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Recent trends in dentistry

Bangladesh Dental Society works to ascertain world class dentistry for Bangladesh, with great pleasure would relish to introduce the 2016(2) issue of Bangladesh Dental Journal. It is dedicated to the professional development of dentistry in Bangladesh and other countries. The Journal is an official publication of Bangladesh Dental Society.

The primary objectives of the Journal are to advance the science and art of dentistry, to encourage scientific research and to improve and enhance the general standard of dentistry in Bangladesh and the rest of the world. We hope to provide the dental community with an educational tool which monitors and reports the latest developments. To achieve these goals of continuously improving the different procedures in dental practice, there is a compelling need for much research, the responsibility of which lies with the professionals in various disciplines that belong to this community.

In recent years, dentistry has become one of the fastest growing and a highly demanding profession at par with the other emerging professions. From an era of ill-fitting or floating dentures to implant retained dentures, unsightly metal braces to near-invisible aligners for Orthodontic treatment, routine extractions for periodontal problems to management of endo-perio lesions, and the bone augmentation procedures for periodontal disease with ease; dentistry as a science has emerged to be at the forefront to provide quality health care.

Implant dentistry has come to be considered an integral part of any dental treatment plan because of its overwhelming success in the right hands. The innovations in the design/type has definitely increased the reach of the dental surgeon to place implants in most unfavorable locations, poor alveolar ridges and in most of the medically compromised patients as well. The immediate loading protocol has also to some extent eliminated the disadvantage associated with Implants; that of long wait for prosthesis. Therefore, implant supported prosthesis has emerged as the single largest rehabilitation protocol and has revolutionized the delivery of modern dentistry.

From the unsightly metallic brackets, dentistry has evolved to a level of invisible orthodontic appliances to achieve the desired esthetics, function and longevity of permanent teeth by using clear transparent braces, ceramic braces, lingual braces using gold/titanium retainers and giving the patient a choice to choose from a variety of treatment options where the esthetics will not be compromised at all. Further, the Orthodontic practice has been refined to involve multi-specialist approach to achieve tangible outcomes using Orthognathic Surgery where definitive results can be predicted and definitive prognosis achieved.

The linkage between the Oral Health with other systemic conditions has come to be established. It is a known fact that poor oral hygiene impacts very many diseases and they have inter-relation of cause and effect level. In a country where over 80% of the population suffers from periodontal conditions at some age or other, resulting in ugly spacing, severe bone loss and mild to moderate mobility of permanent teeth; the latest modalities of bone augmentation, regenerative treatment ensures that we will be able to maintain oral health and thus preserve the teeth for life.

It is a lesser known fact that the dental surgeon can contribute towards the correction of the OSA (obstructive sleep apnea) and snoring by giving simple appliances which are non-invasive and produce tangible and definitive results.

Maxillofacial dental surgeons have also been helping the reconstructive surgeons by providing maxillofacial prostheses like splints for post-surgical and developmental defects, speech appliances to achieve para nasal alveolar molding of lips and cleft palate, post-traumatic surgeries for re-fixing the complex fractures of oro-facial osseous structures.

The dental surgeon has undertaken osteotomies of maxilla and mandible to achieve access to pharyngeal passages for the removal of various neoplasms and tumors with better prognosis and sustainable results for the ENT surgeons, and worked as an integral part of the team for all onco surgeries involving the head and neck. Certain disciplines which were unknown to the dental surgeon have now come to be recognized as within the realm of reach by the modern dental surgeon.

We have invited all researchers, specialists and clinicians in all the disciplines of dentistry, to apportion their cognizance to amend our dental practice and they have responded spontaneously. We appreciate your valuable contributions. We hope you will perpetuate to contribute in future and avail in the advancement of this publication and avail us procure our objectives.

Dr. Md. Humayun Kabir
Editor-in-Chief
Bangladesh Dental Journal

Proportional analysis of developments in the treatment of mandibular fractures

Amin MR¹, Chowdhury MAP², Sarwar MG³, Moula SM⁴, Kabir MH⁵, Ahmed TI⁶, Ahmed I⁷

Abstract:

The purpose of this study was to comparatively analyze trends in the treatment of mandibular fractures. A retrospective review of records of patients treated for mandibular fracture at our department over a 5 year period (2011-2015) was done. Data collected included age, sex, etiology, anatomical site of fracture and treatment method used. There were 406 mandibular fractures in 335 patients. Males constituted 73.7% (n=247) and females 26.3% (n=88); Male female ratio 2:8:1. Age range was 01-72 years, with mean age of 28.5. Patients of 21-30 years of age sustained the most mandibular fractures. Road traffic accidents (43.6%) were the most common cause of fractures, followed by falls (40.0%). The most common site of mandibular fracture was the condyle (36.2%), followed by symphysis / parasymphysis (23.9%). Majority (92.5%) of the fractures were treated by upon approach. However, comparative data with other studies world wide revealed that some centers treated majority of their patients by closed approach. The choice of either closed or open approach methods of treatment of mandibular fractures depended mainly on availability of resources and the socioeconomic situations in different countries.

Keywords: mandibular fracture, Treatment, Proportional analysis.

(Bangladesh Dental Journal 2016; 32: 56-58)

Introduction:

Mandibular fracture is the first or second most common facial bone fracture, occurring twice as frequently as fractures of the midface bones. The incidence is about 38% of all facial bone fractures. Mandibular fractures constitute the bulk of the trauma treated by oral and

maxillofacial services.^{1,2} Mandibular fractures constitutes the bulk of the trauma treated by oral & maxillofacial services.³ Fractures of mandible present a unique problem to the facial surgeons. They were described in ancient Egypt around 1650 BC.⁴ As a given force is applied, the bone no longer behaves elastically so internal displacement of the molecules and permanent deformity of the bone occurs.⁵ A WHO statistics reports indicated that each year one million people die and between 15 and 20 million are injured due to RTA.⁶ The purpose of the study is to proportionately analyze the developments in the treatment of mandibular fractures.

Patients and methods:

There were 335 files of patients treated for mandibular fractures at our department over a 5-year period (2011-2015) were retrospectively studied. Data collected included age, sex, etiology anatomical site of fracture and treatment method used. Records of patients who sustained only mandibular fracture, without any other maxillofacial fractures, were retrieved for this study. Records with incomplete information about the data of interest were not included. Microsoft Excel 2007 was used to calculate percentages and means; descriptive analysis was done.

-
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The anatomical sites of fracture were classified as condyle, symphysis/parasymphysis, body, angle, dentoalveolar region, ramus and coronoid process.

Results:

There were 335 patients, having sustained a total of 406 mandibular fractures. Males constituted 73.7% (n=247) and females 26.3% (n=88); male : female ratio (M:F) of 2:8:1. Age range was 01-72 years, with mean age of 28.5. Patients of 21-30 years of age sustained the most mandibular fractures. Road traffic accidents (43.6%) were the most common cause of fractures, followed by falls (40.0%). The most common site of mandibular fracture was the condyle (36.2%), followed by symphysis / parasymphysis (23.9%). Majority (92.5%) of the fractures were treated by open approach. However, comparative data with other studies worldwide revealed that some centers treated majority of their patients by closed with other studies world wide revealed that some centers treated majority of their patients by closed approach. The choice of either closed or open approach methods of treatment of mandibular fractures depended mainly on availability of resources and the socioeconomic situations in different countries.

Table-I
Distribution of patients according to age

Age (Years)	Number of patients
0-10	37
11-20	77
21-30	83
31-40	63
41-50	44
51-60	23
61-70	6
71-80	2
Total	335

Table-II
Distribution of patients according to etiology of fracture

Etiology	Number of patients	Percentage (%)
Road traffic accidents	146	43.6
Fall	134	40.0
Assault	34	10.1
Work-related accidents	15	4.5
others	6	1.8
Total	335	100.0

Table-III

Distribution of fractures according to anatomical site

Site	Number of Fractures	Percentage (%)
Condyle	147	36.2
Symphysis/Parasymphysis	97	23.9
Body	84	20.7
Angle	54	13.3
Dentoalveolar	14	3.4
Ramus	8	2.0
Coronoid	2	0.5
Total	406	100.0

(n = 97), body 20.7% (n=84), angle 13.3% (n=54), dentoalveolar region 3.4% (n=14), ramus 2.0% (n=8), and coronoid process 0.5% (n=2) respectively (Table-III).

Regarding method of treatment, majority (92.5%) of patients were treated by open approach and 7.5% were treated by closed approach with maxilla-mandibular fixation (MMF). Undisplaced subcondylar fractures with satisfactory occlusion were mainly managed by closed approach.

Discussion:

Mandibular fractures, as a component of maxillofacial injuries, present on a day-to-day practice of oral and maxillofacial surgeons⁷. It is therefore important to monitor trends in their management in order to understand and appreciate how different centers, under different levels of clinical setup/resources, cope and manage their patients amidst the different socioeconomic, resource situations⁸

The highest number of fractures occurred in the condyle (36.2%), followed by symphysis / parasymphysis (23.9%) (Table-III). This pattern is in agreement with a study in Germany⁹, which reported condylar fractures constituting 42% and symphysis / parasymphysis 21%. In the literature, the most fractured site of the mandible shows variation; some studies have reported mandibular angle,¹⁰⁻¹¹ body¹²; symphysis / parasymphysis¹³. It is worthwhile to note that a number of studies are in agreement that the ramus and coronoid are the least fractured regions of the mandible. In fact, in one study, they did not record any fracture of the coronoid process. However, we think this was probably due to the short period (6 months) of their prospective study.

Conclusion:

Majority of the patients were treated by open approach. However, Proportionate data with other studies world wide

revealed that some centers treated majority of their patients by closed approach. The choice of either closed or open approach methods of treatment of mandibular fractures depended mainly on availability of resources and the socioeconomic situations in different countries.

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Prevalence of Pericoronitis and its effective management

Shaikh ZUA¹, Howlader MBU², Rahman MM³, Haq MR⁴

Abstract:

Pericoronitis is an infection associated with an impacted lower third molars that can necessitates the removal of these teeth. The clinical feature of this condition are described and its treated outline, emphasizing local measures. The objective of this study was evaluate the severity of the Pericoronitis and its appropriate management.

A total 90 patient's were included in this study and age ranged from 15-30 years. There were 54 males and 36 females. It was divided in three groups. Group-A, Group-B, Group-C. The Group A : Age range 15-20 years, Group B: Age range 20-25 years, Group C: Age range 25-30 years. The Patients was collected in outpatients department in Dhaka Dental College and treatment was given in Oral Surgery department accordingly. The majority of the patient in our study 72.2% required extraction of teeth, 16.67% cases conservative treatment and 11.11% cases operculectomy was done.

Key words : *pericoronitis , wisdom teeth , prevalence,*

(Bangladesh Dental Journal 2016; 32: 59-60)

Introduction:

Pericoronitis is defined as an inflammation in the soft tissues surrounding crown of a partially erupted tooth. It generally does not arise in teeth erupted normally; usually, it is seen in teeth that erupt very slowly or become impacted, and it most commonly affected the lower third molar¹. Several studies have shown that the microflora of pericoronitis are predominantly anaerobic. Clinically pericoronitis can be acute or chronic. The acute form is characterized by severe pain, often referred to adjacent areas, causing loss of sleep, swelling of the pericoronitis tissues, discharge of pus, trismus, regional lymphadenopathy, pain on swallowing, pyrexia, and in some cases spread of the infection to adjacent tissue spaces. Patient with chronic pericoronitis complain of a dull pain or mild discomfort lasting a day or two. In a study by Nitzan et al (1985) reviewing the clinical aspects of pericoronitis, from a sample of 245, the highest incidence of pericoronitis was found in the 20-29 years age group

(81%) the condition was rarely seen before 15 or after 40². In this study there was no significant difference between the sexes. The 25-30 years aged patient suffered in pericoronitis about 60%. The majority of the cases (72.2%) extraction was done. The prevalence of pericoronitis was 5%.

Materials and Methods :

In this Study, the prevalence of pericoronitis and its management reported during the period July 1995 to May 1996 in Dhaka Dental College. The total ninety patient were selected have age range 15-30 years. There were 54 males and 36 females. It was divided in three group : Group-A, Group-B, Group-C. The age range for Group A 15-20 years, for Group B 20-25 years, for Group C 25-30 years.

The patient was collected in outpatient department in Dhaka Dental College and then transfer to OMFS dept. for pericoronitis treatment. Patient was selected for management purpose by clinical examination and radiological evaluation. The treatment was given by conservative procedure, operculectomy, extraction of malposed, impacted tooth according to severity.

Result:

This study was carried out in the OPD and OMFS dept. Dhaka Dental College & Hospital from July 1995 to May 1996. A total 90 patient with pericoronitis were including in this study. Data of a total number were analyzed, out of 90 patient, 54 males and 36 were females.

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Table-I*Distribution of patient according to age*

Age range (years)	Number	Percentage
15-20	10	11.11%
20-25	20	22.22%
25-30	60	66.67%

A total 90 patient were studied with age range of 15 to 30 years.

Table-II*Distribution of patient according to Sex*

Sex	Number of Patient	percentage
Male	54	60%
Female	36	40%

In this study among 90 patient, male were 54(60%) and female were 36(40%).

Table-III*Distribution of patient according to treatment*

Treatment	Number	Percentage
Operculectomy	10	11.11%
Conservative Treatment	15	16.67%
Extraction	65	72.22%

In this study among 90 patient, 11.11% was oprcutectomy, 16.67% was conservative treatment, 72.22% was extraction.

Discussion:

The present study was conducted in OPD and OMFS dept. in Dhaka Dental College to findout the prevalence of pericoronitis and its management. The prevalence of pericoronitis was 5%. Among the 90 patient, 60% were male and 40% were female. Regarding treatment, among 90 patient, 11.11% was done Operculectomy, 16.67% was Conservative Treatment, 72.22% was done extraction.

Conclusion and Recommendation:

Inflammation of the pericoronal tissue means pericoronitis-which usually becomes problem some to the patient during eruption of mandibular wisdom teeth an adult life. It's a very painful condition, At this stage some patients may be unable to open the mouth properly. Unfortunately, the patient are not interested to overcome this situation due to lack of proper knowledge. The study on this aspect will help to encourage dentist as well as the patient to overcome the problem due to pericoronitis properly and this study may have the opportunity to play a role of Govt. Health for all Programme.

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Relationship between Histopathological malignancy grading and Cervical lymph node metastasis: An analysis of 34 cases of Oral Squamous Cell Carcinoma

Karim MR¹, Parvin M², Ahmed S³, Chowdhury S⁴, Talukder MA⁵

Abstract:

Oral squamous cell carcinoma has a great predisposition to produce metastasis in lymph nodes. In clinical practice, the treatment plan and prognosis of Oral Squamous Cell Carcinoma (OSCC) is mainly based on the primary tumor, regional lymph node metastasis, and distant metastasis (TNM) staging system. The biological activity of OSCC is evaluated and descriptively categorized as highly, moderately and poorly differentiated. This system was primarily developed by Broder, based on the differentiation of the tumor cell population alone. Prognostic value of histopathologic grading of OSCC has varied from not any to highly significant. However, this system does not provide any information on the biological characteristics and thus an aggressive clinical behavior of the tumor. The aim of this study was to assess some indicative histologic parameters that would assist in the prognosis of these lesions. All cases of oral squamous cell carcinoma's treated with wide excision of growth with neck dissection, registered between Nov. 2014 - April 2016 in the Department of Faciomaxillary Surgical Oncology at National Institute of Cancer Research & Hospital, Mohakhali, Dhaka. Surgical specimens of 16 metastasizing tumors were compared with 18 tumors which did not metastasize. Each case was graded according to: Broders' classification in the whole thickness of tumor relation with lymph node metastasis. Broders grading methods failed to show any relation with cervical metastasis. (P=0.729)

Key words: Oral squamous cell carcinoma, cervical lymph nodes, grading, metastasis.

(Bangladesh Dental Journal 2016; 32: 61-65)

Introduction:

Oral cancer represents the third most common form of malignancy in the developing countries, whilst in the developed countries it is the eighth most common form of cancer.¹ Oral squamous cell carcinoma (OSCC) is the most frequent malignancy in the mouth, accounting to 95% of all oral malignant lesions². The strongest association of oral cancer, out of many etiological factors, is chewing of various types of smokeless tobacco, including snuff, naswa and betel quid with tobacco³. It may appear in any location, although there are certain areas in which it is

found more frequently, such as the tongue and floor of the mouth. These areas represent about 90% of all malignancies of the oral cavity⁴. In our region cancer of buccal mucosa is commoner⁵. In patients diagnosed with tumors at an advanced stage, there is high occurrence of invasion to surrounding tissues, with lymph node and distant metastasis, and a peculiarly high risk of second malignancy during the patient's lifetime⁴. The presence of cervical lymph node metastasis in patients with head and neck carcinomas leads to poor prognosis. In patients with nodal metastasis, the 5 years survival rate has been reported to be 20-36% after surgical treatments compared to 63-86% in patients with no lymph node involvement.⁴ Many investigators have studied clinical histopathologic features of primary tumor, such as size of tumor, degree of differentiation, host immune response and pattern of invasion, to determine the propensity for lymph node metastasis¹. Histologic grading has been used as a prognostic factor and for clinical behavior evaluation of OSCC for the past several decades.⁴ The biological activity of OSCC descriptively categorized as highly, moderately and poorly differentiate. This system was primarily developed by Broder, based on the differentiation of the tumor cell population alone.⁴ Since Broders' initial

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classification, multifactorial grading (MFG) systems were introduced which were mainly based on different parameters of tumor cells as well as the tumor host relationship⁴. Hence the aims of this study were to assess the correlation between the lymph node metastasis and histological malignancy grading system. Grading system in appropriate biopsy specimens would be of great value in predicting lymph node metastasis and treatment results of oral squamous cell carcinoma².

Materials and Methods:

A cross-sectional study was conducted at Faciomaxillary Surgical Oncology Department of National Institute of Cancer Research and Hospital, Mohakhali, Dhaka to validate the prognostic efficiency of histologic assessment of primary tumor in predicting cervical metastasis, to identify those histologic features in the tumor most closely associated with cervical metastasis. Thirty four patients of biopsy proven OSCC with or without palpable neck node(s) were included in the study from Nov 2014 to April 2016.

All who were treated elsewhere and having no documentary proof, recurrent or residual diseases after surgery or radiotherapy were excluded from the study. Demographic data, clinical findings of oral lesion, in cases where there was suspicion of distant metastasis imaging studies like X-ray chest, ultrasound of abdomen and C.T Scan(chest & abdomen) if needed were done and findings were recorded in a preformed proforma. General information including age, sex, past medical history, greatest tumor diameter, nodal involvement were all registered. Age group of the study population was above 30 years. Punch or Wedge biopsy report of the disease noted. Resection of primary lesion of oral cavity along with neck dissection was done under general anesthesia. The extent of neck dissection depends on the clinical status of neck. Specimens of primary site and neck dissections were marked according to surgical neck levels and sent for histopathological examination. The histopathological findings were also recorded in the proforma. Data was analyzed by using SPSS version 21.

Results:

A total of 34 cases of OSCC reported during the study period treated with primary resection and neck dissection. Age of the patients ranged from 32 to 62 years with a mean age of 48.18 years (Table-I). Sex distribution of patients were male 17(50%) female 17(50%) (Table II).

All the patients had undergone primary surgical resection. At presentation, 17(50%) of patients had T₃ tumor followed by T₂ was 15 (44.1%), and T₁ was 2 (5.9%) (Figure 1). Among them 22 (64.7%) cases were grade-I and 12(35.3%) were grade-II (Figure-2). Histologically, 18(52.9%) cases found to have positive neck node and absence of nodal metastasis 16(47.1%). (Figure-3). Cervical lymph node metastasis was present in 0% of T₁ tumours, 8.8% of T₂ tumours, 38.2% of T₃ tumours .Total count of metastatic tumor 16(47.1%). (p=0.002) (Table-III). Cervical lymph node metastasis were present 11(32.4.7%) at grade -I and 5(14.7%) at grade-II tumors (p=0.729). (Table-IV). Statistical analysis showed not significant relation between histological grading and lymph node metastasis(p=0.729).

Table-I

Age distribution of patients (n=34)

Age (years)	Frequency	Percentage	Mean±SD	Range
Up to 40	8	23.5	48.18±8.491	32-62
41-50	13	38.2		
>50	13	38.2		

Table-I shows the age of the patients ranged from 32 to 62 years with a mean age of 48.18 years. Among 34 patients (8) 23.5% upto 40 years of age, (13) 38.2% between 41-50 years of age, (13) 38.2% patients >50 years of age.

Table-II

Sex distribution of patients (n=34)

Sex	Frequency	Percentage
Male	17	50
Female	17	50
Total	34	100

Table-II shows sex distribution of patients were male 17(50%) and female 17(50%).

Table-III

Relationship between Tumor size and lymph node metastasis (n=34)

Lymph node metastasis		Tumour size			Total
		T ₁	T ₂	T ₃	
Yes	Count	0	3	13	16
	Percentage	0.0%	8.8%	38.2%	47.1%
No	Count	2	12	4	18
	Percentage	5.9%	35.3%	11.8%	52.9%
Total	Count	2	15	17	34
	Percentage of Total	5.9%	44.1%	50.0%	100.0%

P value=0.002

Table-III shows lymph node metastasis in 0% of T₁ tumours 8.8% of T₂ tumours, 38.2% of T₃ tumours .Total count of metastatic tumor 16 (47.1%) . (n=34). Result shows significant association between Tumor size and lymph node metastasis (P value=0.002).

Table-IV
Relationship between grading & lymph node metastasis (n=34)

Grade	Count	Lymph node metastasis		Total
		Yes	No	
I	Count	11	11	22
	% of Total	32.4%	32.4%	64.7%
II	Count	5	7	12
	% of Total	14.7%	20.6%	35.3%
Total	Count	16	18	34
	% of Total	47.1%	52.9%	100.0%

P value=0.72

Table-IV shows relationship between grading & lymph node metastasis.Total 16(47.1%) cases (n=34) of OSCC shows metastasis.Not significant relationship between grading & lymph node metastasis. (P value=0.72)

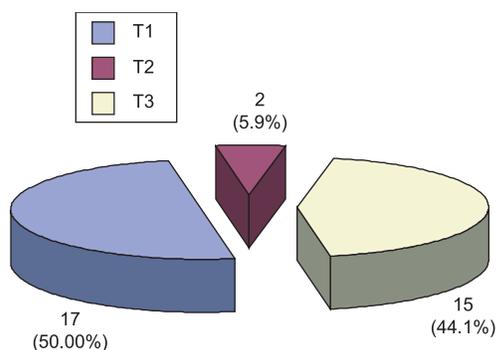


Fig.-1: Tumour size (T)

Figure 1 : Chart depicts the size of tumor of OSCC patients T₁ was 2 (5.9%), T₂ was 15(44.1%), T₃ tumor was 17(50%). 22 (64.7%) cases were grade-I and 12(35.3%) were grade-II.

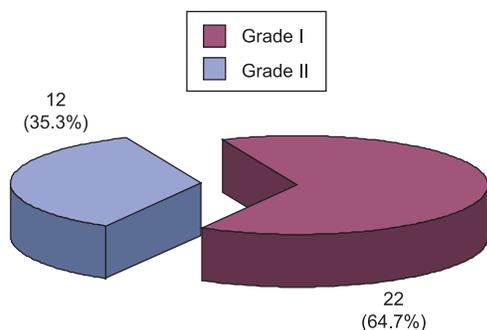


Fig.-2: Histological grading of OSCC(n=34)

Figure-2 :Chart depicts the histological grading of OSCC patients 22(64.7%) tumour were grade II another 12(35.3%) tumor were grade I.

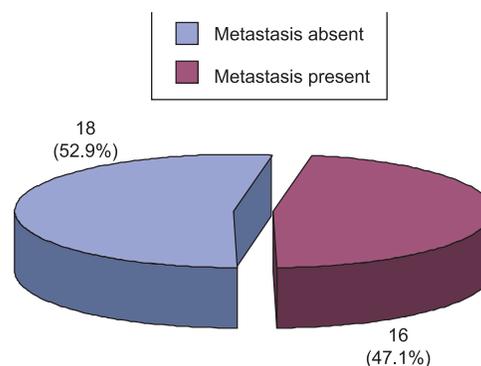


Fig.-3: Lymph metastasis(n=34)

Figure 3: Chart depicts the cervical lymph metastasis in OSCC 18 patients (52.9%) have metastatic nodes and 16 patients (47.1%) have absent metastasis.

Discussion:

Oral squamous cell carcinoma has a great predisposition to produce metastasis in lymph nodes. In clinical practice, the treatment plan and prognosis of oral squamous cell carcinoma is mainly based on the primary tumor, regional lymph node metastasis, and distant metastasis (TNM) staging system¹. However, this system does not provide any information on the biological characteristics and thus an aggressive clinical behavior of the tumor. Histologic grading has been used as a prognostic factor and for clinical behavior evaluation of oral squamous cell carcinoma for the past several decades⁴. At the same time, the prognostic value of different grading classifications controversial⁴. Prognostic value of histopathologic grading of OSCC has varied from not any to highly significant⁵ which correlates present study. (p value=0.72)

Cervical lymph nodes metastasis is well known to be an indicator of poor prognosis in patients with oral cancer⁶. Cervical metastasis is present at initial evaluation in approximately 30% of patients, except for the lips and hard palate³. The biological activity OSCC is evaluated and descriptively categorized as highly, moderately and poorly differentiated. This system was primarily developed by Broder, based on the differentiation of the tumor cell population alone, is of limited value as a basis for choice of treatment as well as for prediction of the outcome of the disease⁷. A possible relation of the degree of malignancy judged by histopathological findings to its prognosis has been examined since Broders reported the degree of keratinization of cancer cells in relation to its prognosis in

1920⁷. Broders' suggested that the grading of the tumors should be according to the differentiation of tumor cells. This system had four grades, of which grade I and II were relatively differentiated tumors, and grades III and IV were not very well differentiated tumors. Despite the widespread use of this system, or slight modifications of it, there has generally only been a limited relationship with the grading and the outcome of treatment and survival of the patient. The suggested reason for such a poor correlation with the grading and prognosis, is the relative heterogeneity of the cell population present in the tumors¹. In our study and Yazdi et al.⁸ in their study, failed to observe any relationship between Broders' system of grading and lymph node metastasis.

Odell et al. in a study of small lingual SCC's, found a relationship between local recurrence and metastasis with Broders' grade⁹. The present study failed to observe any relation between Broder's system of grading and lymph node metastasis. Since Broders' initial classification, multifactorial grading (MFG) systems were introduced which were mainly based on different parameters of tumor cells as well as the tumor host relationship¹⁰.

The relation between Broders' classification and lymph node metastasis with regard to Broders' classification, of the 16 cases analyzed in the metastatic group, 11 were well differentiated (Grade-I), 5 moderately differentiated (Grade-II) of the 18 cases analyzed in non metastatic group, 11 were well-differentiated (Grade I), and 7 moderately differentiated (Grade II). Statistical analysis failed to detect any relationship between Broders' grades and lymph node metastasis. (P=0.729). Among the respondents of this current study, mean ages of patient were 48.18±8.4 years. According to published literature, the mean age was 47.7 with a range of 27 to 75 years. In OSCC patients by Neena D¹. Study by Haq ME¹¹ also found similar statistics were mean age was 47.28±10.5 years also.

Regarding gender 50% of the cases were male and 50% female. A similar study was conducted in Bangladesh by Rahman¹² were among the population 50% were male and 50% female.

About tumor size our study reveal T₃ was 50% and T₂ was 44% and T₁ was 5.9%. Similar result found by Rab et al.¹³ In which T₁ was 8%, T₂ was 46.67% and T₃ plus T₄ were 45.33%. Another study showed the rate of metastasis in the cervical nodes was reported to be 35.36% in OSCC patients⁶. Present study reveal positive lymph node 47.1% which is similar of that study.

Regarding metastasis T₁ and T₂ lesions are often associated with a risk of regional metastasis of 10% to 30% respectively.¹⁴

T3-T4 lesions have a significantly higher risk of regional neck disease^{15,16}. Our study, found a significant relationship (p value =0.002) between tumour size and lymph node metastasis which resemble above studies.

Conclusion:

Oral squamous cell carcinoma is one of the challenges for oral and maxillofacial surgeons. Further studies including more sophisticated statistical methods and more comprehensive and homogeneous materials might clarify whether the grading of OSCC is of any greater significance in reflecting the growth capacity and malignancy of the tumor and in predicting the outcome of the disease at an early stage.

In conclusion, we consider that multifactorial grading system of OSCC.

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The reconstruction of head and neck defects with the Submental Island Flap

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Abstract:

Objective: The aim of our report is to evaluate the outcomes of the submental Island flap reconstruction for defects after ablation in patients with head and neck cancer. **Methods:** All patients who underwent reconstruction for head and neck defects with submental Island flap at Dhaka Medical College & Hospital between January 2014 to December 2015 were observed. The site of tumour, the clinical stage, the technique of flap harvesting, the outcome of cosmesis & function were recorded. **Results:** There were 5 men and 4 women with ages ranging from 38 to 66 years. The sites of tumor were tongue, buccal mucosa, floor of the mouth & retromolar area. The sizes of the flap ranged from 4x3 cm to 7x5 cm, with a median of 5.5 x 4 cm. Five patients underwent radiotherapy after surgery, the radiation dose 60 Gy. The follow up period ranged from 1 to 15 months with a median of 10 months. The long term cosmesis and function were perfect in most patients. One patient died of metastasis. **Conclusion:** The submental Island flap is a reliable alternative for reconstruction of head & neck defects in cancer patients.

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Introduction :

Reconstruction of defects following ablation of the head and neck tumors is a challenging problem. Several methods of reconstruction for the head and neck defects have been developed, such as radial forearm free flap, anterolateral thigh free flap, sternocleidomasoid flap and platysma flap. However, these methods have their own limitations. In recent years, the submental island flap has been increasingly used in the reconstruction of head and neck defects. The submental island flap was first described by Martin et al. in 1993.¹ In 1996 for the first time Strene and Hall reported the use of the submental island flap for reconstruction in oral cancer.² In past 20 years the submental island flap has been used for reconstruction of defects of mouth, face, upper aerodigestive tract, palatum and hypopharyngeal region.³⁻⁷

In past several years we adopted the submental island flap to reconstruct the defects in patients with head and neck cancers.

Methods:

In January 2014 to December 2015 all patients with head and neck cancer were admitted to the Department of Oral and Maxillofacial Surgery and E.N.T. Department of Dhaka Medical College Hospital.

All patients underwent submental island flap reconstruction for head and neck defects after tumour ablation. The site, clinical stage and pathological type of the tumour, the technique of flap harvesting and post operative radiation were recorded. After surgery all patients were followed-up to assess the cosmesis, complication, swallowing functions and speech functions.

Flap design and operative technique:

First the pinch test was conducted to ensure the donor site can be the primary closure. If the test was positive, the flap was useful for repairing. The incisions of the submental island flap were marked, whose size was determined by the lesion in the primary tumour. The upper border of flap was below the mandible, about 1.5 cm in the midline, and the lateral edges of flap did not exceed the mandibular angle bilaterally. Before, harvesting the flap the primary tumour was dissected, and the resection margins were confirmed to be histologically free of tumour on frozen sections. In addition, to avoid recurrence, the neck resection was made. Dissection of the flap proceeded in the subplatysmal plane and pedicles were identified. The flap was lifted off the contralateral anterior belly of the digastrics, the ipsilateral anterior belly of the digastrics was abscised cling to its mandibular attachment and at the intermediate tendon. Meanwile, level 1A was cleared.

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The submental vessels were dissected off the submandibular gland, whose branch supplying the gland was ligated. The vessels were carefully traced to the facial artery and vein. After the submental artery was given off, the distal portion of the facial artery was ligated. To prevent flap loss and other problems, an average of 1 to 2 cm of subcutaneous tissue was preserved around the vascular pedicle. The skin of the donor site could be sewed up together directly. If the skin tension was too large, the donor site was repaired by free grafts. If the submental vessels, musculus digastricus and donor site skin were invaded by lymph nodes, or the submental lymph nodes, or the submental lymph nodes were swollen, this flap had to be abandoned.

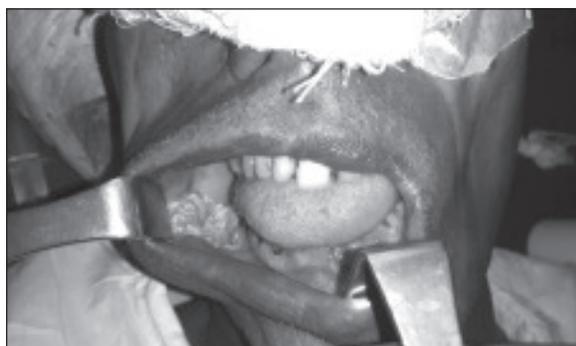


Fig.-1: Preoperative View



Fig.-2: Preoperative flap design



Fig.-3: Operative incision of submental island flap



Fig.-4: Flap being harvested to the defect



Fig.-5: Postoperative view after 15 days

Results:

There were 5 men and 4 women with ranging from 38 to 66 years. The tumour site included buccal mucosa, tongue, floor of the mouth and retromolar area. Buccal mucosa and tongue were the common primary sites. Squamous cell carcinoma was the histopathological diagnosis of all patients. All patients underwent neck dissection before flap harvesting. The skin paddles of the flap ranged from 4x3 to 7x5 cm, with a median of 5.5 x 4 cm. The primary site of the tumour, clinical stage and flap sizes of all cases are shown in Table -I.

Of the 9 cases, 5 cases received post operative radiation whose doses 60 Gy. There was no flap loss in these patients. The other patients had not received radiation due to financial burden.

All patients were followed up for 1 to 15 months with a median follow up duration of 10 months. One patient died of distal metastasis.

The long term cosmesis and function of speech and swallowing were excellent in all cases. One patient developed partial flap loss resulting from infection at the site of surgery.

Table-I
Patients Characteristics

Case	Gender	Age (Years)	Tumour site	Clinical staging	Pathology	Flap size (cm x cm)	Post.op. radiation	Follow up (months)	Outcome
1	M	60	Buccal Mucosa	T2N0M0	S.C.C	5 x 4	RT (60 Gy)	12	Alive
2	F	62	Tongue	T2N0M0	S.C.C.	6 x 4	RT (60 Gy)	08	Alive
3	M	55	Retromolar area	T2N0M0	S.C.C.	5 x 4	Rt (60 Gy)	14	Alive
4	F	50	Buccal mucosa	T3N0M0	S.C.C.	7 x 5	None	05	Alive
5	M	66	Buccal mucosa	T3N0M0	S.C.C.	7 x 5	RT (60 Gy)	07	Alive
6	M	48	Floor of the mouth	T1N0Mo	S.C.C.	4 x 3	None	11	Alive
7	F	58	Tongue	T2N0M0	S.C.C.	5 x 4	RT (60Gy)	15	Dead
8	M	38	Retromolar area	T1N0M0	S.C.C.	4 x 3	None	06	Alive
9	F	40	Tongue	T1N0M0	S.C.C.	4 x 3	None	12	Alive

Discussion:

Reconstruction of head and neck defects tumour ablation is important for head and neck cancer patients. Various techniques were developed, including free skin grafts , free flap and pedical flaps. Free skin grafts are limited to be used for reconstruction of defects in patients with head and neck benign tumors. Free flap has many advantages, including its thin and pliable nature , its ease of harvesting and acceptable donor site morbidity. However, it has unavoidable as limitations , such as functional problems and increased potential for flap failure associated with microsurgery.^{8,9} At the same time this operative technique is complicated, time consuming and requires advanced microsurgical techniques. After surgery the complications heavy economic burden and long term immobilization and anticoagulant therapy may be challenged as well. For some patients with hypertension, diabetes, and atherosclerosis, the free flap is liable to necrosis. Also, for some patients who underwent neck surgery, the blood vessels were damaged, therefore the free flap could be used for reconstruction . Under these conditions the pedicle skin flap can be used for most defects in the head and neck, such as the nasolabial flap, platysma musculocutaneous flap, and the sternocleidomastoid musculocutaneous flap. When the donor vessels were intact, the surgical technique became simple and consumed less time. However, some pedical flaps, such as forehead and platysmamusculocutaneous flaps, flap have disadvantages: such as large scarring in the donor site, with imperfect function after surgery.

In the past two decades, the submental island flap has been widely used for reconstruction of the head and neck defects. Compared with other other pedical flaps the

submental island flap has many advantages. It is thin and pliable, and a large surface area may be harvested, the largest skin paddle can be 15 x 6 cm. Further, as the flap is adjacent to the surgical defect it is easy to harvest. A rich vascular network between the ipsilateral and contralateral facial arteries and veins allows the submental flap to be used safely in patients who have received prior radiation treatment in a therapeutic dose. The submental island flap provides excellent colour and texture that matches to facial skin, and a concealed donor site incision that can be closed primarily. Compared with other pedicle flaps, the submental flap leads to excellent swallowing and speech functions . In addition the vascular pedical length of flap can range to 8 cm providing an arc of rotation extending from the medial canthus to zygomatic arch.¹⁰ It allows the flap to be used for reconstruction of the lower face, tongue, palate, buccal mucosa, mouth floor, laryngeal region etc. For patients with the upper third facial cancers, common submental island flaps cannot reach the defective sites. Therefore, a reverse submental island flap has been designed using retrograde blood flow by dividing the facial vessels proximal to the origin of the submental artery. Karacal et al.¹¹ used this technique in six patients for periorbital soft tissue and socket reconstructive with good results. Chen et al.¹² reported that there was no serious change in the mean intra-arterial pressure in the facial artery after proximal ligation and occlusion of the opposite relevant artery, which suggested that the reverse facial-submental artery island flap is reliable.

The submental artery is a well defined and consistent branch of the facial artery. It rises deep to the submandibular gland and passes forward and medially across the mylohyoid muscle. At its origin, the diameter of the submental artery ranges from 1.0 to 2.0 mm (mean 1.7

mm).¹³ The submental artery may be superficial (30%) or deep to the digastrics muscle (70%).¹⁴ Subastian et al.³ indicated that the terminal submental vessels are protected by including the overlying segment of the anterior belly of digastic muscle. Further, the underlying mylohyoid muscle can be cut or a strip of it included with the pedicle when the flap needs to be tunneled to a defect medial to the mandible. In our experience, the terminal submental vessels were all located deep within the digastric muscle. All harvested flaps were included with the anterior belly of digastrics muscle, and no flap loss occurred.

As for perforator vessels Matsul et al.¹⁵ described that although flaps with a single dominant perforator initially showed signs of altered flap metrics, in 6 h, perfused area of the flap was equivalent to flaps having multiple preserved perforators. To obtain the best outcome, we preserved all perforator vessels. Around the vascular pedical an average of 1 to 2 cm of subcutaneous tissue was preserved; this we could avoid vascular injury or vasospasm. Chen et al.¹⁶ coincidentally used a similar technique, in which an average of 1.5 to 2 cm of subcutaneous tissue was preserved round the vascular pedical to prevent any possible venous problems.

The submental island flap still has some limitations, including the risk of nodal metastases and difficulty in clearing the level I lymph nodes. For patients with palpable or radiologically demonstrable naeck node metastases, the submental island flap should be avoided.

For treatment o patients with head and neck cancers, an adequate dissection and flap harvesting technique careful patient selection and close observation are important. Based on our experience, systematic follow-up treatment may be required for preventing distal metastasis.

Conclusion:

The submental island flap is a reliable alternative for reconstruction of the head and neck defects following tumour ablation. It provides excellent functional and cosmetic results.

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Clinical evaluation of Carbamide Peroxide and Hydrogen Peroxide as vehicle of intracoronal bleaching agents in patients having Vita shade C3 or darker shaded discolored teeth

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Abstract:

Introduction: As an alternative intracoronal bleaching agent, 10% carbamide peroxide gel has been tried and found effective. The objectives of the study were to evaluate and compare the efficacy of carbamide peroxide and hydrogen peroxide as vehicle of dental bleaching agents when mixed with sodium perborate in patients having teeth of C3 or darker shades. **Materials and methods:** On the basis of predetermined inclusion and exclusion criteria, 11 patients could be scrutinized whose teeth shade were C3 or darker than C3. According to the bleaching agents to be evaluated, patients were allocated under 2 groups. The shade of adjacent normal tooth was used as control. Preoperative and postoperative color assessments of the discolored teeth were done weekly by three clinicians independently using a standard clinical shade guide. Evaluation was continued up to achieving the shade of the adjacent control tooth or a maximum of 5 weeks by using a scale of evaluation. Collected data of the weekly efficacy score were analyzed using a statistical software SPSS version 11.5. **Results:** The difference of treatment outcome between the groups on the study patients after 5 weeks of treatment was not statistically significant and also, neither of the two bleaching agents was significantly superior to each other in changing the shades among the patients having C3/darker shades. On comparing the weekly average efficacy score pattern between the groups, carbamide peroxide groups revealed statistically significant score at the end of 4th week and hydrogen peroxide groups revealed same at the end of 1st week. **Conclusions:** Within the study period, both the bleaching agents were able to bleach satisfactorily all the patients up to the desired normal shade. While comparing average efficacy score after 5 weeks, there was no statistically significant difference between the materials.

Keywords: Hydrogen peroxide, carbamide peroxide, sodium perborate etc.

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Introduction:

Tooth discoloration has a multi-causal etiology resulting from behaviors, diseases, injuries and other exposures

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along with various physiological processes.^{1,2,3,4,5} Most post-eruptive discoloration occurs as a result of trauma to the tooth leading to pulpal hemorrhage and necrosis. According to Nutting and Poe⁶ and Grossman⁷, bleeding and permanence of blood inside the conduit of the root is the most frequent cause of darkening of teeth. Tooth discoloration may be classified as extrinsic, intrinsic and a combination of both.³

Tooth discoloration has a direct impact on the esthetics of a person. Attractive teeth have always been the typical patients' primary desire. For this reason, bleaching, a chemical process for whitening materials is widely used in dentistry.⁸ Bleaching is now the single most common esthetic treatment.⁹

External bleaching technique is appropriate for the vital discolored teeth and the extrinsic, superficial and age related discoloration. Non-vital tooth whitening is appropriate for the significant color change in intrinsic discoloration of non-vital teeth. The whitening of endodontically treated teeth can be carried out by internal

whitening treatment or the “Walking bleach” technique.^{10,11,12,13} It is so named because in this technique, bleaching agent is sealed in the access cavity with provisional cement and bleaching occurs while the patient is “walking away” from the office.

In dentistry, bleaching usually refers to products containing some form of hydrogen peroxide.⁹ This active agent of bleaching either can be applied directly or produced in a chemical reaction from Sodium Perborate¹⁴ or Carbamide Peroxide¹⁵. Because of its low molecular weight, hydrogen peroxide diffuses easily through the organic matrix of the enamel and dentin.^{16,17,18} It is very unstable and acts as a strong oxidizing agent through the formation of free radicals,¹⁹ reactive oxygen molecules and hydrogen peroxide anions.²⁰ These reactive molecules can attack the long-chained, dark-colored chromophore molecules and split them into smaller, light colored and more diffusible molecules.

Selection of bleaching agents is done by evaluating the speed and efficacy in re-establishing the natural color of the teeth and their biological behavior to surrounding structures. Evaluation of the efficacy of the different medicaments of internal tooth bleaching by various studies has been done mostly on artificially stained teeth. The conclusion of those in vitro studies was that sodium perborate in water, sodium perborate in 3 and 30% hydrogen peroxide, and 10% carbamide peroxide were efficient for internal bleaching of non-vital teeth. Clinical studies are also necessary to assess the combined efficacy of 10% carbamide peroxide-sodium perborate mixture in comparison to others.

Materials and Methods:

This prospective study was conducted in the Department of Conservative Dentistry and Endodontics, Bangabandhu Sheikh Mujib Medical University (BSMMU). As per inclusion criteria- mature, permanent, intact, anterior asymptomatic teeth with good apical seal including single access opening and teeth having only trauma related discoloration were included for the study. According to the exclusion criteria- immature permanent teeth and teeth having discoloration caused by reasons other than trauma, restoration other than the endodontic filling, crown fracture, resorption, cervical abrasion, post endodontic symptoms etc were excluded from the study. Within the study period, 11 patients having C3 or darker

tooth shade were selected and written consent forms were obtained after explaining the study protocol to the patients in detail.

Purposive sampling technique was adopted. According to the bleaching agents to be evaluated, patients were allocated under following 2 groups:

Group I- Hydrogen peroxide mixed with sodium perborate (n=5).

Group II- Carbamide peroxide mixed with sodium perborate (n=6).

Study Procedure:

Following two weeks of history taking and the professional prophylaxis, the shade of the discolored tooth was recorded by three clinicians on the basis of a value oriented shade guide (VITAPAN Classical) on the preoperative data sheet. Common finding among the three evaluators was finally judged as the preoperative shade. Shade of the adjacent normal tooth was also determined in the similar way. Photographs were taken with a digital camera to record the baseline shades to be compared later on with the succeeding shades during the treatment procedures.

After removing the old restoration, the access cavity was cleaned with 1% sodium hypochlorite in a cotton pledget to remove the accessible remnants of necrotic pulp tissue. Filling of the coronal third of the root was removed up to 3 mm below the cemento-enamel junction using Gates Glidden drills for provision of a space for barrier placement. 4 mm thick layer of glass ionomer cement (type II) was used as a barrier for all the cases.

Sodium perborate powder was mixed with 30% hydrogen peroxide solution in a ratio of 2:1 (g/ml) to make a thick consistency of wet sand and the pulp chamber was packed with the paste by a plastic instrument. A cotton pellet was used to remove the excess liquid and also to compress the paste into all areas of the pulp chamber. After placing a tiny dry cotton pellet, undercut area was cleared off the bleaching agent and the access cavity opening was sealed with zinc phosphate cement for 7 days. Similar technique was also used during 10% carbamide peroxide application.

After 7 days, patients were examined for any change in the shades of the discolored teeth relative to the preoperative one with the help of the Vita shade guide and the shade changes were recorded on the data collection sheet.

Weekly clinical evaluation was done by three clinicians independently and was also recorded on the post-operative data sheet on the basis of a predetermined evaluation scale ranging from 5 to 1.¹³

The Evaluation Scores were as follows—

5 = Best or Optimal.

4 = Very Good.

3 = Good.

2 = Better than previous week.

1 = Identical to previous week/ failure.

According to the shade guide VITAPAN CLASSICAL- Blackish/ Bluish/ Grayish tooth color denoting with increasing intensity as C1, C2, C3 & C4 where C3 & C4 are usually darker than natural teeth.

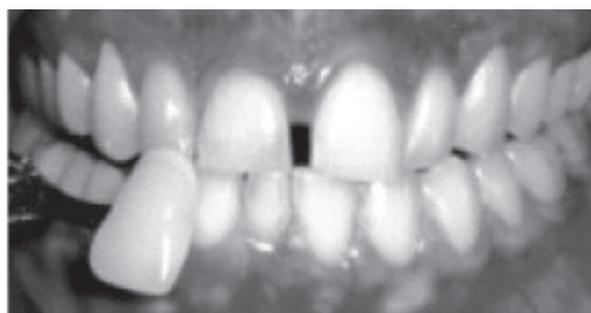
Photographs of the teeth were taken with the shade tabs in position.

The shade of the adjacent natural tooth was determined as the ultimate target. Fresh bleaching agent was replaced within the access cavity weekly up to achieving that target or for a maximum of 5 weeks. On each of the weekly evaluation day, the lightened shades of the treated teeth were recorded, the evaluation scores were documented and photographs were taken. After the desirable whitening had been achieved, the access cavities were packed with the thick mixes of calcium hydroxide for 2 weeks after which permanent restorations were done.

All the data collected during the treatment procedures were submitted for statistical analysis. The statistical analysis had done for the test of significance.



Pre-operative



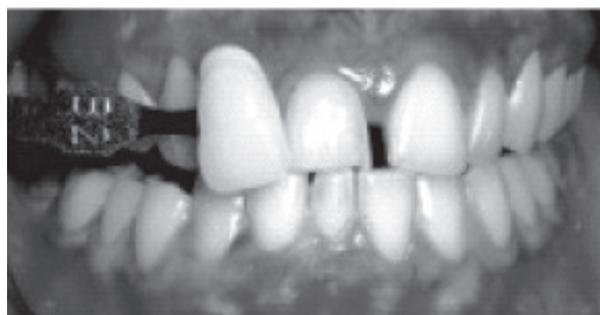
After 1st week



After 2nd week



After 3rd week



After 4th week



After 5th week

Fig.-1: Hydrogen peroxide was mixed with sodium per borate in bleaching of a patient having C4 shade.

Data analysis:

Data were processed and analyzed using SPSS (Statistical Package for Social Sciences) version 11.5. Chi-square (c2) Test was done for distribution of study subjects by treatment outcome. Unpaired Student's t-Test was done for comparison of average efficacy score between the groups and Repeated measure ANOVA and Bonferroni statistics were done for multiple comparisons of weekly average efficacy score between the groups. P value < 0.05 was considered significant. The summarized data were then presented in tables and line-charts.

Result:

The present study was undertaken to evaluate the efficacy of hydrogen peroxide and carbamide peroxide as non vital tooth bleaching agents when both of them were mixed with sodium perborate powder in a ratio of 1: 2 (ml/g). A thick mix of bleaching agent was packed within the pulp chamber of the discolored tooth having C3/darker shade. Weekly evaluations were recorded by three clinicians independently on data collection sheet using an evaluation scale. The summarized data were then presented in form of tables and line-charts.

Table-I

Comparison of overall efficacy of bleaching agents after 5 weeks of treatment on the study shades (n=11):

Groups	Average efficacy score after 5 weeks in C3 or darker shades	p-value [#]
Hydrogen peroxide	2.52 ± 0.39	0.926 ^{NS}
Carbamide peroxide	2.47 ± 1.19	

Data were analyzed using unpaired Student's t-Test and were presented as mean ± SD and p < 0.05 was considered significant. NS=Not significant. n=Number of study shades.

Table-I shows the overall efficacy of the two bleaching agents on C3/darker shades after 5 weeks of treatment and interprets that neither of the agent was significantly superior to each other in changing the shades of teeth.

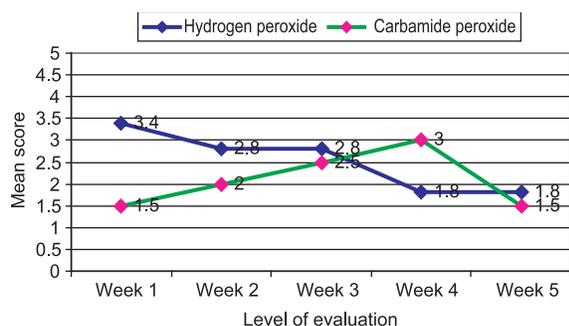


Fig.-2: Weekly average efficacy score pattern between the groups in patients having C3/darker shades.

Starting with a good range (score = 3) of efficacy, the hydrogen peroxide group showed a gradual decline in efficacy to reach an unacceptable range of efficacy (score < 2) and assumed a plateau state during the last week. On the contrary, starting with poor efficacy (score < 2), carbamide peroxide group showed a steady increase in its efficacy up to a good range (score 3) by the end of 4th week and then declined steeply during the last week showing unacceptable range (score < 2).

Table-II

Changes in weekly average efficacy score in different study groups in patients having C3/ darker shades (n=11):

Weeks	Groups		p-value [#]
	Hydrogen peroxide (n=5)	Carbamide peroxide (n=6)	
Week 1	3.4 ± 0.9	1.5 ± 0.7	0.040 *
Week 2	2.8 ± 0.8	2.0 ± 0.0	0.611 ^{NS}
Week 3	2.8 ± 1.3	2.5 ± 0.7	0.651 ^{NS}
Week 4	1.8 ± 0.4	3.0 ± 1.4	0.050 *
Week 5	1.8 ± 0.4	1.5 ± 0.7	0.346 ^{NS}

Data were analyzed using Repeated measure ANOVA and Bonferroni statistics and were presented as mean ± SD and p < 0.05 was considered significant. * =Significant NS=Not significant. n= number of study subjects.

Table-II shows the changes in efficacy score following treatment with hydrogen peroxide and carbamide peroxide in patients having C3/darker shade. The hydrogen peroxide group exhibited a significantly better efficacy compared to carbamide peroxide at the end of 1st week (p < 0.05) whereas the efficacy of carbamide peroxide was significantly better at the end of 4th week (p < 0.05) compared to the hydrogen peroxide group.

Discussion:

By weight, carbamide peroxide contains 33% hydrogen peroxide, so a bleaching gel with 10% carbamide peroxide contains a similar level of active hydrogen peroxide as one containing 3.3% hydrogen peroxide. When compared the efficacy of hydrogen peroxide containing products with carbamide peroxide containing ones having equivalent hydrogen peroxide content and both the products were delivered by similar format and formulations, approximately similar efficacy was reported by various in vitro ²¹ and in vivo studies²². Among those studies, the clinical study by Nathoo et al. (2003) demonstrated that, once a day application of either a 25% carbamide peroxide gel or an 8.7% hydrogen peroxide gel both gave a statistically significant tooth shade lightening

after 2 weeks use, compared to baseline, but found no statistically significant differences between the products. In all these studies, liberated hydrogen peroxide from the carbamide peroxide products were equivalent to the hydrogen peroxide containing products. On the other hand, equal efficacy was observed even when comparative bleaching agents were not consistent in their concentrations, as for example the study where 35% hydrogen peroxide and 35% carbamide peroxide were compared as intracoronal bleaching agent. In this study of Lim et al. (2004) equal efficacy was observed, in spite of having dissimilar hydrogen peroxide content. In the present study also, 30% hydrogen peroxide and 10% carbamide peroxide when mixed with sodium perborate bleached equal number of teeth after 3rd week (23%) and after 5 weeks of treatment, their overall efficacies interpret that neither of the agent was significantly superior to each other in changing the shades of teeth ($p=0.926^{NS}$).

In cases of C3 or darker shades, statistically significant difference was observed between the bleaching efficacy of hydrogen peroxide and carbamide peroxide when mixed with sodium perborate, both after 1st and 4th week. One of the basic phenomena of hydrogen peroxide is that it is highly unstable and it releases all its peroxide within 30-60 minutes and thus it remains efficient within this time range.²³ It acts as a strong oxidizing agent through the formation of free radicals¹⁹, reactive oxygen molecules and hydrogen peroxide anions²⁰. These reactive molecules can attack the long-chained, dark-colored chromophore molecules and split them into smaller, light colored and more diffusible molecules. For this reason, Hydrogen peroxide when mixed with sodium perborate, exhibited a significantly better efficacy at the end of 1st week ($p < 0.05$). On the other hand, Carbamide peroxide is a time-release approach to bleaching. It releases 50% of its peroxide in the first two hours, and can take up to six additional hours to release the remaining peroxide for bleaching. It can remain within the dentin where it can effectively break down the chromogens more efficiently but slowly.²³ Hence, Carbamide peroxide group performed a gradually improving performance up to the end of 4nd week.

Conclusion:

Within the study period, both the vehicles were able to bleach satisfactorily equal number of patients up to the desired normal shade. The Overall efficacy after 5 weeks of treatment showed that there was no statistically

significant difference between the materials. Although weekly evaluation revealed Hydrogen peroxide group to work faster, but considering the associated potential side effects, increase in the concentration of Hydrogen peroxide is not desirable.

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Etching effects of 37% Phosphoric acid and 10% Polyacrylic acid on dentin surface roughness- A scanning electron microscopic study

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Abstract:

The purpose of the present study was to investigate the surface morphology and surface roughness of dentin treated either by Phosphoric acid, Polyacrylic acid and control group. The surface roughness, diameter of the dentinal tubules, intertubular distance was observed by scanning electron microscope (SEM) and Illustrator software. Dentin (n=30) blocks were prepared from human extracted premolar teeth. Following polishing with grit paper, these surfaces were subjected to 37% phosphoric acid, 10% polyacrylic acid and control. The differences in surface roughness, dentinal tubules diameter, intertubular distance were investigated and statistical analysis were performed by ANOVA and t test (P<0.05). It was found that surface roughness was significantly increased with the phosphoric acid. SEM observation showed that following the removal of smear layer, the dentinal tubules were clearly visible. The diameters of dentinal tubules were also high after phosphoric acid etching. Based on this study, it can be concluded that phosphoric acid etching could provide greater surface roughness and better surface characteristics when compare to polyacrylic acid.

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Introduction:

Adhesion or bonding of materials with tooth tissue requires an intimate link between the restorative materials and tooth substances, with adequate surface wetting to decrease surface tension.^{1,2} Bonding between restorative materials and tooth occur by different methods such as (1) Physical electrostatic attraction (vander wall force), (2) Chemical bonding with interatomic bonds developing between the

tooth and restoration interphase, (3) Mechanical bonding with development of irregularities allowing undercut to be filled with a suitable bonding agents providing micromechanical retention.^{3,4} The micromechanical retention is considered as the most common and effective methods in adhesive dentistry.

The fundamental principle of adhesion to tooth substrate is based upon an exchange process by which inorganic tooth material is exchanged for synthetic resin.⁵ This process involves two phases. One phase consists of removing calcium phosphates by which microporosities are exposed at both enamel and dentin tooth surface. The other (hybridization phase) involves infiltration and subsequent polymerization of resin within the created surface microporosities.⁵ The adhesive restorative materials bond micromechanically to the prepared tooth surfaces which is enhanced by etching and conditioning of the tooth surfaces. Etching involves selective removal of components from a solid surface and increases the surface area.⁶

Acid etching was introduced by Buonocore (1955), since than various etching agents like phosphoric acid, lactic acid, nitric acid, maleic acid, polyacrylic acid, chloracetic acid, oxalic acid etc. have been used in adhesive dentistry.⁶ However, the quality of bonding agents may also depends on the materials being bonded and their properties, moisture or other contaminants, the effect of repeated

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thermocycling and the functional loads applied to the tooth and restoration. Furthermore, other factors that affecting bonding includes salivary pellicle and the smear layer which is formed during cavity preparation. Many previous studies reported that the mechanical preparation of dental cavities with rotating or manual instruments produces a thin smear layer that covers the dentin and enamel wall.⁷ This smear layer has a thickness of 1-10 micrometer, and it cannot be removed by the ordinary water spray.⁸⁻¹⁰ If left untouched, it will weaken the bond strength between filling materials and cavity walls. Therefore, etching of the cavity walls has been recommended to accomplish complete removal of this layer with acidic conditioner that applied to enamel and dentin utilizing a total-etch technique. Their mechanism is principally based on the combined effect of hybridization and formation of resin tags.^{8,11}

It has been reported that acid etching removes the smear layer to different degree and increase the width of the dentinal tubule apertures, and demineralize dentin in depth.¹² Various etchants like Phosphoric acid, Citric acid, Lactic acid, Polyacrylic acid, Aluminium salt solution, Maleic acid etc. have been introduced for creating micro-irregularities in the tooth structure. However, previous study has reported that the bonding between materials and tooth tissue is depend on the etching effect of the acid used, chemical composition of tooth structure, the technique used, type, concentration, pH and viscosity of acid used and time of application of acid and depth of surface irregularities.⁶

Therefore, this study was carried out to assess the surface roughness and observed the morphological changes of dentin following the application of Phosphoric acid and compare the results with that of Polyacrylic acid.

Materials and Methods:

This cross sectional comparative in vitro study was performed at Department of Conservative Dentistry & Endodontics, Faculty of Dentistry, BSMMU, Dhaka & Bangladesh Council of Scientific and Industrial Research (BCSIR), Science Laboratory, Dhaka from July 2008 to June 2010.

A total of thirty freshly extracted human premolar teeth (Age ranged from 15 to 20 years old), which was extracted due to orthodontic reason were used for this study. These teeth were stored in 0.9% NaCl solution soon after extraction. All teeth were carefully cleaned to eliminate tarter, calculus, stain and remained tissue by the help of ultrasound scalar. Just prior to preparation, a tooth specimen was thoroughly rinsed in running water. The surfaces of all the teeth were examined under a visible light and all carious, cracked and fractured teeth, root canal treated tooth, and tooth with developmental or structural defects were excluded from the study.

Sample preparation of this study was originally based on a previous study.¹³ Dentin surfaces were prepared by horizontal sectioning through the middle third of the premolar teeth crown and finished with 400, 600, 800 and 1000-grit paper (Water proof silicon carbide abrasive paper). The roots of all teeth were then removed with a high speed turbine bur. The specimens were randomly divided into 3 groups according to different surface treatment used as follows: in Group A (Control), 10 dentin samples did not received any treatment and used as control. They were only washed with distilled water and dried with oil free compressed air for 20 seconds. In Group B, 10 dentin surfaces were etched with 37% phosphoric acid for 20 seconds, rinsed with running water and dried with oil free compressed air, and in Group C, 10 dentin surfaces were etched with 10 % polyacrylic acid for 20 seconds followed by rinsed running water and dried with oil free compressed air. All specimens were dried in ethanol and followed by room temperature before SEM (Hitachi S 3400N, Japan) observation at 15 KV.

Surface roughness of dentin that produced after each treatment group was observed by using by the SEM at x 500 magnification and Illustrator software according to Hossain et al, 2001.¹³ Furthermore, the diameter of the dentinal tubules, intertubular distance was also measured by the SEM at x 500 magnification. Statistical analysis of the results was done by computer software device as statistical packages for social science (SPSS ver. 16.0). For significant of differences, ANOVA and t-test were performed; a value of $p < 0.05$ was considered as significant.

Results:

The mean (\pm SD) dentin roughness of the samples were 13.54 \pm 1.94, 66.34 \pm 6.89 and 46.67 \pm 3.54 in group A, B, C respectively (Table-I). The mean (\pm SD) dentin roughness of group B was significantly ($p < 0.001$) higher in comparison to that of group A and C.

Table-I
Results of Dentin Roughness (n=30)

Groups	Mean (μ m) \pm SD
A (n=10)	13.54 \pm 1.94
B (n=10)	66.34 \pm 6.89
C (n=10)	46.67 \pm 3.54

Statistical Analysis

Group	Dentin roughness (p Value)
A vs B vs C ^a	0.001 ^s
A vs B ^b	0.001 ^s
A vs C ^b	0.001 ^s
B vs C ^b	0.001 ^s

Data were expressed as Mean (μm) \pm SD. Statistical analysis were done by one-way ANOVA^a and Independent sample t-test^b.

Group A: Control

Group B: 37% phosphoric acid treatment

Group C: 10% polyacrylic acid treatment

S: Statistical Significant ($P < 0.05$)

n=number of samples.

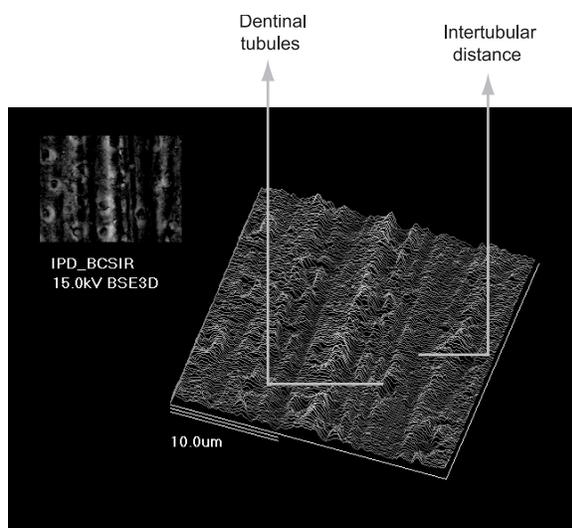


Fig.-1: Representative photographs for measuring the surface roughness of Dentin in control group.

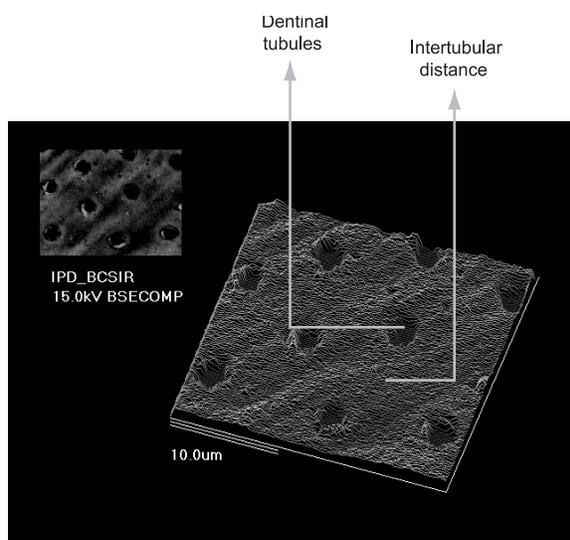


Fig.-2: Representative photographs for measuring the surface roughness of Dentin in Phosphoric acid.

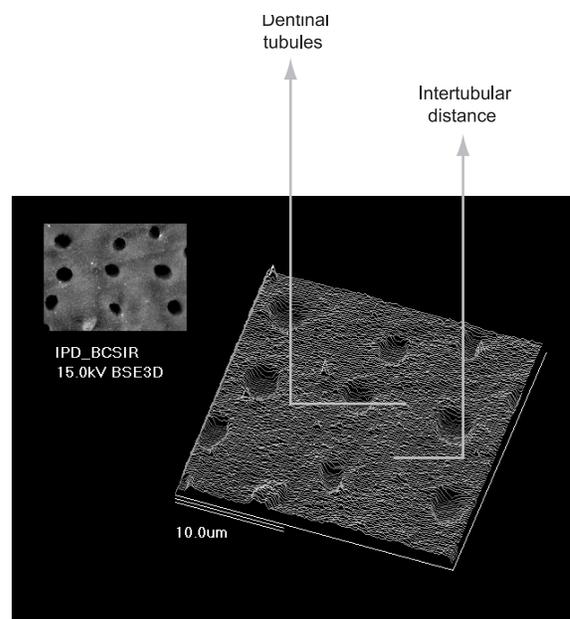


Fig.-3: Representative photographs for measuring the surface roughness of Dentin in Polyacrylic acid.

The mean (\pm SD) diameter of dentinal tubules of the samples was 0.00 ± 0.00 , 3.01 ± 0.11 and 2.53 ± 0.14 in group A, B, C respectively (Table II). The mean (\pm SD) diameter of dentinal tubules of group B was significantly ($p < 0.001$) higher in comparison to that of group A and C.

Table-II

Results of Diameter of dentinal tubules (n=30)

Groups	Mean (μm) \pm SD
A (n=10)	.00 \pm .00
B (n=10)	3.01 \pm .11
C (n=10)	2.53 \pm .14

Statistical Analysis

Group	Dentinal Tubules diameter (p Value)
A vs B vs C ^a	0.001 ^s
A vs B ^b	0.001 ^s
A vs C ^b	0.001 ^s
B vs C ^b	0.001 ^s

Data were expressed as Mean (μm) \pm SD. Statistical analysis were done by one-way ANOVA^a and Independent sample t-test^b.

Group A: Control

Group B: 37% phosphoric acid treatment

Group C: 10% polyacrylic acid treatment

S: Statistical Significant ($P < 0.05$)

n=number of samples.

The mean (\pm SD) intertubular distance of the samples were 0.00 ± 0.00 , 5.76 ± 0.13 and 5.07 ± 0.29 in group A, B, C, respectively (Table III). The mean (\pm SD) intertubular distance of group B was significantly ($p < 0.001$) higher in comparison to that of group A and C.

Table-III
Results of Intertubular Distance (n=30)

Groups	Mean (μm) \pm SD
A (n=10)	0.00 ± 0.00
B (n=10)	5.76 ± 0.13
C (n=10)	5.07 ± 0.29

Statistical Analysis

Group	Intertubular distance (p Value)
A vs B vs C ^a	0.001 ^s
A vs B ^b	0.001 ^s
A vs C ^b	0.001 ^s
B vs C ^b	0.001 ^s

Data were expressed as Mean (μm) \pm SD. Statistical analysis were done by one-way ANOVA^a and Independent sample t-test^b.

Group A: Control

Group B: 37% phosphoric acid treatment

Group C: 10% polyacrylic acid treatment

S: Statistical Significant ($P < 0.05$)

n=number of samples.

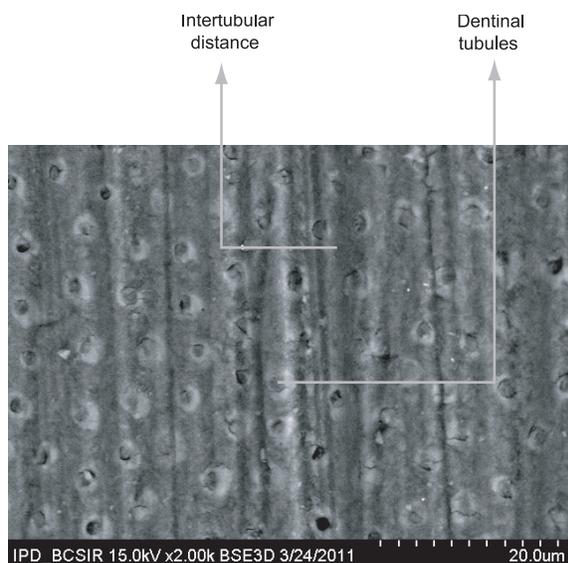


Fig.-4: Representative photograph of control group for morphological Observation of Dentin in control group.

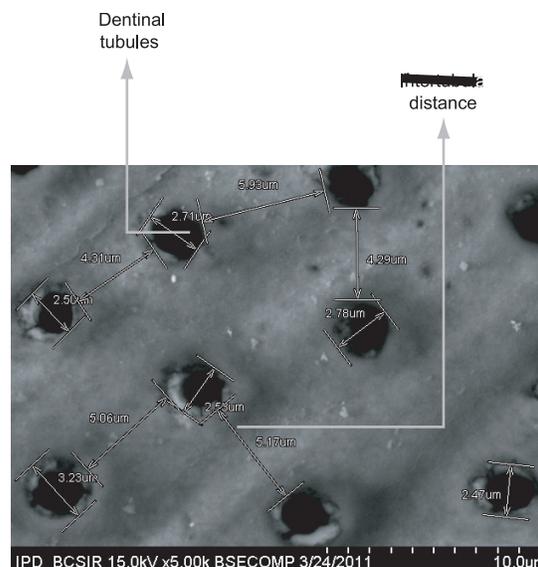


Fig.-5: Representative photographs of Dentin subjected to Phosphoric acid.

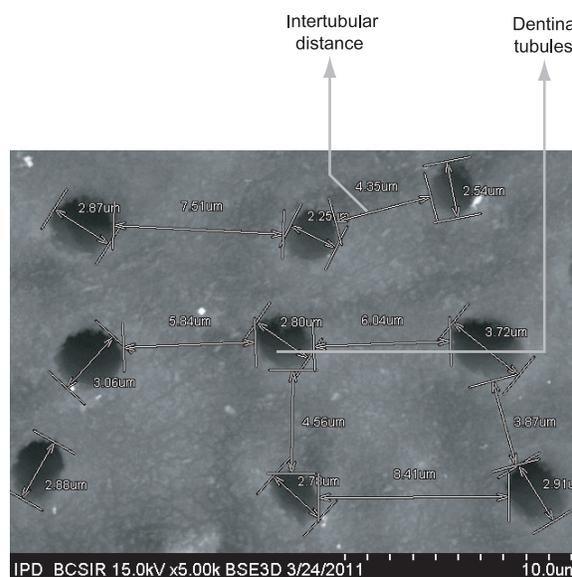


Fig.-6: Representative photographs of Dentin treated by Polyacrylic acid.

Discussion:

Regarding analysis of surface roughness, the present study showed that Phosphoric acid etching produces significantly higher roughness than that of Polyacrylic acid when measured by SEM and Illustrator software. One previous study has confirmed that significant differences in surface roughness greatly influence the microleakage or bond strength of restorative materials because a rougher surface for a given cross-sectional area would have a greater surface area and this further decrease microleakage or increasing bond strength.⁴ However, another study

reported that although the use of profilometer is effective in measuring the surface roughness but surface topography is not possible with the profilometer.¹⁴ Furthermore, SEM analysis is associated with a lack of quantitative analysis of the roughness values. Therefore, Hossain et al.¹³ proposed a color laser 3D profile microscope to measure the surface roughness. They indicated that this instrument can search precisely roughness after acid etching or laser irradiation. Considerable additional research is necessary to confirm the hypothesis.

In the present study, surface roughness of dentin subjected to phosphoric acid and polyacrylic acid and control group were examined by SEM and Illustrator software. The results of surface roughness found in the present study had similarities and dissimilarities with some of the previous studies. Hossain et al.¹³ used a color laser 3D microscope and found that the roughness of dentin following phosphoric acid was $90 \pm 4 \mu\text{m}$, which is almost similar to our present study.

In the present study, surface roughness was measured by SEM and Illustrator software. Comparing to profilometer, we consider that this technique is able to search precisely the roughness and is easy and less expensive too. Furthermore, the results of SEM observation showed that following phosphoric acid etching, in the dentin surface, the orifice of the dentinal tubules was exposed. This appearance was similar to the previous studies by Hossain et al.¹³ and Nakabayashi et al.¹¹

The polyacrylic acid surface on the other hand produces a rough appearance, and in the dentin surface, the dentinal tubules were also exposed. This appearance was also similar to the previous studies by Smith¹, who reported that this surface is suitable to adhesion to dentin. However, in the control group, the results of SEM observation shows that dentinal tubules could not be recognized because they were covered with smear layer. Previous study have reported that remaining of smear layer over the treated surface will weaken the bond strength between filling materials and the cavity walls.^{8,9} Therefore, we considered that the exposed dentinal tubules following phosphoric acid etching might facilitate good adhesion of the tooth tissue with the restorative materials. Furthermore, comparing to other weak acid etching agent (such as polyacrylic acid, citric acid, EDTA) bonding between tooth tissue and restorative materials was high following phosphoric acid etching.¹⁵

The diameter of dentinal tubules and inter tubular distance were also measured by the SEM. It was found that diameter

of dentinal tubules and inter tubular distance were high in phosphoric acid group than that of polyacrylic acid and control groups. Sturdevant³ in a previous study reported that diameter of the dentinal tubules following phosphoric acid etching were ranged between 2-3 μm . The result of the present study was corresponded to that of previous study.³ Therefore, based on the present study together with the previous study, it can be said that high diameter of the dentinal tubules after phosphoric acid treatment might facilitate the formation of hybrid zone, since a primer and an adhesive can penetrate the surface better when the smear layer is removed; it might play an important role in decreasing microleakage of composite resin restoration.⁴ However, there are controversial hypothesis too. Chemical changes in the dentin may also produce an increase in dentin permeability and in dentin wetness, increase potential for pulp irritation, and modification of the fraction of organic matter and decalcification of the inorganic component.¹⁶ Therefore, it can be said that during phosphoric acid etching, it is necessary to protect the dentin by using a lining/base material to cover the dentin, especially in deep cavities.

Conclusion:

Based on this study, it can be concluded that phosphoric acid etching could provide greater surface roughness, better surface morphology when compare to polyacrylic acid. However, further researches are needed to determine the extent of any benefits of high surface roughness by phosphoric acid etching.

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Relation between signs and symptoms of Temporomandibular joint disorder and cross bites among the patients attending in the Orthodontic dept. of BSMMU

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Abstract:

Temporomandibular disorder (TMD) are by far the most predominant condition affecting the temporomandibular joint (TJ). Crossbite sometimes aggravated the signs and symptoms of TMDs if untreated for long time. The objective of this study is to evaluate the relation between the signs and symptoms of temporomandibular joint disorder and cross bite. This cross sectional study was conducted in the Department of Orthodontics, BSMMU, from January 2013 to July 2014. In this cross sectional study, the sample was consisting of 204 outdoor patients who were willing to receive orthodontic treatment with an age range above 6 years. The subjects were requested to answer questionnaires concerning age, sociodemographic variables, history of stress and lifestyle. The symptoms were transposing in to a severity classification according to the number and frequency of positive responses. The collected data sets were evaluated by the chi-square test between TMD severity and gender. Almost all the cases in this study had atleast one TMDs sign and symptoms. Some of the TMDs like clicking sound, restriction in jaw movement pain during chewing food were considerable prevalent among crossbite cases attending orthodontic outpatient department. The maximum respondents were found to have sound on mouth opening (51.5%), followed by pain during chewing food (32.4%) and restriction in jaw movement (22.5%). Whereas the least positive response were pain in head or neck, lip or chick biting and mental stress. Deviation of jaw and restriction in jaw movement were found to be significant. TMD's signs and symptoms were common in crossbite cases.

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Introduction:

Temporomandibular joint disorder(TMD) represents a common health problem¹. Despite the fact that dental caries and periodontal disease are the main problems in oral health, temporomandibular joint disorders (TMD), due to their magnitude and transcendence, are becoming

important diseases within dentistry care as well as public health problem due to the number of people they affect. It is an umbrella term embracing a number of clinical manifestations that involves the temporomandibular joint (TMJ), the masticatory muscles and the teeth. Patient with TMD usually suffer from muscle and/or joint pain on palpation and on mandibular movement, joint sound and the mandibular range of motion may be limited². TMD can affect any patients regardless of age including children³ or gender with varying signs and symptoms⁴. However, due to the variation in symptoms among different patients and in the same patient at different times, the diagnosis of this clinical entity may be difficult⁵.

The prevalence of this type of disease, according to the literature, varies between 28 and 88% depending on the type of population studied, as well as the diagnosis system used⁶. The available evidence regarding TMD is not entirely clear⁷, although the old paradigm that the disease was a manifestation of the Costen syndrome has been changed and the new paradigm that proposes a multicausal model⁸ does not clearly assert what factors are associated with the disease. Individuals with low self esteem are more likely to suffer from TMD⁹, psychological and emotional

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factors are clearly involved in the development of the disorder¹⁰.

The information regarding signs and symptoms of TMD has been collected by clinical examination and questionnaires in some studies or interview in others¹¹. A number of authors around the world have found variables associated with TMD. For example, muscular force¹² has been seen to play a principle role in the physiology of the orofacial complex and changes in muscular force may be reflected in the function of the TMJ. The loss of posterior tooth¹³ is a variable that has been associated with TMD. Malocclusions¹⁴, mainly those of class II type I of Angle, have been consistently related to TMD. Relationships have also been found with psycho-emotional factors^{6, 8, 15}, anxiety and stress.

The prevalence of TMDs has been observed most frequently among woman.^{6,8,16} Various authors have also observed that the frequency of the signs and symptoms of TMD increase with age.¹⁷ Para functional habits like the bruxism or abnormal decay of teeth,^{8,14} occlusal characteristics like premature contact or interferences on the work side or balance side are associated with TMD as well as the side of chewing preference.¹⁸

The objective of this study to find the relation of TMD sign and symptoms in crossbite cases attending the outpatient department of orthodontics, BSMMU.

Objectives

General objective: evaluate the relation of signs and symptoms of temporomandibular joint disorder among cross bite cases in BSMMU.

Specific objectives:

- To evaluate the variation of the signs and symptoms of temporomandibular joint disorder with anterior crossbite and posterior crossbite.
- To assess the variation of signs and symptoms of TMDs between gender.
- To assess the variation of signs and symptoms of TMDs with age.

Materials and methods:

This cross sectional study was conducted in the Department of Orthodontics, BSMMU. Dhaka during the period of January 2013 to July 2014. In this cross sectional study, the sample was consisting of 204 outdoor patients who were willing to receive orthodontic treatment with an age range above 6 years.

Procedure for Collecting Data: The patients visiting outpatient department of orthodontics, who were diagnosed with cross bite were selected and a predesigned questionnaire was given to them. The same questionnaire also had a column to note the type of cross bite (anterior cross bite and posterior cross bite) by the researcher.

Questionnaire

This questionnaire is designed to help to evaluate your TMJ and associated structure problems. Please answer all questions as honestly as possible.

1. Name:
2. Age3. Sex.....4. Occupation.....
8. Gender: Male/female
9. Marital Status: Single/married
10. Do you hear joint sounds? Yes/No
11. Do you have limitation in mouth opening? Yes/No
12. Do you have pain in or about the ears? Yes/No
13. Have you ever had joint locking? Yes/No
14. If yes, how many times? Once/More
15. Do you have pain on chewing? Yes/No
16. Have you ever had trauma to head and neck area? Yes/No
17. If yes, how many times? Once/More
18. Do you have stress, or under stressful conditions? Yes/No
19. Do you have arthralgia in other joints in your body? Yes/No
20. Is your sleep disturbed in the night? Yes/No
21. Do you live with your family? Yes/No

Inclusion criteria:

- Patient who attends in the orthodontic outdoor age above 6 years.
- Patient with crossbite.

Exclusion criteria

- Patient with cleft lip and palate.
- Syndromic cases like cleidocranial dysplasia, craniofacial microsomia etc.

Results:

A total of 204 patients diagnosed with cross bite were taken in this study. There were 76 male (37.25%) and 128(62.75%) females. The age range of the cases was from 7 years to 25 years, the mean age was 18.22 years.

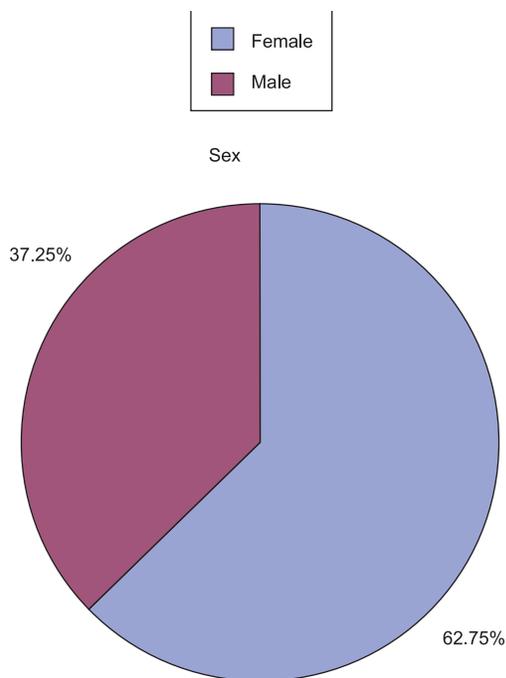


Fig.-1: Percentage of the male and female ratio of the respondents

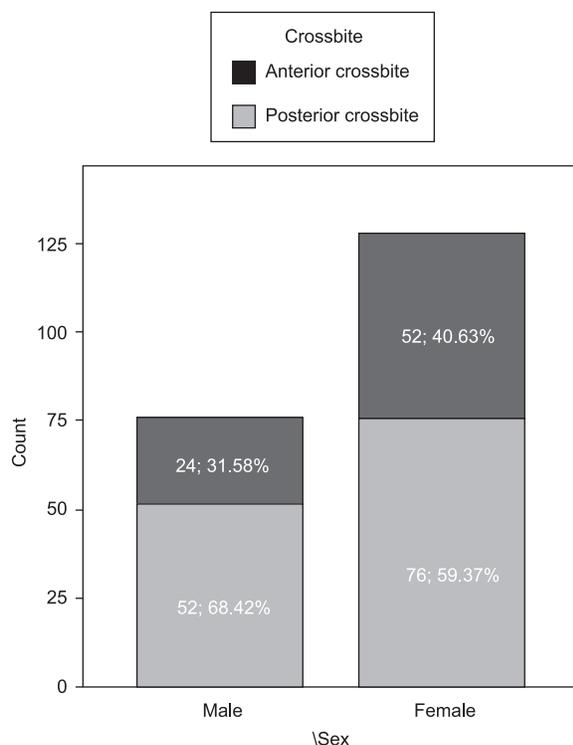


Fig.-2: Frequency & Percentage of the crossbite distribution among the gender

Table-I
Distribution of cross bite among respondents

	Frequency (N)	Percent (%)
Anterior crossbite	76	37.3
Posterior crossbite	128	62.7
Side of		
Right	42	20.6
Left	54	26.5
Posterior crossbite		
Both	32	15.7

Table-II
The frequency and percentage of response

TMD Response	Frequency (n)	Percent (%)
Sound on jaw movement	105	51.5
Restriction in jaw movement	46	22.5
If yes		
Mouth opening	34	16.7
Left right movement	7	3.4
Forward backward movement	3	1.5
Deviation of jaw	34	16.7
If yes		
Right	21	10.3
Left	13	6.4
Pain in/near ear	12	5.9
History of jaw lock	33	16.2
If yes		
Once	18	8.8
More than Once	15	7.4
Pain during chewing food	66	32.4
Pain In head or neck	11	5.4
Mental stress	10	4.9

*Self reported by the respondents.

The maximum respondents were found to have sound on mouth opening (51.5%), followed by pain during chewing food (32.4%) and restriction in jaw movement (22.5%) whereas the least positive response were pain in head or neck, lip or chick biting and mental stress.

Table-III
Comparison of anterior and posterior cross bite

TMDResponses	Cross bite		Total N (%)	Sig
	Anterior cross bite, n (%)	Posterior cross bite, n (%)		
Sound on jaw movement	37 (48.68)	68 (53.96)	105(51.47)	0.320
Restriction in jaw movement	15 (19.74)	31 (24.60)	46(22.54)	0.287
Deviation of jaw	8 (10.53)	26 (20.63)	34(16.66)	0.050
Pain in/near ear	3 (3.95)	9 (7.14)	12(5.88)	0.282
History of jaw lock	9 (11.84)	24 (19.04)	33(16.17)	0.135
Pain during chewing food	19 (25)	47 (37.30)	66(32.35)	0.057

*Self reported by the respondents.

Chi- square test was performed for the responses among anterior and posterior cross bite. Deviation of jaw was found to be significant.

Table-IV
Comparison of response for male and female

TMDResponses	Gender		Total N (%)	Sig
	Male n (%)	Female n (%)		
Sound on jaw movement	44 (57.89)	61 (47.65)	105 (51.4)	0.102
Restriction in jaw movement	23 (30.26)	23 (17.96)	46(22.54)	0.033
Deviation of jaw	16 (21.05)	18 (14.06)	34(16.66)	0.136
Pain in/near ear	5 (6.57)	7 (5.47)	12(5.88)	0.483
History of jaw lock	16 (21.05)	17 (13.28)	33(16.17)	0.105
Pain during chewing food	28 (36.84)	38 (29.68)	66(32.35)	0.184
Pain In head or neck	5 (6.57)	6 (4.68)	11 (5.39)	0.395
Mental stress	5 (6.57)	5 (3.90)	10(4.90)	0.296
Any other illness	8 (10.52)	6 (4.68)	14(6.86)	0.100

*Self reported by the respondents.

Chi-square test was performed for the responses among male and female. Restriction in jaw movement was found to be significant

Table-V
Comparison of response for age group

TMDResponses	Age group			Total n (%)	Pearson's chi- square sig.
	12 years and below n (%)	13 to 18 years n (%)	19 years and above n (%)		
Sound on jaw movement	6(35.29)	48(52.17)	51 (53.68)	105(51.47)	0.371
Restriction in jaw movement	1 (5.88)	20(21.73)	25(26.31)	46(22.54)	0.173
Deviation of jaw	2(11.76)	20(21.73)	12 (12.63)	34(16.66)	0.211
Pain in/near ear	1 (5.88)	5(5.43)	6(6.31)	12(5.88)	0.968
History of jaw lock	2(11.76)	16(17.39)	15(15.78)	33(16.17)	0.838
Pain during chewing food	4(23.53)	30(32.60)	32(33.68)	66(32.35)	0.710
Pain In head or neck	0(0)	8(8.69)	3(3.15)	11 (5.39)	0.149

*Self reported by the respondents.

Chi-square test was performed to compare between age groups for TMD's signs and Pearson's chi-square value was considered for significance.

Discussion:

The result of present investigation showed that symptoms of TMD's were remarkably prevalent among the 204 patients with cross bite sample who attend in the outdoor patient department of orthodontics. Clicking sound, pain during chewing food and restriction in jaw movement were the most prevalent findings of this study, whereas pain in head and neck, lip or cheek biting was among the least prevalent sign and symptoms of TMD'.

Many studies have shown that there are significant associations of cross bite with TMDs¹⁹, whereas other studies have shown that TMDs are not significantly associated with Crossbite²⁰.

This study shown that TMDs were significantly associated with posterior crossbite. Sound on jaw movement, restriction in jaw movement, deviation of jaw, pain during chewing food were more common in posterior crossbite cases (Table-III) which was observed in a previous study²¹.

This study has shown that the TMDs are not significantly associated with any of the gender. Restriction of jaw movement was found to be significantly higher in males than females. No other TMDs showed any significant difference between the genders. Generally, epidemiological studies have documented a greater frequency and severity of TMD in females than in males²². Although these differences have been explained by behavioral, psychosocial, hormonal, and constitutional factors, no conclusions have been drawn^{22,23}. Yet other studies have found no significant difference between male and female population for TMDs in crossbite²⁴.

This study demonstrated that sound on mouth opening that is clicking (51.5%) was the most common symptom in the sample investigated, which was observed in a previous study⁶. Pain in or around the ears during chewing food (32.4%) was the second most common symptom, whereas, other studies demonstrated this to be most common symptom²⁵.

The results of the present study indicated that age variations within the investigated sample had no significant effect on TMD symptoms. This finding supported a previous study²⁶ that investigated the age effect on TMD on a large sample of 7008 subjects, but contrasted the findings of other studies which reported either an increase in symptoms with age in a sample of 2255 subjects²⁷ or a decrease with age in a sample of 920 subjects²⁸. The disagreement among the previously reported studies may be related to sample size or its demographic distribution.

Although mental stress has been related to TMDs in most of the studies²⁹, this study has shown less frequency of mental stress. This could be because this study was conducted in crossbite cases only and major contributor to TMDs could be cross bite rather than any psychological stress.

Jaw deviation was found to be 16.7% in total study sample, a study by Rabab M Feteih³⁰ showed lower occurrence of jaw deviation of 3.9%, which was done in a souidi Arabian adolosents whereas this study was done among patients seeking orthodontic treatment for crossbite. This study shows that jaw deviation was associated with crossbite cases.

It is accepted that TMD symptoms are more common in females²⁸. The findings of present study shows almost similar presentation of TMD symptoms in both sexes, this could be contributed to the fact that females are more aware of their appearance in this society than males, most of the males come for treatment only after progression of the disease.

Conclusions:

Almost all the cases in this study had at least one TMDs sign and symptoms. Some of the TMDs like clicking sound, restriction in jaw movement, and pain during chewing food were considerable prevalent among cross bite cases attending orthodontic outpatient department. A conclusion can be drawn from this study that cross bite does contribute to temporomandibular joint disorders.

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Relationship of tobacco smoking with Alveolar osteitis after tooth extraction

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Abstract:

Background: Alveolar osteitis is classically seen as the postoperative complication of tooth extraction, which occurs commonly during healing phase of extraction sockets where blood clot fails to form or is lost. Nicotine the active constituent in tobacco is absorbed through the oral mucosa. This drug increases the platelet aggregation thereby increasing the risk of microvascular thrombosis and peripheral ischemia. Thus smoking increases the risk of incidence for alveolar osteitis.

Objectives: The present study was conducted to assess the role of smoking for development of alveolar osteitis.

Materials and Methods: This prospective comparative study was done at the Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, Bangabandhu Sheikh Mujib Medical University, Dhaka for the period of 1 year. Age matched 41 post extraction male patients was purposively taken as the sample of the study. Samples were divided into two groups as—Group-A: smokers (case group) and Group-B: non-smokers (control group). All procedures had been performed under local anesthesia (using 2% lidocaine without vasoconstrictor) by an experienced dental surgeon. Data of age of the patients, socio-demographic status, smoking status, post-operative complications, wound healing conditions and blood flow in the mental artery was collected. Color Doppler Sonographic examination of the mental artery on both sides (Right and Left) was carried out to measure the blood flow.

Data analysis was performed using SPSS software (version 19).

The “chi-square” test and student “t”-test was used to study the association between alveolar osteitis and smoking. Significance was set at P < 0.05.

Results: There was a non-significant relationship of smoking and development of alveolar osteitis (P=0.227). Wound healing condition of non-smoker group was better than smoker group (36.58% vs. 14.63% respectively), and P value was 0.009. There was a non-significant relationship with smoking and blood flow in mental artery although smoker group showed lesser peak systolic volume (PSV) and greater resistance index (RI) than that of non-smokers.

Conclusion: Dry socket is a commonly encountered postoperative condition in patients undergoing extraction. The etiology of alveolar osteitis is not clearly known. No significant association was found between smoking and development of AO but smokers have more chance of developing AO (36.58% vs. 14.63% respectively). Smokers also showed lesser PSV and Greater RI although it was not statistically significant. Further research and investigations are required to be carried out to draw firm conclusions and provide a better way in management of this condition by using novel dosage forms.

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Introduction:

Alveolar osteitis is the inflammation of the alveolar bone of either the mandible or maxilla. It is also known as dry socket, or less commonly fibrinolytic alveolitis. This is classically seen as the post-operative complication of tooth extraction, which occurs commonly in extractions involving mandibular third molars. Alveolar osteitis occurs during healing phase of extraction sockets (Blum, 2002; Jaffar & Tin-Oo, 2009). It usually occurs where the blood clot fails to form or is lost from the tooth socket. This will lead to an empty socket where bone is exposed to the oral cavity, causing a localized alveolar osteitis limited to lamina dura. It is associated with increased pain and delayed healing time (Wary et al. 2003).

After extraction of a tooth, blood is extravasated into the socket, and clot is formed. This blood clot is replaced with granulation tissue which consists of proliferating endothelial cells and fibroblasts which are surrounding alveolar bone and gingival mucosa (Wary et al. 2003). Next, it is replaced by fibrillar bone and finally by mature woven bone. On the other hand, the blood clot may fail to form because of poor blood supply. The clot may be lost due to excessive mouth rinsing, or disintegrate prematurely due to fibrinolysis too. During high levels of fibrinolytic activity in and around the tooth extraction socket, fibrinolysis-tissue activators released from damaged bone convert plasminogen to plasmin causing breakdown of the blood clot. Kinins are also activated which lead to pain sensation (Sweet & Butler, 1978; Meechan, et al. 1988).

Besides that, bacteria may secondarily colonize the socket, and caused further dissolution of the clot. Bone tissue is exposed to the oral environment, and a localized inflammatory reaction takes place in the adjacent marrow spaces (Nusair & Younis, 2007). This localizes the inflammation to the walls of the socket, which become necrotic. The necrotic bone in the socket walls is slowly separated by osteoclasts and fragmentary sequestrum may form (Wary et al. 2003). It is a much more serious condition when bone is exposed at other sites in the human body. In the case of alveolar osteitis, healing is retarded because tissue must grow from the surrounding gingival mucosa, which takes longer than the normal organisation of a blood clot (Barclay, 1987).

There are some predisposing factors for development of acute alveolar osteitis such as- extraction site, surgical trauma, infection, oral contraceptive, radiotherapy and smoking. Posterior mandibular area is the common site. Dry sockets occur more frequently in the mandible than in the maxilla due to thick cortical bone resulting in poor

perforation of blood supplying the mandible. It occurs more commonly in the extraction of the third molars. (Muhammad, 2010).

Difficult extractions occur in older and dense bone which may have a decreased vascularity. Birn (1073), proposed that trauma from extraction and aggressive curettage cause the inflammation of the alveolar osseous medulla which leads to the release of cell mediators. This causes fibrinolytic activity. Bacteria may also play a contributing factor in the etiology of dry socket. Delayed healing may occur due to the presence of microorganisms like *Enterococcus*, *Streptococcus viridans*, *Bacillus coryneform*, *Proteus vulgaris*, *Pseudomonas aeruginosa*, *Citrobacter freundii*, *Escheria coli*. Nisan et al (1983) proposed that the anaerobic bacteria *Treponema denticola* showed plasminogen like fibrinolytic activity.

It occurs more frequently in females than males due to possible hormonal cause. Sweet and Butler (1938) reported that the incidence of dry socket occur more in females (4.1:1, female:Male).

Smoking reduces the neutrophil chemotaxis and phagocytosis thus impairing the production of immunoglobulin (Noroozi, 2009). Nicotine, the active constituent in tobacco is absorbed through the oral mucosa. This drug increases the platelet aggregation thereby increasing the risk of microvascular thrombosis and peripheral ischemia. Proliferation of fibroblast and macrophages is also inhibited (Silverstein, 1992). The incidence of dry socket was significantly higher in smokers than in non smokers but there is a strong association between the amount consumption of smoking and the incidence of dry socket (Mohammed, 2011).

Smoking impairs endothelium-dependent relaxation of vessels. The immediate response of healthy endothelium to an increase in blood flow (and other physiological stimuli) is an increase in intracellular calcium. This increase in calcium concentration stimulates the synthesis of nitric oxide from l-arginine by the enzyme nitric oxide synthase (NOS). Essential co-factors for this activity include tetrahydrobiopterin, itself synthesized in endothelium. The nitric oxide diffuses out of the endothelium to bind to the Fe²⁺ in the haem moiety of guanylate cyclase to stimulate the synthesis of cyclic GMP. The increased concentration of cyclic GMP triggers smooth muscle relaxation. Smoking limits the endothelial synthesis of nitric oxide in two (or more) ways. The increased concentration of blood-borne free radicals accelerates cellular lipid peroxidation. The lipid peroxides avidly bind to available nitric oxide. The synthesis of nitric oxide also is reduced to decreased synthesis of tetrahydrobiopterin. Nitric oxide is no longer available to stimulate endothelium-dependent relaxation (Heng, et al. 2007; Noroozi & Philbert 2009; Tomar, 2005).

Vasoconstrictors in the local anesthetics used for extraction may also contribute to the formation of dry socket. Vasoconstrictors cause temporary local ischemia which increases the risk of developing alveolar osteitis (Birn, 1973; Fridrich, 1990).

Numerous studies have been done on the postoperative complications from dental extractions most often of interest in alveolar osteitis (Larsen, 2002; Hermes, et al. 1998; Johnson & Blanton 1988). The results were sometimes conflicting. Larsen (2002) identified inexperienced surgeon and tobacco use as contributing factors to alveolar osteitis. Monaco, et al. (1999) implicated smoking be a risk factor for alveolar osteitis. Meehan, et al. (1988) identified heavy smoking, difficult extractions, females, and mandibular posteriors as predisposing factors to alveolar osteitis formation. Hermes, et al. (1998) suggested smoking is not responsible for the increased incidence of alveolar osteitis.

The present study is a quality improved study undertaken to assess the role of smoking to alveolar osteitis after extractions.

Materials and methods:

Type of study:

Prospective comparative study.

Place of the Study:

Oral and Maxillofacial Surgery Department, Faculty of Dentistry, Bangabandhu Sheikh Mujib Medical University.

Study Period: 1 Year (July 2015 to June 2016).

Study Population:

Smoker and non smoker patients who need extraction of tooth.

Sampling Method:

Purposive sampling technique.

Size of Sample:

$$n = \frac{z^2[P_1(1-P_1)+P_2(1-P_2)]}{e^2}$$

here, P_1 = Proportion in one group
 P_2 = Proportion in another group
 n = Sample size for each group
 e = SE (Precision)
 $z = 1.96$

Grouping of Sample:

Grouping of samples were done according to-

Group-A: 21 smoker patients (Case group)

Group-B: 20 non-smoker patients (Control group)

Selection Criteria:

Inclusion criteria:

- Patients age between 22 to 60 years
- Male smoker and non smoker patients
- Conservatively treated failed tooth
- Gross carious tooth which can not be preserved

Exclusion criteria:

- Allergy to local anesthetics, antibiotics or analgesics
- Use of vasoconstrictor
- Diabetic patients
- Radiotherapy
- Female patients

Taking of any habitual medication e.g. Antidiabetic, antihypertensive, antihistamine, Antidepressant, Antipsychotic, Anxiolytic

Variables:

1. Age
2. Blood flow of inferior alveolar artery
3. Healing condition

Ethical Aspect

Ethical clearance for the study was taken from institutional review board, BSMMU, Dhaka, Bangladesh.

All study subjects assured adequate treatment of my complications developed in relation to study purpose.

Results:

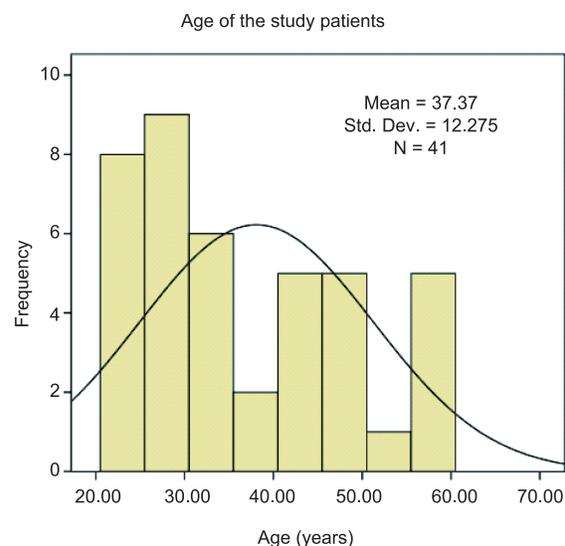


Fig.-1: Distribution of patients according to their age

Histogram (fig. 1) shows that age of the patients ranged from 23 years to 60 years; and their (mean±sd) age is 37±12.28.

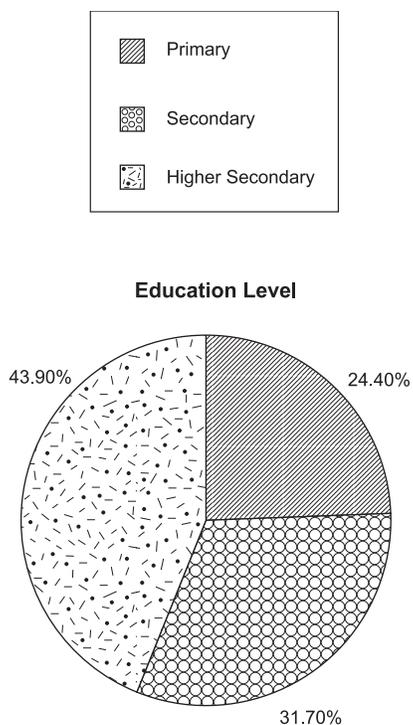


Fig.-2: Distribution of patients according to their level of education

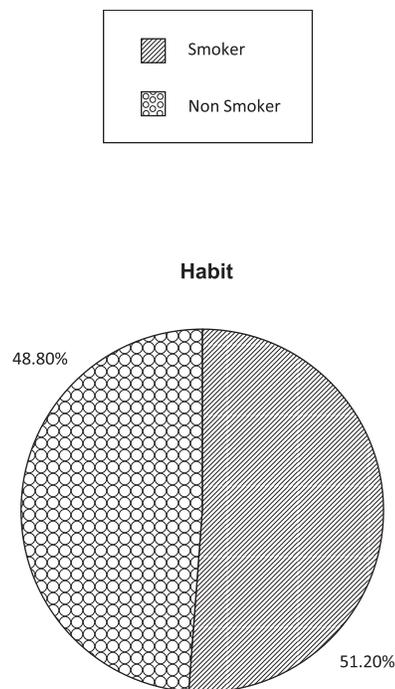


Fig.-3: Distribution of patients according to their habit of smoking.

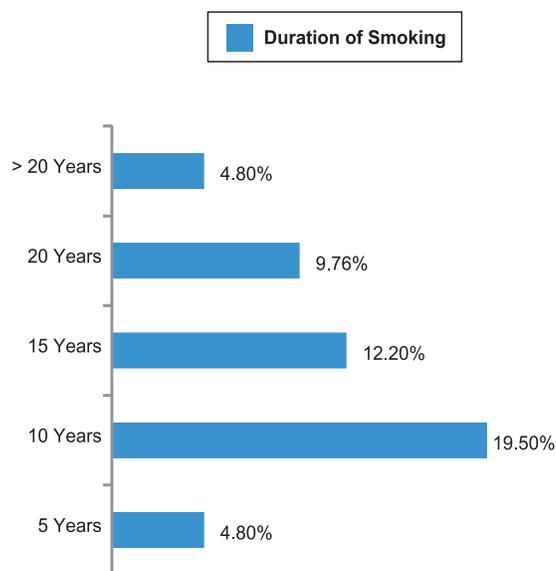


Fig.-4: Distribution of patients according to their duration of smoking

Fig. 2 shows that most (43.90%) patients had education of higher secondary level, 31.70% patients had education of secondary level and 24.40% patients had education of primary level.

Fig. 3 shows that smoker and non-smoker patients were about to same; smoker 51.20% and non-smoker 48.80%.

Fig. 4 shows that most (19.50%) patients are smoking for 10 years, (12.20%) patients are smoking for 15 years, 9.76% patients are smoking for 20 years, 4.8% and patients are smoking for >20 years and (4.80%) patients are smoking for 5 years.

Table-I
Distribution of patients according to alveolar osteitis in smoker & non-smoker patients

	Smoker		Non Smoker		Total		P value
	n	%	n	%	n	%	
Alveolar Osteitis	1	2.44	0	0	1	2.44	0.227
No Alveolar Osteitis	20	48.78	20	48.78	39	97.56	
Total	21	51.21	20	48.78	41	100	

P value was reached from χ^2 test comparing smoker and non smoker patients in group A and group B.

Table-II
Distribution of patients according to wound healing condition in smoker & non-smoker patients

Wound Healing Condition	Smoker		Non Smoker		Total		P value
	n	%	n	%	n	%	
Good	6	14.63	15	36.58	21	51.21	0.009
Fair	14	34.14	4	9.76	18	43.90	
Poor	1	2.44	1	2.44	2	4.88	
Total	21	51.21	20	48.78	41	100	

P value was reached from χ^2 test comparing smoker and non smoker patients in group A and group B.

Table-III
Blood flow of inferior alveolar artery in smoker & non-smoker patients

			Smoker (Mean±Sd)	Non smoker (Mean±Sd)	P value
Blood Flow	Right	PSV (cm/s)	23.56±6.50	29.40±15.63	0.345
In		RI (cm/s)	0.91±0.08	0.89±0.08	0.412
Mental	Left	PSV (cm/s)	25.81±7.02	28.03±5.51	0.162
Artery		RI (cm/s)	0.90±0.07	0.86±0.09	0.450

P value was reached from t- test comparing smoker and non smoker patients in group A and group B.

Table-I shows that no patient but only 1(2.44%) patient from smoker group developed alveolar ostitis. The relationship of smoking and development of alveolar ostitis is non-significant (P=0.227).

Table-II shows that wound healing of 6(14.63%) patients of smoker group was good where 15(36.58%) wound healing of non-smoker group were good. In smoker group, 14(34.14%) wound healing were fair, and 4(9.76%) wound healing were fair in non-smoker group. The relationship of smoking and wound healing condition of alveolar osteitis is significant (P=0.009).

Table-III shows the blood flow in mental artery. In right side, PSV (Mean±Sd) in smoker group 23.56±6.50 cm/s and, 29.40±15.63 cm/s for non-smoker group. In left side, PSV (Mean±Sd) in smoker group 25.81±7.02 cm/s and, 28.03±5.51 cm/s for non-smoker group There is no statistical significant difference in between both groups

(P=0.345) but in smokers group PSV was lesser than non-smokers group.).

In right side, RI (Mean±Sd) in smoker group 0.91±0.08 cm/s and, 0.89±0.08 for non-smoker group. In left side, RI (Mean±Sd) in smoker group 0.90±0.07 cm/s, and 0.85±0.09 cm/s for non-smoker groups There is no statistical significant difference in between both groups (P=0.412) but smokers group showed greater RI than non-smokers group.

Discussion:

Tobacco smoking is widely documented to have several adverse effects and has been implicated in several diseases, mainly those of the cardiovascular and respiratory systems. It is also considered to be associated with surgical outcome and the development of complications during and after many types of surgery. The relative risk for complications after surgery is reported

to be 1.2–5.5 times greater in smokers than in non-smokers. Although it is well documented that smoking has deleterious effects in many types of surgery, little recent information is available on whether it has any impact in uncomplicated exodontia.

Kolokythas, Olech, and Miloro (2010) stated for routine dental extractions, the incidence of alveolar osteitis has been reported in the range 0.5% to 5%. The incidence of alveolar osteitis after extraction of mandibular third molars varies from 1% to 37.5% (Heasman and Jacobs, 1984). It has been well documented that surgical extractions result in about 10 times higher incidence of alveolar osteitis (Blum, 2004)

The current study found a non-significant relationship ($P=0.227$) between smoking and development of alveolar osteitis, but only 1(2.44%) patient from smoker group developed alveolar osteitis where no patients from non-smoker group developed alveolar osteitis (Table I). This results are supported by study of Bergdahl & Hedstrom (2004) and Oginni (2008). Heng et al. (2007) assessed the association of smoking with the occurrence of alveolar osteitis and found smoking to be non-significantly related to develop in alveolar osteitis after dental extraction which is correlates to the present study. However, Al-Khateeb and Alnahar (2008) observed that nonsmokers reported significantly higher pain scores than smokers.

This study findings differed by Bortoluzzi et al (2012), who found statistically significant association ($P=0.04$) between smoking & development of alveolar osteitis after simple extraction. This different might be due to variation in number of tobacco sticks consumed per day by patients. Present study found 7.30% patients smoked 20 sticks/day and other study found 18.20% patients smoked ≤ 20 sticks/day and 3.10% patients smoked >20 sticks/day. Al-Belasy (2004) observed an increased rate of PCs (AO) following the extraction in water pipe smokers compared with non-smokers (26% vs. 7%) and, similarly, found the incidence of AO to be higher in cigarette smokers than in non-smokers (16% vs. 7%).

Al-Wraikat (2009) conducted a study and found 25.96% patients returned with alveolar osteitis. The difference of incidence of alveolar osteitis between smokers and non-smokers was statistically significant ($p<0.05$). The difference between the two groups was statistically significant ($p<0.05$). Halabi et al (2012) reported a statistically significant association between traumatic extraction tobacco smoking after extraction (OR, 3.5; 95% CI, 1.3 to 9.0) and the development of alveolar osteitis.

Wound healing is a dynamic process that involves number of phase's i.e. inflammatory phase, proliferation phase and maturation phase. Inflammatory phase is the body's natural response to injury. After injury, clot is formed. Once the hemostasis is achieved, blood vessels dilate to allow the essential cells, antibodies, WBCs, growth factors, enzymes and nutrients to reach the injured area. Neutrophils and macrophages come into their action. During proliferative phase, fibroblast lay down the collagen to form the granulation tissue along with angiogenesis and later epithelialization occurs. Maturation phase involves remodeling of collagen. Cellular activity reduces and the number of blood cells decreases in number.

In the present study, non-smoker found significantly ($P=0.009$) better wound healing in comparison with smoker group (36.58% vs. 14.63%). Smoking has been associated with delayed wound healing as a result, in part, of the actions of nicotine as a vasoconstrictor and promoter of platelet adhesiveness and thrombotic microvascular occlusion, all of which contribute to tissue ischaemia. With regard to bone regeneration, nicotine has been shown to inhibit osteogenesis, vascularity and bone lengthening in mandibular distraction angiogenesis in an animal model.

Smoking is reported to be important factor responsible for post-operative infections leading to hindrance in bone healing. A meta-analysis by Ward and Klesges (2001) reported the magnitude of the association between cigarette smoking and bone mass and showed that smokers presented reduce bone mass, compared with non-smoker. Saldanha et al (2006) in six months study reported that the smoking may affect remodeling process following tooth extraction. In their study, alveolar bone height lost significantly more (1.5mm) in smokers as compared to non-smokers (1mm). They also reported that radiographic bone density was more pronounced in smokers than non-smokers. They believed that smoking increases the bone resorption at the fracture bone ends, interfering with the osteoblastic function. Cheynet et al (2001) in their study of infections complications of 60 mandibular osteotomies, smoking was observed as important risk factor responsible for post-operative infections. Levin et al (2001) observed greater complications following surgeries in smokers. They suggested that heat released from cigarette smoke and toxic by-products of tobacco such as nicotine, hydrogen cyanide and carbon monoxide could be risk factors affecting the success of dental procedures.

Birn (1973) and Heng et al. (2007) found that for mandibular third molar surgeries, the overall complications were high regardless of smoking status. It has been speculated by

some that the increased incidence of complications, particularly alveolar osteitis, in mandibular molar extractions is associated with the thick cortical bone and the poor blood supply, but this theory has been questioned. The present study found non-significant relationship with smoking and blood flow in mental artery although smoker group showed greater PSV and lesser RI than that of non-smokers. As far our knowledge, no more study found similar to this study comparing blood flow in mental artery between smoker and non-smoker group.

Conclusion:

Dry socket is a commonly encountered postoperative condition in patients undergoing extraction. The etiology of Alveolar osteitis is not yet clearly known. The current study showed no significant difference in blood flow between smokers and non-smokers group of post-extraction patients. It might be due to wide range (23 to 60 years) of age of study populations but study group showed less PSV (23.56+-6.50 cm/s vs 29.40+-15.63 cm/s). RI also greater in smokers group (0.91+- 0.08 vs 0.89+-0.08) but not statistically significant. There is no significant difference in development of alveolar ostitis between smokers and non-smokers group but non-smokers group shows better condition in wound healing and had not development in alveolar ostitis. These effect might be due to consumption of tobacco smoking or any other possible predisposing factors for development of alveolar osteitis and healing of wound.

Further research and investigations are required to be carried out to draw firm conclusions and provide a better way in management of this condition by using novel dosage forms

Recommendation:

The study was conducted in small sample and in short period; so it could be done in large sample to validate the current findings.

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Status of Carious lesions among patients undergoing Fixed orthodontic treatment

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Abstract:

Background: Enamel demineralization resulting in carious lesions is one of the most common complications associated with fixed orthodontic treatment with high frequency. These lesions are manifested as opaque chalky white spots around brackets and bands on teeth surface.

Objective: To determine the status of carious lesions among patients undergoing fixed orthodontic treatment.

Materials and Methods: 92 patients were selected randomly among orthodontic patients according to inclusion and exclusion criteria. After patients selection, treatment was started with preadjusted edgewise appliance and two stage space closer method was applied. These 92 patients had undergone orthodontic treatment for a period of 12 months. Patients were examined immediately before placement of appliance, after 6 months and 12 months from placement of appliance by direct visual examination procedure. Before starting of orthodontic treatment all previous carious teeth were filled, scaling and polishing were done as pre-orthodontic preparation. Non-invasive etching technique was applied and autocure composite material was used for bonding and glass-ionomer cement for banding. Excess bonding material was removed from around brackets. Then scaling was done in every monthly recall visit. Patients were given instructions about tooth brushing after meal with fluoride tooth paste, interdental brush using, fluorated mouth rinse once every night during treatment period. Advice was to avoid refined carbohydrate and drinks. Scoring of carious lesions was done by International Caries Detection and Assessment System II (ICDAS II). Data analysis was done by SPSS and student T test was done.

Results: It was found that 30.40% patients had carious lesions in the form of white spot lesions after wearing fixed appliances for 6 months and after 12 months using fixed appliance 46.70% patients developed carious lesions. Carious lesions mostly found in Class II div.1 malocclusion, bimaxillary proclination, severe crowding, patients with incompetent lip, negligence of oral hygiene, previously carious patients and whom more auxiliary appliances were used. On observation; labial/buccal surface were mainly affected due to position of appliance, Upper jaw teeth were more affected than lower jaw, and commonly affected teeth were upper lateral incisor and canines. The difference of frequency of carious patient after 6 months and 12 months of appliance placement were statistically significant ($p > 0.05$).

Conclusion: Carious lesions in the form of white spot were high in patients treated with fixed orthodontics appliances.

Key words: Carious Lesions, White Spot Lesions, Enamel demineralization, Fixed Orthodontic appliance, Malocclusion, ICDAS II.

(Bangladesh Dental Journal 2016; 32: 96-100)

Introduction:

Carious lesion in the form of white spot lesion is one of the complications of orthodontic treatment.¹ These lesions that occur on tooth surface during orthodontic treatment is identified as opaque chalky white spot or brownish discoloration without surface disruption.² Several studies

reveal that carious lesion have a high prevalence rate of 2-96%.³ Orthodontic appliances create potential space for bacterial plaque accumulation.

Higher levels of cariogenic bacteria present in this plaque, most commonly Streptococcus Mutans and Lactobacilli.^{1,3,4,5} Carious lesions in the form of white spot

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lesions develop within 4 weeks from starting of the orthodontic treatment and progression of the early demineralization to a carious lesion usually takes about 6 months.^{4,5} These lesions are commonly found on the buccal surfaces of teeth around the brackets, molar bands, especially in the cervical region. Development of carious lesions in patients undergoing fixed orthodontic treatment is common complication. It is a major esthetic problem that arises during treatment period. This problem has been recognized and many attempts for prevention have been offered in many literatures but it is continued as a problem.

Methods:

This was a descriptive type of cross sectional study done in BSMMU, Bangladesh. Sample size was 92 and study period as one year. Sample was selected randomly among patients undergoing orthodontic treatment according to inclusion and exclusion criteria. Before starting of this study, approval was obtained from Institutional Review Board of BSMMU. Patients of 12-40 years of age and was under treatment for a period of more than 12 months. Patients above 40 years of age or below 12 years of age, with enamel hypoplasia, enamel pigmentation, fluorosis, and tetracycline staining, or having more than 4 carious or filled teeth were excluded during sample selection.

After patients selection, treatment was started with preadjusted edgewise appliance and two-stage space closer method was applied. Patients were examined at starting, after 6 months duration and after 12 months duration. Before starting treatment all caries cavity were filled. Minimum-invasive etching technique was applied and autocure composite material was used for bonding and glass-ionomer cement for banding. Excess bonding material was removed from around brackets and bands. Scaling and polishing were performed at starting and regularly in follow up visits.

Every patient was evaluated after removing auxiliary wire and power chains. Patients were given instructions about tooth brushing after every meal with fluoride paste, interdental brush, mouth rinse once every night. Advice was given to avoid refined carbohydrate and drinks.

Scoring of carious lesions was done by International Caries Detection and Assessment System II (ICDAS II).

Score 0 - No visible white spots or surface disruption (No demineralization).

Score 1 - Visible white spot without surface disruption (Mild demineralization).

Score 2 - Visible white spot lesion having a roughened surface but not requiring restoration (Moderate demineralization)

Score 3 - Visible white spot lesion requiring restoration (Severe demineralization)

Data collection:

Data was collected from samples at starting, after 6 months duration and after 12 months duration (± 1 months) from the starting of treatment. Statistical analysis of the data was performed by SPSS. Student t-test was done and value of $p < 0.05$ was considered as statistically significant.

Results:

Table-I

Frequency of carious patients (n=92) and carious teeth (n=2024)

	Carious patients No. (%)	Carious teeth No. (%)
At starting	7(7.6%)	13(0.64%)
After 6 months	28(30.4%)	49(2.42%)
After 12 months	43(46.7%)	76(3.75%)

Table-II

Comparison of carious patients, carious teeth and caries score

	Carious patients Mean \pm SD	Carious teeth Mean \pm SD	Carious score Mean \pm SD
After 6 months	0.304 \pm 0.474	0.532 \pm 0.886	0.663 \pm 1.167
After 12 months	0.467 \pm 0.505	0.826 \pm 0.995	0.935 \pm 1.254
Statistical analysis			
Group	Carious patients (p value)	Carious teeth (p value)	Carious score (p value)
6 months vs 12 months	0.007*	0.032*	0.017*

Table-III*Age basis distribution of carious patients after 6 months and 12 months from starting of treatment*

Group	Age group	Cariou patients
After 6 months (n=92)	< 20 yrs (n=61)	21(34.42%)
	> 20 yrs (n=31)	7(22.58%)
	Total	28
After 12 months (n=92)	< 20 yrs (n=61)	31(50.81%)
	> 20 yrs (n=31)	12(38.70%)
	Total	43

Table-IV*Gender basis distribution of carious patients after 6 months and 12 months from starting of treatment*

Group	Sex	Cariou patients
After 6 months (n=92)	Male (n=26)	6(23.07%)
	Female (n=66)	22(33.33%)
	Total	28
After 12 months (n=92)	Male (n=26)	12(46.15%)
	Female (n=66)	31(46.96%)
	Total	43

Table-V*Jaw basis distribution of carious teeth*

Group	Total Cariou Teeth	Cariou teeth	
		Upper jaw	Lower Jaw
After 6 months	49	27(55.1%)	22(44.9%)
After 12 months	76	47(61.8%)	29(38.2%)

Table-VI*Assessment of surfaces for carious lesions*

Group	Cariou teeth	Labial/baccal	Lingual	Occlusal
After 6 months	49	40(81.6%)	2(4.1%)	7(14.3%)
After 12 months	76	61(80.3%)	4(5.3%)	11(14.5%)

Table-VII*Malocclusion basis distribution of carious patients and carious teeth after 6 months and 12 months (n=92)*

Malocclusion	Cariou patients	
	After 6 months (n=28)	After 12 months (n=43)
Class I (n=21)	5 (25.8%)	9 (20.9%)
Class II div1 (n=45)	16 (35.6%)	24 (55.8%)
Class II div 2 (n=8)	2 (25.0%)	3 (37.5%)
Class III (n=6)	1 (16.7%)	2 (33.3%)
Bimax. (n=12)	4 (33.3%)	5 (41.7%)

Discussion:

All patients were treated with 18 slot preadjusted edgewise appliance, banding on 1st molars, metal bracket and autocure or light cure composite adhesive. Two stages of space closure method were applied. It was found 30.4% carious lesions after 6 months from starting of treatment. And 46.7% after 12 months from starting of treatment. A study by Ahmed I et al. shows that prevalence of caries after 6 months of treatment is 33% and after 12 months of treatment is 61%. An Indian study by Sagarika N et al. (2012)⁴ shows that prevalence rate 15.6% (control group) after 6 months and 75.6% after 12 months from starting of treatment. Another recent study done by Tufekci E et al. (2011)⁵ in Virginia Medical University showing prevalence of white spot 38% following 6 months of starting of treatment and 46% 12 months of starting of treatment. It was compared to the result the study of Ahmed et al. (2011).¹ Result of this study was about similar after 6 months duration but lower after 12 months duration. On the other hand, when it was compared to the result of study by Tufecsi et al. (2011)⁵ result of this study was lower after 6 months duration and about similar after 12 months duration.

This variation of results was due to materials used in bonding and banding, patient's cooperation to oral hygiene and follow up visit, composition of enamel, type of malocclusion, number of auxiliary appliances, method of treatment and mineral contents in water.

Female were more affected than male after 6 months duration and no difference was found after 12 months duration. Patients below 20 years of age had more carious lesions. It is due to newly developing enamel, negligence to oral hygiene and unable to follow instructions about tooth brushing and drinks and sugary foods. Upper lateral incisors and upper canine were affected most commonly due to more accessories used on canine and upper lateral incisor during 2 stages of space closure, inflamed gingiva, more accessories e.g. coil spring, power chain, low salivary washout. On surfaces involvement, Buccal or labial surface were affected mainly. It is due to presence of brackets, wires, power chains and other accessories on labial or buccal surface of tooth. Upper jaw teeth were mostly affected that was 55.1% after 6 months duration & 61.8% after 12 months due to more accessories on brackets and more loops in upper arch wire, inflamed gingiva, low salivary flow specially in case of class II div.1 malocclusion and mouth breathing.

Class II div. 1 malocclusion were more vulnerable to carious lesions. Secondly bimaxillary proclination due to

incompetent lip, mouth breathing, low salivary flow and more auxiliary appliances used during space closer.

According to score system by ICDAS II, carious score gradually increased with duration of treatment. After 6 months, mean caries score was 0.663 & After 12 months, mean caries score was 0.935. The higher frequency of carious lesions found in patients with low socio-economic status, bad oral hygiene, incompetent lip, mouth breathing, treated with more auxiliaries on brackets or arch wire.

White spot lesions that found at starting were due to enamel hypoplasia, enamel pigmentation, fluorosis, tetracycline staining and initial developing caries.⁶

A rise in carious lesions was found in patients with previous multi-carious teeth. Patients who had taken more sugary foods and drinks during treatment period were more vulnerable to carious lesions. These lesions are healed within 6 months to 12 months after removal of appliances and gradually disappeared.⁷ Some persists even up to 5 years of removal appliance.²

Conclusions:

Results of this study stated that about 50% patients were affected by carious lesions in mild form in minimum 1 tooth after 12 months from the bonding and banding. The preventive measures that were applied during treatment appeared not to be fully effective. This problem indicates an alarming concern and significant attention from both patients and orthodontists on prevention of effective caries prevention.

Recommendations:

All preventive measures during treatment period as well as assessment of oral hygiene in every recall visits are essential. Risk assessment methods and recommendations for prevention and management of carious lesions should be predetermined at the starting of treatment. Evaluation of brackets, wires, gingival condition in every recall visit is essential for management carious lesions as well as others complications.

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Association of serum Albumin and Globulin concentration with Oral Squamous Cell Carcinoma patient and healthy person

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Abstract :

Background : Serum albumin decreases in oral squamous cell carcinoma patient. So it should be evaluated for better outcome before surgery . **Objectives:** To observe the association between serum albumin and globulin levels with oral squamous cell carcinoma patient and healthy person.

Methods: This observational comparative study investigated 35 oral squamous carcinoma patients (OSCC) and 35 healthy persons having age above 40 years and all study population were free from systemic diseases . Serum albumin was measured by albumin method using a solubilizing agent bromocresol purple (BCP) dye . Serum total protein was measured by Automated Dilution Protocol using some reagent in ARCHITECT PLUS machine . Serum globulin was calculated by deduction of serum albumin from serum total protein . **Results:** The mean age of the oral cancer group was 58.1 years (SD ±8.8) while that for the healthy group was 50.3 years (SD±8.5) . The mean serum albumin level in cancer group is 39 gm/L, mean serum globulin level 36.4 gm/L, SD of serum albumin level 5.5, SD of serum globulin level 4.2, p value -0.014. The mean serum albumin level in healthy group is 41gm/L, mean serum globulin level is 35.8gm/L, SD of serum albumin level 2.4, SD of serum globulin 10, p value -0.002 . **Conclusion:** The study concluded that there was no significant relationship between the observed data of groups A and group B . So , it has proved that serum albumin and serum globulin do not decrease in all patients with oral squamous cell carcinoma. In this study serum albumin decreased only a few patients, that was not significant.

Key Worlds: Serum albumin , Serum globulin, Oral squamous cell carcinoma .

(Bangladesh Dental Journal 2016; 32: 101-104)

Introduction:

Oral cancer is defined as a malignant neoplasm involving the oral cavity, which is a region extending from the lips to the anterior pillars of the fauces.¹ Malignant oral neoplasms represent 2-4% of all cancers in the United States of America, 2% in Britain and 1% in Australia². Tobacco and alcohol are regarded to be the most

important aetiological factors in the development of oral cancer . The areca nut, viral and fungal infections also responsible for developing oral cancer. Many studies have also implicated diet and nutrition in the etiology of oral cancer Franceschi et al suggested that inadequate nutrition enhances cancer risk and this was corroborated by a study in India which showed that subjects with oral cancer were less likely than control subjects to eat meat, eggs, milk and fish at least once per week. Other studies, however, showed conflicting relationships between diet and oral cancer⁴. In Southeast Asian region, up to 50% of all cancers arise in the oral cavity. However, many cases of oral cancer develop without prior exposure to the previous agents. In these cases virus, diet or genetic predisposition have been hypothesized to play the role . In the field of molecular biology there are lots of studies to find out the genetic basis of tumour genesis. Neoplasm arises from a series of genetic alterations that leads to cellular proliferation & differentiation . This genetic alteration may be induced by inactivation of tumour suppressor gene.

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The most common genetic abnormalities found in different type of human cancers are the mutation of the tumour suppressor gene.⁵ Low serum albumin in patients with oral cancer may partly be due to effect of cytokines such as interleukin-6 (IL-6) and tumour necrosis factor (TNF). These inflammatory mediators are produced by tumour and host cells in malignancies and both act by increasing the local transcapillary escape of albumin in the tumour bed and by decreasing the hepatic synthesis of albumin. It should be noted that albumin acts as an extracellular antioxidant, but unlike antioxidant vitamins that scavenge reactive oxygen radicals, albumin scavenges mainly carbon-centered free radicals.⁶ Low serum albumin may thus reduce the role of albumin in mopping up free radicals and thus causes toxic cellular injuries that could trigger the process of carcinogenesis. Low serum albumin also impaired salivary gland function and thus reduced oral mucosal immunity.⁷

In Bangladesh, there is no study of serum albumin and globulin concentration with oral squamous cell carcinoma patients and healthy persons. So aim of the study to evaluate the association of these proteins with oral squamous cell carcinoma patients and healthy persons.

Methods:

It was a observational comparative study. The study was done in the Department of Oral and Maxillofacial Surgery and Department of Biochemistry, Bangabandhu Sheikh Mujib Medical University, Shahbag, Dhaka during the period June 2015 to February 2016. Thirty five (35) patients with OSCC who were diagnosed histopathologically were in the study group -A and equal number of healthy persons were in the control group -B having age above 40 years were the study population. Method of the sampling was purposive. Detail history and clinical examination had done. Venous blood was collected both from the patients and healthy persons. Serum albumin was measured by albumin method using a solubilizing agent bromocresol purple (BCP) dye. Serum total protein was measured by Automated Dilution Protocol using some reagent in ARCHITECT PLUS machine. Serum globulin was calculated by deduction of serum albumin from serum total protein. All the data were collected in a data collection sheet with informed written consent and will be analyzed by SPSS (Computer based statistical packages for social science). Difference between the two groups will be analysed for statistical significance using the student t-test. Statistical significance will be determined at $p < 0.05$.

Results:

Thirty five oral cancer patients (OSCC) and thirty five normal healthy persons were selected according to inclusion and exclusion criteria. The mean age of the oral cancer group was 58.1 years (SD ± 8.8) while that for the healthy group was 50.3 years (SD ± 8.5). There was statistically significant difference between the mean ages patients with oral cancer and the healthy persons.

The mean serum albumin level in cancer group is 39 gm/L, mean serum globulin level 36.4 gm/L, SD of serum albumin level 5.5, SD of serum globulin level 4.2, p value -0.014.

The mean serum albumin level in healthy group is 41 gm/L, mean serum globulin level is 35.8 gm/L, SD of s.albumin level 2.4, SD of s.globulin 10, p value -0.002.

Serum albumin concentration of 12 oscc patient's is below normal (28-35gm/L). Serum globulin concentrations of both groups were within normal limit. BMI of both groups were calculated from weight and height. Only BMI of 2 OSCC patient's and 2 healthy person's were below normal, 25 OSCC patient's and 29 healthy person's within normal limit, 8 OSCC patient's and 4 healthy person's above normal.

The bargram showing serum albumin concentration of 12 OSCC patients within (28-35gm/L) other 23 patients within (36-50gm/L), this proteins in healthy group within (36-50gm/L) (Fig.-1).

The bargram showing serum globulin concentration of 4 OSCC patients & 7 healthy persons were within (23-30gm/L), 20 OSCC patients & 22 healthy persons within (31-38gm/L), 11 oscc & 4 healthy persons within (39-46gm/L) and 4 healthy persons >46 gm/L (Fig.-2).

Distribution of s. albumin of the study population (n=35)

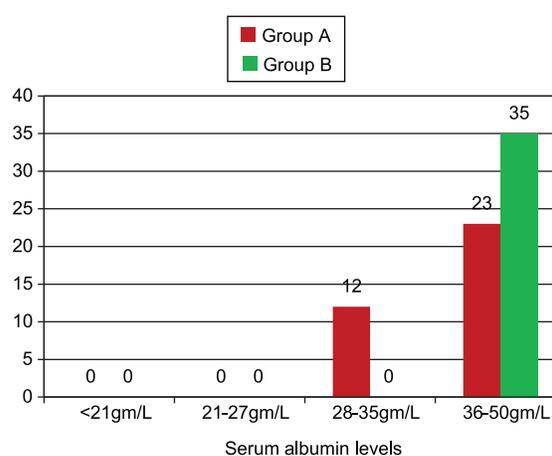


Fig.-1: Comparison of serum albumin levels in group A & group B.

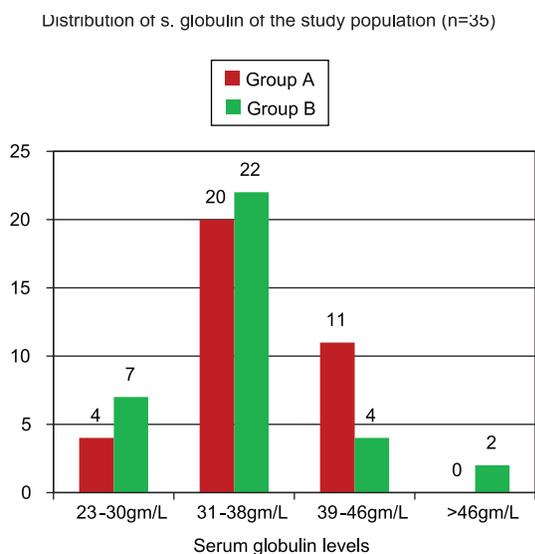


Fig.-2 : Comparison of serum globulin levels in Group A & Group B.

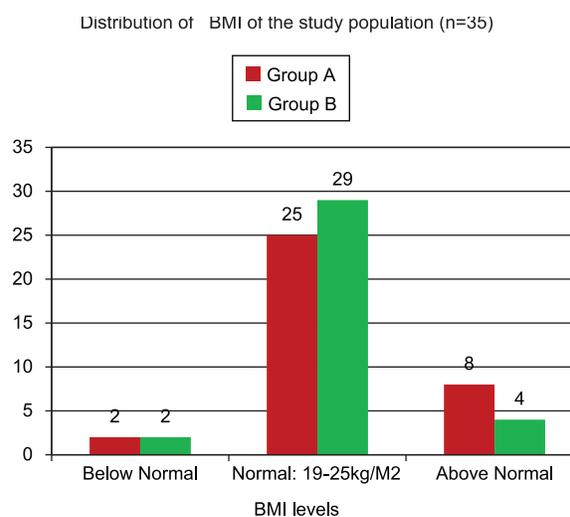


Fig.-3: Nutritional status of Group A & Group B.

Table-I

Assessment of risk of oral cancer with low serum albumin, alcohol intake, tobacco intake and no habits

	Oral cancers				P	OR	95.0% CI for OR
	Yes (N=35)		No (n=35)				
	N	%	N	%			
Low serum albumin	12	34.3	0	0	0.342	18.26	3.98, 271.34
Alcohol intake	0	0	0	0	0.000	0.00	0.34, 3.53
Tobacco intake	34	97.1	32	91.4	0.881	4.05	0.74, 22.20
No habits	1	2.9	3	8.6	0.131	1.02	0.17, 13.21

Discussion:

The aim of this study was to identify any association of serum albumin and globulin with oral squamous cell carcinoma patients and normal healthy persons.

This study was carried out in the department of Oral and Maxillofacial Surgery of BSMMU. Thirty five patients of oral squamous cell carcinoma and thirty five normal healthy persons were selected according to criteria.

The ultimate goal of study was to see the relation of serum proteins with oral cancer patients preoperatively and assess their nutritional status, pre operative preparation and post operative outcome.

The mean serum albumin and serum globulin levels for oral epithelial cancer in this study was not statistically & significantly lower than healthy group.⁸ In a study from Norway observed that serum albumin levels of oral squamous cell carcinoma patients were lower than normal.

Serum albumin concentration in oral cancer patients were low, may partly be due to the effect of cytokines, IL-6 and TNF. These inflammatory mediators are produced by tumour and host cells in malignancies. They both increasing local transcapillary escape of albumin in the tumour bed and decreasing the hepatic synthesis of albumin. There was no mention about the status of serum globulin. In this study, with serum albumin, serum globulin concentration also seen. But we have not got significant results. Only serum albumin concentration of 12 OSCC patient's out of 35 patients 34.3% were below normal (28-35gm/L). Eight of these twelve patients were histopathologically grade-II invasive squamous cell carcinoma. Serum globulin concentrations of both groups were within normal limit. BMI of both groups were calculated from weight and height. Only BMI of 2 OSCC patient's and 2 healthy person's were below normal, 25 OSCC patient's and 29 healthy person's were within

normal limit, 8 OSCC patient's and 4 healthy person's were above normal.

A study (relation between serum albumin and oral epithelial cancer) done at a Nigerian Tertiary Hospital in 2010, where sample size was oral cancer group 32 and healthy group 30. Low serum albumin of cancer patients were 17 (53.1%) and one healthy person (3.3%).

Patients with advanced oral squamous cell carcinoma those need palliative treatment should be avoided from this study, because of decreasing oral intake of diet which may decrease serum albumin concentration. So, patients with OSCC grade-I and grade-II should be included in the study.

Conclusion :

The study concluded that there was no significant relationship between the observed data of group A and group B. So, it has proved that serum albumin and serum globulin do not decrease in all patients with oral

squamous cell carcinoma. In this study serum albumin decreased only a few patients, that was not significant.

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Dental anomalies in patients with maxillary canine impaction attending in the Orthodontic department of BSMMU

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Abstract:

A cross sectional case-control study was conducted in BSMMU from December 2012 to July 2014. The study was carried out among the participants attending in the orthodontic department of BSMMU. With the aim to determine the relationship of palatally displaced canines and buccally displaced canines with congenital dental anomalies. 50 patients with at least one impacted maxillary canine and 50 controls with no impaction of maxillary canines were purposely selected.

It was found that significant association of peg shaped lateral incisors with palatally displaced canines, buccally displaced canines and maxillary impacted canines. There was no significant association of buccally and palatally displaced maxillary canines among gender. Almost two third of palatally displaced maxillary canine impacted patients were unilateral.

Key words: Maxillary impacted canine, dental anomalies, buccally displaced, palatally displaced, Agensis, Peg-shaped lateral incisors, Supernumerary teeth, Transposition.

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Introduction:

Teeth whose normal eruption is prevented by adjacent teeth or bone; malposed teeth, such as those situated lingually or buccally to the normal arch or in infra occlusion is called impacted teeth.¹ Impacted maxillary canines are found either buccally or palatally. The permanent canines are well recognized as important teeth, in spite of their vital role in establishing the arch form, their contribution in esthetic smile, and their participation in functional occlusion.

Maxillary canine, excluding the third molars, is the most frequently impacted tooth in the permanent dentition with

the reported prevalence ranging from 0.8 to 2.8 percent.^{1,2} As with many other inherited anatomical condition, early recognition and interception are best strategies in conservative clinical management of the palatally displaced canine anomaly. At present, the most interceptive procedure for a palatally developing, interrupted canine involves early extraction of associated maxillary deciduous canine tooth at the time of the diagnosis in the mixed dentition⁽³⁾. The etiology of maxillary canine impaction is still under discussion. Although numerous possible factors are under assessment, it is certain that the buccally displaced canine and the palatally displaced canine are characterized by different etiopathogenesis.³

Females are more affected by maxillary canine impaction than males, with a male: female ratio 1:2 (in both palatally displaced canine group and buccally displaced canine group) and in the orthodontic control group, there is also a high prevalence of females.^{4,5,17,23}

An association between maxillary lateral incisor anomalies and palatally displaced canines was demonstrated⁵; moreover, an association with a smaller mesiodistal crown width and shorter roots of the maxillary lateral incisor⁴ was reported.

In spite of these considerations, a great number of studies suggested the "genetic theory"³ of palatally displaced canines: given the simultaneous occurrence of palatally

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displaced canines and congenital dental anomalies, these authors believe that a palatally displaced canine was only one aspect of a dental eruption disorder that could be genetic origin.^{8,9,12,15,16,20-23}

In numerous studies, proponents of the “*guidance theory*” have also reported a significantly higher incidence of hypoplastic, peg-shaped lateral incisors in patients with palatally displaced canine compared with the general population.^{4,8,10,19,24}

Evidence has been mounting regarding the association of palatally displaced canines with congenital missing teeth^{3,20} in particular, associations with maxillary lateral incisor^{7,10,15,20} and second premolar⁴ aplasia have been observed. Numerous studies have highlighted the association between palatally displaced canines and tooth size reduction, especially maxillary lateral incisors.^{3,8,15} Also the transposition maxillary canine/first premolar^{3,12} and maxillary lateral incisor/canine²¹ have been associated with palatally displaced canines. Few studies have been conducted to determine the association of buccally displaced canines with congenital dental anomalies.¹⁸

Therefore, the aim of this study was to determine the relationship of palatally displaced canines and buccally displaced canines with congenital dental anomalies and sex, to evaluate the association of maxillary canine displacement with other congenital dental anomalies and to evaluate the distribution of palatally displaced canines and buccally displaced canines.

Materials and methods:

This study was carried out on the patients attending in the Orthodontic department of BSMMU. From these impacted maxillary canine was diagnosed on the basis of clinical examinations and standardized radiographs (Orthopantomograms & Occlusal view)

50 patients with at least one impacted maxillary canine were purposively selected as study group and this group was divided into two study groups: a palatally displaced canine group and a buccally displaced canine group.

The two study groups were compared with a control group consisted of 50 patients without maxillary canine impaction who were purposively selected from initial sample based on the following criteria's: (1) Patients with and without maxillary canine impaction. (2) Age between 13-30 years. (3) Absence complex craniofacial malformation or syndrome. (4) Absence of Sequelae of traumatic injuries

to the teeth. (5) Absence of Cleft lip and palate. (6) Absence of Multiple or advanced caries. (7) Absence of Hormonal disturbance such as Hypothyroidism and Hyperthyroidism.

Congenital dental anomalies were identified from direct observation of the dental casts and confirmed by clinical examination, analysis of orthopantomograms & occlusal view were:

- Agenesis: Congenitally missing teeth. This may vary from the absence of a single tooth to multiple teeth. In this study Agenesis of each tooth (excluding the mandibular and maxillary 3rd molars); were evaluated separately.
- Impaction of other teeth: Teeth whose normal eruption is prevented by adjacent teeth or bone; malposed teeth, such as those situated lingually or buccally to the normal arch or in infra occlusion is called impacted teeth. In this study maxillary and mandibular 3rd molars were excluded because of the more delayed eruption of these teeth.
- Peg-shaped maxillary lateral incisors: Small rudimentary conical shaped maxillary lateral incisors which is dimensionally small than the normal maxillary lateral incisors.
- Supernumerary teeth: Teeth that is extra to the normal complement are termed as supernumerary teeth.
- Transposition: Positional interchange of two adjacent teeth within the same quadrant.

Data were collected from all sample groups in the data collection sheet. Statistical descriptive analysis was performed and data were analyzed using SPSS (Statistical Package for the Social Sciences) version 20 for windows. The analysis for significant associations were performed using the chi-square test; result were assume to be significant when the *P* value were <.05.

Results

Fifty patients between 13 and 30 years affected by maxillary canine impaction (34 female and 16 male). The control group (50 patients) was composed of 37 female and 13 male subjects between 13 and 30 years of age. Within buccally displaced group, 30.77% patients had impaction of other teeth, 15.39% patients had agenesis lateral incisors, 15.39% Patients had peg-shaped lateral incisors, 7.69% patients had supernumerary teeth and 7.69% patients had transposition of teeth.(Table-1).

Within the control group, 8% patients had agenesis lateral incisor, 6% patients had impaction of other teeth. Peg-shaped lateral incisors, transposition of teeth and supernumerary teeth were not found in the control group. Comparison of the buccally displaced canine group with control group revealed a statistical significant associations of Impaction of other teeth and Peg shaped lateral incisor with buccally displaced canine impactions ($p < 0.05$). The comparison of buccally displaced canine group with the control group demonstrated missing maxillary lateral incisor, Transposition and Supernumerary teeth were not significant associations with buccally placed canine impactions (Table-1).

Comparison of the palatally displaced canine group with control group demonstrated significant association of peg shaped lateral incisor with palatally displaced canine impactions ($p < 0.05$). The comparison of palatally displaced canine group with the control group demonstrated missing maxillary lateral incisor, impaction of other teeth and

transposition had no significant associations with palatally placed canine impactions. (Table-II).

In male group 75% had palatally displaced canine and 25% had buccally displaced canine.

In female group 73.53% had palatally displaced canine and 26.47% had buccally displaced canine. No statistically significant relationship was found between gender for palatally displaced canine and buccally displaced canine. Out of 50 impacted patients 34 were females and 16 were male patients (male: female ratio was 1:2.13). (Table-III).

Within maxillary impacted canine group, 18% patients had impaction of other teeth, 14% patients had agenesis maxillary lateral incisors, 12% patients had peg-shaped lateral incisors, 4% patients had transposition of teeth and 2% patients had supernumerary teeth. Within the control group, 8% patients had agenesis lateral incisor, 6% patients had impaction of other teeth. (Table-IV).

Table-I

Comparison of buccally displaced canine group with control group for dental anomalies.

		Buccally displaced canine group (n/%)	Control group (n/%)	Significance
Agenesis Maxillary lateral incisor	Present	2(15.39%)	4(8%)	0.361
	Absent	11(84.61%)	46(92%)	
Impaction of other teeth	Present	4(30.77%)	3(6%)	0.028
	Absent	9(69.23%)	47(94%)	
Peg shaped lateral incisor	Present	2(15.39%)	0(0%)	0.040
	Absent	11(84.61%)	50(100%)	
Supernumerary teeth	Present	1(7.69%)	0(0%)	0.206
	Absent	12(92.31%)	50(100%)	
Transposition	Present	1(7.69%)	0(0%)	0.206
	Absent	12(92.31%)	50(100%)	

Table-II

Comparison of palatally displaced canine group with control group for dental anomalies

		Palatally displaced canine group(n/%)	Control group (n/%)	Significance
Agenesis Maxillary lateral incisor	Present	5(13.51%)	4(8%)	0.313
	Absent	32(84.49%)	46(92%)	
Impaction of other teeth	Present	5(13.51%)	3(6%)	0.204
	Absent	32(84.49%)	47(94%)	
Peg shaped lateral incisor	Present	4(10.81%)	0(0%)	0.030
	Absent	33(89.19%)	50(100%)	
Transposition	Present	1(2.70%)	0(0%)	0.425
	Absent	36(97.30%)	50(100%)	

Table-III
Comparison of buccally displaced canine and palatally displaced canine among gender.

	M/ %	F/ %	Total/%	Significance
Buccally placed	4(25%)	9(26.47%)	13(26%)	0.428
Palatally placed	12(75%)	25(73.53%)	37(74%)	
Total	16(100%)	34(100%)	50(100%)	

Table-IV
Association of dental anomalies with maxillary canine impaction.

		Impaction Group n (%)	Control group n(%)	P value
Maxillary lateral incisor Agenesis	Present	7(14%)	4(8%)	0.262
	Absent	43(86%)	46(92%)	
Impaction of other teeth	Present	9(18%)	3(6%)	0.061
	Absent	41(82%)	47(94%)	
Peg shaped lateral incisor	Present	6(12%)	0(0%)	0.013
	Absent	44(88%)	50(100%)	
Super numerary teeth	Present	1(2%)	0(0%)	0.500
	Absent	49(98%)	50(100%)	
Transposition	Present	2(4%)	0(0%)	0.247
	Absent	48(96%)	50(100%)	

Peg-shaped lateral incisors, transposition of teeth and supernumerary teeth were not found in the control group. Table-IV shows chi-square test for the study group compared with the control group. Peg shaped lateral incisor demonstrated significant associations with maxillary canine impactions ($p < 0.05$). The comparison of study group compared with the control group, missing maxillary lateral incisor, Impaction of other teeth, Transposition and Supernumerary teeth were not significant associations with maxillary canine impactions. (Table-IV)

Within maxillary impacted canine patients, 37 presented with palatally displaced canine and 13 with buccally displaced canine. In figure-1, distribution of palatally displaced canine group shows unilateral right impaction (37.84%) and unilateral left impaction (37.84%) with lower percentage of bilateral impaction (24.33%); the unilateral: bilateral ratio (3.11:1). The buccally displaced canine group shows high number of unilateral left (53.85%) compared with unilateral right impactions (30.77%), and only (15.39%) presented with bilateral impactions; the unilateral: bilateral ratio was (5.5:1). (Figure-1)

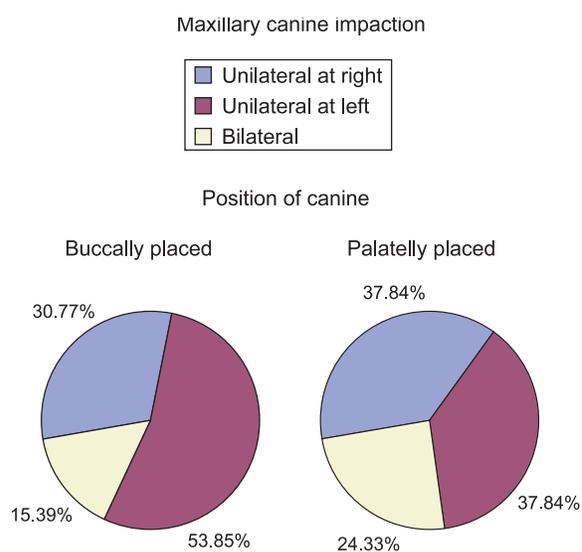


Fig.-1: *Distribution of Palatally and buccally displaced canine*

Discussion:

The present study focused on impacted maxillary canine and coexisting dental anomalies. These studies confirm

the earlier authors regarding the role of anomalous maxillary lateral incisors in maxillary canine impaction.⁴

Various theories and hypothesis have been offered regarding the reasons of maxillary impacted canine. Guidance theory is one of them. The role of the root of the lateral incisor is to serve as a guide for the normal eruption of the maxillary cuspid.¹¹ Miller suggested even a rudimentary lateral incisor can develop a root of sufficient length to provide the guidance needed for normal eruption of the cuspid. However, according to,² teeth with a small mesiodistal dimension usually develop late. Which means a lateral incisor would be insufficiently develop to provide critical guidance during the very early stage to developed and migration of the cuspid to the labially or palatally.

The comparison of buccally displaced canine group, palatally displaced canine group and maxillary impacted canine group with control group demonstrated statistical significant association of peg shaped lateral incisor with buccally displaced canine, palatally displaced canine and maxillary impacted canine. Which support the guidance theory. This result support the previously reported.^{4,10,19,20,24}

Several authors observed close association between agenesis lateral incisors and maxillary impacted canine except for the third molars. Which support the “genetic theory”.^{4,8,10,20} The comparison of palatally displaced canine group, buccally displaced canine group and maxillary impacted group with the control group demonstrated missing maxillary lateral incisor teeth were not significant associations with palatally displaced canine, buccally displaced canine and maxillary impacted canine. This result supports the previously reported.⁴ This report differs from the “genetic theory”.

Comparison of buccally displaced canine group with control group demonstrated significant associations of impaction of other teeth with buccally displaced canine. This result supported by growing scientific evidence^(15,18) and differs from report given by.¹⁶

Some authors related palatally displaced canines to the impaction of other teeth except 3rd molars.^{15,17,18} This evidence was not supported by the present study.

The comparison of buccally displaced canine group and maxillary impacted canine group with the control group, supernumerary teeth were not significant associated with buccally displaced canine group and maxillary impacted canine group. This result supports the previously reported.^{17,18}

Analysis of the buccally displaced canine group, palatally displaced canine group and maxillary impacted canine group did not reveal significant association with Transposition. This result supports the previously reported.¹⁸ But other author¹⁷ was found significant association of transposition with palatally displaced canine group.

In this study there was no patient with supernumerary teeth in palatally displaced canine group.

In this study maxillary canine impaction between male and female were not significant with gender among impacted canine; as similar previously reported.¹⁷

In this study within the impacted patients palatally impacted canine patients were 37 (74%) and buccally impacted canine patients were 13(26%). This study confirmed the higher number of palatally displaced canine compared to buccally displaced canine previously reported by other authors^{4,7,14,15,17} with a palatal:buccal (2.84:1) canine impaction ratio is almost same(3:1).

Females were more affected by maxillary canine impaction than males, with a male: female ratio of 1:2.13(in both palatally displaced canine group and buccally displaced canine group). These data are almost similar to reports in previous studies.^{4,5,17,22,23} This was claimed to be due to primarily females being more likely to seek orthodontic treatment for esthetic reasons and thus being more strongly represented in orthodontic collectives.¹⁵ Almost two third palatally displaced maxillary canine impacted patients were unilateral and one third patients were bilateral and the male-female ratio was 1:3, similar to ratios reported in the literature.^{4,6} Buccally displaced canine was characterized by fewer bilateral impaction (unilateral: bilateral ratio of 1:5.45), this result is almost same previously reported.¹⁷

Conclusions:

The result of the present study indicate that

1. There was a statistical significant association of peg-shaped lateral incisor with palatally displaced canine, buccally displaced canine and maxillary impacted canine.
2. There was no significant association of buccally displaced canine and palatally displaced canine among gender.
3. There was no significant association of agenesis, impaction of other teeth, supernumerary teeth and transposition with maxillary canine impaction.

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Five root canals of a Mandibular first molar tooth: A case report

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Abstract:

The purpose of this study was to demonstrate the importance of knowledge of the internal anatomy of root canals for the success of endodontic treatment. The present report describes a right mandibular first permanent molar requiring root canal therapy, found to have three separate canals in the mesial root as mesiobuccal (MB), middle mesial (MM), mesiolingual (ML) & two separate canals in the distal root as distobuccal (DB), distolingual (DL). In this case these canals were identified and endodontic treatment was done followed by final restoration. This case provides an evidence of variations in the mesial root of mandibular 1st molar tooth. Complete clinical and radiographic examination and adequate knowledge of the morphology of this kind of teeth is necessary for successful clinical outcome.

Key Word: Mandibular 1st Molar; Five root canals, Middle Mesial canal, Endodontic Treatment.

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Introduction:

Knowledge of internal dental anatomy is fundamental to the success of endodontic treatment. Incomplete instrumentation, inadequate cleaning & shaping & the subsequent defective obturation of root canals are the main causes of endodontic treatment failure.¹ Anatomical characteristics of the different types of teeth and their possible variation are challenges that routinely faced by practitioners performing endodontic treatment. The correct access into the pulp chamber, which should allow access to the orifices of the root canals and an optimum view of the chamber floor, is a fundamental step in endodontic therapy as it enables the identification of any variation in the number and position of root canals.² The middle mesial canal has been more commonly located in mandibular 1st

molar. Several studies have evaluated the degree of variation in the number of roots and root canals in mandibular 1st molars. Fabra campons studies 145 mandibular 1st molars & found that 2.75% of the teeth had five canals.³ Martinez-burna and Badanelli conducted a canal investigation & found 29 teeth with five root canals in a sample of 2362 mandibular permanent molars and reported that 12 out of 100 molars studied had a third mesial canal.⁴

Aminsobhani et al studied the occurrence and location of the middle mesial canal of mandibular 1st molar & second molar in relation to other two mesial canals that were treated in private practice that middle mesial canal was located in the middle of the distance between the mesiobuccal and mesiolingual canals. The canal configuration was found in 6, 2nd molars & 21, 1st molars. Middle mesial canals in all of the cases joined to mesiobuccal or mesioligual canals. None of the teeth consisted of three independent canals with three apical foramina.⁵ Beatty & krell described a mandibular 1st molar with three independent canals in the mesial root.⁶ Author Dr. Carlos Heibom et al. reported the number of roots, total number of canals, the number of middle mesial canals & number of foramina and found 0.8% teeth have five canals among 4745 mandibular 1st molars.⁷

According to Ingle one of the most important causes of endodontic treatment failure is the incomplete obturation of the root canal system. Therefore, the correct location, instrumentation & obturation of all canals are indispensable procedures.⁸

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Case report:

A 19 years old male patient reported to the department of Conservative Dentistry & Endodontic, BSMMU with decayed tooth & associated pain over his right mandibular region. Intra oral examination revealed class 1 deep carious lesion in mandibular right 1st molar. The tooth exhibited no mobility, was mildly tender to percussion and gives a negative respond to vitality test. The preoperative diagnostic radiograph of the tooth revealed a deep carious lesion involving the pulp with widening of apical periodontal space. A diagnosis of necrotic pulp with apical periodontitis was made and endodontic treatment was scheduled. After isolation, the carious lesion was removed and an endodontic access was made. Inspection of pulp chamber floor showed orifices corresponding to mesiobuccal, mesiolingual, distobuccal and distolingual canals. On careful examination of the groove between the mesiobuccal and mesiolingual canal orifice was identified and subsequently negotiated. The working length was established (MB-20mm, ML-20mm, Middle Mesial-19mm, DB-19.5mm, DL-19mm). The canals were instrumented with NiTi file and irrigation was done with 2.5% NaOCl solution and normal saline alternatively. After preparation the canal was finally flushed with normal saline & dried with sterile paper points and Ca(OH)₂ was given at the full length of the canals with Lentulo-spiral for 1 week. At the subsequent visit the Ca(OH)₂ dressing was removed and irrigation was done with 17% EDTA alternating with 2.5% NaOCl and normal saline to ensure effective removal of the Ca(OH)₂ and the root canal was dried with absorbent paper point and was obturated with GP cone using lateral condensation technique. A final radiograph was taken to confirm extension of root canal filling. The permanent



Fig.-1: Pre operative X-ray (RVG view)

restoration was done followed by crown prosthesis. Then up to 6 months follow up visit, the patient was evaluated clinically where there was no tenderness to percussion with no sinus tract or any sign of periodontal disease and tooth was functional.

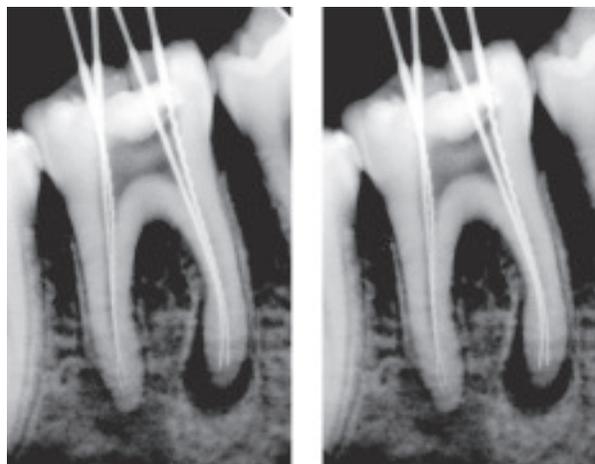


Fig.-2: WLM X-ray (RVG-View)

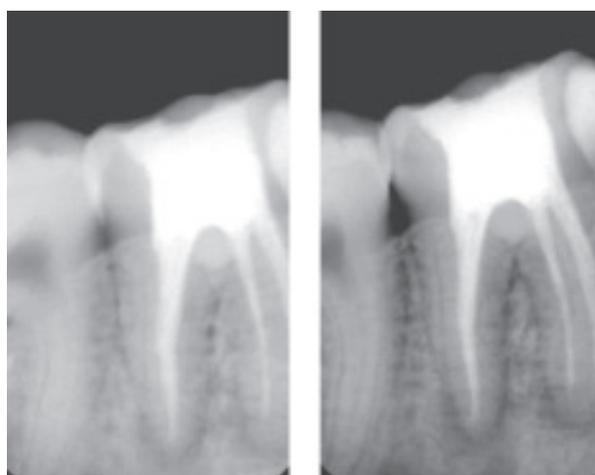


Fig.-3: Final X-ray (RVG-View)

Discussion:

Before root canal treatment clinician should have adequate knowledge of the pulp chamber and anatomy of teeth. All root canals should be accessed, cleaned and shaped to achieve a three dimensional obturation of the entire root canal space.

There is an abundant amount of reports that relate the anatomic variations of the mandibular molars. This should induce the clinician to observe the pulp chamber floor to locate possible canal orifices. This will increase the long term prognosis of endodontic therapy. Searching for additional canal orifice should be standard practice for

clinician. A round bur or ultrasonic tip can be used for removal of any protuberance from the mesial axial wall would prevent direct access to the developmental groove between MB & ML orifices. This developmental groove should be carefully checked with sharp endodontic explorer (DG-16). If orifices are located the groove can be troughed with ultrasonic tip, its mesial aspect until small file can negotiate this intermediate canal.⁹ New technology such as dental operating microscopes and dental loupes offer magnification and illumination of the operating field and substantially improved the visualization of the root canal orifices.^{9,10} But we did not use these new technologies during treatment session.

Numerous studies in the past decade have described the morphology of teeth including mandibular molars. The morphology of mesial root canals in mandibular molar is complex and high frequency of intercanal communication or isthmuses.^{7, 8, 9, 10-13} The presence of third canal (middle mesial) in the mesial root of the mandibular molars has been reported to have an incidence of 0.95% to 15%.^{4,7,11,14,15} In almost all of the clinical cases reported until today these canals joined the mesiobuccal & mesiolingual canal in the apical third.¹⁶ Radiographic examination using intraoral periapical view is important for the evaluation of the canal configuration. However it has its inherent limitation to access the root canal system completely. Digital radiography at different angles with subsequent image analysis can be used effectively. Computed tomography (CT) imaging has been widely used in medicine since the 1970s and was introduced in the endodontic field in 1990. Recently cone beam CT (CBCT) and RVG imaging has been shown to provide comparable images at reduced dose and cost to be considered as an alternative to multi detector CT imaging in endodontic. La *et al* 2010 suggested clinical detection and management of an independent middle mesial canal in mandibular molar by using CBCT imaging.^{17, 18, 19}

Various diagnostic aids like dyes, champagne bubble test, ultrasonic's, micro openers and transillumination aids, irrigators to improve pulp chamber visibility (Stropko) and observing the chamber for bleeding spots could be used by the clinician as an effective means to locate additional canal orifices.^{20,21,22}

Conclusion:

Knowledge of dental anatomy is fundamental for good endodontic preparation. Identification of these extra canals and their instrumentation is one of the key factors in the prevention of unsuccessful treatment outcomes. In

addition to the various diagnostic aids, operator experience has also been identified as a key factor in locating these aberrant canals. The clinician should be aware of the incidence of this type of variation in the mandibular first molar tooth and perform a preoperative radiological assessment from different angles, a proper access preparation, and thorough examination of the pulp chamber to locate and debride all the canals. An accurate clinical evaluation of root canal and morphology in mandibular first molar should be done using various diagnostic methodologies with magnification and illumination, which would pave the way for long-term success of endodontic therapy.

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Orofacial pain and it's management - A review

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Introduction:

- Pain and Pleasure are simple ideas incapable of definition. - Barke.
- Pain is the most common symptom arising in the mouth, face and neck and is the most common reason for attending as emergency patient to a dental surgeon.
- The biological value of pain is that it usually signifies tissue damage.
- Pain usually arises peripherally, by stimulation of receptors, and is modified centrally.

Pathways of dental pain

- Impulses originating in the nerve-endings of the dental pulp and the supporting structures of the teeth are conveyed to the central nervous system by the second and the third divisions of the fifth cranial nerve.
- From the Gasserian ganglion, these neural pathways pass to the sensory nucleus of the trigeminal nerve extends C2 level of the spinal cord.
- They then pass via the trigeminal lemniscus to the thalamus and then via connecting neurons to the cortex of the brain.
- Interruption of these neural pathways at any level may abolish the sensation of pain.

Pain

Character of the pain:

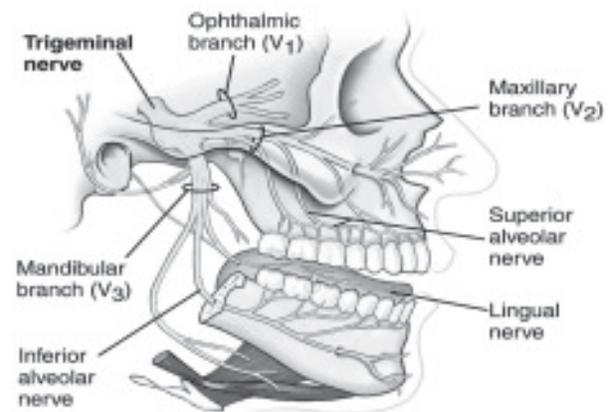
- Three characters of pain are commonly described:
Sharp/ stabbing Dull/ throbbing/ boring
Pulpitis Early pulpitis

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- Pericoronitis
- Trigeminal neuralgia
- Burning
- Burning mouth syndrome
- Post herpetic neuralgia

The Anatomical Basis of Dental



Pain of dental origin

- Pulpal pain
- Periodontal pain
- Gingival pain
- Bone pain
- Pain associated with denture bases.

Pain of Non- Dental Origin

- Neuralgic
 - Trigeminal neuralgia
 - Bell's palsy

Vascular Origin

- Migraine
- Referred pain

Maxillary Antrum

- Sinusitis
- Malignancy

Salivary Gland

- Acute bacterial sialadenitis
- Mumps

Oral Mucosa

- Herpes zoster
- Mucosal ulceration

Masticatory Muscles

- T. M joint disorder
- MPDS

Ears

- Otitis media

Eyes

- Glaucoma

Psychogenic

- Atypical facial pain
- Atypical odontalgia

Management of orofacial pain:

- Management includes diagnosis and treatment.
- Diagnosis:

History and Examination are the main paramount of diagnosis. When investigating acute dental pain the history should focus on the pain's:

- Location
- \Type
- \Frequency and duration
- \Exacerbation and remission
- \Severity
- \Area of radiation
- \Current medications

History And Examination

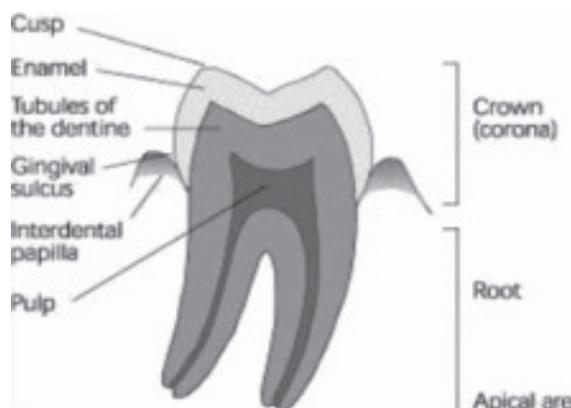
What are structures that need to be examined?

The following structures need to be examined carefully in order to be sure that the pain is of dental origin or not:

- Tongue
- Buccal mucosa
- Floor of the mouth
- Teeth and periodontal tissues
- T.M joints
- Salivary glands
- Lymph nodes

Which test can assist diagnosis?

There are several simple tests that may assist in diagnosis of dental pain.

**Pulp Sensitivity Test**

- Thermal Tests
 - Cold test
 - Heat test
- Electric pulp test
- Test cavity preparation

Procussion Test

- Using an instrument handle, the tooth is tapped in the longitudinal axis.
- A painful response suggests possible periapical inflammation.

Probing

- Placing a fine, blunt probe gently into the gingival sulcus surrounding the tooth enables the health of the gingival tissues to be assessed.
- Bleeding and/ or sulcus depth greater than 3-4 mm indicate gum disease.

Mobility Test

- Holding a tooth firmly on the buccal and lingual sides between the fingers enables mobility to be assessed.
- All teeth have a small amount of mobility (<0.5 mm), but visible movement suggests loss of bone support around the root of the tooth.

Palpation

- Careful palpation around the area of concern may reveal the tenderness and the type and extent of swelling.

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Radiographic Examination

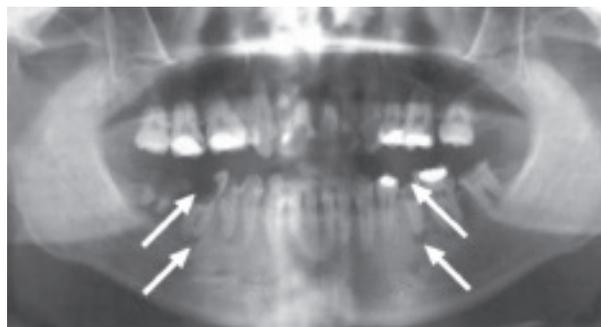
- The radiograph is one of the most important tools in making a diagnosis.

- Without radiograph, case selection, diagnosis and treatment would be impossible as it helps examination of oral structure that would otherwise be unseen by naked eye.

Orthopantomogram:

- It is possible to obtain a screening radiograph, such as orthopantomogram (OPG), that may assist in the diagnosis, location of the cause of the pain.

OPG (Orthopantomogram)

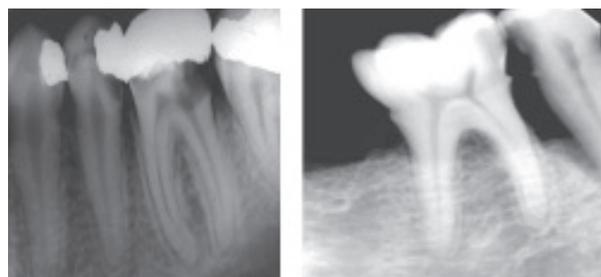


Other Radiographs

Intraoral periapical view

Bitewing radiograph

Parallel technique



Short, Sharp, Stabbing (Acute) Pain

- This type of pain can be generalized or confined to one region of the mouth.
- Dentinal sensitivity is characterized as a sharp pain that occurs soon after a provoking stimulus.
- Caused by caries, split cusp, loss or fractured restoration or a fractured tooth.

Treatment of acute pain

- For root sensitivity— a desensitizing toothpaste and a reduction in acid in the diet.
- A fluoride mouth-rinse.

- In the case of caries, a lost filling or fractured tooth— a temporary restoration with eugenol.
- Oral analgesics.

Dull, Throbbing, Persistent (Chronic) Pain

- This type of pain may have several causes. These include tooth problems, pericoronitis, gingivitis, TMJ disorder, or even maxillary sinusitis.

Pulpitis:

- The most common dental cause of dull, throbbing, persistent pain is caries.
- The pain may radiate and be referred to other areas of the mouth.
- Difficult in sleeping and exacerbated by lying down.
- Heat may make the pain worse whereas cold may alleviate it.
- The pain intermittent with no regular pattern.

Treatment of pulpitis

- Root canal therapy or tooth extraction.
- In some patients, periapical inflammation can lead to a cellulites of the face. This is a surgical emergency.
- If pus is present— drained, the cause eliminated.
- Antibiotics.
- Antihistamines as adjunctive analgesic.

Oral Pain and Antibiotics

- Should Antibiotics be Prescribed?
- There is evidence that dental surgeons are using antibiotics empirically for dental pain.
- Most dental emergency situations involve patients with acute inflammation of the dental pulp or the periapical tissues.
- Prescribing antibiotics for these conditions will not remove the cause of the problem nor destroy the bacteria within the tooth.
- Antibiotics should be limited to patients with
 - Malaise
 - Fever
 - Lymph node involvement
 - A suppressed or compromised immune system
 - Cellulites
 - A spreading infection
 - A rapid onset of severe infection.

Aphthous Stomatitis

- Aphthous stomatitis constitutes the most common painful oral mucosal disease and affect 10-25% of the population.
- Etiology:
The exact cause is unknown but the main factors are;
 - Genetic predisposition
 - Trauma
 - Immunological abnormalities
 - Gastrointestinal disorder
 - Hematological abnormalities
 - Hormonal disturbances
 - Stress

**Treatment:**

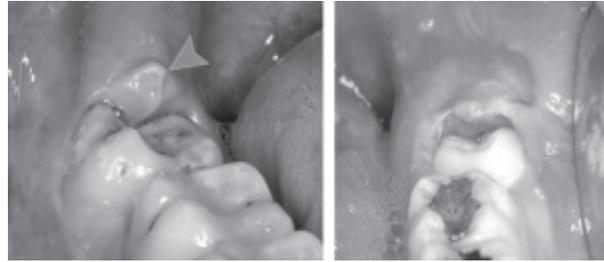
- Treatment of vitamin B12 deficiency or folate deficiency.
- Corticosteroid
- Triamcinolone dental paste
- Tetracycline mouth rinses
- Chlorhexidine mouthwashes
- Topical salicylate preparations.

Pericoronitis :

- Soft tissue problems that may cause dull, throbbing, persistent pain include local inflammation or pericoronitis.
- Acute pericoronitis involves bacterial infection around an unerupted or partially erupted tooth and usually affects the lower third molar.
- There may be trismus.

Treatment

- Food debris should be removed and drainage established.



- Irrigation with chlorhexidine and rinsing the mouth with hot salty water.
- Penicillin and Metronidazol should be given.

Gingivitis :

- Gingivitis is a rapidly progressive infection of the gingival tissues that causes ulceration of the interdental gingival papillae.
- It can lead to extensive destruction.
- Stress, smoking and poor oral hygiene being predisposing factor.
- The pain is dull, deep- seated and constant.
- The gums can bleed spontaneously and there is also an unpleasant taste in the mouth.

Treatment:

- Scalling and Gingivectomy.
- Chlorhexidine mouthwashes and a course of metronidazol.
- Treating the contribution factors should prevent a recurrence.

**Dry Socket:**

- A dull throbbing pain may develop two to four days after a tooth extraction.
- Smoking is a major predisposing factor as it reduces the blood supply.



- The tissue around the socket is very tender and white necrotic bone is exposed in the socket.

Treatment

- The area should be irrigated thoroughly with saline solution.
- If loose bone is present, thorough cleaning of the socket.
- Patients should be shown how to irrigate the area and told to do regularly.
- Analgesics and antibiotics.

Sinusitis:

- This is caused by infection of the maxillary sinus, usually following an upper respiratory tract infection.
- However, there can be a history of recent upper tooth extraction leading to an oro-antral fistula.
- Patients usually complain of unilateral dull pain in all posterior upper teeth.
- All these teeth may be tender to percussion, but they will respond to a pulp sensitivity test.
- There are usually no other dental sign.

Treatment:

- Decongestants can help sinus drainage.
- Antibiotics probably have only a minor role in mild cases.
- Referral to an ENT surgeon for better management.

Trigeminal Neuralgia:

- Extreme pain that may even lead to suicidal depression, may be associated with trigeminal neuralgia.
- Unilateral, short lasting, excruciating, unbearable, stabbing, paroxysmal facial pain.
- Pain is typically limited to one of the three divisions of the trigeminal nerve.
- A trigger zone presents.

Treatment:

- Non- analgesic drug Carbamazepine.
- Gabapentin.
- Phenytoin may be used.
- Cryotherapy, Surgical section, Thermo coagulation of peripheral nerve may be attempted if pain is uncontrolled.

TMJ Pain:

- This is the most common problem in or around the TM joints.
- Unilateral or bilateral, dull pain within the TM Joint.
- Sometimes on waking, or during eating or speech.

Treatment:

- In most instances symptoms are self-limiting, treatment should be conservative.
- Analgesics, Anxiolytic and Antidepressants.
- Occlusal splints and surgical correction.

Atypical Facial Pain:

- Pain is not a simple sensation, but has been described as the unpleasant experience felt “when hurt in body or mind.”
- The psychological aspects of pain are often important.
- Features suggestive of psychogenic facial pain;
 - women of middle age or older may be affected
 - Absence of organic signs
 - pain poorly localized
 - Lack of response to analgesics
 - Unchanging pain persistent for many years
 - Lack of any triggering factors
 - Sometimes good response to antidepressive treatment.

Conclusion:

Therapeutics

- Pain control can be achieved by:
 - Non-opoid Analgesics
 - Opid Analgesics

Non-Opid Analgesics:

- Non-steroidal anti-inflammatory drugs (NSAIDs) are the main stay of therapy for the management of acute dental pain.
- They have also been evaluated for chronic orofacial pain.

Opid Analgesics:

- Combining an NSAID with opioid results in additive analgesia.

Take Home Messages

- If you wait until you feel pain, it's way too late.

Know this:

Most dental issues do not cause pain at first. Caries before they become deep, are painless.

Gum diseases also silent. But once, you are wincing in pain, that means there is probably already an infection causes pockets of your gums have already riddled with bacteria.

Bottom line:

Make frequent check-up appointments to nip invisible-to-you problems in the bud, and put your dentist on speed dial should you notice any problems.

8 Bestthings you can do for your teeth:

- More Than Just Brushing and Flossing
- Chew Sugarless Gum
- Add Cheese
- Focus on Fiber-Rich Fruits and Vegetables
- Drink Tea

- Add Supplements
- Use Antimicrobial Mouth Rinse
- Avoid Some Harsh Habits

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