ANALYSIS

23(100), November - December, 2019

ISSN 2321–7359
EISSN 2321–7367

Medical Science

A prospective study on the role of antibiotics in abbreviating the frequency of post extraction complication following the third molar extraction

Mohammed Abidullah[1]✉, **Fahd Nasser Al Qahtani**[2], **Ahd Fahd Al Qahtani**[3], **Ahmed Abdelaziz Mohamed Essa**[4]

[1]Assistant Professor (Oral Pathology & Microbiology), Department of Dental & Biomedical Sciences, Faculty of Dentistry, Al Baha University, Al Baha, Saudi Arabia
[2]Associate Professor (Radiology), Dean Of Dentistry College, Al Baha University, Al Baha, Saudi Arabia
[3]Dental Student, Ibn Sina Dental College, Jeddah, Saudi Arabia
[4]Assistant Professor (Oral Pathology), Department of Dental & Biomedical Sciences, Faculty of Dentistry, Al Baha University, Al Baha, Saudi Arabia

✉**Corresponding author**
(Oral Pathology & Microbiology), Department of Dental & Biomedical Sciences, Faculty Of Dentistry, Al Baha University, Al Baha, Saudi Arabia;
Email: mdabid2512@gmail.com

Article History
Received: 09 August 2019
Reviewed: 12/August/2019 *to* 23/September/2019
Accepted: 26 September 2019
Prepared: 29 September 2019
Published: November - December 2019

Citation
Mohammed Abidullah, Fahd Nasser Al Qahtani, Ahd Fahd Al Qahtani, Ahmed Abdelaziz Mohamed Essa. A prospective study on the role of antibiotics in abbreviating the frequency of post extraction complication following the third molar extraction. *Medical Science*, 2019, 23(100), 981-987

ABSTRACT

Aims and Objectives: To assess the role of antibiotic usage in lowering postoperative inflammatory complications after third molar extraction. *Materials and Methods:* A questionnaire based study was conducted among the oral surgeons who regularly do third molar extractions. Primary variable assessed was incidence of inflammatory complications after 3rd molar extractions. *Results:* A total of 40 oral surgeons participated in the study. Details of 725 patients were recorded in whom 950 third molars were removed. 370 patients have taken antibiotics post operatively. There was a high male predominance (543). Mean BMI was 24.6±8.3 kg/m2. The mean PDS and ODS was 2.09±2.6 and 11.92±6.2 respectively. *Conclusion:* The incidence of post operative complications was less in patients who underwent the post extraction antibiotic regimen after the extraction of the third molar.

Keywords: Antibiotic, Extraction, Oral Surgeon, Third molar

1. INTRODUCTION

Oral surgeons in their daily practice come across extraction of third molars (M3) frequently as a minor oral surgical procedure. Most of these extractions are uneventful but in few cases post extraction inflammatory complications are observed after their removal (Morrow et al., 2018). Studies have shown that complications are rare after M3, but since large number of M3 extractions, these complications should be taken in to account and steps have to be taken to limit or eliminate such complications and sometimes complexities (Marcussen et al., 2016). Oral surgeons on routine basis prescribe antibiotics to reduce complications, but few studies revealed positive findings of reduced postoperative inflammatory complications after usage of antibiotics. Whereas few other studies did not reveal any effects of lowering complications (Ren et al., 2007, Prajapati et al., 2016).

With M3 being most common minor oral surgical operative procedures in dental practice, studies have been done regarding types of impaction and techniques of their removal, but very few studies have been carried out regarding the complications after removal, especially about the role of antibiotics in reducing postoperative inflammatory complications. We carried out our study to assess the relation between postoperative antibiotic usage and inflammatory complications (SSI or AO) after M3 removal.

2. MATERIALS AND METHODS

A prospective study questionnaire study of M3 removal was carried out among oral surgeons of North Karnataka & the study data was also collected from Al Baha, Saudi Arabia. The Primary variable assessed was incidence of inflammatory complications after 3rd molar extractions. The duration of the study was from April 1st, 2018 to December 31st, 2018. The study was carried after obtaining institutional ethical committee clearance (SBPDC/EC15/2018) and informed consent from the subjects.

Inclusion Criteria

Third molar removal patients, whose details were available with oral surgeons,

Exclusion Criteria

Only data from oral surgeons was collected, data from general dental surgeons and other dental specialities was not collected.
Patients with systemic diseases were excluded

After obtaining the ethical committee approval the present study was carried out and informed consent from all subjects were obtained. Sample size was determined from a similar studies using the formula: $n=[(z\propto+z\beta)\sigma d]^2$. With a confidence interval of 95% and power of 95% for the study, a sample size of 40 was obtained. Random sampling of the study subject were done in to two study groups, group A; in whom postoperative antibiotic was given (Amoxycillin-Clavulonic acid: 500/125 mg tablet) and group B, where antibiotic was not prescribed. The observed primary variable was occurrence and type of inflammatory complication (Alveolar Osteitis/AO or Surgical Site Infection/SSI) after M3 removal.

SSI was defined if there was a frank purulence at the extraction site or oedema postoperatively. AO was diagnosed if there was pain after 36 hours post operatively and clinically the extraction site shows loss of the blood clot with exposed bone. Other aspects assessed were gender, age, body mass index (BMI), habits and medical history.

Preoperative Disease severity Score (PDS) was assessed by adding the preoperative disease conditions like caries, periodontal disease, infection, resorption, fracture, adjacent tooth pathology or supra eruption. A zero score was assigned when the M3 was free of any pathology /disease.

Operative difficulty score (ODS) was measured by a scale of 0 to 6

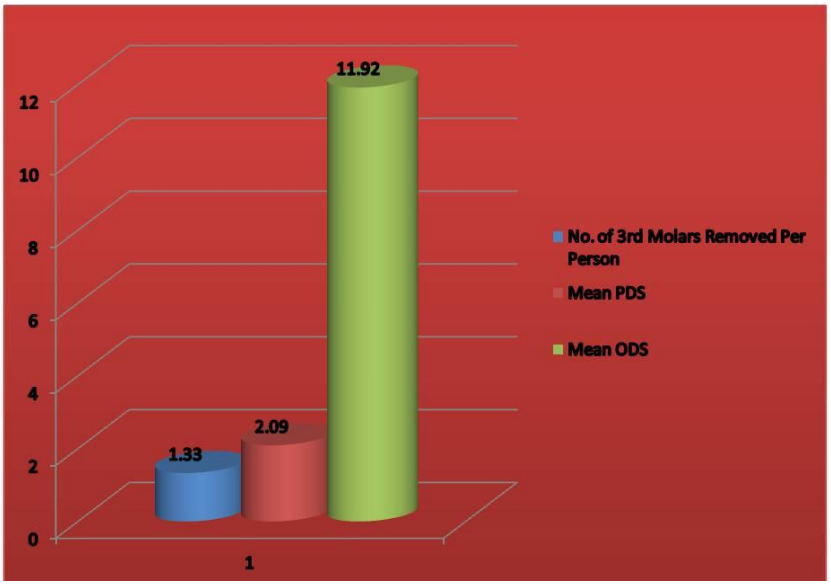
0- M3 Not extracted;
1- Erupted, non surgical removal
2- Erupted surgical removal
3- Impacted in soft tissue
4- Impacted in bone partially
5- Impacted in bone fully
6- Impacted in bone complicated or difficult in extraction

The obtained data tabulated on MS excel sheet and descriptive statistics were computed for all the study variables using IBM SPSS 22.0 software program ((IBM® SPSS® Statistics, Armonk, NY). A P value < 0.05 was treated as significant.

3. RESULTS

40 OMSs involved in the study. 775 patients were enrolled with 1025 third molars removed. After excluding the cases where data was not available, the final sample obtained was 725 in whom 950 M3 were removed. We found that 370 (51.03%) patients have taken antibiotics post operatively.

The mean age was 24 ±18.6 years. We observed a very high male preponderance of 543 (74.89%). 114 patients (15.72%) were taking tobacco in some or other form. The average number of M3 removed per person was 1.31. The mean PDS per patient was 2.09±2.6 and the mean ODS was 11.92±6.2 (Table 1 and Graph 1).



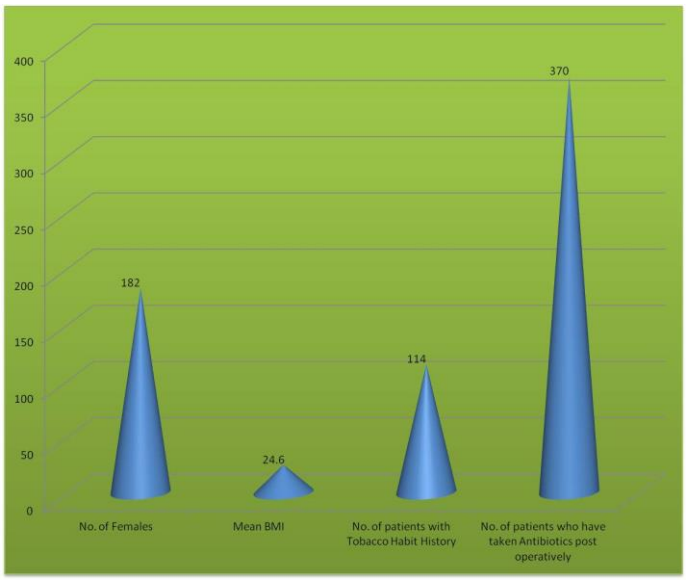
Graph 1 Summary of Study Variables

Table 1 Summary of Study Variables

VARIABLE	VALUE
Mean Age	24 ±18.6 years
No. of Males	543 (74.89%)
No. of Females	182 (25.11%)
Mean BMI	24.6 ±8.3 kg/m2
No. of patients with Tobacco Habit History	114 (15.72%)
No. of 3rd Molars Removed Per Person	1.33
Mean PDS	2.09±2.6
Mean ODS	11.92±6.2
No. of patients who have taken Antibiotics post operatively	370 (51.03%)

BMI-Body Mass Index, PDS- Preoperative Disease severity Score, ODS- Operative Difficulty Score

There was statistical significance relationship observed in variable of age and PDS with the exercise of usage of antibiotics or not where as BMI, ODS and presence or absence of complications was insignificant (Table 2 and Graph 2).



Graph 2 Bivariate Analyses of All Study Variables Versus Postoperative Antibiotic Exposure

Table 2 Bivariate Analyses of All Study Variables verses Postoperative Antibiotic

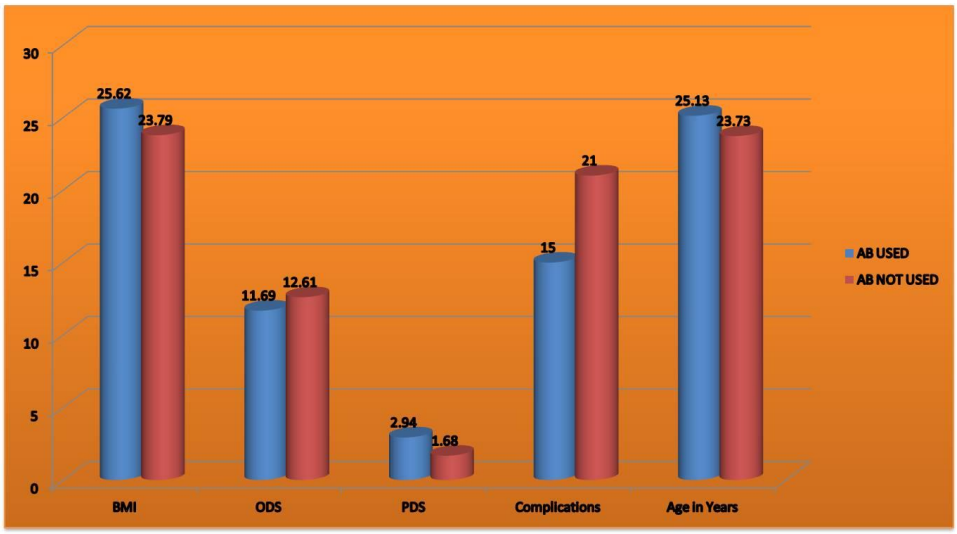
Variable		Usage of Antibiotic		P value
		Yes	No	
Age in Years		25.13±7.56	23.73±4.98	<0.001*
Gender	Males	268 (49.35%)	275 (50.65%)	<0.001*
	Females	102 (56.04%)	80 (43.96%)	
BMI		25.62±3.63	23.79±3.42	0.5233
ODS		11.69±5.39	12.61±5.68	0.6081
PDS		2.94±1.8	1.68±1.6	0.0416*
Complications		15 (0.040%)	21 (0.059%)	0.0617

BMI-Body Mass Index, PDS- Preoperative Disease severity Score, ODS- Operative Difficulty Score

The following variables gender, usage of tobacco and ODS were colligated with development of inflammatory complications, whereas age, BMI and PDS were insignificant (Table 3 and Graph 3).

Table 3 Bivariate Analyses of All Study Variables Versus Postoperative Inflammatory Complications (Surgical Site Infection or Alveolar Osteitis)

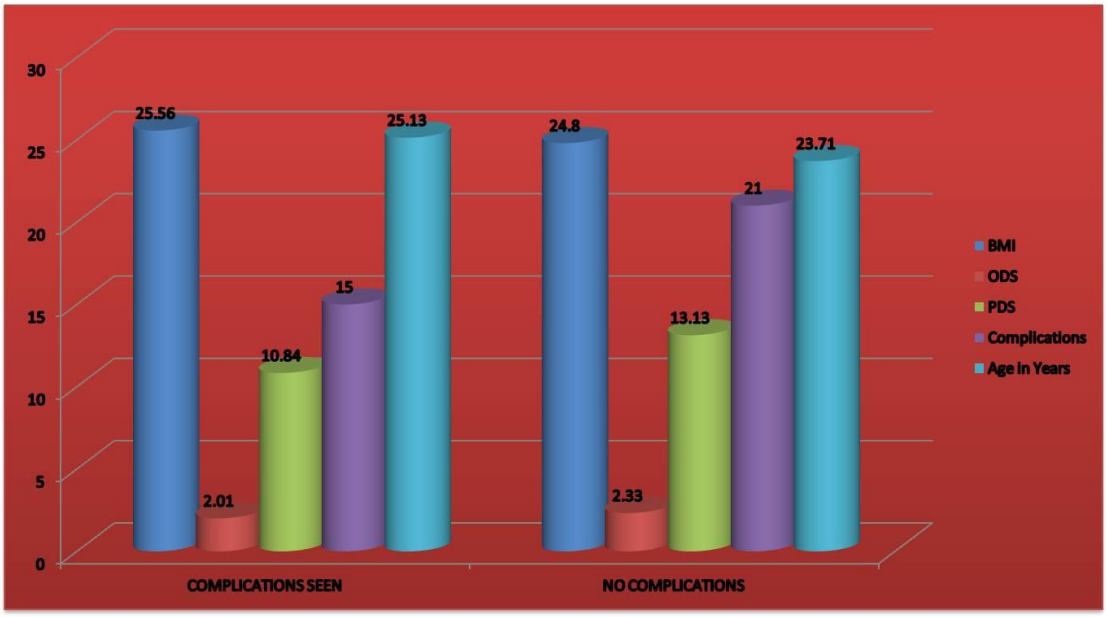
Variable		Complications		P value
		Yes	No	
Age in Years		25.01±4.65	23.71±4.68	0.7242
Gender	Males	14 (2.5%)	529 (97.5%)	0.0014*
	Females	7 (3.846%)	175 (96.154%)	
BMI		25.56±3.54	24.80±3.52	0.6432
ODS		2.01±1.5	2.33±2.01	0.4145
PDS		10.84±5.65	13.13±5.29	<0.001*
Tobacco Habit		30 (83.33%)	6 (16.67%)	0.0002*



Graph 3 Bivariate Analyses of All Study Variables Versus Postoperative Inflammatory Complications (Surgical Site Infection or Alveolar Osteitis)

BMI-Body Mass Index, PDS- Preoperative Disease severity Score, ODS- Operative Difficulty Score

Incidence of inflammatory complications in the antibiotic group was 1.62% compared with 8.46% in the non antibiotic group (relative risk [RR] =0.17; 95% confidence interval [CI], 2.8131 to 18.1790; P =0.021) (Table 4 and Graph 4). We did not observe any information regarding antibiotic resistance or reactions.



Graph 4 Postoperative Antibiotic Exposures versus Postoperative Inflammatory Complications (AO or SSI)

Table 4 Postoperative Antibiotic Exposure versus Postoperative Inflammatory Complications (AO or SSI)

Inflammatory Complication (AO or SSI)	Yes	No	Total
Yes—postoperative antibiotics	6 (1.62%)	364 (98.37%)	370 (51.03%)
No Antibiotics	30 (8, 46%)	325 (91.54%)	355 (48.97%)
Total	36 (5.10%)	688 (94.89%)	725 (100%)

Relative risk = 0.17; 95% confidence interval, 0.0919 to 0.3125; P<0.001; AO- Alveolar Osteitis; SSI- Surgical Site Infection.

4. DISCUSSION

The rationale of carrying our study was to determine the relation between antibiotic use postoperatively and the incidence of inflammatory complications (AO or SSI) after M3 extractions. Our hypothesis was that postoperative antibiotics would reduce the inflammatory complications after M3 removal. The present study main aim was to gauge the antibiotics role in reducing postoperative inflammatory complications after third molar extractions. Our findings disproved the null hypothesis of no variation in inflammatory complications between the two study groups (Dodson et al., 2016, Courvalin et al., 2016).

M3 extractions are one of the most frequent surgical procedures performed by OMS in their routine dental practice. Studies showed that in most of the cases, M3 extraction is not followed by inflammatory complications postoperatively. Even if there are any complications, they seem to be very mild, without any enduring effects. Most of the studies reported very low rate of postoperative complications (<5%), As M3 extractions are very common on day by day basis, hence recording possible inflammatory complications is given importance (Lacasa et al., 2017, Monaco et al.,1999).

We observed lower inflammatory complications in subjects who were under antibiotics coverage postoperatively than those who didn't, which was statistically significant ($P<0.001$). Our results are similar to Lacasa et al. who found that postoperative amoxicillin and clavulanic acid twice a day was more effective than single preoperative dose in lessening infection rates after surgical M3 extractions (Lacasa et al., 2017).

However in contrast to our findings Monaco et al revealed that a postoperative amoxicillin 2 gm for 5 days did not lessened postoperative complications considerably in comparison to controls (Monaco et al., 1999). Calvo et al. also observed akin findings of insignificant enhancement in postoperative events in persons who have not taken antibiotics postoperatively (Calvo et al., 2012). The most common complication after M3 extraction was AO, frequency ranging between 4% to 30%, (Sigron et al., 2014, Pourmand et al., 2014).

In our study, AO was seen in 3.6% of all enrolled patients (postoperative antibiotic group, 0.6%; non antibiotic group, 3.00%). Incidence of SSIs after M3 removal was shown to range between 1 to 27% but normally less than 5% of cases (Parthasarathi et al., 2011, Lang et al., 2017).We found SSI in 1.60% of all the patients (postoperative antibiotic group, 0.39%; non antibiotic group, 1.21%). Oral cavity contains a large variety of bacteria. Even though many measures like chlorohexidine rinses, antibiotics, using sterile instruments are taken to reduce the bacterial content, the vast number of normally inhabitant bacteria cause inherent surgical site contamination. Prescribing antibiotics for efficacious prevention and diminution of postoperative inflammatory complications after M3 extraction is still debated. Although antibiotics are unquestionably potent means in fighting infection, the possibility for adverse reactions and bacterial resistance should be cautiously weighed in comparison to their prospective benefits (Macy et al., 2014).

Studies' regarding the incidence of allergies to penicillin and cephalosporin's found it to be at 9 and 1%, respectively. Bacteria's developing antibiotic resistance due to irrational use of antibiotic is the major menace we are facing today in medical practice. Looking at this menace and taking into consideration its entire ill effects medical professional should more importance to the plans how to contain it instead of focusing on the steps how to avert the occasional infectious complication due to extraction. In our study, 51.03% of samples have taken antibiotics in some form.

We also found significant variations among OMS of the study area in relation to time, route of administration, dosage and antibiotic type used. But due to presence of deficient standardization regarding the aspects such as type, dosage, frequency and length of postoperative antibiotics administration. Various antibiotics prescribed by OMS were amoxicillin, clindamycin, erythromycin, amoxicillin and clavulanic acid (1,000 and 62.5 mg) or other antibiotics. Our findings are in accordance to previous similar studies (Parthasarathi et al., 2011, Lang et al., 2017, Macy et al., 2014).

The disadvantage of indiscriminate prescription of antibiotics includes increased risk for allergic/toxic reactions and can lead to antibiotic-resistant microorganisms (Lang et al., 2017, Macy et al., 2014), whereas, we did not observe any information regarding antibiotic resistance or reactions. All the findings related with inflammatory complications were noted by the clinicians who were doing the treatment to the patients only after the clinician has undergone our study methodology variables AO and SSI standard definitions.

Strengths of study

1.Complications were recorded based on usage of antibiotics

2.Study was carried after imparting training to the doctors

Limitations

1.Duration of surgery, amount of tissue trauma, systemic conditions of patients were not recorded, which have an effect on incidence of postoperative complications.
2.Skill, training levels of OMS were not evaluated
3.The technique used for M3 removal was not recorded, which could also have an effect on the occurrence of complications.

Future Perspectives

In future, studies with larger sample size and more standardized model of postoperative antibiotic management, uniform postsurgical follow-up, and impending blinding of participants should be carried out.

5. CONCLUSION

We found that antibiotic therapy after M3 removal resulted in a slightly reduced risk for inflammatory complications (AO or SSI). In future, studies with a larger, more uniform sample with consistent post extraction follow-up and probable blinding of subjects to variables being gauged would be valuable to verify or refute the present observations.

Source of Support

Nil

Conflicts of interest

None

REFERENCE

1. Calvo AM, Brozoski DT, Giglio FP, Goncalves PZ, Santana E, Dionisio TJ. Are antibiotics necessary after third molar removal? Oral Surg Oral Med Oral Pathol Oral Radiol 2012; 114 (5,suppl):S199-208.
2. Courvalin P. Why is antibiotic resistance a deadly emerging disease? Clin Microbiol Infect 2016; 22 (5):405-7.
3. Dodson TB, Gonzalez ML: American Association of Oral and Maxillofacial Surgeons Anaesthesia and third molar extractions benchmark study: Rationale, Methods and Initial findings. J Oral Maxillofac Surg 2016; 74 (5):903-10.
4. Lacasa JM, Jimenez JA, Ferras V, Bossom, Sola- Morales O, Grarcia rey C. Prophylaxis versus premptive treatment for infective and inflammatory complications of surgical third molar removal: A randomized, double blind, placebo-controlled, Clinical trial with sustained release amoxicillin/ clavulanic acid (100/62.5mg) Int J Oral Maxillofac Surg 2017;36 (4):321-7.
5. Lang MS, Gonzalez ML, Dodson TB. Do antibiotics decrease the risk of inflammatory complications after third molar removal in community practices? J Oral Maxillofac Surg 2017; 75 (2):249-55.
6. Macy E. Penicillin and beta-lactam allergy: Epidemiology and diagnosis. Curr Allergy Asthma Rep 2014; 14 (11):476.
7. Marcussen KB, Lauland AS, Jorgensen HL, Pinholt EM. A systematic review on effect of single dose preoperative antibiotics at surgical osteotomy extraction of lower molars. J Oral Maxillofac Surg 2016; 74 (4):693-703.
8. Monaco G, Staffolani C, Gatto MR, Checchi L. Antibiotic therapy in impacted third molar surgery. Eur J Oral Sci 1999; 107 (6):437-41.
9. Morrow AJ, Dodson TB, Gonzalez ML, Chuang SK, Lang MS. Do postoperative antibiotics decrease the frequency of inflammatory complications following third molar removal? J Oral Maxillofac Surg 2018; 76:700-708.
10. Parthasarathi K, Smith A, Chandu A. Factor's affecting incidence of dry socket: A prospective community-based study. J Oral Maxillofac Surg 2011; 69 (7):1880-4.
11. Pourmand PP, Sigron GR, Mache B, Stadlinger B, Locher MC. The most common complications after wisdom tooth removal: part 2: A retrospective study of 1,562 cases in the maxilla. Swiss Dent J 2014; 124 (10):1047-51, 1057-61.
12. Prajapati A, Sathiye S. Benefits of not prescribing prophylactic antibiotics after third molar surgery. J Maxillofac Surg 2016; 15:217-20.
13. Ren YF, Malstrom HS. Effective of antibiotic prophylaxis in third molar surgery. A meta-Analysis of randomized controlled clinical trials. J Oral Maxillofac Surg 2007; 65 (10): 1909-21.
14. Sigron GR, Pourmand PP, Mache B, Stadlinger B, Locher MC. The most common complications after wisdom tooth removal: Part 1: A retrospective study of 1,199 cases in the mandible. Swiss Dent J 2014; 124 (10):1042-6, 1052-6.