GOSLON Yardstick between each subject describes in proportion. Table 5 and Figure 7 show same proportion between each group. Most subjects fell into the GOSLON Yardstick type IV (poor growth) while none of the subjects categorized as GOSLON Yardstick type I (excellent growth). We also analyzed the inter-ratter reliability using The Kappa statistic test which revealed moderate inter-rater reliability between examiner 1-2 and 2-3 and substantial between examiner 1-3 as described in table 4.

Inter-rater	Kappa Value
Inter-rater 1-2	0,583
Inter-rater 2-3	0,512
Inter-rater 1-3	0,716

Table 4. Inter-ratter Reliability

	UCCLP with honey drops (n=10)	UCCLP without honey drops (n=10)
Goslon Yardstick Type I	0 (00.0)	0 (00.0)
Goslon Yardstick Type II	1 (10.0)	1 (10.0)
Goslon Yardstick Type III	3 (30.0)	3 (30.0)
Goslon Yardstick Type IV	4 (40.0)	4 (40.0)
Goslon Yardstick Type V	2 (20.0)	2 (20.0)

Table 5. Proportion of Goslon Yardstick

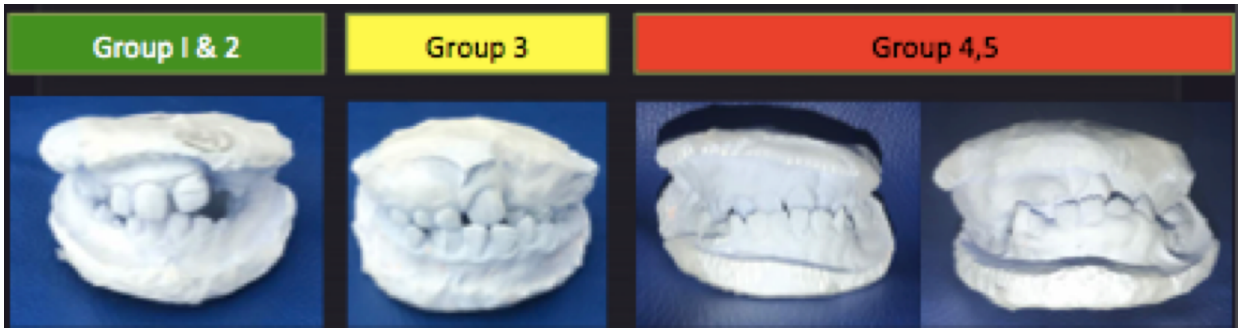

Figure 6. Dental cast categorized using Goslon Yardstick method

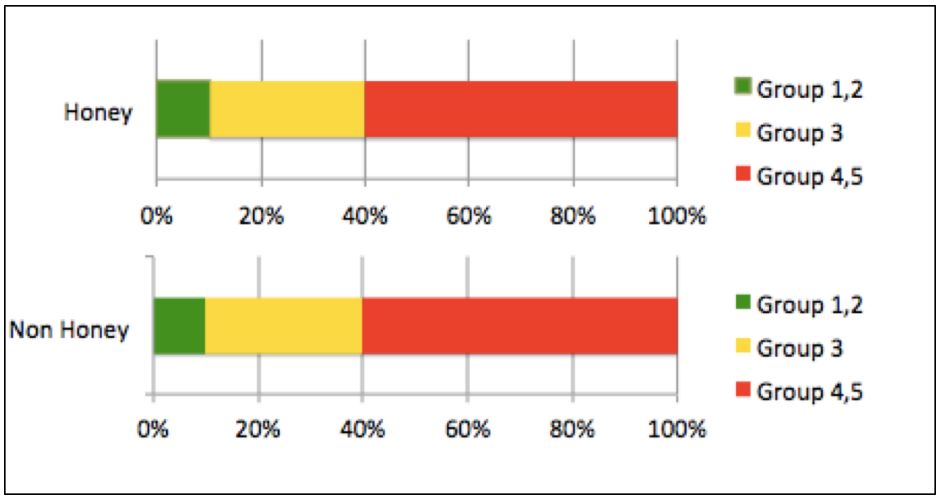

Figure 7. Proportion of Goslon Yardstick

Data Analysis of Risk Factors

The frequency and median of each factor to each groups were presented in Table 6.

	UCCLP with honey drops (n=10)	UCCLP with no honey drops (n=10)
Congenital Missing Lateral Incisors		
- Yes	7	5
- No	3	5
Family history		
- Yes	2	3
- No	8	7
Body Mass Index	15.88 (12.43 - 27.7)	15.59
Timing of lip repair (months)	10.5	3

Table 6. Risk Factor Analysis

Correlation of Each Factor to SNA Angle

The correlation of ANS-PNS (palatal length) to BMI that was calculated using Spearman were deemed statistically significant (Table 7). The correlation of mean ANS-PNS difference to family history of maxillary hypoplasia was also significant (Table 8). There were no significant result in the mean difference of SNA angle to congenital missing lateral incisor (Table 9).

	Body Mass Index		Timing of lip repair	
	r	P-value	r	P-value
SNA	**0.42**	**0.06**	**-0.01**	**0.96**
SNB	0.40	0.07	-0.40	0.86
ANB	-0.14	0.57	0.19	0.41
ANS-PNS	**0.49**	***0.30**	**-0.80**	**0.73**

Table 7. Correlation of BMI and Timing of Lip Repair to SNA Angle (*Spearman correlation)

	Family History (median)	
	Yes	No
SNA	**78**	**78**
SNB	80	81
ANB	-1	-1
ANS-PNS	**4.2**	**4.5**

Table 8. Difference of Median of SNA Angle in relation to Family History of Maxillary Hypoplasia

	Congenital Mising Lateral Incisor (median)	
	Yes	No
SNA	**78**	**77.5**
SNB	78.5	80.5
ANB	1	0
ANS-PNS	4.5	4.3

Table 9. Difference of Median SNA Angle to Congenital Missing Lateral

It should be noted that due to the small sample size of this study, the statistical results derived from this study may not be representative. Nevertheless, these risk factors should be taken into account in the overall growth of maxilla.

In this case control study, it was discovered that honey oral drops given following two flap palatoplasty does not significantly impact the growth of the maxilla during initiation phase of skeletal growth as assessed by Cervical Vertebrae Assessment by Lamparski and modified by Hassel and Farman.

There were more subjects with normal SNA angle in the honey oral drops group compared to the control group (4 vs. 2). This finding may support the theory of satisfactory maxillary growth with the administration of honey oral drops.

No difference in the result of GOSLON Yardstick assessment were observed between the two groups. This finding confirms that despite having moderate to substantial inter-rater reliability between our evaluators, the proportion of the GOSLON category in each group were similar. Only one subject in each of the groups that were categorized as good growth. Regardless of this finding, it should be noted that most of the subjects fall into the category of poor maxillary growth.

To summarise, none of the aforementioned risk factors, except for nutrition and family history of maxillary hypoplasia, showed significant correlation with cephalometric measurements, specifically the ANS-PNS. Therefore, it can be inferred that nutrition and family history may be one of the contributing factors in maxillary growth.

A study by Meazzini et al. in 2011 described a correlation between the presence of lateral incisors to maxillary growth and was demonstrated as a significant difference between mean SNA between the groups. However, this correlation was not observed in our study. This may be partially explained by the small number of subjects with missing lateral incisors in this study. This would suggest that the absence of permanent lateral incisors is almost consistent in syndromic patients with cleft lip and palate (Binder's syndrome and holoprocencephaly) whereas none of our subjects is syndromic.[35,36,37]

The results of this study is similar to a prior study by Meazzini et al. in 2011 regarding timing of lip repair, as they also found no correlation between the timing of lip to maxillary growth despite many published studies described the influence of lip repair to maxillary growth (Bardach et al., 1984 and Kapucu et al., 1996). It would suggest that early lip repair alone does not affect the maxillary growth. However, unlike lip repair, palate repair surgery requires proper timing and technique to facilitate optimal maxillary growth.

It should be noted that our data were obtained during the initial phase of skeletal growth. There are several further phases of skeletal growth that may yield different results in maxillary growth. Our data requires follow up along with the phase of growth to see the final effect of honey to maxillary growth.

CONCLUSION

Honey oral drops following two-flap palatoplasty is suggested to yield good result of SNA angle in almost half of the subjects at the initial phase of skeletal growth. As the completion of maxillary growth occurs approximately at the age of 20, the result of this study should not be concluded as the final result of maxillary growth. Several factors is proposed to influence the maxillary growth of cleft patients; one of which being surgical technique.

Further study is warranted to evaluate the final result of honey oral drops and faster epithelialization on cleft palate patients following palatoplasty.

Regardless, other approaches to achieve better maxillary growth for cleft palate patient should be considered. To date, there are various approaches of palatoplasty in terms of the surgical techniques and timing that are constantly evolving. Procedures such as The Gothenburg Two Stages Palatoplasty or Delayed Hard Palate Closure (DHPC) may serve as an alternative to achieve better maxillary growth(20).

Corresponding author :
Prasetyanugraheni Kreshanti, M.D.
Cleft Craniofacial Center. Plastic Surgery Division
Cipto Mangunkusumo General National Hospital
Pras_MD@yahoo.com

REFERENCES

1. Kreshanti P, Sudjatmiko G, Bangun K. The effect of honey given as oral drops in precipitating epithelialization of lateral palatal defects post two-flap palatoplasty. J Plast Rekonst. 2012;1(5):504-509
2. Desmoulire A, Redard M, Darby I, Gabbiani G. Apoptosis Mediates the Decrease in Cellularity during the Transition between Granulation Tissue and Scar. Am J Pathol.1995; 146:56-66.
3. Mukarramah DA, Sudjatmiko G. Comparison of wound bed preparation time in chronic traumatic wound using topical honey application and conventional dressing. J Plast Rekonst. 2012;1(4):426-434
4. Sundoro A, Sudjatmiko G. Comparison of physical-chemical characteristic and antibacterial effect between manuka honey and local honey. J Plast Rekonst. 2012;1(3):341-347
5. Djoenaedi I, Sudjatmiko G. Topical honey application in treating large ulcerated wound as a complication of vascular malformation in a 5 month-old baby. J Plast Rekonst. 2012;1(2):182-186
6. Harsono AD, Sudjatmiko G. The effect of honey on granulating tissue of the mandibular bone. J Plast Rekonst. 2012;1(3):338-340
7. Haryanto H, Urai T, Mukai K, Gontijo Filho PP, Suriadi S, Sugama J, Nakatani T. Effectiveness of Indonesian Honey on the Acceleration of Cutaneous Wound Healing: An Experimental Study in Mice. Wounds. 2012 Apr;24(4):110-9.
8. Ghaderi R, Afshar M. Topical application of honey for treatment of skin wound in mice. Iran J Med Sci 2004; 185-188.
9. Al-Waili N, Salom K, Al-Ghamdi AA. Honey for wound healing, ulcers, and burns; data supporting its use in clinical practice. Scientific World Journal. 2011 Apr 5;11:766-87.
10. Molan, PC. Potential of honey in the treatment of wounds and burns. American Journal of Clinical Dermatology. 2001; 2(1): 13-9.
11. Cooper R. The antibacterial activity of honey. In: White R, Cooper R, Molan P, Eds. Honey: A modern wound management product. Wounds UK Publishing, Aberdeen; 2005. 24-32.
12. Maezzini MC, Tortora C, Morabito A, Garattini G, Brusati R. Factors that affect variability in impairment of maxillary growth in patients with cleft lip and palate treated using the same surgical protocol. J Plast Surg Hand Surg, 2011; 45: 188–193.
13. Thomaz EBAF, Cangussu MCT, Silva AAM, Asis AMO. Is Malnutrition Associated with Crowding in Permanent Dentition?. Int J Environ Res Public Health. 2010 Sep; 7(9): 3531–3544.
14. Sinko K Caacbay E, Jagsch R, Turhani D, Baumann A, Mars M. The GOSLON Yardstick in Patients with Unilateral Cleft of the Lip and Palate: Review of Vienna Sample. Cleft Palate Craniofac J 1996;33:495-6.
15. Fudalej P, Hortis-Dzierzbicka M, Obloj B, Miller-Drabikowska D, Dudkiewicz Z, Romanowska A. Treatment outcome after one-stage repair in children with complete unilateral cleft lip and palate assessed with the Goslon yardstick. Cleft Palate Craniofac J 2009; 46:374-80

16. Dogan S, Olmez S, Semb G. Comparative Assessment of Dental Arch Relationships Using Goslon Yardstick in Patients with Unilateral Complete Cleft Lip and Palate using Dental Casts, Two-Dimensional Photos, and three Dimensional Images. Cleft Palate Craniofac J 2012;49(3): 347-351.
17. Mars M, Batra P, Worrell E. Complete unilateral cleft lip and palate: validity of the five-year index and the Goslon Yardstick in predicting long-term dental arch relationships. Cleft Palate Craniofac J. 2006;43:557–562.
18. Mars M, et al. The Goslon Yardstick: A New System of Assessing Dental Arch Relationship in Children with Unilateral Clefts of Lip and Palate. Cleft Palate J 1987;24:315-22.
19. Boo-Chai K. The unoperated adult cleft of the lip and palate. *Br J Plast Surg*. 1971;24:250.
20. Simamora HN, Lamtiur E, Handayani S, Bangun K. Maxillary growth evaluation after cleft palate repair using Goslon criteria: Preliminary Study. J Plast Rekonst. 2012;1(3):310-315
21. Yoshida H, Nakamura A, Michi K, Go-Ming Wang, Cephalometric Analysis of Maxillofacial Morphology in Unoperated Cleft Palate Patients. Cleft Palate Craniofac J 1992;29(5):419-424.
22. Hoffman WY. Cleft Palate. In: Neligan PC. Plastic Surgery 3rd Edition. Elsevier. 2013.
23. Kryger ZB, Sisco M. Practical Plastic Surgery. Texas USA: Landes Bioscience; 2007.
24. Ortiz-Monasterio F, Serrano A, Barrera G, et al. A study of untreated adult cleft palate patients. *Plast Reconstr Surg*. 1966;38:36–41.
25. Sofaer JA. Human tooth-size asymmetry in cleft lip with or without cleft palate. *Arch Oral Biol*. 1979;24:141–146.
26. Hellquist R. Team work and clinical research in the treatment of cleft lip and palate. *Sven Tandlak Tidskr*. 1973;66:145–155.
27. Hurst CA, Eppley BL, Havlik RJ, Sadove AM, Surgical Cephalometric: Applications and Developments. Plastic Reconstr Surg 2007;120:92-104.
28. Ratetschak KH, Wolf HF, eds. Color Atlas of Dental Medicine, Orthodontic - Diagnosis: Thieme; 1993.
29. Choudhary S, Cadier MAM, Shinn DL, Shekhar K, McDowall RAW. Effect of Veau- Wardill- Kilner Type of Cleft Palate Repair on Long Term Midfacial Growth. Plast Reconstr Surg 2003;111:570-82
30. Sinko K Caacbay E, Jagsch R, Turhani D, Baumann A, Mars M. The GOSLON Yardstick in Patients with Unilateral Cleft of the Lip and Palate: Review of Vienna Sample. Cleft Palate Craniofac J 1996;33:495-6.
31. Fudalej P, Hortis-Dzierzbicka M, Obloj B, Miller-Drabikowska D, Dudkiewicz Z, Romanowska A. Treatment outcome after one-stage repair in children with complete unilateral cleft lip and palate assessed with the Goslon yardstick. Cleft Palate Craniofac J 2009; 46:374-80.
32. Eteraf-Oskouei T, Najafi M. Traditional and Modern Uses of Natural Honey in Human Diseases: A Review. Iran J Basic Med Sci; 2013; 16: 731-742.
33. Patel PK, Zhao L, Ferraro JW. Surgical Planning: 2D to 3D. In: Ferraro's Fundamentals of Fundamentals of Maxillofacial Surgery 2ns edition. Springer. New York. 2015.
34. Bakri S, Rizell S, Lilja J, Mark H. Vertical Maxillary Growth After Two Different Surgical Protocols in Unilateral Cleft Lip and Palate Patients. Cleft Palate Craniofac J; 2014;51(6):645-650.
35. Ravi MS, Ravikala S. Assessment of Skeletal Age in Children with Unilateral Cleft Lip and Palate. Int J Clin Pediatr Dent. 2013 Sep-Dec; 6(3): 151-155.
36. Bardach H, Mooney MP. The relationship between lip pressure following lip repair and craniofacial growth: an experimental study in beagles. Plast Reconstr Surg 1984;73:544–55.
37. Kapucu MR, Gursu KG, Enacar A, Aras S. The effect of cleft lip repair on maxillary morphology in patients with unilateral complete cleft lip and palate. Plast Reconstr Surg 1996;97: 1371–8.
38. Bakri S, Rizell S, Lilja J, Mark H. Vertical Maxillary Growth after Two Different Surgical Protocols in Unilateral Cleft Lip and Palate Patients. Cleft Palate-Craniofacial Journal [Internet]. 2014;51(6):645-50.