



Single versus multiple antibiotics during extraction of mandibular first and second molar

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Article History:

Received on: 09 Nov 2020

Revised on: 06 Dec 2020

Accepted on: 09 Dec 2020

Keywords:

Extraction,
Mandibular Molars,
Antibiotics,
Prophylactic

ABSTRACT

Extractions of molars are one of the frequently performed procedures in a dental clinic and it is associated with innumerable trans operative and post-operative complications, such as edema, trismus, localized alveolar osteitis, pain and surgical site infection. Some authors advocate the use of local and systemic antibiotics to reduce the incidence of these postoperative complications. Despite the risks of allergic reactions among some individuals, toxicity and the development of antibiotic resistant microorganisms, about 50% of dentists routinely prescribe the use of prophylactic antibiotics for this purpose, however the number of antibiotics prescribed vary among dental practitioners. A retrospective study was done among patients visiting the Department of Oral and Maxillofacial Surgery undergoing extraction of first and second mandibular molar and prescribed post-operative antibiotics. The number and group of antibiotics were noted, data were tabulated, and descriptive statistics were performed. Among 1909 patients, about 95% of the patients were prescribed single antibiotic post-extraction, and this was high among young adults, whereas multiple antibiotics were highly opted and prescribed for middle-aged adults.



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ISSN: 0975-7538

DOI: <https://doi.org/10.26452/ijrps.v11iSPL3.3679>

Production and Hosted by

IJRPS | <https://ijrps.com>

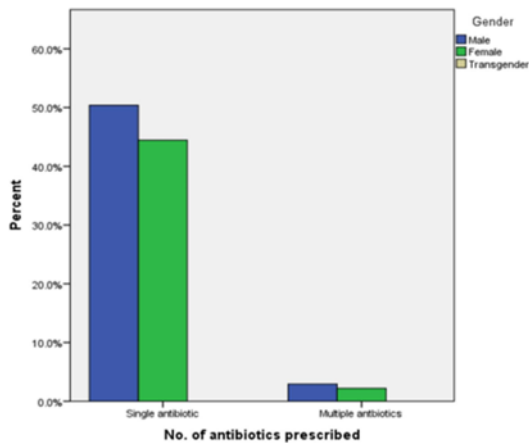
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INTRODUCTION

Tooth extraction is a very common surgical procedure and is most frequently done by general den-

tal practitioners about which the general population is pretty knowledgeable about (Patturaja and Pradeep, 2016). In spite of the steady decrease in routine extraction of permanent teeth registered in the last decades (Thomas *et al.*, 1994; Sleeman *et al.*, 1995; McCaul *et al.*, 2001), general dental practitioners from European countries may extract up to seven teeth per week (Worthington *et al.*, 1999). An estimated 17% of patients undergo extractions over a five-year period (Chrysanthakopoulos, 2011), with the highest tooth extraction rate per patient being among patients in the sixth and seventh decade of life (Mettes *et al.*, 2012). The main reasons for extraction of permanent teeth are still caries and periodontal disease as reported by Jain SV *et al.* (Jain *et al.*, 2019). The main objective for a successful surgery is to minimize, as much as possi-

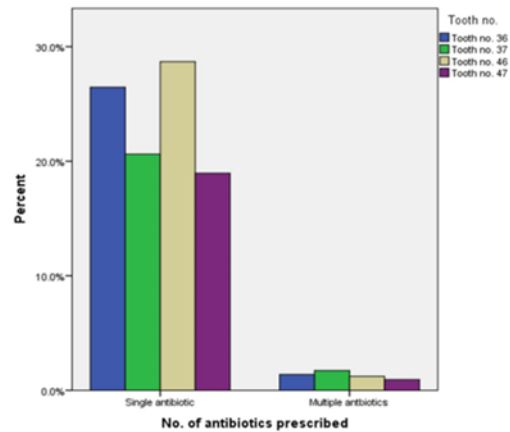
ble, patient discomfort in the postoperative period after tooth extraction. Symptoms such as trismus, swelling, fever, pain and dry socket are complications which are unpleasant and uncomfortable for patients and could generate difficulty in performing oral hygiene, during speaking, in chewing and alteration of other activities of daily life, resulting in impairment of the patient's productivity and life. All these complications depend on the inflammatory response post-extraction but can also be due to subsequent infection (Lodi et al., 2012). Signs of post-extraction infectious complications include swelling, fever, pain and abscess. Another complication of putative bacterial origin is alveolar osteitis (dry socket), a painful condition which follows the dissolution of the blood clot which occurs as a result of bacterial invasion (Jaafar and Nor, 2000).



Graph 1: Bar graph representing an association between the number of antibiotics prescribed and gender of patients.

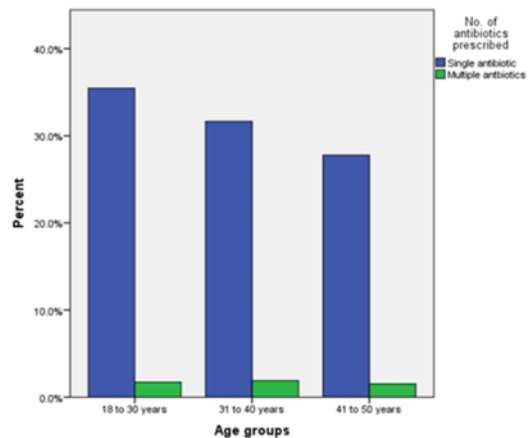
The incidence of alveolar osteitis in a study done in Chennai, India was reported as 4% (Jesudasan et al., 2015). The overall incidence of postoperative infections is relatively low in current trends. However antibiotics are frequently prescribed in a prophylactic way, particularly in case of complicated surgeries and patients with systemic diseases potentially causing immunodeficiency such as HIV infection, diabetes and cancer (Bouloux et al., 2007; Epstein et al., 2000). There is a range of antibiotics which are effective in treating dental infections, these include penicillin, erythromycin, amoxicillin, doxycycline and metronidazole, which are usually administered orally, between one and four times daily. Alternatively, antibiotics can also be due administered by parenteral or local routes (Lodi et al., 2012). The mechanism of how postoperative prescribed antibiotics work is that the oral environment contains a range of bacteria which have the potential to cause painful infections in wounds.

Antibiotics are effective in treating such infections and are also likely to act to prevent the development of painful wound infections. Apart from antibiotics, analgesics are also prescribed like ketorolac, paracetamol, aceclofenac etcetera (Rao and Kumar, 2018).



Graph 2: Bar graph representing an association between the number of antibiotics prescribed and age group of the patients.

However the number of antibiotics prescribed may vary among dentists in normal cases of dental extractions. And thus the objective of this study is to evaluate the difference between single versus multiple antibiotics prescribed post extraction of mandibular first and second molar.



Graph 3: Bar graph representing frequency distribution of a number of antibiotics prescribed to patients.

Previously we have worked on assessing knowledge on HIV/AIDS (Rahman and MP, 2017), biomedical waste management (MP and Rahman, 2017), management of oral sub mucous fibrosis (Patil et al., 2017), oral squamous carcinoma (Marimuthu et al., 2018), alteration of pain perception by virtual reality (Sweta et al., 2019), assessed anxiety level

of patients following local anesthesia administration (MP, 2017a), Lefort lost (Christabel *et al.*, 2016) (21) and the use of botulinum toxin in the management of orofacial disorders (MP, 2017b), however, there is lack of studies regarding the usage of prophylactic antibiotics. The aim of the study was to compare the factors revolving around the prescription of single and multiple antibiotics following extraction of mandibular first and second molars.

MATERIALS AND METHODS

A retrospective study was carried out in a university setting among patients visiting a dental hospital, a predominantly South Indian population. Patients who visited the Department of Oral and Maxillofacial Surgery undergoing extractions of the mandibular first and second molar and the list of antibiotics prescribed to them postoperative was collected. Records of the patients were obtained from Saveetha Dental College and Hospitals. The advantage of this methodology was the ease of access and the limitations was that the sample was not large enough, only outpatient records were analyzed for this study (Abhinav, 2019) and the study was confined to a single metropolitan area. Approval for the study and permission to access patients records was obtained from the ethical review board of Saveetha Institute of Medical and Technical Sciences (SIMATS). The case sheets of patients between the ages 18 to 70 years who were undergoing extraction of mandibular first and second molar were chosen, and the antibiotics prescribed to them were collected from the time period from June 2019 to March 2020. Patients with a history of ankylosis and space infections, immuno compromised status and ones diagnosed with psychological disorders were excluded whereas patients within the age group, 18 to 70 years undergoing extraction of mandibular first and second molars were included in the study. Incomplete data were excluded from the study due to the possibility of bias. The data were collected, tabulated, frequency distribution charts were made. Descriptive statistics were performed using SPSS (Statistical Package for Social Sciences for Windows) by IBM v 17.00, and chi-square tests were performed. Information regarding antibiotic allergy was not studied (Packiri *et al.*, 2017).

RESULTS AND DISCUSSION

There were a total of 1909 patients who underwent extraction of first and second mandibular molars among which 1811 (94.8%) were prescribed a single antibiotic whereas only a very small percentage of 5.2% of the patients were prescribed multi-

ple antibiotics Table 3. Among patients prescribed single antibiotics, amoxicillin was the highly prescribed, and among multiple antibiotics prescribed, amoxicillin, metronidazole was the most paired group of antibiotics prescribed. Females (53%) were highly prescribed recipients of single antibiotics, whereas males (57%) were most commonly prescribed multiple antibiotics. Ages of 18 to 30 years Table 5 were usually prescribed single antibiotics, and the middle-aged adults were prescribed multiple antibiotics which were noted to be a significant correlation. Table 4 shows that 46 was the most commonly extracted tooth, followed by 36. This study helps us to understand the prevalence of single versus multiple antibiotics keeping in mind the danger of antibiotic resistance which is a slow-growing crisis as knowledge of dental students about the newest guidelines for antibiotic prophylaxis for high-risk patients in dentistry and the correct application of these guidelines in different aspects are very important for safe dental practice (Kumar and Sneha, 2016).

The most common form of antibiotic prophylaxis which is still being used in systemic administration (Poeschl *et al.*, 2004; Lloyd and Earl, 1994) although the use of antiseptic mouthwashes and placement of antibiotics in extraction sockets have been shown to be partially effective in the prevention of post-operative infections. More recently, attention has been turned to the utilization of drugs which are narrow spectrum and active only against causative pathogens. A specific bactericidal, metronidazole has been shown to be effective in preventing complications following third molar surgeries (Kaziro, 1984; Mitchell, 1986).

Graph 1 shows the distribution of the number of antibiotics prescribed among genders of patients undergoing extraction of mandibular first and second molars which showed that single antibiotics were more prescribed when compared to multiple antibiotics ($p < 0.05$), this was higher in case of males than in females. The above-mentioned data set Table 1 may be attributed to the fact that there's awareness among dental practitioners about the ever-looming slow-growing concern that is antibiotic resistant microorganisms. This ensures that multiple antibiotics are prescribed only if there is a requirement such that if the patient is immunocompromised and is at an increased risk of serious bacterial infections, patients with comorbidities, patients undergoing chemotherapy and patients who have had a history of post-extraction complications.

Graph 2 shows the age-wise distribution of the number of antibiotics prescribed and Table 2 shows their

Table 1: Chi-square association test for a number of antibiotics prescribed and gender of the patient.

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.603	1	.437
No of Valid Cases	1907		

Table 2: Chi-square association test for the number of antibiotics prescribed and age of patients.

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.665	2	.717
No of Valid Cases	1909		

Table 3: Frequency table of the number of antibiotics prescribed post extraction of 1st & 2nd mandibular molars.

A number of antibiotics prescribed	Frequency	Percent
Single antibiotics	1811	94.9
Multiple antibiotics	98	5.1
Total	1909	100.0

Table 4: Frequency table of the type of tooth extracted.

Tooth extracted	Frequency	Percent
Tooth number 36	501	26.2
Tooth number 37	402	21.1
Tooth number 46	538	28.2
Tooth number 47	358	18.8
Total	1799	94.2
Missing System	110	5.8

Table 5: Frequency table of the ages of patients undergoing extraction of 1st & 2nd mandibular molars.

Ages	Frequency	Percent
18 to 30 years	710	37.2
31 to 40 years	640	33.5
41 to 50 years	559	29.3
Total	1909	100.0

association. This states that single antibiotics were highly prescribed among the age group 18 to 30-year-old patients, and multiple antibiotics were prescribed among the middle-aged group of patients. This can be explained by the increased risk of systemic diseases like diabetes mellitus, hypertension and history of cardiac diseases or surgeries among middle-aged adults due to the increased levels of stress.

Graph 3 shows the number of antibiotics prescribed based on the tooth extracted among which 4th quadrant molars were most frequently extracted, but

multiple antibiotics were usually prescribed post 3rd quadrant molar extractions. From this data, it can be derived that extractions of 36 and 37 are more traumatic when compared to the 4th quadrant molars. This difference can be attributed to the dentists skill and patient-clinician position. The limitations of this study are the small sample size and that it covers only one metropolitan area. Accurate diagnosis, fulfilling the requirements of the patients, and preventing any complications of treatment will aid in better understanding of the prescription of antibiotics, which will eventually aid in better treatment outcomes.

CONCLUSION

Within the limits of the study, it can be concluded single antibiotics were most often prescribed after extraction of mandibular first and second molars and an inclination was observed towards multiple antibiotics being prescribed to patients who were 30 years and above and single antibiotics prescribed to younger patients. Further, studies divulging into the reason of extraction, method of extraction and post-operative healing will shed more light on the prophylactic antibiotics being prescribed post-extraction and aid both patient and dental practitioners.

ACKNOWLEDGEMENT

We would like to thank the Chancellor, Director of academics and the Dean of Saveetha Dental College for the constant encouragement with my work during all stages of the study. Approval for the study and permission to access patients' records was obtained from the ethical review Board of Saveetha Institute of Medical and Technical Sciences with the approval number: SDC/SIHEC/2020/DIASDATA/0619-0320.

Funding Support

The authors declare that they have no funding support for this study.

Conflict of Interest

The authors declare that they have no conflict of interest for this study.

REFERENCES

- Abhinav, R. P. 2019. The patterns and etiology of maxillofacial trauma in South India. *Annals of Maxillofacial Surgery*, 9(1):114.
- Bouloux, G. F., et al. 2007. Complications of Third Molar Surgery. *Oral and Maxillofacial Surgery Clinics of North America*, 19(1):117-128.
- Christabel, A., et al. 2016. Comparison of pterygo-maxillary 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*, 45(2):180-185.
- Chrysanthakopoulos, N. A. 2011. Reasons for extraction of permanent teeth in Greece: a five-year follow-up study. *International Dental Journal*, 61(1):19-24.
- Epstein, J. B., et al. 2000. A survey of antibiotic use in dentistry. *Journal of the American Dental Association*, 131(11):1600-1609.
- Jaafar, N., Nor, G. M. 2000. The prevalence of post-extraction complications in an outpatient dental clinic in Kuala Lumpur Malaysia—a retrospective survey. *Singapore Dental Journal*, 23(1):24-28.
- Jain, S. V., 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):139-146.
- Jesudasan, J. S., et al. 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*, 53(9):826-830.
- Kaziro, G. S. 1984. Metronidazole (flagyl) and arnica montana in the prevention of post-surgical complications, a comparative placebo controlled clinical trial. *British Journal of Oral and Maxillofacial Surgery*, 22(1):42-49.
- Kumar, M. S., Sneha, S. 2016. Knowledge and awareness regarding antibiotic prophylaxis for infective endocarditis among undergraduate dental students. *Asian Journal of Pharmaceutical and Clinical Research*, 9:154-159.
- Lloyd, C. J., Earl, P. D. 1994. Metronidazole: two or three times daily—a comparative controlled clinical trial of the efficacy of two different dosing schedules of metronidazole for chemoprophylaxis following third molar surgery. *British Journal of Oral and Maxillofacial Surgery*, 32(3):165-167.
- Lodi, G., et al. 2012. Antibiotics to prevent complications following tooth extractions. *Cochrane Database of Systematic Reviews*, 11:CD003811.
- Marimuthu, M., et al. 2018. Canonical Wnt pathway gene expression and their clinical correlation in oral squamous cell carcinoma. *Indian Journal of Dental Research*, 29(3):291.
- McCaul, L. K., et al. 2001. The reasons for extraction of permanent teeth in Scotland: a 15-year follow-up study. *British Dental Journal*, 190(12):658-662.
- Mettes, T. G., et al. 2012. Surgical removal versus retention for the management of asymptomatic impacted wisdom teeth. *Cochrane Database of Systematic Reviews*, 8:CD003879.
- Mitchell, D. A. 1986. A controlled clinical trial of prophylactic tinidazole for chemoprophylaxis in third molar surgery. *British Dental Journal*, 160(8):284-286.
- MP, S. K. 2017a. Relationship between dental anxiety and pain experience during dental extractions. *Asian Journal of Pharmaceutical and Clinical*

- Research*, 10(3):458–461.
- MP, S. K. 2017b. The emerging role of botulinum toxin in the treatment of orofacial disorders: a literature update. *Asian Journal of Pharmaceutical and Clinical Research*, 10(9):21–29.
- MP, S. K., Rahman, R. 2017. Knowledge, awareness, and practices regarding biomedical waste management among undergraduate dental students. *Asian Journal of Pharmaceutical and Clinical Research*, 10(8):341–345.
- Packiri, S., et al. 2017. Management of Paediatric Oral Ranula: A Systematic Review. *Journal of clinical and diagnostic research*, 11(9):6–9.
- 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):312–321.
- Patturaja, K., Pradeep, D. 2016. Awareness of Basic Dental Procedure among General Population. *Research Journal of Pharmacy and Technology*, 9(9):1349.
- Poeschl, P. W., et al. 2004. Postoperative prophylactic antibiotic treatment in third molar surgery— a necessity? *Journal of Oral and Maxillofacial Surgery*, 62(1):3–8.
- Rahman, R., MP, S. K. 2017. Knowledge, attitude and awareness of dental undergraduate students regarding HIV/aids patients. *Asian Journal of Pharmaceutical and Clinical Research*, 10(5):175–180.
- Rao, T. D., Kumar, M. S. 2018. Analgesic Efficacy of Paracetamol Vs Ketorolac after Dental Extractions. *Research Journal of Pharmacy and Technology*, 11(8):3375.
- Sleeman, D., et al. 1995. Day case oral surgery: a review of 25 years experience at the Dublin Dental Hospital. *British Dental Journal*, 179(6):221–224.
- Sweta, V. R., et al. 2019. Role of virtual reality in pain perception of patients following the administration of local anesthesia. *Annals of Maxillofacial Surgery*, 9(1):110.
- Thomas, D., et al. 1994. The provision of oral surgery services in England and Wales 1984-1991. *British Dental Journal*, 176(6):215–219.
- Worthington, H., et al. 1999. Extraction of teeth over five years in regularly attending adults. *Community Dentistry and Oral Epidemiology*, 27(3):187–194.