

INCIDENCE OF TRANSALVEOLAR EXTRACTION IN UPPER FIRST MOLAR AMONG PATIENTS VISITING A DENTAL HOSPITAL

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<p>Article Info Volume 82 Page Number: 17143 - 17150 Publication Issue: January - February 2020</p> <p>Article History Article Received: 18 October 2019 Revised: 14 November 2019 Accepted: 22 December 2019 Publication: 29 February 2020</p>	<p>Abstract: Transalveolar extraction is a method employed when normal forceps extraction is not possible due to various difficulties which included tooth fracture during normal extractions. Though this technique is employed in clinical practice, it can lead to several complications after surgery. Hence, the objective of this study was to evaluate the incidence of transalveolar extractions of upper first molar. A retrospective study was conducted. Data collection was done through reviewing records of 86000 patients visiting a hospital in Chennai from June(2019) to March(2020). A total of 1453 patients who had undergone extraction of upper first molar were evaluated. Data such as age, gender, type of extraction and tooth number were evaluated. Both frequency and Chi-square tests were done through IBM SPSS statistical analysis. Prevalence of transalveolar extractions in the upper first molar was 1.5% in the study population. Among the individuals who had undergone transalveolar extraction, 59.09% were males and 40.91% were females. About 59.09% of the transalveolar extractions occurred in the age group of 20-40. Within the limits of this study, the incidence of transalveolar extraction was 1.5% of the upper first molar and more prevalent among the 20-40 age group.</p> <p>Keywords: Incidence, Surgical approach, Tooth fracture, Transalveolar extraction, Upper first molar.</p>
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I. INTRODUCTION:

Tooth extraction is a most commonly performed procedure in developing countries(Saheeb and Sede, 2013). An ideal extraction of tooth is considered as painless removal of the whole tooth, or a tooth root with minimal trauma to the investing tissues, so that the uneventful healing of the wound occurs(Narasimman, 2018). Extraction of a tooth is

performed for several reasons including dental caries, periodontal diseases, orthodontic reasons, impacted teeth, failed dental treatment, prosthetic indications and other reasons. From the cross-sectional studies conducted across different countries, dental caries and periodontal diseases are the major cause of the tooth loss(Agerholm and Sidi, 1988; Corbet and Davies, 1991; Haddad et al., 1999).

The maxillary first molar can be a very difficult tooth to extract atraumatically. The root morphology contains a very divergent root pattern with a thick palatal root. It is very adjacent to the maxillary sinus which is the most common cause of oro-antral communication(Polat, Ay and Kara, 2007). A study by Shah et al(Shah, Faldu and Chowdhury, 2019) reported the first molar to be the most frequently extracted teeth. This is due to several reasons including as the first permanent tooth to be erupted in the oral cavity and broader surface area with pit and fissures making them more susceptible to plaque accumulation and caries formation(Katoma, Siziya and Sichilima, 2017).

Extraction of teeth requires the combination of principles of surgery and elementary physical mechanisms. When these principles are applied correctly the tooth can be removed from the socket without any use of a large amount of strength and force. Excessive force without a proper surgical can damage the surrounding bone and teeth. Such excessive force occasionally damages or fractures the crown leading to the need of surgical extraction/transalveolar extraction(Awasthi, 2018).

Transalveolar extractions are the surgical removal of teeth by drilling the bone after the elevation of the flap. It is one of the most commonly performed minor oral surgical procedures in maxillofacial surgery for the impacted third molar removal(Bui, Seldin and Dodson, 2003). However, it can cause various post operative complications including dry socket, pain, trismus and swelling(Grossi et al., 2007).

Previously our team had conducted numerous clinical trials(Jesudasan, Abdul Wahab and Muthu Sekhar, 2015; Christabel et al., 2016), in vitro

studies(Patil et al., 2017; Marimuthu et al., 2018; Rao and Santhosh Kumar, 2018; Abhinav et al., 2019; Sweta, Abhinav and Ramesh, 2019; Vijayakumar Jain et al., 2019) and surveyed(Kumar and Sneha, 2016; Patturaja and Pradeep, 2016; Kumar, 2017a; Kumar and Rahman, 2017; Rahman and Mp, 2017) and reviewed(Kumar, 2017b; Packiri, Gurunathan and Selvarasu, 2017) various aspects of oral and maxillofacial surgery over the past five years. Now we are focussing on epidemiological studies. There are no studies done regarding the incidences and prevalence of transalveolar extractions. Hence in the present study, we evaluate the incidence of transalveolar extractions of upper first molars among the patients visiting a dental hospital.

II. MATERIALS AND METHODS:

Sampling:

This study was conducted in a university setting. The study samples were chosen from the patients visiting a hospital in Chennai from June(2018) to March(2020).

Data collection:

A retrospective study was carried out on patients of all ages who had undergone extraction of 16 and 26. Data collection was done through reviewing the records of 86000 between June(2019) - March(2020). Data such as age, gender, type of extraction, tooth number were noted. The data collected was verified with intraoral photographs.

Inclusion criteria:

Patients of all groups who had undergone extraction of 16 and 26 were included.

Exclusion criteria:

Patient who are under special care, dentofacial trauma were excluded from this study
Incomplete/censored data were excluded too.

Approval:

Ethical clearance was obtained from the Institutional scientific review board of Saveetha dental college and hospitals(SDC/SIHEC/2020/DIASDATA/0619-0320).

Data analysis:

The data collected was entered in an Excel sheet. Data was analysed through frequency tests and cross tabulations using SPSS software.

III. RESULTS AND DISCUSSION:

A total of 1454 patients were reported to have undergone extraction of 16 and 26 in the span of 9 months(June(2019) - March(2020)). Among them, 1.51%(22) of the patients had undergone transalveolar extractions of maxillary first molar(Graph 1).

In the study population 54.8% were males and 45.1% were females. The incidence of transalveolar extraction was higher in males(59.9%) than females(40.9%), however which is statistically insignificant(Chi square; $p>0.05$)(Graph 2)

Majority of the patients who had undergone transalveolar extractions belong to the age group of 20-40 years(59.9%) and about 31.82% of the patients belong to the age group of 40-60 years(Graph 3). There was no difference in the tooth number in which had undergone transalveolar extractions(Maxillary right first molar(16) - 50%, Maxillary left first molar(26) - 50%).

Though exodontia is the most common surgical procedure performed in the maxillofacial surgery, its complications are unexpected events that can lead to increased morbidity which occasionally can progress

to prolonged phase of treatment(Venkateshwar et al., 2011)

Dental caries are the most common infectious diseases in the world and about 60%-90% of the students are affected by it(Saber et al., 2018). Cahen et al(Cahen, Frank and Turlot, 1985) reported various reasons for tooth extraction such as dental caries, endodontic problems such as pulp inflammation, necrosis or tooth fracture, periodontal diseases, eruption problems, extractions for prosthetic and orthodontic treatment, trauma, occlusal dysfunctions such as extrusion, and iatrogenic factors. The maxillary first molar is one of the permanent teeth which erupts early and is more prone to carious exposure and it is important in maintaining normal masticatory function(ADA Division of Communications, Journal of the American Dental Association and ADA Council on Scientific Affairs, 2006). A study by Udoye et al(Udoye et al., 2018) reported that in both jaws, extraction of molars were more prevalent(57.1%), followed by premolars (27.1%) and anterior teeth (15.7%).

In the present study, there were about 1454 patients who had undergone extraction of maxillary first molar. Previous studies by Ozmen et al(Ozmen, 2019) and George et al(George et al., 2011) reported that the maxillary first molar was the most frequently extracted tooth. In the present study, there was no significant difference between genders associated with tooth loss(males - 54.8%, females - 45.4%). However few studies reported higher prevalence of maxillary first molar tooth loss among males(Barbato and Peres, 2009; Jafarian and Etebarian, 2013). This may be due to the higher aesthetic concerns and awareness among females.

Extractions could lead to various complications including haemorrhage, persistent pain, swelling, infections, dry socket, dentoalveolar fractures, oral sinus communications etc.,. These are influenced by various factors including age, health condition, tooth level, surgeon's experience, smoking, contraceptive medications, surgical technique(Aravinth and Ganapathy, 2019). Fracture of maxillary tuberosity is one of the most common complications in the extraction of the upper first molar(Altuğ et al., 2009). Baniwal et al(Baniwal et al., 2007) studied the complications of exodontia in tertiary centres and reported that the most frequent complication was the fracture of tuberosity. Controlled force and proper surgical planning is required to avoid the fracture of bone or tooth crown during extractions.

In the present study, the incidence of transalveolar extraction of the upper first molar was 1.51% and occurred more commonly in the age group of 20-40 years. Transalveolar extraction can lead to various complications than normal extractions. A study by Adwani et al(Adwani et al., 2012) reported a higher incidence of dry socket in transalveolar extraction than intra alveolar extraction. Postoperative complications from transalveolar extractions occur at the rate ranging from 10% to 12%(Burke, 1961; Natarajan, Balakrishnan and Thangavelu, 2017).

Incidence of the transalveolar extraction and other complications can be limited by giving meticulous importance to surgical details including patient's preparation, asepsis, proper management of soft and hard tissues, controlled force of surgical instruments etc.,.

Limitations:

There are several limitations for this present study. Since this is a retrospective study, the sample size is very less and is limited to certain geographical

locations. Hence, a cohort study with the inclusions of other parameters such as inclusion of all other teeth, complications and etiology of transalveolar extraction with large samples is needed for future scope.

IV. CONCLUSION:

Within the limitations of this study, the incidence of transalveolar extractions of the upper first molar was found to be 1.51%. It was more common in the age group of 20-40 years. Since there are no studies conducted on the incidence of transalveolar extractions, more epidemiological studies with large samples should be conducted to rule out the definite cause and outcome of those surgical approaches.

AUTHOR'S CONTRIBUTION:

All authors contributed to the design and implementation of the research, analysis of the results and to the writing of the manuscript.

CONFLICT OF INTEREST:

The authors declared that they have no conflicts of interest.

V. REFERENCES:

- [1] Abhinav, R. P. et al. (2019) 'The Patterns and Etiology of Maxillofacial Trauma in South India', *Annals of maxillofacial surgery*, 9(1), pp. 114–117.
- [2] ADA Division of Communications, *Journal of the American Dental Association and ADA Council on Scientific Affairs* (2006) 'For the dental patient. Tooth eruption: the permanent teeth', *Journal of the American Dental Association*, 137(1), p. 127.
- [3] Adwani, N. et al. (2012) 'Incidence of dry socket following intraalveolar and

- transalveolar extraction: A comparative study', Journal of Datta Meghe Institute of Medical Sciences University. unknown, 7(4), pp. 228–233.
- [4] Agerholm, D. M. and Sidi, A. D. (1988) 'Reasons given for extraction of permanent teeth by general dental practitioners in England and Wales', British dental journal, 164(11), pp. 345–348.
- [5] Altuğ, H. A. et al. (2009) 'Extraction of upper first molar resulting in fracture of maxillary tuberosity', Dental traumatology: official publication of International Association for Dental Traumatology, 25(1), pp. e1–2.
- [6] Aravinth, H. and Ganapathy, D. (2019) 'Knowledge about post-extraction complications among dental students', Drug Invention Today, 11(2).
- [7] Awasthi, M. (2018) 'Basic Principles of Oral and Maxillofacial Surgery', Manual for Dental Hygienist, pp. 284–284.
- [8] Baniwal, S. et al. (2007) 'Prevalence of complications of simple tooth extractions and its comparison between a tertiary center and peripheral centers: a study conducted over 8,455 tooth extractions', JNMA; journal of the Nepal Medical Association, 46(165), pp. 20–24.
- [9] Barbato, P. R. and Peres, M. A. (2009) 'Tooth loss and associated factors in adolescents: a Brazilian population-based oral health survey', Revista de saude publica, 43(1), pp. 13–25.
- [10] Bui, C. H., Seldin, E. B. and Dodson, T. B. (2003) 'Types, frequencies, and risk factors for complications after third molar extraction', Journal of oral and maxillofacial surgery: official journal of the American Association of Oral and Maxillofacial Surgeons, 61(12), pp. 1379–1389.
- [11] Burke, J. F. (1961) 'The effective period of preventive antibiotic action in experimental incisions and dermal lesions', Surgery. surgjournal.com, 50, pp. 161–168.
- [12] Cahen, P. M., Frank, R. M. and Turlot, J. C. (1985) 'A survey of the reasons for dental extractions in France', Journal of dental research. journals.sagepub.com, 64(8), pp. 1087–1093.
- [13] Christabel, A. et al. (2016) 'Comparison of pterygomaxillary dysjunction with tuberosity separation in isolated Le Fort I osteotomies: a prospective, multi-centre, triple-blind, randomized controlled trial', International Journal of Oral and Maxillofacial Surgery, pp. 180–185.
- [14] Corbet, E. F. and Davies, W. I. (1991) 'Reasons given for tooth extraction in Hong Kong', Community dental health, 8(2), pp. 121–130.
- [15] George, B. et al. (2011) 'Prevalence of permanent tooth loss among children and adults in a suburban area of Chennai', Indian journal of dental research: official publication of Indian Society for Dental Research, 22(2), p. 364.
- [16] Grossi, G. B. et al. (2007) 'Assessing postoperative discomfort after third molar surgery: a prospective study', Journal of oral and maxillofacial surgery: official journal of the American Association of Oral and Maxillofacial Surgeons, 65(5), pp. 901–917.
- [17] Haddad, I. et al. (1999) 'Reasons for extraction of permanent teeth in Jordan', International dental journal, 49(6), pp. 343–346.
- [18] Jafarian, M. and Etebarian, A. (2013) 'Reasons for extraction of permanent teeth in general dental practices in Tehran, Iran', Medical principles and practice: international journal of the Kuwait University, Health Science Centre, 22(3), pp. 239–244.
- [19] Jesudasan, J. S., Abdul Wahab, P. U. and

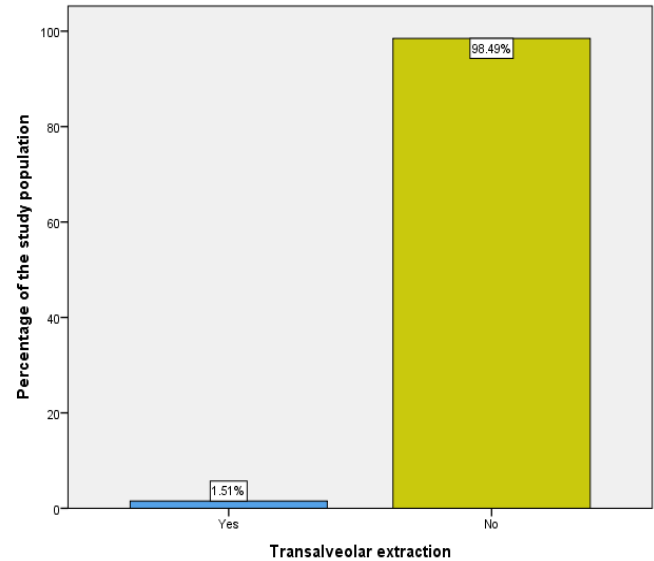
- Muthu Sekhar, M. R. (2015) 'Effectiveness of 0.2% chlorhexidine gel and a eugenol-based paste on postoperative alveolar osteitis in patients having third molars extracted: a randomised controlled clinical trial', *British Journal of Oral and Maxillofacial Surgery*, pp. 826–830.
- [20] Katoma, M., Siziya, S. and Sichilima, A. (2017) 'The most frequently extracted teeth type: a retrospective cross-section study at Ndola teaching hospital, low cost dental clinic, Zambia', *Asian Pacific Journal of Health Sciences*, 4(3), pp.98-101.
- [21] Kumar, S. (2017a) 'Relationship between dental anxiety and pain experience during dental extractions', *Asian Journal of Pharmaceutical and Clinical Research*, p. 458.
- [22] Kumar, S. (2017b) 'The emerging role of botulinum toxin in the treatment of orofacial disorders Literature update', *Asian Journal of Pharmaceutical and Clinical Research*, p. 21.
- [23] Kumar, S. and Rahman, R. (2017) 'Knowledge, Awareness, and Practices regarding biomedical waste management among undergraduate dental students', *Asian Journal of Pharmaceutical and Clinical Research*, p. 341. doi: 10.22159/ajpcr.2017.v10i8.19101.
- [24] Kumar, S. and Sneha, S. (2016) 'Knowledge and awareness regarding antibiotic prophylaxis for infective endocarditis among undergraduate dental students', *Asian Journal of Pharmaceutical and Clinical Research*, p. 154. doi: 10.22159/ajpcr.2016.v9s2.13405.
- [25] Marimuthu, M. et al. (2018) 'Canonical Wnt pathway gene expression and their clinical correlation in oral squamous cell carcinoma', *Indian journal of dental research: official publication of Indian Society for Dental Research*, 29(3), pp. 291–297.
- [26] Narasimman, C. (2018) Application of physics forceps for extraction of mutilated tooth to avoid transalveolar extraction method: A Prospective study. masters. Ragas Dental College and Hospital, Chennai.
- [27] Natarajan, B., Balakrishnan, G. and Thangavelu, K. (2017) 'Comparison of Efficacy of Amoxicillin versus Ciprofloxacin in Postsurgical Management of Transalveolar Extraction', *Journal of pharmacy & bioallied sciences*, 9(Suppl 1), pp. S187–S190.
- [28] Ozmen, B. (2019) 'Evaluation of Permanent First Molar Tooth Loss in Young Population from North Turkey', *Balkan Journal of Dental Medicine*, pp. 20–23. doi: 10.2478/bjdm-2019-0004.
- [29] Packiri, S., Gurunathan, D. and Selvarasu, K. (2017) 'Management of Paediatric Oral Ranula: A Systematic Review', *Journal of clinical and diagnostic research: JCDR*, 11(9), pp. ZE06–ZE09.
- [30] Patil, S. B. et al. (2017) 'Comparison of Extended Nasolabial Flap Versus Buccal Fat Pad Graft in the Surgical Management of Oral Submucous Fibrosis: A Prospective Pilot Study', *Journal of maxillofacial and oral surgery*, 16(3), pp. 312–321.
- [31] Patturaja, K. and Pradeep, D. (2016) 'Awareness of Basic Dental Procedure among General Population', *Research Journal of Pharmacy and Technology*, p. 1349. doi: 10.5958/0974-360x.2016.00258.4.
- [32] Polat, H. B., Ay, S. and Kara, M. I. (2007) 'Maxillary tuberosity fracture associated with first molar extraction: a case report', *European journal of dentistry*, 1(4), pp. 256–259.
- [33] Rahman, R. and Mp, S. K. (2017) 'Knowledge ,attitude and awareness of dental undergraduate students regarding human immunodeficiency virus / acquired immunodeficiency syndrome

patients', Asian J Pharm Clin Res, 10(5), pp. 175–180.

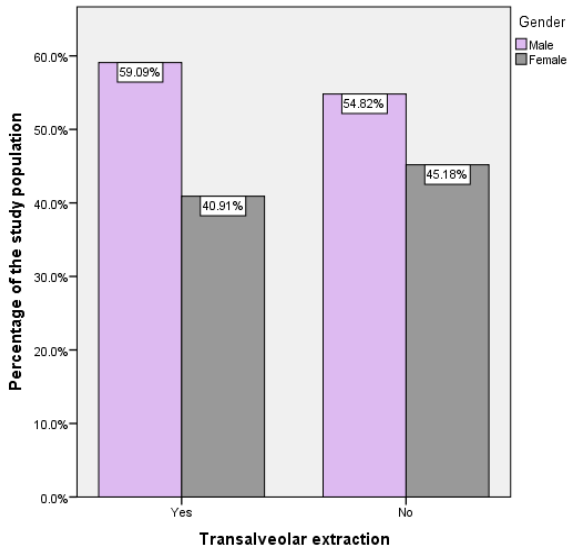
- [34] Rao, T. D. and Santhosh Kumar, M. P. (2018) 'Analgesic Efficacy of Paracetamol Vs Ketorolac after Dental Extractions', Research Journal of Pharmacy and Technology, p. 3375. doi: 10.5958/0974-360x.2018.00621.2.
- [35] Saber, A. M. et al. (2018) 'Consequences of early extraction of compromised first permanent molar: a systematic review', BMC oral health, 18(1), p. 59.
- [36] Saheeb, B. D. and Sede, M. A. (2013) 'Reasons and pattern of tooth mortality in a Nigerian Urban teaching hospital', Annals of African medicine, 12(2), pp. 110–114.
- [37] Shah, A., Faldu, M. and Chowdhury, S. (2019) 'Reasons for extractions of permanent teeth in western India: A prospective study', International Journal of Applied Dental Sciences, 5(1), pp. 180–184.
- [38] Sweta, V. R., Abhinav, R. P. and Ramesh, A. (2019) 'Role of Virtual Reality in Pain Perception of Patients Following the Administration of Local Anesthesia', Annals of maxillofacial surgery, 9(1), pp. 110–113.
- [39] Udoye, C. I. et al. (2018) 'Prevalence and Reasons for Extraction of Endodontically Treated Teeth in Adult Nigerians', The journal of contemporary dental practice, 19(12), pp. 1469–1473.
- [40] Venkateshwar, G. P. et al. (2011) 'Complications of exodontia: a retrospective study', Indian journal of dental research: official publication of Indian Society for Dental Research, 22(5), pp. 633–638.
- [41] Vijayakumar Jain, S. et al. (2019) 'Evaluation of Three-Dimensional Changes in Pharyngeal Airway Following Isolated Lefort One Osteotomy for the Correction of Vertical Maxillary Excess: A Prospective Study',

Journal of maxillofacial and oral surgery, 18(1), pp. 139–146.

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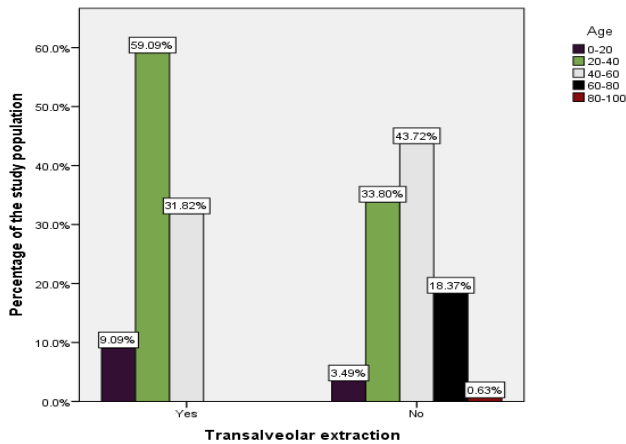


Graph 1: Bar chart shows the distribution of study population who had undergone transalveolar extractions of maxillary first molars. X-axis shows the requirement for the transalveolar extractions. Y-axis shows the distribution of the study population in percentage. Only 1.51% (blue) of the study population had undergone transalveolar extraction of 16 and 26.



Graph 2: Bar chart showing the distribution of study population who had undergone transalveolar extractions of maxillary first molar based on gender. X-axis shows the requirement for the transalveolar extractions and Y-axis shows the percentage of study population based on gender. There was a higher incidence of transalveolar extractions among males(59.09%-pink) than females(40.91%-grey), however which was not statistically significant(Chi square test; $\chi^2=0.160$, $df=1$, $pValue=0.689(>0.05)$)

percentage of study population based on age. There was a higher incidence of transalveolar extractions in the age group of 20-40(59.09%-green), which was statistically significant(Chi square test; $\chi^2=10.838$, $df=4$, $pValue=0.028(<0.05)$)



Graph 3: Bar graph showing the distribution of the study population who had undergone transalveolar extractions of maxillary first molar based on age group. X-axis shows the requirement for the transalveolar extractions and Y-axis shows the