Estimating Age of Maxillary and Mandibular Third Molar Eruption in Late Adolescent Age

Nila Kasuma[1], Susi Abidin Hasam [2] ,Haria Fitri [3], Fildzah Nurul Fajrin[4]

[1] Department of Dentistry, Andalas University, Padang,West Sumatera, 25128,Indonesia

[2] Department of Dentistry, Andalas University, Padang,West Sumatera, 25128,Indonesia

[3] Department of Dentistry, Andalas University, Padang,West Sumatera, 25128,Indonesia

[4] Biomedical Graduate Program , Faculty of Medicine,Andalas University, West Sumatera, 25128 Indonesia

** Corresponding Author: Nila Kasuma, Mailing list E-mail:nilakasuma10@gmail.com, Phone: +62-81266402727, Fax: +62-75138925*

Background

Third molars are, in many respects, the most variable teeth in the dentition. They are most often congenitally missing and can follow an abortive eruption path and become impacted. The 3rd molar is the one tooth marker indicating that an individual is likely to be at least 18 years of age. The aim of this study, which was conducted on 1st term Andalas University students, is to predict the risk of 3rd molar eruption problems in late adolescent age as well as to find the relationship between third molar eruption and age.

Materials and methods

This is a cross sectional study involving a sample of 300 male studens aged 16-21 and 300 female students aged 17-19. An oral examination was taken for each visual clinical subject.

Results

This research reveals that the mean age of having complete clinically erupted maxillary third molars is 21.02 years in male subjects and 21.48 years in female subjects. While the mean age of having complete clinically erupted mandibular third molars is 20.23 years in male subjects and 21.03 years in female subjects.

Conclusions

This approach requires the target individuals to have regular dental reviews or 'checkups', so that the status of the wisdom teeth can be monitored to prevent further pathologic conditions later in life.

Keywords : Maxillary and Mandibular Third Molar, Third Molar Eruption, Late Adolescent Age.

Introduction

Third molars (3M) are teeth located at the very back of the mouth on both the upper and lower jaws. They usually appear in the mouth between the ages of 18-24 years.[1] Upper and lower 3M teeth are the last teeth to erupt, regardless of race and gender, and normally do not erupt at occlusal plane until mandibular growth has completed.[2] Wisdom teeth, on the other hand, often grow (erupt) through the gums without problems, but are sometimes unable to erupt properly and becomes "impacted".[1] Third molar crown formation begins around 9 to 10 years of age and may be seen in panoramic radiograph, in about 90% of the cases, at 11 years of age. The eruption period of third molar teeth is very variable as it initiates at the age of 16. However, third molar teeth more frequently erupt between 18 and 20 years of age [2].

The impaction of mandibular 3rd molar is a common problem in adults that causes pain, pericoronitis and some times, more serious problems such as cellulitis, submandibular space infections in delayed condition. Therefore 3rd molar need to be extracted in initial stage after confirming the type and eruption pattern of particular teeth by radiograph to avoid delayed problem associated with impaction such as post operative pain and infection.[3] The preventive removal treatment (non-surgical, surgical) of third molars (M3s) should be based on evidence. To optimize the timing of treatment of 3rd molars, it is essential to predict the eruption of the tooth and, and more importantly to identify beforehand the tooth/teeth that would be involved in pathologic conditions later in life.[4]

Method

This is a cross sectional study conducted at Medika Andalas Clinic from May – July 2017. The research subjects consist of 300 male and 300 female students . Inclusion criteria are: subjects in the age group of 16 - 20 years . Exclusion criteria are: previous history of surgical removal of third, second, or first molar; previous history of surgery in the posterior jaws; previous history of any pathology of development anomalies like cleft palate and syndromes; previous history of orthodontic treatment ; congenitally missing third molars are not included. [5] The subjects were examined on dental unit under adequate illumination by using sterilized mouth mirrors and probes for the eruption of third molars.

Result

The study sample consists of 600 subjects, of which 300 (50%) are males and 300 (50%) are females, aged between 16 – 21 years. The total number of third molars in the study is 253 clinically erupted maxilla and mandible.

Table 1. Comparison of the status of maxilla and mandible third molars in both sexes

Teeth	Sex	Mean ±SD	p Value
Maxillary M3	Male	21.02±0.25	0.023
	Female	21.48±0.15	
Mandibular M3	Male	20.23±0.72	0.019
	Female	21.03±0.37	

Table 1 shows that the mean age of having complete clinically erupted maxillary third molars is 21.02 years in male subjects and 21.48 years in female subjects. The mean age of having complete clinically erupted mandibular third molars is 20.23 years in male subjects and 21.03 years in female subjects .Statistically significant difference ($P < 0.05$) is obtained in maxillary and mandibular third molars on male and female subjects. This difference indicates that maxillary eruption sequence is earlier in males than in females.

Discussion

This study shows the same results as those of Priyadarshini in South India in 2015. The mean age of having complete clinically erupted maxillary third molars is 22.41 years in male subjects and 23.81 years in female subjects, while that of mandibular third molars is 21.49 years in male subjects and 23.34 years in female subjects. Mandibular third molars are clinically missing more often in females than in males. The eruption of mandibular third molars is generally ahead of the emergence of maxillary third molars in the oral cavity. Third molar development between male and female subjects shows statistically significant differences at calcification stage F and stage G in maxillary third molars and stage F in mandibular third molars ($P < 0.05$).

Third molars in humans are by far the most variable teeth with respect to size, shape, and formation. Third molars are also the only teeth to complete their formation after the onset of puberty and they exhibit an unusually long developmental course lasting more than 10 years.[5] Third molar sometimes erupt completely, but sometimes they cannot do so properly and become impacted. A lack of space in the arches is a common cause of impaction of third molars. When remodeling/resorption in the anterior region of the mandibular ramus is limited, M3s become impacted.[6]

The impacted mandibular third molar teeth is common in adults. It has been estimated that 1 out of every 11 mandibular third molar teeth of individuals aged 15 to 35 is impacted. [3] Impacted wisdom teeth have been associated with pathological changes such as pericoronitis, root resorption, periodontal disease, caries and development of cysts or tumours.[7]

Most discomfort of erupting wisdom teeth is equivalent to teething and disappears on full eruption. Most infection of the gum tissue around the erupting or partially erupted teeth can be prevented by a good oral hygiene, including tooth brushing. Infection occurs in fewer than 10% of third molars, most of which can be cured with antibiotics, oral rinsing, or removal of excess tissue (the hyperculum) around the tooth, without requiring removal of the tooth itself.[8]

When the discomfort indicates a surgery treatment , tooth removal should be done. In 2000, the first National Institute of Clinical Excellence (NICE) guidelines related to third molar (M3) surgery, a commonly performed operation in the United Kingdom, were published.[9] Third molar extraction is one of the most frequent procedures in oral surgery. The reason for these extractions is the high incidence of impaction, often associated with a number of oral problems, such as pericoronitis, periodontal defects in the distal region of the second molar, caries in the third or second molars, different types of odontogenic cysts and tumors, and crowding of the lower incisors.[10]

It’s been said that as one becomes older, third molars (M3s) become more difficult/may take longer to remove, and may result in an increased risk of complications associated with the removal. The age of 25 years appears in many studies to be a critical time after which complications increase more rapidly. It also appears that recovery from complications is more prolonged and is less predictable and less complete with increasing age. As such, many clinicians recommend removal of M3s in patients as young adults. Advocates of M3 retention need to review carefully with their patients the risks of delaying M3 removal with the same degree of emphasis as the risks associated with operative treatment.[11] Venta’s study concluded that one fourth of retained and disease-free M3s need to be removed preventively at a young age, whereas the rest should be treated according to signs and symptoms.[4]

Wisdom teeth do not always fulfil a functional role in the mouth. When surgical removal is carried out in older patients the risk of more postoperative complications, pain and discomfort increases. Nevertheless, in most developed countries the prophylactic removal of trouble-free wisdom teeth, either impacted or fully erupted, has long been considered as 'appropriate care'. Prudent decision-making, with adherence to specified indicators for removal, may reduce the number of surgical procedures by 60% or more. It has been suggested that watchful monitoring of asymptomatic wisdom teeth may be an appropriate strategy.[12]

The findings also suggest that there is only a cost saving or health gain in removing asymptomatic, pathology-free mandibular third molars .[6] Should the chance of a patient developing one of pericoronitis, periodontitis, and caries these three diseases be greater than the threshold value identified in this study then removal becomes the more cost-effective strategy. Retention of impacted wisdom teeth is defined as monitoring the status of wisdom teeth. To avoid adverse effects and the cost of removal of wisdom teeth, some advocate retention of asymptomatic disease-free impacted wisdom teeth (e.g. NICE 2000). This approach requires individuals to have regular dental reviews or ’checkups’, so that the status of the wisdom teeth can be monitored.[7]

Conclusion

The mean age of having complete clinically erupted maxillary third molars is 21.02 years in male subjects and 21.48 years in female subjects while the mean age of having complete clinically erupted mandibular third molars is 20.23 years in male subjects and 21.03 years in female subjects. This approach requires the targeted individuals to have regular dental reviews or ’checkups’, so that the status of the wisdom teeth can be monitored to prevent further pathologic conditions later in life.

Refference

1. Nhs Center For Reviews And Dissemination. Prophylactic removal of impacted third molars: is it justified? *Br J Orthod*. 1998;26(2):149-151. doi:10.1093/ortho/26.2.149.
2. Vilela EM, Amorim Vitoi P. Study of position and eruption of lower third molars in adolescents. 2011;88(44):390-397.
3. Biswas G, Gupta P, Das D. Wisdom teeth - A major problem in young generation, study on the basis of types and associated complications. *J Coll Med Sci*. 2010;6(3):24-28. doi:10.3126/jcmsn.v6i3.4071.
4. Ventä I. How Often Do Asymptomatic, Disease-Free Third Molars Need to Be Removed? *J Oral Maxillofac Surg*. 2012;70(9):S41-S47. doi:10.1016/j.joms.2012.04.037.
5. Priyadharshini KI, Idiculla JJ, Sivapathasundaram B, Mohanbabu V, Augustine D, Patil S. Age estimation using development of third molars in South Indian population: A radiological study. *J Int Soc Prev Community Dent*. 2015;5(Suppl 1):S32-8. doi:10.4103/2231-0762.156522.
6. Edwards MJ, Brickley MR, Goodey RD, Shepherd JP. The cost, effectiveness and cost effectiveness of removal and retention of asymptomatic, disease free third molars. *Br Dent J*. 1999;187(7):380-384. doi:10.1038/sj.bdj.4800285a.
7. Ghaeminia H, Perry J, Mel N, et al. 27578151. 2016;(8). doi:10.1002/14651858.CD003879.pub4.www.cochranelibrary.com.
8. Friedman JW. The Prophylactic Extraction of Third Molars: A Public Health Hazard. *Am J Public Heal J Public Heal*. 2007;97(97):1554-1559. doi:10.2105/AJPH.
9. Renton T, Al-Haboubi M, Pau A, Shepherd J, Gallagher JE. What Has Been the United Kingdom's Experience With Retention of Third Molars? *J Oral Maxillofac Surg*. 2012;70(9):S48-S57. doi:10.1016/j.joms.2012.04.040.
10. Costa MG Da, Pazzini CA, Pantuzo MCG, Jorge MLR, Marques LS. Is there justification for prophylactic extraction of third molars? A systematic review. *Braz Oral Res*. 2013;27(2):183-188. doi:10.1590/S1806-83242013000100024.
11. Pogrel MA. What Is the Effect of Timing of Removal on the Incidence and Severity of Complications? *J Oral Maxillofac Surg*. 2012;70(9):S37-S40. doi:10.1016/j.joms.2012.04.028.
12. Mettes DT, Nienhuijs MM, van der Sanden WJ, Verdonschot EH, Plasschaert A. Interventions for treating asymptomatic impacted wisdom teeth in adolescents and adults. In: Mettes DT, ed. *Cochrane Database of Systematic Reviews*. Chichester, UK: John Wiley & Sons, Ltd; 2005. doi:10.1002/14651858.CD003879.pub2.