Extraction of Asymptomatic Tooth with And Without Antibiotic Therapy

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Abstract:

Background: Extraction of asymptomatic tooth constitutes a large proportion of maxillofacial surgery procedure and antibiotics are indiscriminately prescribed before and after tooth extraction in Bangladesh. **Objectives:** This cross sectional study was designed to evaluate the efficacy of postoperative antibiotic therapy in reducing postoperative morbidity in two groups following extraction of asymptomatic tooth. **Methods:** A total of 112 patients, 54 Female and 58 Male, aged 16 to 35 years comprised the study materials. Diagnosis was made by accurate history, clinical examination and radiographs. Clinical examination was done to assess the presence or absence of local infection, pain, swelling and mucosal coverage whereas Orthopantomogram (OPG) and Intraoral Periapical (IOPA) radiographs were taken to assess the angulations, position and bony coverage. Tooth extraction was performed with buccal guttering technique after adequate elevation and reflection of full thickness mucoperiosteal flap. The Control Group was given Cap. Amoxicillin 500mg, orally daily for 5 days postoperatively. The Study Group was not given antibiotics. Pain, swelling and trismus were evaluated preoperatively and on 2nd, 7th and 14th postoperative day. Data was processed and analyzed using SPSS version 16.0 for windows and was compiled and test of significance was done using Chi square (x^2) test and unpaired't' test. **Results:** Statistical analysis of the data indicated that pain and swelling was significantly reduced and significant maximum mouth opening was achieved, when preoperative and postoperative results were compared, in both the groups $P > 0.05$, statistically not significant. **Conclusion:** There were no significant differences among the groups in the incidence of postoperative morbidity (pain, swelling and trismus).

Key Words: Asymptomatic Tooth Extraction, Postoperative Antibiotics and Postoperative Morbidity.

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Introduction:

Asymptomatic tooth refers to the tooth which is inapparent or subclinical. Asymptomatic means symptom free, the patient may not have any complaints but it is not risk free there can be clinical and/or radiological sign of infection. Asymptomatic tooth extraction is carried out in the following circumstances: lack of space where they are unlikely to erupt, to prevent damage to the adjacent tooth, to facilitate orthodontic treatment; incase of crowding of dental arches for gaining space, serial extractions, third molar extractions and oral surgery; like transposition and intentional re-implantation and prior to orthognathic surgery. 18-40% of all extracted tooth are asymptomatic.[1]

The morbidity of the surgical operation increases in the proportion to the age of the patient.[2] The total mucosal and bony coverage constitute an effective barrier against bacterial invasion while the partial mucosal coverage constitute a 22-34 fold greater risk of complications.[1] Operations to extract asymptomatic tooth are considered clean contaminated operations and the risk of postoperative wound infection under these circumstances is less than 5%.[3] Tooth angulations, position and age are major risk factor for postoperative morbidity and 20-year old patient has a 10% risk of postoperative infectious complications, a 40-year-old exceeds 30%.[4]

Pain has been cor-related to surgical extractions, suturing, bony impactions and the duration of surgery; Swelling is correlated to surgi-cal extractions, reflection of the mucoperiosteum and the duration of surgery; Trismus is correlated to surgical extrac-tions, the duration of extraction and tooth sectioning.[5]

The risks of indiscriminate use of antibiotic leads to the development of resistant organisms, secondary infection, toxicity and allergic reactions and 6-7% of patients who are given antibiotics have some kind of adverse reaction.[6] The antimicrobial drugs appear to have a marginal benefit in surgical removal of clinically uninfected tooth.[7] The optimal time for the administration of antibiotics in clean

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contaminated surgery is up to 2 hour before the first surgical incision is made.[8] Amoxicillin has long been the antibiotic of choice, because it is highly effective against the bacterial spectrum normally found in patients and is nontoxic, it is a useful antibiotic for the treatment of oral infections.[9] The specific postoperative oral prophylactic antibiotic therapy after tooth extraction does not contribute to a better wound healing, less pain or increased mouth opening and could not prevent inflammatory problems after surgery.[7]

Methods:

This cross sectional study was conducted in the Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, BSMMU, over a period of 24 months from January 2010 to December 2011. The proposed study was presented in front of the Ethical Review Committee, BSMMU and the ethical clearance was achieved. 112 patients (54 female and 58 male; age range 16 to 35 years) fulfilling the basic requirements of inclusion and exclusion criteria were included in the series of this study. The angulations, position, mucosal and bony coverage of the tooth to be extracted were assessed by clinical examination and radiographs; OPG and IOPA x-rays (Table-I). Inclusion criteria were; absence of local inflammation and infection, age range 16 to 35 years, for orthodontic purpose, impacted, unerupted, malaligned, partially and fully erupted tooth, patients showing co-operation with the study and with postoperative follow-up and no contraindication to the drugs in the surgical protocol.

All patients enrolled in the study gave their informed written consent to the procedure. The patients were randomly subdivided in two groups of 56 each. Study Group was not given antibiotics and Control Group was given antibiotic Cap. Amoxicillin 500mg orally daily for 5 days postoperatively. Tooth extraction was done under loco-regional anesthesia (2% lignocaine hydrochloride plus adrenaline 1:100000) in the same operating room with the same type of instruments by single operator under similar conditions. All patients were free of pain and other inflammatory conditions at the time of surgery. Immediately before tooth extraction all patients were asked to rinse the mouth for 1 minute with 0.12% chlorhexidine mouthwash. None of the patient was given anti-microbial drugs preoperatively. The technique was standardized for tooth extraction. Full thickness mucoperiosteal envelop flap was prepared and extraction was performed with buccal guttering technique. Postoperative instructions were given and each patient was asked to follow them strictly.

Patients were asked to do the regular follow-up on 2^{nd}, 7^{th} and 14^{th} postoperative day for evaluation of pain, swelling and trismus (Inter Incisal Distance). All the preoperative and postoperative data were collected in data collection sheet. Intensity of pain (Fig. 1) was evaluated in preoperative and postoperative session using Visual Analogue Scale (VAS) of 10 cm horizontal line where the end points were marked as no pain and unbearable pain. Patients were asked to indicate on the line at a point which corresponds to the level of pain intensity he/she feels. Evaluation (Fig. 2) of facial swelling was performed using horizontal and vertical guide with a flexible ruler or measuring tape before the surgery and postoperatively, horizontal measures correspond to the distance between tragus and outer corner of mouth (c-d) and vertical measures correspond to the distance between outer corner of eye to angle of mandible (a-b). Inter Incisal distance was measured (Fig. 3) before surgical procedure and postoperatively with a digital vernier caliper, measuring scale or measuring tape from incisal edge of the upper and lower right central incisors at maximum opening of jaw. Photographs were also taken preoperatively and during each follow-up session to document the outcome.

The data were entered into the computer for analysis with the help of software program SPSS version 16 for windows. The data were expressed as number, percentage and mean + SD over the table. The evaluation was done by unpaired‘t’ test and Chi square (x^2) test. The result was considered significant if p value was <0.05. Tables were used to show the results and bar diagram were performed as necessary.

Results:

The sample group was formed by 112 patients, 54 (51.79%) were female and 58 (48.21%) were male. The mean age was 23.64+4.68 years (range, 16-35 years). The majority were in second decade. The following variables were evaluated in relation to the 2 groups; Classification of angulations and position of teeth according to Winter’s and Pell and Gregory, mucosal and bony coverage of teeth (Table-I), pain (Table-II), swelling (Table-IV) and trismus (Table-III). The most common; Winter’s Classification were Mesioangular and Vertical, 41.97% and 27.69% respectively and Pell and Gregory Classification were position A and position B, 72.33% and 18.75% respectively whereas most of the teeth were without Mucosal and Bony Coverage, 66.97% and 76.79% respectively (Table-I). No pain was found during preoperative period. P value for Intensity of Pain in two groups, in different follow-up visit was 0.648, 0.508 and 0.145 respectively (Table-II). P value for Inter Incisal Distance in two groups, in different follow-up visit was 0.691, 0.291, 0.457 and 0.577 respectively (Table-III). P value for Facial Width in two groups, in different follow-up visit was 0.816, 0.854, 0.777 and 0.816 respectively (Table-IV). The statistical analysis did not show any evidence of significant differences ($P > 0.05$) among groups for pain, swelling and trismus and no evidence of significant association between classifications and mucosal and bony coverage of teeth were observed among the groups.

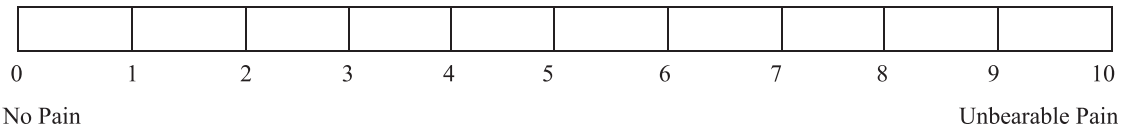

Fig. -1: *Visual Analogue Scale consisting of 10cm horizontal line.*

Fig.-2: *Land marks for evaluation of facial swelling.*

Fig.-3: *Measurement for Inter Incisal Distance with a digital vernier caliper.*

Table-I

Distribution of teeth by sex, age, angulations, position and mucosal and bony coverage

Variables	Category	Number of Patients Study Group	P valueSig<0.05 Control Group	
Sex	Female	25/56 (44.64%)	29/56 (51.79%)	
	Male	31/56 (55.36%)	27/56 (48.21%)	
Age in years	16-20	12/56 (21.43%)	19/56 (33.93%)	
	21-25	24/56 (42.86%)	19/56 (33.93%)	0.042^{s}
	26-30	12/56 (21.43%)	15/56 (26.79%)	
	31-35	8/56 (14.29%)	3/56 (5.36%)	
Angulations of teeth	Mesioangular	24/56 (42.87%)	23/56 (41.07%)	0.848^{ns}
	Vertical	16/56 (28.58%)	15/56 (26.79%)	0.832^{ns}
(Winter's Classification)	Buccoangular	8/56 (14.30%)	11/56 (19.63%)	0.500^{ns}
	Distoangular	3/56 (5.37%)	4/56 (7.14%)	0.500^{ns}
	Horizontal	3/56 (5.37%)	2/56 (3.57%)	0.450^{ns}
	Linguoangular	1/56 (1.80%)	1/56 (1.80%)	0.752^{ns}
	Unusual	1/56 (1.80%)	0/56	0.500^{ns}
Position of teeth	A	43/56 (76.79%)	38/56 (67.86%)	0.290^{ns}
(Pell and Gregory	B	9/56 (16.07%)	12/56 (21.43%)	0.467^{ns}
Classification)	C	4/56 (7.14%)	6/56 (10.71%)	0.507^{ns}
Mucosal Coverage of teeth	Without	40/56 (71.43%)	35/56 (62.5%)	0.315^{ns}
	Partial	12/56 (21.43%)	12/56 (21.43%)	1.000^{ns}
	Total	4/56 (7.14%)	9/56 (16.06%)	0.140^{ns}
Bony Coverage of teeth	Without	49/56 (87.5%)	37/56 (66.06%)	0.007^{s}
	Partial	4/56 (7.14%)	16/56 (28.57%)	0.003^{s}
	Total	3/56 (5.36%)	3/56 (5.36%)	1.000^{ns}

ns = Not Significant. s = Significant. Statistical analysis was done by Chi square (x2) test.

Table-II

Difference in Intensity of Pain (VAS) with Period of Evaluation

PainPeriod of Evaluation	Study Group Mean+SD	Control Group Mean+SD	P value Sig<0.05
Preoperative	0.0+0.0	0.0+0.0	-
2nd POD	3.61+2.45	3.39+2.5	0.648ns
7th POD	1.36+1.43	1.18+1.42	0.508ns
14th POD	0.21+0.62	0.07+0.37	0.145ns

ns = Not Significant. Statistical analysis was done by Unpaired't' test.

Table-III

Difference in Inter Incisal Distance (Trismus) with Period of Evaluation

Inter Incisal Distance Period of Evaluation	Study Group Mean+SD in mm	Control Group Mean+SD in mm	P value Sig<0.05
Preoperative	0.0+0.0	0.0+0.0	-
Preoperative	52.56+10.37	51.9+6.81	0.691ns
2nd POD	43.78+15.25	40.78+9.87	0.291ns
7th POD	49.91+11.52	48.56+7.19	0.457ns
14th POD	52.82+10.24	51.91+6.56	0.577ns

ns = Not Significant. Statistical analysis was done by Unpaired't' test.

Table-IV

Comparison of Facial Width (Swelling) with Period of Evaluation

Facial Width Period of Evaluation	Study Group Mean+SD in mm	Control Group Mean+SD in mm	P value Sig<0.05
Preoperative	104.23+6.90	104.48+6.75	0.816ns
2nd POD	108.9+9.53	109.01+8.23	0.854ns
7th POD	105.41+7.35	105.52+7.16	0.777ns
14th POD	104.34+6.92	104.57+6.79	0.816ns

ns = Not Significant. Statistical analysis was done by Unpaired't' test.

Discussion:

The ideal agent for use after tooth extraction should alleviate pain, reduce swelling and trismus to a minimum, promote healing and have no unwanted effects such an agent does not exist, for relief of pain analgesics are the obvious choice where possible an analgesic with additional anti-inflammatory properties should be used.[10] The appearance of the postoperative morbidity, although affected favourably or unfavourably by surgical technique, mucoperiosteal flap reflection, duration of extraction and tooth sectioning are ultimately related to the manifestations of inflammation in response to tissue injury orchestrated by the mediators of the acute inflammatory response.[11]

The procedures with indications for antibiotic prophylaxis in dental surgery were recently published in a consensus statement in Spain. These include periapical surgeries, bone surgeries, surgeries for dental implant, bone grafts, excision of benign tumours and exodontias of impacted teeth.[12] Martin et al[13] discussed on the use of antibiotics regarding the removal of soft tissue, total or partial removal of bone, ideal time of use, dose, duration and route of administration.

Knutsson et al[14] reported that the mean age (p=0.016) of the patient was statistically significant, our study revealed that the mean age (p=0.042) of the patient was also statistically significant (Table-I) which is the important factor in decision-making process. De Boer et al[15] reported the bony density changes with age. Bui et al[16] stated that the prevalence of the different angulations of teeth is incomparable as classification systems vary across different studies and most studies measured angulations of teeth by visual impression alone. Hence, results obtained from one study were not comparable to another. Gulsun et al[17] reported that the most common winter's classifications were Vertical and Mesioangular, 42.92% and 36.94% respectively. Our study showed that the most common winter's classifications (Table-I) were Mesioangular 41.97% and Vertical 27.69%.

Eeden et al[18] reported the pain on 1st postoperative day was p > 0.6 and on day 2 to day 6 the p value = 0.882 and 0.107 which signifies that the pain between medicated and non-medicated patient was statistically not significant whereas our study revealed that the Intensity of Pain (Table-II) on 2nd, 7th and 14th postoperative day was p>0.05 which was also statistically not significant. Hence, there is no correlation between decreasing in intensity of pain and prescribing and not prescribing antibiotics.

Poeschl et al[7] revealed that there was no significant difference between the groups regarding overall occurrence of difference in mouth opening after surgery (range, 3.4% to 4.4%; mean 3.98%) whereas our study showed that for Inter Incisal Distance (Table-III), was statistically not significant (P>0.05) between two groups in different follow up visit.

Monaco et al[19] reported the postoperative swelling was present in 30 of 32 extractions performed with antibiotic and in all 27 extractions without antibiotic and found that the difference between swelling in control and test groups was statistically not significant and Poeschl et al[7] showed that the specific postoperative antibiotic treatment after removal of tooth could not prevent the cases of inflammatory problems after surgery whereas our study showed that the facial swelling (Table-IV) in both study and control group was also statistically not significant (P>0.05). This shows that there was no change in facial swelling in the patients who were given antibiotics and the patients who were not given antibiotics.

There was no significant difference between the results of antibiotic and no antibiotic groups, so each and every patient should be well informed about the risks of indiscriminate antibiotic prescribing include the development of resistant organisms, secondary infection, toxicity and allergic reactions. This study can be a base for further studies to examine the differences in postoperative morbidity, with and without antibiotics. However, further study could be done with larger sample size and greater logistic support.

Conclusion:

The results show that no clinically apparent infection, disturbance of wound healing or other complications were noted in those patients who were not given antibiotics. There were no significant differences among the groups in the incidence of pain, swelling and trismus. Thus, it is not necessary to prescribe postoperative antibiotics following extraction of asymptomatic tooth. Postoperative pain, swelling and trismus can be reduced through careful tissue manipulation, the administration of analgesics and anti-inflammatory medication and patient adherence to the postoperative instructions provided. Hence, the dental professionals should be aware of proper use of antibiotics. This study can be a base for further studies to examine the differences in postoperative morbidity. However, further study could be done with larger sample size and greater logistic support.

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