Journal of Neonatal Surgery
ISSN(Online): 2226-0439
Vol.13 , (2024)
https://www.jneonatalsurg.com

OPEN ACCESS

Coronoid Head And Neck Height On Left Side Of The Mandible Using Orthopantomogram For Gender Determination.

Vedha R Nair[1], Vijay Anand M[2]

[1] Department of Prosthodontics, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, Tamil Nadu, India

[2] Department of Prosthodontics, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, Tamil Nadu, India

Cite this paper as: Vedha R Nair, Vijay Anand M (2024) Coronoid Head And Neck Height On Left Side Of The Mandible Using Orthopantomogram For Gender Determination.... Journal of Neonatal Surgery, 13, 2496-2499

ABSTRACT

INTRODUCTION:Coronoid process can be an admirable graft for maxillofacial reconstructive surgeries. The mandibular coronoid process is derived from a Greek word 'korone' and described as a triangular piece of flattened bone which projects upwards from the anterior part of the mandibular ramus. However it exists in various shapes and sizes. Coronoid morphology and clinical and other applications in reconstructive surgery and anthropology have been thoroughly established in the literature. Maxillofacial surgeons can use knowledge of the coronoid process's various morphological forms during reconstructive procedures and as a donor site for sinus augmentation. It is also useful in anthropological studies and in forensic dentistry. This study focuses on the determination of the various coronoid process head and neck height on the left side and its correlation with age and sex estimation.

MATERIALS AND METHOD:For the study, 30 Orthopantomogram of 15 male and 15 female were obtained from Saveetha Dental College and Hospitals who underwent examination for several reasons at the university dental radiology and imaging clinic. After obtaining the height of the coronoid processes statistical analysis was performed using SPSS version 23.

RESULT:The coronoid head and neck height for males were obtained as 3.69 +1.93 and for females as 5.70+1.44.

CONCLUSION: The coronoid process on the right side was more dimorphic in nature than the left side. Hence, the coronoid process can serve as an important anthropometric measurement for identification....

Keywords: Coronoid process, anthropometric measurement, orthopantomogram, gender determination..

INTRODUCTION

The mandible is the strongest and largest bone of the skull, having various morphological features which can be useful in the age, sex, and race estimation of the skeleton. Coronoid process can be an admirable graft for maxillofacial reconstructive surgeries. (1) The mandibular coronoid process is derived from a Greek word 'korone' and described as a triangular piece of flattened bone which projects upwards from the anterior part of the mandibular ramus. However it exists in various shapes and sizes.(2) The shape of the coronoid process and sigmoid notch is useful in anthropological studies and forensic dentistry. The margins and medial surface of the coronoid process give attachment to temporalis muscle. Secondary accessory cartilage appears in the region of the coronoid process by about 10 to 14 weeks of intrauterine life. (3)

Coronoid process is also being used as a non-metric skull variant in excellent estimation of age, gender, race and species. Coronoid morphology and clinical and other applications in reconstructive surgery and anthropology have been thoroughly established in the literature.(4) Maxillofacial surgeons can use knowledge of the coronoid process's various morphological forms during reconstructive procedures and as a donor site for sinus augmentation. It is also useful in anthropological studies and in forensic dentistry.(5) The coronoid process seems to be suitable for paranasal augmentation. Its clinical application is also favourable because its size and morphology fits into the paranasal region, with the additional advantages of biocompatibility, availability, and reduced operation time for harvesting. (6) Due to the closeness of the medial aspect of the coronoid process to the distal molar, difference in anatomy of the coronoid process might result in a significantly small vestibular space. No functional limitations are apparent after removing the coronoid process.(7) Coronoid process enlargement may be seen in some pathological conditions like osteochondroma, exostosis, osteoma and other developmental anomalies. Though mandibular fracture is a common occurrence, still coronoid fracture incidence is rare (2%) and requires ..

no treatment unless obtrusion on the zygomatic arch is present. (8) The coronoid height is the distance between the coronoid and most protruding portion of inferior border of the ramus of mandible.The

length of coronoid process is the measurement from the line tangential to the deepest part of mandibular notch to apex of the coronoid process. This study focuses on the determination of the various coronoid process head and neck height on the left side and its correlation with age and sex estimation.

MATERIALS AND METHODS

For the study, 30 Orthopantomogram of 15 male and 15 female were obtained from Saveetha Dental College and Hospitals who underwent examination for several reasons at the university dental radiology and imaging clinic. The patients' ages were from 25 to 30 years. Scans were included if they showed coronoid processes bilaterally. The coronoid process height was measured from the scans.

Statistical analysis

After obtaining the height of the coronoid processes statistical analysis was performed using SPSS version 23. Krussal wallis test was applied to compare classes. Graphs were obtained and results were derived.

RESULTS

The coronoid process is the smaller of two projections located on the proximal end of the ulna. In table 1.1, it was found that the standard deviation of the coronoid process neck height on the left side for male was 1.93 whereas for females was 1.44. The mean for the coronoid neck height for male was found to be 3.69 and for females 5.77. Therefore the coronoid head and neck height for males were obtained as 3.69 +1.93 and for females as 5.70+1.44. From figure 2.1 and 2.2 shows the graphical representations of the male and female mean coronoid neck height against the count of samples.

Moreover age related bone remodelling process and the dental occlusal play have been found to determine some changes and alterations in the shape of the mandible hence altering the height of the coronoid process. Skeletal deformities in muscle deformation inherent to craniofacial morphology of the coronoid process like in prognathism, the spatial anatomy difference of the skeletal structure as a result of bilateral difference in muscle volume.

Table 1.1. Tabular column showing the mean and standard deviations in coronoid neck height for male and Female respectively.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Male	31	1.20	8.70	3.6935	1.93441
Female	26	3.50	8.70	5.7077	1.44303
Valid N (listwise)	26				

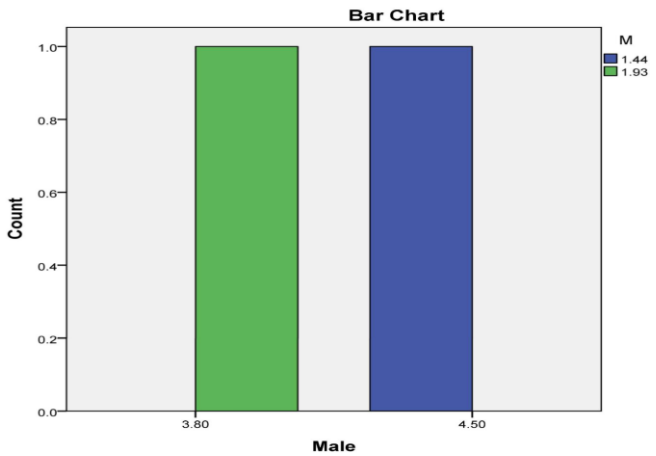

Figure 1.1. Graph showing the mean for the coronoid head and Neck height in male

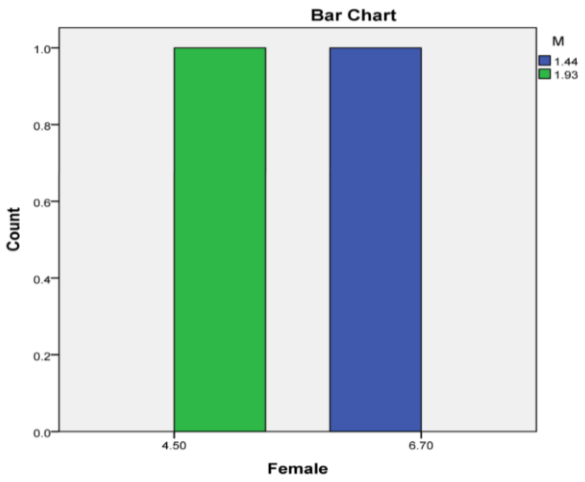

Figure 1.2. Graph showing the mean for the coronoid head and Neck height in female

DISCUSSION

In a study by Subbaramaiah et al, the height of the coronoid process and ramus length at the coronoid process found to have significant differences on the right and left side in male and female mandibles and concluded that it can serve as a novel parameter in sex determination.(2) Al-Guniad et al reported in his study on various mandibular measurements including coronoid height on the determination of sex of the mandible and it was identified that men showed higher values in the majority of the variables compared to women population.(9) In the study by Nayak et al, the size of the coronoid process on the right side was approximately 1.5mm longer than on the left side.(10)

In a study by Jovevska et al, the coronoid height was found to be 0.01 mm longer for males than for females and 0.01 mm longer for dentulous than edentulous.(11) In the morphometric analysis of the coronoid process of the mandible in the Malaysian population by Alias et al, the coronoid process in the Malaysian population too showed greater values for men than women. The discriminant function showed accuracy in identification for men 75.8% and female 63.1%.(12) In a study by Jyothsna et al, it was shown that the accuracy of determination of gender using coronoid height is 74% on the right side and 73% on the left side. (13)

Kambylafkas at al, conducted a study and concluded that the estimation of total ramus height is reliable and found to show a true asymmetry using panoramic radiograph. (14) In a study by Samatha et al, it was found that mandibular ramus height was the beat parameter with statistical significance of p= 0.005.(15) Saini et al, in her study on the dry mandibles of Indian population found that the ramus showed strong sexual dimorphism. The best parameters were coronoid height, condylar height and projective height of the ramus.(16)(17,18)

CONCLUSION

Anthropometric study has always been handy as a helpful tool in various fields of study whether it be forensics or archaeology. Human remains have been a major source of identification of bodies during disasters. Many times, during these situations, the human skull, being one of the hardest in the body, is obtained from the sites. Mandible and mandibular measurements provide the most important sources of victim identifications. In the present study, the use of the coronoid process serves as an important factor for identification. It was found that the coronoid processes are longer for males compared to females and undergo resorption faster than females. The comparison with several studies showed that the coronoid process on the right side was more dimorphic in nature than the left side. Hence, the coronoid process can serve as an important anthropometric measurement for identification.

ACKNOWLEDGEMENT

The authors would like to thank Saveetha Dental College and Hospitals, Saveetha Institute of medical and technical Sciences,Saveetha University for providing research laboratory facilities to carry out the study.

CONFLICT OF INTEREST

The authors reported the conflict of interest while performing this study to be nil.

SOURCE OF FUNDING: NIL.

REFERENCES

[1] Jadhav DS, Professor A, Department of Anatomy, MIMER Medical College, Dabhade T, Pune-, et al. Variations in the shapes of the coronoid process of adult human mandible in Marathwada and Western Maharashtra region [Internet]. Vol. 4, MedPulse International Journal of Anatomy. 2017. p. 17–9. Available from: http://dx.doi.org/10.26611/1001424

[2] Size of coronoid process and ramus as novel parameters in determination of mandibular sex [Internet]. Vol. 5, Indian Journal of Clinical Anatomy and Physiology. 2020. p. 402–5. Available from: http://dx.doi.org/10.18231/2394-2126.2018.0093

[3] Shakya S, Nagraj SK. Morphology of Coronoid Process and Sigmoid Notch in Orthopantomograms of South Indian Population [Internet]. Vol. 4, World Journal of Dentistry. 2013. p. 1–3. Available from: http://dx.doi.org/10.5005/jp-journals-10015-1193

[4] Subbaramaiah M, Bajpe R, Jagannatha SR, Jayanthi KS. A Study of Various Forms of Mandibular Coronoid Process in Determination of Sex [Internet]. Vol. 2, Indian Journal of Clinical Anatomy and Physiology. 2015. p. 199. Available from: http://dx.doi.org/10.5958/2394-2126.2015.00020.1

[5] Parveen S, Department of Prosthodontics, B. R. Ambedkar Dental College, Patna, Bihar. A Morphological Study of Coronoid Process of Adult Human Dry Mandibles [Internet]. Vol. 6, Journal of Medical Science And clinical Research. 2018. Available from: http://dx.doi.org/10.18535/jmscr/v6i4.27

[6] Kim YK, Hwang JW, Lee HJ, Yun PY. Use of the coronoid process as a donor site for sinus augmentation: a case report. Int J Oral Maxillofac Implants. 2009 Nov;24(6):1149–52.

[7] Kasat PA, Bhuiyan PS. A study on coronoid process of the dry adult human mandibles [Internet]. Vol. 65, Journal of the Anatomical Society of India. 2016. p. 9–14. Available from: http://dx.doi.org/10.1016/j.jasi.2016.07.007

[8] Pradhan S, Resident S, Dept of Anatomy, S. C. B Medical College, Cuttack, Odisha, et al. Anatomical Study of Various Shapes of Mandibular Coronoid Process in Relation to Gender &Age [Internet]. Vol. 13, IOSR Journal of Dental and Medical Sciences. 2014. p. 09–14. Available from: http://dx.doi.org/10.9790/0853-13820914

[9] Al-Gunaid TH. Sex-related variation in the dimensions of the mandibular ramus and its relationship with lower third molar impaction. Journal of Taibah University Medical Sciences [Internet]. 2020 Jun 27 [cited 2022 Sep 19];15(4). Available from: https://pubmed.ncbi.nlm.nih.gov/32982633/

[10] Website [Internet]. Available from: http://dx.doi.org/10.9790/0853-14616669

[11] Website [Internet]. Available from: https://ikm.mk/ojs/index.php/kij/article/view/1973

[12] NORCAL Publications [Internet]. [cited 2022 Sep 19]. Available from: https://norcaloa.com/

[13] DETERMINATION OF GENDER USING CONDYLAR HEIGHT AND CORONOID HEIGHT â AN ORTHOPANTOMOGRAPHIC STUDY [Internet]. [cited 2022 Oct 22]. Available from: https://www.longdom.org/articles/determination-of-gender-using-condylar-height-and-coronoid-height--anorthopantomographic-study.pdf

[14] Kambylafkas P, Murdock E, Gilda E, Tallents RH, Kyrkanides S. Validity of panoramic radiographs for measuring mandibular asymmetry. Angle Orthod. 2006 May;76(3):388–93.

[15] Website [Internet]. Available from: https://doi.org/10.4103/0975-1475.186367

[16] Saini V, Srivastava R, Rai RK, Shamal SN, Singh TB, Tripathi SK. Mandibular ramus: an indicator for sex in fragmentary mandible. J Forensic Sci. 2011 Jan;56 Suppl 1:S13–6.

[17] Arumugam V, Doggalli N, Arthanari A, Rudraswamy S. Sex estimation through mandibular ramus flexure using Orthopantomogram and Lateral Cephalogram-A comparative study [Internet]. Vol. 43, Journal of Indian Academy of Forensic Medicine. 2021. p. 18–21. Available from: http://dx.doi.org/10.5958/0974-0848.2021.00005.1

[18] Kizhakkoottu S, Arthanari A. Age Estimation using Mandibular Projective Ramus Height: A Retrospective Digita Orthopantomographic Study [Internet]. Journal of Pharmaceutical Research International. 2021. p. 300–6. Available from: http://dx.doi.org/10.9734/jpri/2021/v33i62a35550.

.