ISSN: 2581-5989
PubMed - National Library of Medicine - ID: 101738774

International Journal of Dental Science and Innovative Research (IJDSIR)
IJDSIR : Dental Publication Service
Available Online at: www.ijdsir.com
Volume – 5, Issue – 1, February - 2022, Page No. : 295 - 303

An innovative perspective to analyze the morphology of velum in OSMF patients-A radiographic study

[1]Dr. Aiman Mahfooz, III[rd] year Post graduate student, Department of Oral medicine and radiology, Teerthanker Mahaveer Dental college And Research Centre.

[2]Dr. M.K. Sunil, Professor and Head, Department of Oral medicine and radiology, Teerthanker Mahaveer Dental College and Research Centre.

[3]Dr. Upender Malik, Professor, Department of Oral medicine and radiology, Teerthanker Mahaveer Dental College And Research Centre.

[4]Dr. Roopika Handa, Professor, Department of Oral medicine and radiology, Teerthanker Mahaveer Dental College And Research Centre.

[5]Dr. Chhavi Srivastava, II[nd] year Post graduate student, Department of Oral medicine and radiology, Teerthanker Mahaveer Dental college And Research Centre.

[6]Dr Vaishali, I[st] year Post graduate student, Department of Oral medicine and radiology, Teerthanker Mahaveer Dental college And Research Centre.

Corresponding Author: Dr. Aiman Mahfooz, III[rd] year Post graduate student, Department of Oral medicine and radiology Teer thanker Mahaveer Dental College and Research Centre.

Citation of this Article: Dr. Aiman Mahfooz, Dr. M.K. Sunil, Dr. Upender Malik, Dr. Roopika Handa, Dr. Chhavi Srivastava, Dr Vaishali, "An innovative perspective to analyze the morphology of velum in osmf patients-A radiographic study", IJDSIR- February - 2022, Vol. – 5, Issue - 1, P. No. 295 – 303.

Copyright: © 2022, Dr. Aiman Mahfooz, et al. This is an open access journal and article distributed under the terms of the creative commons attribution noncommercial License. Which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Introduction: Tobacco Chewing is most prevailing habit in India especially In South East Asia and Western U.P Which could result into most common premalignant condition that is Oral Submucous fibrosis. Digital Lateral Cephalogram provides better visualization and to analyse the changes in morphometric and morphology of soft palate.

Aim & objective: The aim of the present study is to assess the morphological and morphometric variations of soft palate in Oral sub mucous fibrosis (OSMF) with respect to age and gender and to assess inter group comparison of the morphology of soft palate variations in individuals with or without oral submucous fibrosis (OSMF), by digital lateral cephalogram.

Materials and methodology: A total of 100 subjects of both the gender, were randomly divided in two group such as Group I(study) consist of total fifty Subjects who are clinically diagnosed OSMF and Group II(control) consist of 50 Subjects having history of habit with no

mucosal changes within the age group of 18-45 year. Later the morphology and morphometric changes of Soft Palate was evaluated using Digital Lateral cephalogram followed by statistical analysis.

Results: In Group I (Study) Type 1(Leaf) shapes commonly noticed. In Group II (control) predominantly Type 2 (Rat-tail) shape was found. Anteroposterior dimension between the groups with mean length of 26.96 with Std. Deviation 5.083 in group I (study group) and 28.87mean length with Std. Deviation 3.187 in Group II (control group) were found to be statistically significant.SI width in Group I (study group) 7.96 with Std. Deviation 0.179and in Group II (control group) 7.98 with Std. Deviation 0.202 had been found to be non-significant. Other than this Two new shapes Triangular and beak shapes were Recorded in the study.

Conclusion: Digital Lateral Cephalogram proves a better imaging modality then conventional radiographs and advanced imaging techniques like CT, MRI as it has low cost, less time consuming, low radiation and can be done as often as required in assessment of shapes of velum in different conditions.

Keywords: Oral Submucous Fibrosis, Soft palate, Digital Lateral cephalogram.

Introduction

In India the common form used is smokeless form of tobacco and frequently used products are Tambakoo, khaini, gutkha, betel leaf with tobacco and results in OSMF and it is accepted, having highest malignant potential than any other oral premalignant lesions.[1]

OSMF is a harmful disorder of oral cavity. It is having multifactorial Etiology factor such as areca nut, capsaicin, deficiencies of iron, zinc, and necessary vitamins, autoimmune disease and relation with specific human leukocyte antigen (HLA) antigen.

OSMF is a persistent impairing ailment leads to a fibrosis that not only involves oral cavity, but also include changes in soft palate, pharynx and upper third of the oesophagus and often leads to difficulty in Swallowing, difficulty in opening mouth due to loss of cheek flexibility.

The soft palate is the fibrous and vascular tissue which is attached to posterior border of hard palate and the morphological shapes of soft palate is varied depending on habit, age and gender of subjects.[2]

The Digital lateral cephalogram view is by far the most valuable view for evaluation of soft palate as Numerous authors stated that with increasing age changes in dimension of velum seen in patients not only with OSMF but in sleep apnea, cleft lip and palate also. The DLC is a helpful tool to analyse the Patterns of velar in OSMF with different age groups, and gender. Hence, the need for the present study was felt for early detection of disease and to assess the changes in the soft palate morphology that can be helpful in treatment OSA and Cleft palate.

Material and Methodology

The study was conducted in the Department of OMR at TMDCRC, Moradabad. This study comprised of 100 patients, of both genders within the age group of 18- 45 years. These Subjects were further divided into two groups of 50 Patients each. In Group I **(**study group) Clinically diagnosed with OSMF as and Group II individuals having history of habit with no mucosal changes which were further evaluated radiographically to rule out any changes in soft palate. Permission to perform the study was obtained from ethical committee of TMDCRC, Moradabad, Uttar Pradesh. Every patient selected was informed about the study and Informed consent were procured from them.

© 2022 IJDSIR, All Rights Reserved

Written informed consent was obtained from all the patients after explaining the study and treatment protocols. Detailed case history was recorded with particular emphasis on type, frequency per day, and duration of adverse habits (areca nut, gutka, or a combination of both). Based on the clinical findings, the final diagnosis of OSMF is given based on the criteria given by Ranganathan et al (2001).

As per the covid instruction and a proper clinical examination were carried out in department. The clinical examination of selected patient were diagnosed with OSMF as per the criteria given by Ranganathan et al (2001) he has classified the various categories according to sign and symptoms as

- Class 1- only symptoms, with no demonstrable restriction of mouth opening.
- Class 2- limited mouth opening 20 mm and above.
- Class 3-mouth opening less than 20 mm.
- Class 4-OSMF advanced with limited mouth opening. Precancerous changes seen throughout the mucosa.

Later these subjects were evaluated for radiographic examination at Dept. of OMR for Digital lateral Cephalograms. These digital images were transferred into computer system and then analysed for the morphology of soft palate according to criteria given by You et al (2008)[3] and Rathore et al (2019)[4].

According to the criteria given by You et al there are six shapes i.e.,

Type 1- leaf shape (Fig.1)

Type 2-rat tail, (Fig.2)

Type 3-butt shape, (Fig.3)

Type 4-straight line shape, (Fig.4)

Type 5-s shape, (Fig.5)

Type 6-crook shape, (Fig.6)

Supriya Rathore et al as given another two new shapes.

Type 7-u shape, (Fig.7)

Type 8 -bifid shape. (Fig.8)

Later the morphometric evaluation is done by Master edit PDF 5.7 version Software. The measurement of SP such as length and SI and AP dimension were evaluated from PNS to tip of uvula similarly greatest width was SI diameter of the soft palate.

The data was entered in the Microsoft Excel 2007 & using the SPSS statistical software 23.0 Version it was determined. The difference of mean scores between two independent groups was done using the unpaired/independent t test. The intergroup comparison for the frequencies was done using the Chi square test. The level of the significance for the present study was fixed at 5%.

Inclusion Criteria

- Patients clinically diagnosed with oral submucous fibrosis (OSMF) and individual with the history of habit without any mucosal changes were informed about the study protocol and selection were based on their willingness to take part in the study.

Exclusion Criteria

- Congenital anomalies i.e. congenital cleft lip and palate, systemic disease, syndrome. Surgery of Oro pharyngeal region and trauma to head and neck and region any Odontogenic or space infections Pregnant and lactating females.

Results and observation

Intergroup variation of soft palate shapes with different stages in osmf group were In Stage I About 7 (43.8%) Type 1 (Leaf) shape, Similarly in Stage II more no. of patterns found in Type 2 (Rat tail) shape about 7 (38.9%) However, in stage III OSMF the more no. of shapes found in Type 3 (Butt) 5(41.7) Similarly in Stage IV only Type 1 (Leaf) and Type 2 (Rat tail) pattern were found in 2 subject each 2 shape (0.2%) and none of the

© 2022 IJDSIR, All Rights Reserved

shape found in Straight line, Crook, U shape and Triangular, Beak. shape P value 0.001 which is statistically significant. (Table 1)

Age related changes in shapes of soft palate in control group 16-25 year (Rat tail) (38.5%),26-35 year (S Shape) 2 (33.3%),36-45 year (Rat tail) (40.0%) similarly in study group 16-35 Year (leaf shape) 11 (34.4%),26-35 year (leaf shape) 4 (40.0%),36-45 Year (leaf shape) (37.5%) were commonly noticed.

In control group Type 2 (Rat Tail) shape was predominant in both males and female's subjects. Similarly in study group Type 1 (leaf shape) was more common in both males and female's subjects.

Intergroup difference in the morphology of velar in Control group the predominantly Type 2 (Rat shape) 18 (36.0%), Similarly in Study group was found that predominantly more number of (leaf) shape Type 1 of S.P18(36.0%) were found with P value of 0.001 which is statistically significant. (Table 2)

The Anteroposterior parameter of between both and control and study group with the mean score 28.87 with Std. Deviation 3.187 in control group and it was found that mean 26.96 and Std. Deviation 5.083 in study group which is statistically significant with P Value of 0.027.(Table 3)

The Intergroup comparison of SI parameter between the both Control and study group was 7.98 with Std. Deviation 1.433 in control group and in study group with mean value of 7.96 With Std. Deviation 1.272 which is statistically significant with P value of 0.937.(Table 4)

Discussion

Lateral cephalogram is one of the acceptable techniques to evaluate morphological and morphometric changes in soft palate. The morphological pattern of velar as being one to ignore in the past but it has variable presentation on lateral cephalogram as it is based on slit radiography so the acquired image formed can be enhanced, easy to extract measurement.

In the present study ,comparison of shape between different stages in group 1 (OSMF) shows predominantly 7 (43.8%) Type 1(leaf) shape in stage 1,7 (38.9%) Type 2 (rat tail) in stage II ,5 (41.7%) Type 3 (Butt) shape in stage III and 2 cases (50.0%) in each Type 1& Type 2 (Rat tail) shape in stage IV were noticed ,While in stage I Butt and straight line 1(6.2%), Type 5 (S shape), Type 10 (Beak) shape 1(5.6%) each in stage II, Type 2 (Rat tail) , Type 5 (S shape), Type 10 (Triangular) 1(8.3%) in Stage III, None of the cases reported in Stage IV other that Type 1(leaf) and Type 2 (Rat tail) were noticed as least shape in our study which is in accordance to the study done by Shanker VN et al (2013)[5], Lakshmi C et al (2015)[2] except the triangular and beak shape.

A Study done by Upadhyay C et al (2017)[6], Alok A et al (2019)[7] have noticed the same results other than the two new shapes in present study as in Control Group, soft palate Morphology commonly seen in age group of 16-25 year is Type 2 (Rat tail) of about 15(38.5%) and least shape found to be Type 4,5,6,7,8,9,10 1(2.6%) each. In 26-35 Type 5(S shape) 2(33.3%) are commonly found, and least number of shapes was observed are Leaf and Rat tail, Butt Shape, crook shape 1 (16.7%) similarly in 36-45 age group Type 2 (Rat tail) shapes of soft palate of about 2(40.0%) is commonly seen, while in 36-45 age group type 1 (Leaf), Type 3 (Butt Shape), Type 9 (Triangular) 1(40.0%) were found.

In group 1 (Study) age related changes in soft palate morphology found that Type 1 (leaf) of about (34.4%) in age group 16–25-year, and in 26-35 year &36-45 year of age about (40.0%) and (37.5%) leaf shape which is according to the study done by Rathore et al (2019)[4]. However, in control group the similar gender related

© 2022 IJDSIR, All Rights Reserved

changes were observed predominantly Type 2 (Rat tail) shapes of about 9(40.9%) compare to all other shapes and in males it was found that more number of shapes seen in (leaf shape) Type 1and (Rat tail) of about 9(32.1%) with P value of 0.001 statistically significant, which is similar to the study done by Khaitan T et al (2016)[8], Nagaraj T et al (2016)[9].

However, gender related changes of soft palate also found more predominance in Type 1 of about 11(44.0%) in females followed by Type 2 shape of soft palate of about 7(28.0%) and in males it shows more in Leaf shape of about 7(28.0%) respectively, It is parallel to study done by Lakshmi C et al, (2016)[2], Tripathy et al (2020)[10].

The shapes of soft palate compare with the two groups such as Group I and Group II. In group I (Study) predominantly leaf shape were higher in number of about 18(36%) and least number of shapes found in Straight line, U shape, Bifid, Beak shape similarly in Group II (control) it was found predominantly Type 1 i.e.,18(36%) and least no. of shapes of pattern Type 4, Type 9 and Type 10 seen respectively. Similarly, study done by Tripathy et al (2020) [10], Domir S K et al (2019)[11].

The Anteroposterior dimension were compared with both control and study Group. In group 1 (study) with mean score 29.96 with Std. Deviation 5.083 and similarly in control group mean score was about 28.87 with Std. Deviation 3.187 which is statistically significant 0.027, which is similar to Shanker VN (2013)[5] and Rathore et al (2019)[4].

The Super inferior parameter observed between the groups. It was found that in Group I (study) the mean score of 7.96 with Std. Deviation 1.272 in Group II (control) showed the mean score of 7.98 with Std. Deviation 1.433 respectively with P value of 0.937 which is statistically non-significant, similar to study done by Shanker VN et al[5]. However, Triangular and beak shape are the two new shapes not to be found in any of the study.

Conclusion

In addition to Eight shapes, another two new shapes such as Triangular shape(fig.9) and beak shape (fig.10) were found in the study through Digital Lateral Cephalogram. These two Shapes are unique and not mentioned in any of the available literature.

The A-P dimension of soft palate was seen to be reducing as the disease progresses.

Hence the study can be helpful in early detection of changes in soft palate that could be helpful in the treatment of OSMF and can be beneficial in the management of OSA and cleft palate.

References

1. Balram Rai, "Tobacco use among Indian states: Key findings from the latest demographic health survey 2019– 2020", Tobacco Prevention & Cessation, 2021

2. Lakshmi Chintamaneni, An Innovative Approach to Evaluate the Morphological Patterns of Soft Palate in Oral Submucous Fibrosis Patients: A Digital Cephalometric Study. International Journal of Chronic Diseases. 2016. 1-6. 10.1155/2016/5428581.

3. You M, Morphological variety of the soft palate in normal individuals: a digital cephalometric study. Dento Maxillofac Radiol 2008, 37: 344e349

4. Rathore S PN, Morphological evaluation of soft palate in various stages of oral submucous fibrosis and normal individuals: A digital cephalometric study. J Indian Acad Oral Med Radiol,2019, 31, 51-6

5. V. N. Shankar, “Morphometric evaluation of soft palate in oral submucous fibrosis—a digital cephalometric study,” Journal of Cranio-Maxillofacial Surgery, 2014, vol. 42, no. 1, pp. 48–52,

© 2022 IJDSIR, All Rights Reserved

6. Upadhyaya, C, Morphological Diversity of Soft Palate in Nepalese Population: A Retrospective Cephalometric Study. Orthodontic Journal of Nepal, 2017,*7*(1),1822.https://doi.org/10.3126/ojn.v7i1.18896

7. Alok, A Radiographic Assessment of Morphological Diversity of Soft Palate in Darbhanga (Bihar) Population: An Original Research. 2019, 7. 160-164.

8. Khaitan T, Digital cephalometric analysis illustrating morphological variation of the soft palate. J Indian Acad Oral Med Radiol. 2015; 27:532. doi:10.4103/0972-1363.188745.

9. Nagaraj Tejavathi, A radiographic assessment of morphologies of soft palate: A retrospective study. Journal of Medicine, Radiology, Pathology and Surgery 2016, 3. 1-4. 10.15713/ins.jmrps.66.

10. Manaswita Tripathy, A Digital Cephalometric Study on The Morphometric Evaluation of Soft Palate in Oral Submucous Fibrosis Asian Pacific Journal of Cancer,Prevention,Vol21DOI:10.31557/APJCP.2020.21.7.2169

11. Pentapati Kalyana, Radiographic Evaluation of Soft Palate Morphology and Correlation with Gender on Lateral Cephalograms. World Journal of Dentistry 2015, 6. 10.5005/jp-journals-10015-1331.

12. Gururaj Arakeri, "Long- term effectiveness of lycopene in the management of oral submucous fibrosis (OSMF): A 3-year follow-up study", Journal of Oral Pathology & Medicine, 2020

13. K. Kumar, "Morphological variants of soft palate in normal individuals: a digital cephalometric study," Journal of Clinical and Diagnostic Research, 2012, vol. 5, no. 6, pp. 1310–1313

14. B. N. Praveen, "Various shapes of soft palate. A lateral cephalometric study," World Journal of Dentistry, 2011, vol. 2, no. 3, pp. 207–210.

15. Deepa, V, Morphological Varieties of Soft Palate in Normal Individuals, Cleft Palate Patients and Obstructive Sleep Apnea Patients with Reference to Indian Population: A Preliminary Digital Cephalometric Study. World Journal of Dentistry. 2013 4. 241-249. 10.5005/jp-journals-10015-1239.

16. Mohan Ravi, Morphometric evaluation of soft palate in oral submucous fibrosis-A digital cephalometric analysis. West African Journal of Radiology. 2014,21. 7. 10.4103/1115-1474.128073.

17. Santosh VK, Normative Soft palate dimensions and morphology in subset of Indian population: A Digital Cephalometric study. Indian J Oral Health Res 2015:1:48-51

18. Tekchandani V, Co-relation of clinical and histologic grade with soft palate morphology in oral submucous fibrosis patients: A histologic and cephalometric study. J Dent Specialities,2015;3(1):68-75

19. Nerkar A, Comparative morphometric analysis of soft palate between OSMF and normal individuals: A digital cephalometric study. Int J Maxillofac Imaging. 2017;3(1):1–7.

20. Deshmukh RA, Morphometric evaluation and comparison of soft palate in individuals with and without oral submucous fibrosis: A digital cephalometric study. SRM J Res Dent Sci. 2015;6(4):220. doi:10.4103/0976-433x.170245.

21. Chalkoo, "Morphological varieties of soft palate in normal subjects: a digital cephalometric study." Indian Journal of Dental Advancements, Oct.-Dec. 2015, vol. 7, no. 4.

22. Patil BM, Velar morphological variants in oral submucous fibrosis: A comparative digital

© 2022 IJDSIR, All Rights Reserved

cephalometric study. Indian J Dent Res. 2017;28(6):623. Doi: 10.4103/ijdr.ijdr_275_16.

23. Chappidi Vani, Morphological variations of soft palate and influence of age on it: A digital cephalometric study. IAIM,2017 4(10): 72-76.

24. Nandhini Subramaniam Arvind, Assessment of various shapes of soft palate-A retrospective lateral cephalometric study. Research J. Pharma and Tech2018:11(2) -5233-5237.DOI 10.5958/0974-360X2018. 00954.X

25. Valambath. S, Morphological assessment of the soft palate and a possible correlation with obstructive sleep apnea – A digital cephalometric study. Natl J Physiol Pharm Pharmacol 2020;10(01):21-26.

26. Dr. Rakhee Modak, "Morphology of Soft Palate – Analysis by Digital Cephalometric Study." IOSR Journal of Dental and Medical Sciences (IOSR-JDMS), vol. 18, no. 8, 2019, pp57-62.

27. Babita Prasad, "Morphometric Evaluation of Soft Palate Among Men and Women- A Digital Cephalometric Study." J Forensic Res 12 (2021). Doi:10.37421/jfr.2021.12.469.

Tables and legends

Table 1: intergroup variation of soft platae shapes with different stages in osmf group.

	Leaf	Rat Tail	Butt	St Line	S Shape	Crook	U shape	Bifid	Triangular	Beak	p value
Stage I	7	2	1	1	3	2	0	0	0	0	0.001 (Significant)
	43.8%	12.5%	6.2%	6.2%	18.8%	12.5%	0%	0%	.0%	.0%	
Stage II	5	7	4	0	1	0	0	0	0	1	
	27.8%	38.9%	22.2%	.0%	5.6%	.0%	0%	0%	.0%	5.6%	
Stage III	4	1	5	0	1	0	0	0	1	0	
	33.3%	8.3%	41.7%	.0%	8.3%	.0%	0%	0%	8.3%	.0%	
Stage IV	2	2	0	0	0	0	0	0	0	0	
	50.0%	50.0%	.0%	.0%	.0%	.0%	0%	0%	.0%	.0%	

Table 2: intergroup difference in the morphology of velar.

	Type1	Type2	Type3	Type4	Type5	Type6	Type7	Type8	Type9	Type10	p value
Study Group (Group I)	18	12	10	1	5	2	0	0	1	1	0.001 (Significant)
	36.0%	24.0%	20.0%	2.0%	10.0%	4.0%	.0%	.0%	2.0%	2.0%	
Control Group (Group II)	36.0%	24.0%	20.0%	2.0%	10.0%	4.0%	.0%	.0%	2.0%	2.0%	
	30.0%	36.0%	12.0%	2.0%	6.0%	4.0%	2.0%	2.0%	4.0%	2.0%	

© 2022 IJDSIR, All Rights Reserved

Table 3: AP parameters are compared within groups.

	Group_	Mean	Std. Deviation	Std. Error Mean	P value
AP	Study (Group I)	26.96	5.083	0.718	0.027 (Sig)
	Control (Group II)	28.87	3.187	0.450	

Table 4: intergroup comparison of si parameters between the groups.

	Group_	Mean	Std. Deviation	Std. Error Mean	P value
SI	Study (Group I)	7.96	1.272	0.179	0.937 (NS)
	Control (Group II)	7.98	1.433	0.202	

Shapes of soft palate observed

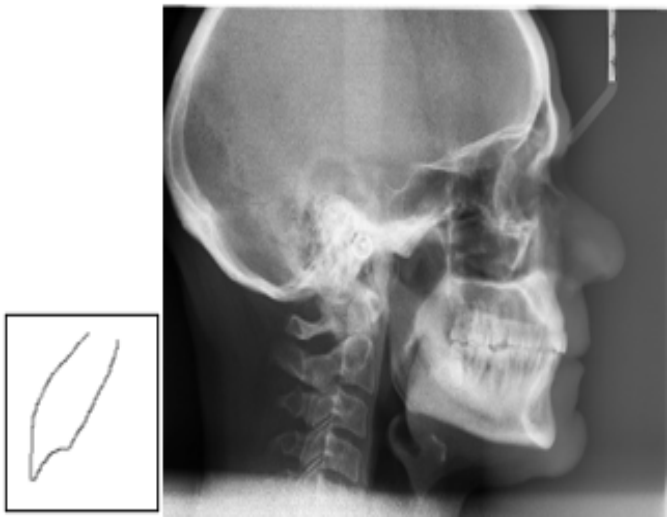

Figure 1: leaf shape.

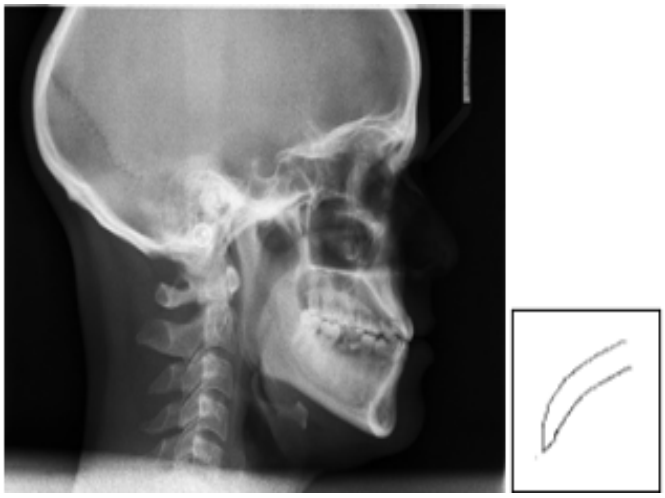

Figure 2: rat tail shape.

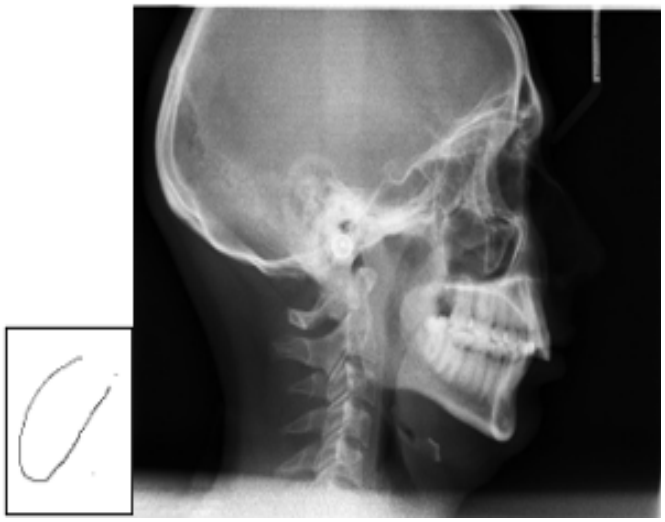

Figure 3: butt shape.

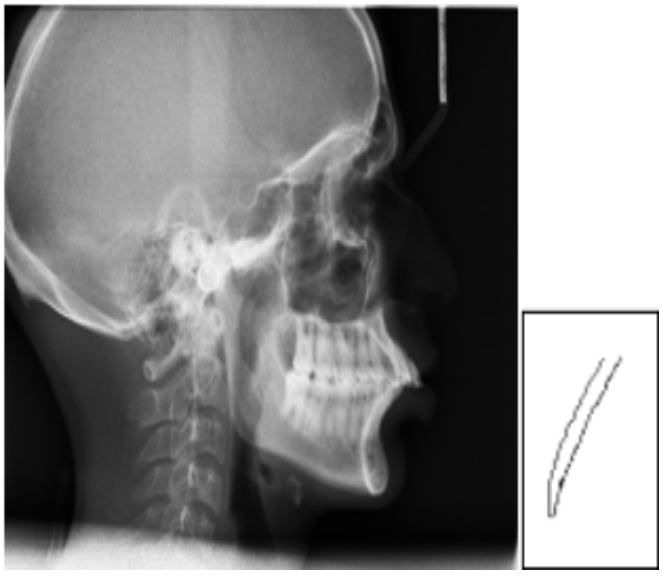

Figure 4: straight line.

© 2022 IJDSIR, All Rights Reserved

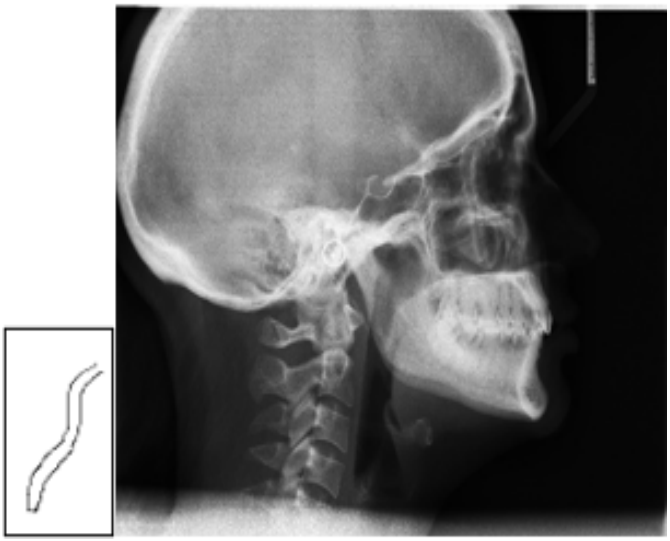

Figure 5: s shape.

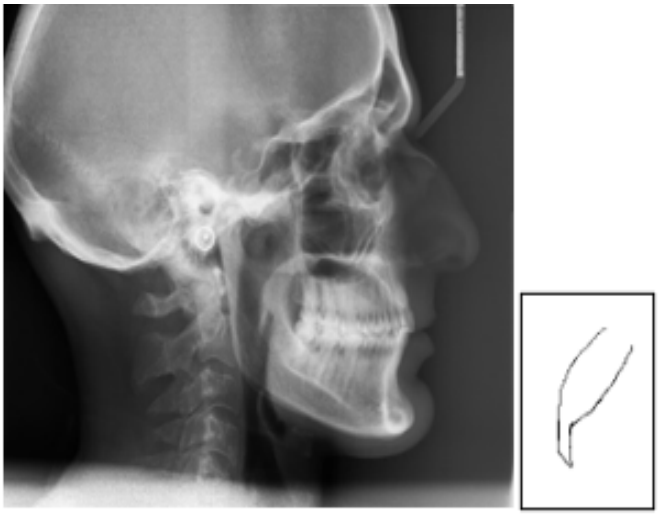

Figure 6: crook shape.

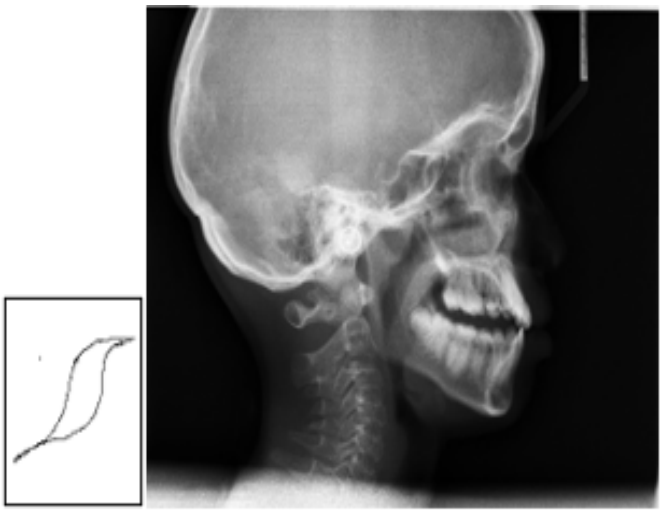

Figure 7: u shape.

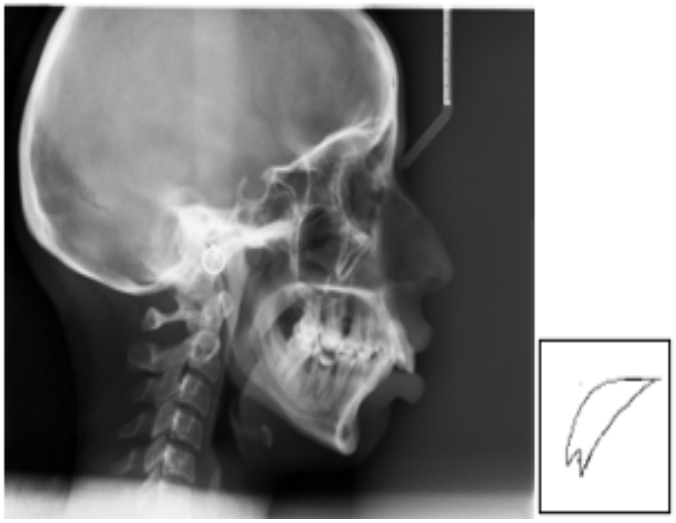

Figure 8: bifid shape.

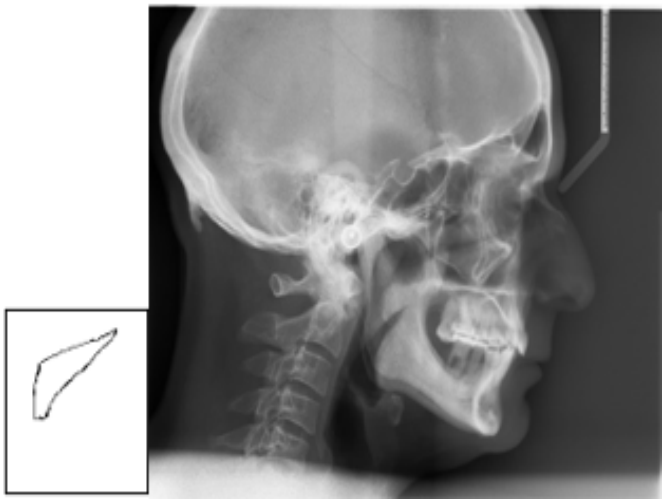

Figure :9 Triangular shape.

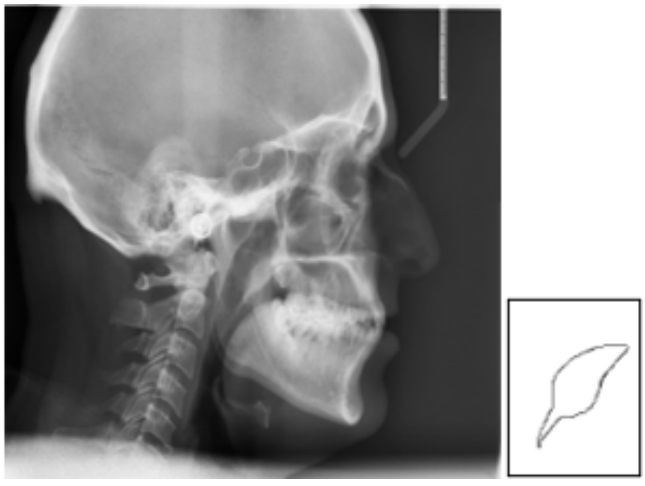

Figure 10: beak shape

© 2022 IJDSIR, All Rights Reserved