

INCIDENCE OF TYPE OF IMPACTION IN PATIENT VISITING SAVEETHA DENTAL HOSPITAL FROM THE AGE GROUP OF 0 - 30

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ABSTRACT:

Introduction and Aim:

The objective of the study was to estimate the incidence of type of impaction in patients visiting Saveetha Dental Hospital. Tooth impaction is a pathological situation in which a tooth can not or will not erupt into its normal functioning position. This problem can be solved by dental treatment. The mandibular third molars are the most frequently impacted teeth that can be found in humans. The surgical removal of impacted mandibular third molar is one of the most commonly performed minor oral surgical procedures in maxillofacial surgery.

Materials and Method:

A cross sectional retrospective study of, study population will 534 patients visiting Saveetha Dental College and Hospital undergoing trans alveolar extraction. Their radiographs were seen and interpreted. The data was tabulated and analysed. SPSS by IBM was used for data analysis. Result:

From the study of 534 patients undergoing transalveolar extraction of impacted teeth we find that there are no one below the age of 10 (0%), and there were 62 patients who were between the age group of 11 to 20 years of age (11.6%) and there were 472 patients between the age group of 21 to 30 years of age (88.4%). Mandibular third molar impaction was most common was 299 (56.0%), mesio-angular was the most common type (15.4%) and 82 of them were horizontally impacted (15.4%) The distribution of angulation of impacted third molars in our study showed that mesioangular impaction was the most frequent (49.2%).

Conclusion:

From the above study we conclude that there is a high prevalence of impaction in males than females, impaction most commonly occurs in the age group of 10 to 30 years of age. There is an incidence of mandibular third molar impaction than maxillary third impaction. Misio-angular impaction is the most common type of impaction seen. There was a significant difference between the age and type of impaction. There is a need for knowledge of the difficulty index among doctors to evaluate the difficulty of the transalveolar impaction.

KEYWORDS: Disto - Angular, Horizontal, Mesio - Angular, Transalveolar extraction, Vertical.

INTRODUCTION:

The word impaction originated from the Latin word "impact" which means organ or structure, which because of an abnormal mechanical condition has been prevented from assuming its normal position. William stated impacted

tooth as one which is completely or partially unerupted and is positioned against another tooth, bone, or soft tissue so that its further eruption is unlikely (1).

Impacted teeth are those which fail to erupt or develop into the proper functional location in oral cavity beyond the time usually expected. Etiology may be multifactorial usually due to adjacent teeth, dense overlying bone or soft tissue, size of the mandible or maxilla with the resultant lack of space in the jaw, aberrant path of the eruption, abnormal positioning of tooth bud, differential root growth between the mesial and distal roots, or pathological lesions (2).

Tooth impaction is a pathological situation in which a tooth can not or will not erupt into its normal functioning position. This problem can be solved by dental treatment (3). The mandibular third molars are the most frequently impacted teeth that can be found in humans (4). Impacted teeth are often associated with pericoronitis, periodontitis, cystic lesions, neoplasm, root resorption and can cause detrimental effects on adjacent tooth (4,5).

Several methods have been used to classify the impaction. This classification is based on many factors which are the level of impaction (6), the angulations of the third molars and the relationship to the anterior border of the ramus of the mandible. Depth or level of maxillary and mandibular third molars can be classified using the Pell and Gregory classification system, where the impacted teeth are assessed according to their relationship to the occlusal surface (OS) of the adjacent second molar (7).

Impacted teeth can lead to impaction of food, pericoronitis, caries, pain, and development of pathology. Therefore, impacted third molar prophylactic removal is becoming a common practice nowadays.

The surgical removal of impacted mandibular third molar is one of the most commonly performed minor oral surgical procedures in maxillofacial surgery (8). 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. Common postoperative sequelae of conventional third mandibular removal are pain, trismus, and swelling, which influence the patient's quality of life in the postoperative period (9).

In this index, Pederson has given a difficulty index value for impacted mandibular third molar according to angulations, depth, and ramus relationship. The angulations of the mandibular third molar to the second mandibular molar are considered into four positions—mesioangular, horizontal, vertical, and distoangular. The relationship of the mandibular third molar to the ramus of the mandible was considered to fall into 3 classes. Class I—there is sufficient space between the ramus and distal margin of the second molar for the accommodation of the mesial-distal diameter of the crown of the 3rd molar. Class II—space between the ramus and distal surface of the 2nd molar was less than the mesial-distal diameter of the crown of the lower third molar. Class III—all or most of the 3rd molar lay within the ramus (10) (11)

The objective of the study was to estimate the incidence of type of impaction in patients visiting Saveetha Dental Hospital from the age group of 0 - 30 years of age.

Our team has extensive knowledge and research experience that has translate into high quality publications(12),(13),(14),(15),(16–25) (26),(27–29).(30,31)

MATERIALS AND METHOD:

Study design :- A prevalence study.

Study setting :- OPD Department in a private dental institution in Chennai.

Study size :- 534 outpatients attending the OPD department.

Sampling and scheduling :- Owing to the nature of the study design and setting, a convenience sampling method was used, and the data was collected.

Survey instrument :- An online platform called DIAS was used to collect the data and the data of patients undergoing trans alveolar extraction was tabulated and analysed.

Inclusion and Exclusion criteria :- All those who underwent trans alveolar extraction in Saveetha Dental College and Hospital were included in the study. Patients who were diagnosed with impaction and not willing for the treatment were not included in the study.

Ethical clearance :- Prior to the study, ethical clearance was obtained from the institution ethical committee of Saveetha University.

Statistical analysis :- The responses from the Google Forms were transferred into excel and were then imported to SPSS by IBM software, (version 25). Descriptive statistics were done using frequency and percentage. Inferential statistics were done using the Chi-square test. Interpretation was based on a p value less than 0.05, which was considered statistically significant. Comparisons were done between independent variables like age, gender, occupation and knowledge, attitude, practice responses by the participants.

RESULTS AND DISCUSSION:

From the study of 534 patients undergoing transalveolar extraction of impacted teeth we find that there are no one below the age of 10 (0%), and there were 62 patients who were between the age group of 11 to 20 years of age (11.6%) and there were 472 patients between the age group of 21 to 30 years of age (88.4%). In a similar study conducted by Deepak Passi et. al, shows there

were out of 250 patients 156 of them were between the age group of 10 to 30 years of age which is similar to our study (32). The normal age of occurrence of third molars is 18–25 years (33). More than one-third of the third molar gets impacted most commonly due to lack of space for tooth eruption. Third molars are the teeth that are the last to erupt and have a higher chance of getting impacted. From the total population of the study 273 of them were male population (51.0%) and 261 of them were the female population (48.8%) and 1 of the total population was trans gender (0.2%). From our study we found that the incidence of mandibular and maxillary third molar impaction was higher in males as compared to females. This is in contrast with the study of Muhamad et al.,(34) Hashemipour et al.,(35) Quek et al.,(36) Hugoson and Kugelberg,(37) Ma'aita and Alwrikat,(5) and Kim et al.(5,38) They reported a gender predilection for females. However, Brown et al.(39) and Montelius (40) studies no sexual predilection gender-wise for incidence of mandibular third molar. From the conducted study we of impacted tooth type we can see that the incidence of mandibular third molar was 299 among 534 patients (56.0%) and the incidence of maxillary third molar was 29 (5.4%) and the other tooth which were indicated for trans alveolar extraction was 206 (38.6%). In a study conducted by Maryam-Alsadat Hashemipour et. al, the proportion of impacted mandibular third molars was significantly more than that of impacted maxillary third molars, and more than that of impacted upper and lower third molars together (35). Due to the increased prevalence of impacted third molars and its association with numerous complications, these retained teeth, assessment of the position and difficulty of third molars in terms of its position, angulation, and the level in relation to gender, and arch is a important for better patient management and decision-making of whether to retain or remove the teeth. Among the type of impaction we see that 82 of the patients were reported and treated with transalveolar extraction was mesio-angular (15.4%), the incidence of disto-angular impaction was 80 among the population (15.0%), 66 of the impacted tooth was vertically impacted (12.4%), 82 of them were horizontally impacted (15.4%) and 224 of the patients were treated with transalveolar extraction were reported due to other reasons like fractured teeth, attempted to extraction, buccoverte teeth and crown fracture (41.9%). It is seen that mesioangular impactions and horizontal impaction is the commonest type and this may be due to their late development and maturation, path of eruption and lack of space in the mandible in later age (35). Our findings are similar to the study reports from Pakistan, USA, Nigeria, China, Thailand, Spain and Malaysia, where the most common type was mesioangular impactions (41),(36),(42),(8,43). However, some studies show that vertical impaction is the most common, which does not support our study because mesioangular impaction was followed by horizontal impaction (44),(45). The distribution of angulation of impacted third molars in our study showed that mesioangular impaction was the most frequent (49.2%) followed by vertical (24%), horizontal (20%), and distoangular (4.8%). Our finding is supported by studies of Kramer and Williams,(40) Quek et al.,(36) Moris and Jerman,(46) Hassan,(47) and Hashemipour et al.(35) who reported that mesioangular impaction was the most prevalent type of impaction in the mandibular third molars of African American, Singaporean, American, Arabian, and Iranian populations, respectively. The cross tab between the age and type of impaction was done which shows p-value of 0.000 which is found to be significant. Pathologies associated with impacted third molar are pericoronitis, caries, food lodgment, pocket formation, periodontal bone loss, root resorption of adjacent teeth, and development of cysts and tumors (48).

Graph 1: Graph showing age prevalence in the collected population of patients undergoing transalveolar impaction no one below the age of 10 (0%), and there were 62 patients who were between the age group of 11 to 20 years of age (11.6%) and there were 472 patients between the age group of 21 to 30 years of age (88.4%).

Graph 2: Graph showing gender prevalence in the collected population of patients undergoing transalveolar impaction 273 of them were male population (51.0%) and 261 of them were the female population (48.8%) and 1 of the total population was trans gender (0.2%).

Graph 3: Graph showing tooth indicated for transalveolar impaction incidence of mandibular third molar was 299 among 534 patients (56.0%) and the incidence of maxillary third molar was 29 (5.4%) and the other tooth which were indicated for trans alveolar extraction was 206 (38.6%).

Graph 4: Graph showing type of impaction indicated for transalveolar impaction 82 of the patients were reported and treated with transalveolar extraction was mesio-angular (15.4%), the incidence of disto-angular impaction was 80 among the population (15.0%), 66 of the impacted tooth was vertically impacted (12.4%), 82 of them were

horizontally impacted (15.4%) and 224 of the patients were treated with transalveolar extraction were reported due to other reasons like fractured teeth, attempted to extraction, buccoverted teeth and crown fracture (41.9%).

Graph 5: Graph showing error graph of comparison between type of impaction and age prevalence.

CONCLUSION:

From the above study we conclude that there is a high prevalence of impaction in males than females, impaction most commonly occurs in the age group of 10 to 30 years of age. There is an incidence of mandibular third molar impaction than maxillary third impaction. Misio-angular impaction is the most common type of impaction seen. There was a significant difference between the age and type of impaction. There is a need for knowledge of the difficulty index among doctors to evaluate the difficulty of the transalveolar impaction.

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CONFLICT OF INTEREST :

The authors declare no conflict of interest.

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REFERENCE:

1. Nahum AM. Oral and maxillofacial surgery, 5th Edition, Volumes 1 and 2. By W. Harry Archer, 1,859 pp, illus, W.B. Saunders Co., Philadelphia, PA, 1975. \$108.00 [Internet]. Vol. 4, Head & Neck Surgery. 1982. p. 529–529. Available from: <http://dx.doi.org/10.1002/hed.2890040617>
2. Ishihara Y, Kamioka H, Takano-Yamamoto T, Yamashiro T. Patient with nonsyndromic bilateral and multiple impacted teeth and dentigerous cysts. *Am J Orthod Dentofacial Orthop.* 2012 Feb;141(2):228–41.
3. Bishara SE. Impacted maxillary canines: a review. *Am J Orthod Dentofacial Orthop.* 1992 Feb;101(2):159–71.
4. Lima C-J, Silva L-C-F, Melo M-R-S, Santos J-A-S-S, Santos T-S. Evaluation of the agreement by examiners according to classifications of third molars. *Med Oral Patol Oral Cir Bucal.* 2012 Mar 1;17(2):e281–6.
5. Ma’aita J, Alwrikat A. Is the mandibular third molar a risk factor for mandibular angle fracture? [Internet]. Vol. 89, *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology.* 2000. p. 143–6. Available from: <http://dx.doi.org/10.1067/moe.2000.103527>
6. Almendros-Marqués N, Alaejos-Algarra E, Quinteros-Borgarello M, Berini-Aytés L, Gay-Escoda C. Factors influencing the prophylactic removal of asymptomatic impacted lower third molars. *Int J Oral Maxillofac Surg.* 2008 Jan;37(1):29–35.
7. Breik O, Grubor D. The incidence of mandibular third molar impactions in different skeletal face types. *Aust Dent J.* 2008 Dec;53(4):320–4.
8. Bui CH, Seldin EB, Dodson TB. Types, frequencies, and risk factors for complications after third molar extraction. *J Oral Maxillofac Surg.* 2003 Dec;61(12):1379–89.
9. Grossi GB, Maiorana C, Garramone RA, Borgonovo A, Creminelli L, Santoro F. Assessing postoperative discomfort after third molar surgery: a prospective study. *J Oral Maxillofac Surg.* 2007 May;65(5):901–17.
10. Fonseca RJ. ORAL AND MAXILLOFACIAL SURGERY. 2017.
11. Color atlas and text of orthognathic surgery [Internet]. Vol. 45, *Journal of Oral and Maxillofacial Surgery.* 1987. p. 377. Available from: [http://dx.doi.org/10.1016/0278-2391\(87\)90389-2](http://dx.doi.org/10.1016/0278-2391(87)90389-2)
12. J PC, Pradeep CJ, Marimuthu T, Krithika C, Devadoss P, Kumar SM. Prevalence and measurement of anterior loop of the mandibular canal using CBCT: A cross sectional study [Internet]. Vol. 20, *Clinical Implant Dentistry and Related Research.* 2018. p. 531–4. Available from: <http://dx.doi.org/10.1111/cid.12609>
13. Wahab PUA, Abdul Wahab PU, Madhulaxmi M, Senthilnathan P, Muthusekhar MR, Vohra Y, et al. Scalpel Versus Diathermy in Wound Healing After Mucosal Incisions: A Split-Mouth Study [Internet]. Vol. 76, *Journal of Oral and Maxillofacial Surgery.* 2018. p. 1160–4. Available from: <http://dx.doi.org/10.1016/j.joms.2017.12.020>
14. Mudigonda SK, Murugan S, Velavan K, Thulasiraman S, Krishna Kumar Raja VB. Non-suturing microvascular anastomosis in maxillofacial reconstruction- a comparative study. *Journal of Cranio-Maxillofacial Surgery.* 2020 Jun 1;48(6):599–606.

15. Narayanasamy RK, Muthusekar RM, Nagalingam SP, Thyagarajan S, Ramakrishnan B, Perumal K. Lower pretreatment hemoglobin status and treatment breaks in locally advanced head and neck squamous cell carcinoma during concurrent chemoradiation. *Indian J Cancer*. 2021 Jan;58(1):62–8.
16. Wang H, Chinnathambi A, Alahmadi TA, Alharbi SA, Veeraraghavan VP, Krishna Mohan S, et al. Phyllanthin inhibits MOLT-4 leukemic cancer cell growth and induces apoptosis through the inhibition of AKT and JNK signaling pathway. *J Biochem Mol Toxicol*. 2021 Jun;35(6):1–10.
17. Li S, Zhang Y, Veeraraghavan VP, Mohan SK, Ma Y. Restorative Effect of Fucoxanthin in an Ovalbumin-Induced Allergic Rhinitis Animal Model through NF- κ B p65 and STAT3 Signaling. *J Environ Pathol Toxicol Oncol*. 2019;38(4):365–75.
18. Ma Y, Karunakaran T, Veeraraghavan VP, Mohan SK, Li S. Sesame Inhibits Cell Proliferation and Induces Apoptosis through Inhibition of STAT-3 Translocation in Thyroid Cancer Cell Lines (FTC-133). *Biotechnol Bioprocess Eng*. 2019 Aug 1;24(4):646–52.
19. Bishir M, Bhat A, Essa MM, Ekpo O, Ihunwo AO, Veeraraghavan VP, et al. Sleep Deprivation and Neurological Disorders. *Biomed Res Int*. 2020 Nov 23;2020:5764017.
20. Fan Y, Maghimaa M, Chinnathambi A, Alharbi SA, Veeraraghavan VP, Mohan SK, et al. Tomentosin Reduces Behavior Deficits and Neuroinflammatory Response in MPTP-Induced Parkinson's Disease in Mice. *J Environ Pathol Toxicol Oncol*. 2021;40(1):75–84.
21. Zhang C, Chen Y, Zhang M, Xu C, Gong G, Veeraraghavan VP, et al. Vicenin-2 Treatment Attenuated the Diethylnitrosamine-Induced Liver Carcinoma and Oxidative Stress through Increased Apoptotic Protein Expression in Experimental Rats. *J Environ Pathol Toxicol Oncol*. 2020;39(2):113–23.
22. Gan H, Zhang Y, Zhou Q, Zheng L, Xie X, Veeraraghavan VP, et al. Zingerone induced caspase-dependent apoptosis in MCF-7 cells and prevents 7,12-dimethylbenz(a)anthracene-induced mammary carcinogenesis in experimental rats. *J Biochem Mol Toxicol*. 2019 Oct;33(10):e22387.
23. Saravanakumar K, Park S, Mariadoss AVA, Sathiyaseelan A, Veeraraghavan VP, Kim S, et al. Chemical composition, antioxidant, and anti-diabetic activities of ethyl acetate fraction of *Stachys riedereri* var. *japonica* (Miq.) in streptozotocin-induced type 2 diabetic mice. *Food Chem Toxicol*. 2021 Jun 26;155:112374.
24. Veeraraghavan VP, Hussain S, Papayya Balakrishna J, Dhawale L, Kullappan M, Mallavarapu Ambrose J, et al. A Comprehensive and Critical Review on Ethnopharmacological Importance of Desert Truffles: *Terfezia clavayri*, *Terfezia boudieri*, and *Tirmania nivea*. *Food Rev Int*. 2021 Feb 24;1–20.
25. Wei W, Li R, Liu Q, Devanathadesikan Seshadri V, Veeraraghavan VP, Surapaneni KM, et al. Amelioration of oxidative stress, inflammation and tumor promotion by Tin oxide-Sodium alginate-Polyethylene glycol-Allyl isothiocyanate nanocomposites on the 1,2-Dimethylhydrazine induced colon carcinogenesis in rats. *Arabian Journal of Chemistry*. 2021 Aug 1;14(8):103238.
26. Sathya S, Ragul V, Veeraraghavan VP, Singh L, Niyas Ahamed MI. An in vitro study on hexavalent chromium [Cr(VI)] remediation using iron oxide nanoparticles based beads. *Environmental Nanotechnology, Monitoring & Management*. 2020 Dec 1;14:100333.
27. Chandrasekar R, Chandrasekhar S, Sundari KKS, Ravi P. Development and validation of a formula for objective assessment of cervical vertebral bone age. *Prog Orthod*. 2020 Oct 12;21(1):38.
28. Ramakrishnan M, Dhanalakshmi R, Subramanian EMG. Survival rate of different fixed posterior space maintainers used in Paediatric Dentistry – A systematic review [Internet]. Vol. 31, *The Saudi Dental Journal*. 2019. p. 165–72. Available from: <http://dx.doi.org/10.1016/j.sdentj.2019.02.037>
29. Felicita AS, Sumathi Felicita A. Orthodontic extrusion of Ellis Class VIII fracture of maxillary lateral incisor – The sling shot method [Internet]. Vol. 30, *The Saudi Dental Journal*. 2018. p. 265–9. Available from: <http://dx.doi.org/10.1016/j.sdentj.2018.05.001>
30. Su P, Veeraraghavan VP, Krishna Mohan S, Lu W. A ginger derivative, zingerone-a phenolic compound-induces ROS-mediated apoptosis in colon cancer cells (HCT-116). *J Biochem Mol Toxicol*. 2019 Dec;33(12):e22403.
31. Wan J, Feng Y, Du L, Veeraraghavan VP, Mohan SK, Guo S. Antiatherosclerotic Activity of Eriocitrin in High-Fat-Diet-Induced Atherosclerosis Model Rats. *J Environ Pathol Toxicol Oncol*. 2020;39(1):61–75.
32. Passi D, Singh G, Dutta S, Srivastava D, Chandra L, Mishra S, et al. Study of pattern and prevalence of mandibular impacted third molar among Delhi-National Capital Region population with newer proposed classification of mandibular impacted third molar: A retrospective study. *Natl J Maxillofac Surg*. 2019 Jan;10(1):59–67.
33. Rantanen AV. The Age of Eruption of the Third Molar Teeth: A Clinical Study Based on Finnish University Students. 1967. 86 p.

34. Altiparmak N. Prevalence of Distal Caries in Mandibular Second Molars Adjacent to Impacted Third Molars: A Retrospective Study Using Panoramic Radiography [Internet]. Vol. 8, Journal of Dental Health, Oral Disorders & Therapy. 2017. Available from: <http://dx.doi.org/10.15406/jdhodt.2017.08.00307>
35. Alsadat-Hashemipour M, Tahmasbi-Arashlow M, Fahimi-Hanzaei F. Incidence of impacted mandibular and maxillary third molars-a radiographic study in a Southeast Iran population [Internet]. *Medicina Oral Patología Oral y Cirugía Bucal*. 2013. p. e140–5. Available from: <http://dx.doi.org/10.4317/medoral.18028>
36. Quek S. Pattern of third molar impaction in a Singapore Chinese population: a retrospective radiographic survey [Internet]. Vol. 32, *International Journal of Oral and Maxillofacial Surgery*. 2003. p. 548–52. Available from: <http://dx.doi.org/10.1054/ijom.2003.0413>
37. Najim U, Slotte C, Norderyd O. Prevalence of furcation-involved molars in a Swedish adult population. A radiographic epidemiological study [Internet]. Vol. 2, *Clinical and Experimental Dental Research*. 2016. p. 104–11. Available from: <http://dx.doi.org/10.1002/cre2.27>
38. Kim J-C, Choi S-S, Wang S-J, Kim S-G. Minor complications after mandibular third molar surgery: type, incidence, and possible prevention. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*. 2006 Aug;102(2):e4–11.
39. Brown LH, Berkman S, Cohen D, Kaplan AL, Rosenberg M. A radiological study of the frequency and distribution of impacted teeth. *J Dent Assoc S Afr*. 1982 Sep;37(9):627–30.
40. Montelius GA. Impacted Teeth: A Comparative Study of Chinese and Caucasian Dentitions.
41. Website.
42. Meisami T, Sojat A, Sándor GKB, Lawrence HP, Clokie CML. Impacted third molars and risk of angle fracture [Internet]. Vol. 31, *International Journal of Oral and Maxillofacial Surgery*. 2002. p. 140–4. Available from: <http://dx.doi.org/10.1054/ijom.2001.0215>
43. Chaparro-Avenida AV, Pérez-García S, Valmaseda-Castellón E, Berini-Aytés L, Gay-Escoda C. Morbidity of third molar extraction in patients between 12 and 18 years of age. *Med Oral Patol Oral Cir Bucal*. 2005 Nov;10(5):422–31.
44. Almendros-Marqués N, Berini-Aytés L, Gay-Escoda C. Influence of lower third molar position on the incidence of preoperative complications. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*. 2006 Dec;102(6):725–32.
45. Bataineh AB, Albashaireh ZS, Hazza'a AM. The surgical removal of mandibular third molars: a study in decision making. *Quintessence Int*. 2002 Sep;33(8):613–7.
46. Morris CR, Jerman AC. Panoramic radiographic survey: a study of embedded third molars. *J Oral Surg*. 1971 Feb;29(2):122–5.
47. Hassan A. Pattern of third molar impaction in a Saudi population [Internet]. *Clinical, Cosmetic and Investigational Dentistry*. 2010. p. 109. Available from: <http://dx.doi.org/10.2147/cciden.s12394>
48. Stanley HR, Alattar M, Collett WK, Stringfellow HR Jr, Spiegel EH. Pathological sequelae of “neglected” impacted third molars. *J Oral Pathol*. 1988 Mar;17(3):113–7.
49. Rafiqi, Haris, and Sana Farooq. "Upcoming Dentist: Wrap Up Your Marketing Skills with These Secret Ingredients." *International Journal of Sales & Marketing Management Research and Development (IJSMMRD)* 11 (2021): 11-14.
50. Dharuman, M. U. T. H. U. M. A. T. H. I., S. Gopalakrishnan, and R. B. Velmurugan. "Development of biomedical publications on orthodontics research in PubMed from 1991 to 2013: a bibliometric analysis." *TJPRC Int J Orthod Res* 1 (2015): 1-6.
51. Rabha, Arup Kumar, and SwargaJyoti Das. "Efficacy of Toothbrushes with and Without Dental Floss: A Comparative Study." *International Journal of Dental Research & Development (IJDRD)* 6.2 (2016).
52. Choudhury, Purobi, et al. "Periodontal disease and pregnancy outcome: a correlative study." *Intern. J. Dental Res. Develop* 7.2 (2017): 1-6.
53. PREMKUMAR, KS. "Ergonomics in orthodontics-a review." *International Journal of Dental Research and Development* 6.4 (2016): 20.
54. Kaur, M. A. N. E. E. T., S. U. M. I. T. Makkar, and S. Kidwai. "Anthropometric evaluation of buccal alveolar bone dimension of maxillary anterior teeth in indian population: A cone beam computed tomography study." *IJDRD* 6.6 (2016): 23-32.