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CONTENTS

Original Article

Prevalence of Dental Caries among High School students of Northern Bangladesh

Azizi AMMS[1], Ahmed MS[2], Mamun MA[3], Habib MA[4], Rahman MZ[5], Zaman MMH[6], Azizi S[7]

Abstract:

Introduction: Dental caries is a public health problem in developing countries like Bangladesh. The problem is dreadful among school children particularly of lower socio-economic status. The present study was planned to assess the prevalence of dental caries among high school students.

Methodology: The study was conducted in three rural high schools in northern part of Bangladesh selected by simple random sampling(SRS) technique .Students studying in class VII to class X aged 13-16 years were checked by check list for presence of dental caries and asked about the oral hygienic habit and socio-demographic characteristics with the help of predesigned questionnaire.

Results: Total 450 students participated in the study and the prevalence of dental caries was found to be 45.33%. The prevalence of dental caries was significantly higher among students belonging to family having less per capita monthly income.(statistically significant (P < .001) The prevalence was significantly lower among students who had brushing habits more than twice a day as compared to those having brushing habit once daily or not every day.

Conclusion: Dental caries can be prevented by proper oral hygiene habits. Awareness among students and their mothers should be generated for primary prevention of this condition. Early diagnosis and prompt treatment can prevent further damage and can save the teeth.

Key words: *Dental caries, High school students, Northern, Bangladesh*

Rangpur Dent. Coll J 2016; 4(2): 1-3

Introduction:

Dental health is often neglected by a vast majority of population. In the developing countries like Bangladesh the prevalence of dental carries is very high particularly among the children. The prevalence is even higher in rural people and in school children. The absence of practice of healthy habits often leads to this type of problem. Dental caries is not only a medical problem but many socio-demographic factors are said to be associated with this. Usually the habit of taking care of dental health is obtained from the parents and other senior members of family. In Bangladesh where the birth rate is still high and there is less spacing between two births, mothers often are not capable of giving proper care to all the children. The unhealthy practice of children often leads to many medical problems some of which can cause permanent damage. Utmost care must thus be taken so that dental caries should not develop. Early diagnosis with prompt treatment is also necessary.

Methodology:

The study was conducted in three high schools of Birganj Upozilla of Dinajpur district by multi stage sampling. Among these one govt.boy's &one govt.girl's school and 3rd one is a private high school selected randomely. Students of class VII to class X were included in the study. Sample size of this study was 450, the number was selected using standard statistical formula.

Study tools & technique:

Study was conducted by face to face interview of the students using pretested structured questionnaire. Oral health status was checked by a check list & examination and examination was done by a group of dental surgeons.

Result:

Majority of the students were in 12-13 yr & in 14-15 yr age group 51% & 49%respectively; among them 57.11% were boys & rest were girls. Majority (considering father's economic status) belonged to middle class (47.89%) & in poor economic class 17.81%. Only 12% belonged to rich

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socio economic class. Regarding occupational status of their father, majority (62%) are involved in business & agriculture related work, 32% are involved in service & only 6% are engaged in other work. majority of their mother are housewife (71.33%) only 12.44% were in different services & rest 16.22% are engaged in different levels of business & agricultural works. Regarding habits & practice of oro dental health 21.55% had brushing habit once, 74.89% twice & only 3.56% brush their teeth more than twice a day, majority of them 79.77% used brush & paste for dental purpose & rest of the students used other things for brushing such as ash, powder, branch of trees etc.

Figure-01: Distribution of respondent according to gender & Dental Caries.

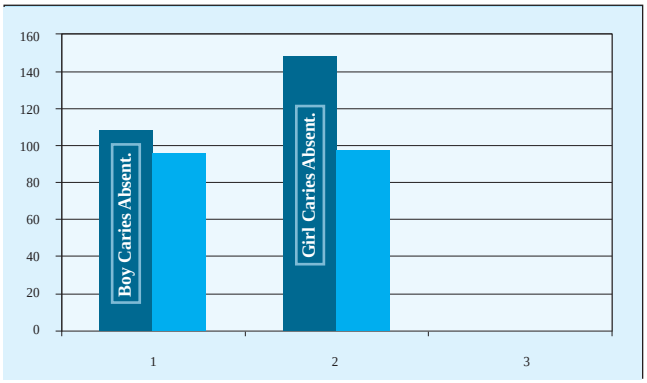

Figure-02: Frequency distribution of students regarding dental cleaning technique and dental carries.

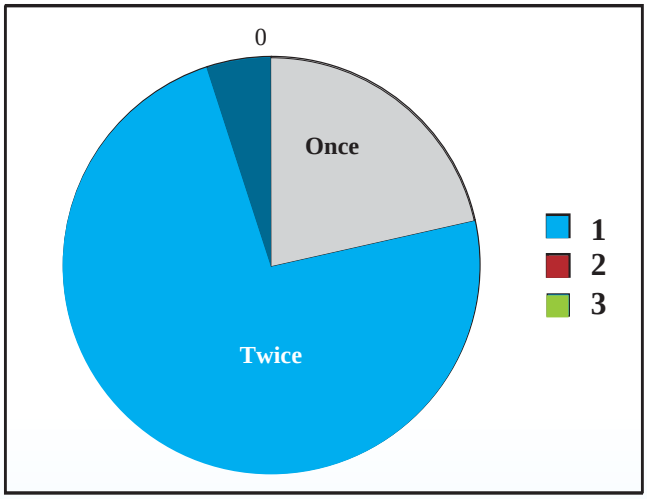

Table-01: Distribution of respondent according to Age and dental Caries n=450.

Age (years)	Frequency	Dental Carries	
		Present	Absent
12 to 13	231	95	136
14 to 16	219	109	110
Total	**450**	**204**	**246**

Shows that 12 to 13 years respondent were 231 among them 95 respondents had dental caries and 136 were absent. In 14 to 16 year's respondent were 219 among them 109 respondent had dental caries and 110 were absent.

Table-02: Distribution of respondents according to mothers occupation and dental Caries n = 450.

Occupational Status (Mother)	Frequency	Dental Carries	
		Present	Absent
Service	56	28	28
Business & Agriculture	73	6	67
Housewife	321	170	151
Total	**450**	**204**	**246**

Table-02: Shows that respondents mother occupation were 56 service, 73 Business & Agriculture, 321 House wife and dental caries were 28 service, 6 Business of Agriculture and 170 Housewife children.

Figure-3: Frequency distribution of students regarding Brushing Teeth per day and prevalence of dental carries

How many times you brush your teeth	Frequency	Percentage (%)	Dental Carries	Prevalence
Once/day	97	21.56%	44	21.50%
Twice/day	337	74.89%	150	73.50%
More than Twice / day	16	3.55%	10	5.00%
Total	**450**	**100%**	**204**	**100.00%**

Figure shows 97 students wash their teeth once daily and had 21% dental carries, 337 brush twice daily and had 73% caries again 16 brush their teeth more than twice and had only 5% dental caries.

Clinical examination which was done by a group (12 dentists) of dental surgeons from Rangpur dental college with relevant instruments in open day light in school auditorium. Out of 450 students 204 were found suffering from dental caries & prevalence was 45.33% Among the paste& brush user 76% are absent from caries where as 24%who use other things for cleaning purpose are suffering from caries

Discussion:

Dental caries is one of the leading problem in school going children as well as in adults. The World Health Organization (WHO) has recognized dental caries as a pandemic and reported its prevalence among school children to range from 60-90%. [1] Present study has found out the prevalence of dental caries to be as high as 45.33% in the rural students of High schools in northern area of Bangladesh.[1] In a similar study of prevalence in Sundarban area of West Bengal in India it was as high as 72%.[1] In another study in Maharashtra of India the prevalence of dental caries in 3-14 yrs old children it was 80.92%.[2]

Dixit et al.[3]conducted a study among school children in Nepal and they found that the prevalence of dental caries among the school children aged 12-13 years was 41% which is nearly the prevalence in the present study. In Kenya, Ng'ang'a and Valderhaug[4] reported a prevalence of 40-50% among children aged 13-15 years. However in this study prevalence of dental caries of girls were higher (49%) than that of boys (42%), reverse result was found in the

study conducted[5] by SS Rahman,CH Rasul,MA Kashem,SS Biswas in 'Prevalence of dental caries in the primary dentition among under five children'. Again same resut was in study of in Sundarban[1] or that of study done by Dexit et el.[2]

Although the overall prevalence in their study was lower than the present study. Similar to this findings, there was no significant difference in prevalence between girls and boys. Gathecha et al.[6] revealed that the difference of prevalence of dental caries between boys and girls are not significant. Contrary to this report and the report of Dixit et al. Natapov et al.[7] reported a higher prevalence among 5 years old boys than girls. The present study found that prevalence of dental caries was Significantly ($P < .001$) higher in lower income group as compared to upper income group. Usually people belonging to lower income group are devoid of hygienic practice and they live in unhygienic environment.

These factors often lead to dental caries & some finding was found in study of Pratiti datta's prevalence of Dental caries among school children in Sundarban, India[1] and in other's study.

However when the students brush their teeth more than twice than prevalence of dental caries decline as in this study [statistically significant ($P < .001$)] but in the study of Sundarban, India it was found that caries prevalence was decreases even after more than one brushing.

Gathecha et al.[6] in a study in Kenya have found that brushing habit has no significant effect on the prevalence of dental caries which is contradictory to the results of present study. Rao and Bharambe[8] in their study found that 60.8% children were habituated to clean their teeth with toothpaste. In this study 80% students are habituated to clean their teeth with tooth paste & brush& 76%were free from caries ($p<.05$).

Conclusion:

Dental caries is not only a medical problem but also a social problem. Awareness among students can be generated by the school teachers because they are the role model for the students. Parents should be aware of the dental health of their children. Parent/teacher meetings should be regularly organized during which parents are educated on the importance of good hygiene practices in disease prevention. Health education should be incorporated within the regular activities of the school. Overall education, particularly female education can help to solve the problems in future

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Original Article

Oral Health Status Among 5-11 Years School Children in a Selected School of Dhaka City

Taleb A[1], Zaki M[2], Mohammad G[3]

Abstract:

A good quality of life is possible if students maintain their oral health and become free of oral disease. This study was a descriptive type of cross sectional study conducted at Police Line Smrity School and College, on 20th October 2014. Respondents were students of secondary school children (class six). The main objective of the study was to assess the oral health status among secondary school children through the decayed, missing and filled teeth (DMFT) score of their teeth. A total of 200 students were interviewed with a structured pre-tested questionnaire and examined by a checklist. On analysis of data it was found that among the 200 children, maximum number of respondents was between 9-12 years of age and their number was 125(62.5%). Among them 68(34%) were male and 132(66%) were female. For oral hygiene maintenance 168(84%) respondents used tooth brush along with 87(43.5%) tooth paste for tooth cleaning. Maximum respondents 159(79.5%) used to clean their teeth once daily. Majority of the respondents 187(93.5%) used to clean their teeth before meal and *maximum 145(72.5%) change their tooth brush when required. Out of 200 respondents 126(63%) had decayed teeth followed by 132(66%) had missing teeth and only 38(19%) had filled teeth. The total DMFT score was 391 and mean DMFT score was 1.95. This study provides baseline information about oral hygiene status of 5-11 years school children, which can be used in the future assessment, diagnosis and management of oral and dental problems and live a healthy life.*

Key words: *Oral hygiene, Oral health status, DMFT*

Rangpur Dent. Coll J 2016; 4(2): 4-6

Introduction:

Maintaining good oral hygiene is one of the most important things a person can do for his teeth and gums. Healthy teeth not only enable one to look and feel good, they make it possible to eat and speak properly. Good oral health is important to overall wellbeing. Daily preventive care, including proper brushing and flossing will help to solve problems before they develop and is much less painful, expensive and annoying than treating conditions that have been allowed to progress.[1]

Taking care of your teeth at home can help to maintain dental health and prevent caries and other gum diseases from developing. The goal of regular home care is to combat the buildup of plaque in and around the teeth and gums and fight against bad breath, tooth decay and gum disease. Adults who neglect their teeth and who let plaque build up often develop infections in the delicate tissues around their teeth.[2]

Oral health is the integral part of general health. Poor oral health can have adverse effect on general health. Poor oral health can affect a person's quality of life. Oral pain, missing teeth or oral infections can influence the way a person speaks, eats and socializes. These oral health problems can reduce a person's quality of life by affecting their physical, mental and social well being. Oral disease, like any other disease needs to be treated. A chronic infection in the mouth is a serious problem that should not be ignored. Research

has shown there is an association between oral disease and oral health problems such as diabetes, heart disease and stroke, respiratory illness in older adults as well as pre-term and low birth weight babies. Although researchers are just beginning to understand this relationship, evidence shows that oral disease can aggravate other health problems and that keeping a healthy mouth is an important part of leading a healthy life.[3]

Materials and Methods:

This was a descriptive type of cross sectional study conducted at Police Line Smrity School and College, Dhaka on 20th October 2015. Respondents were students of secondary school children (class six). Study population was all students of that school. A total of 200 students were interviewed with a structured pre-tested questionnaire and examined by a checklist prepared for the diagnosis of oral health status. After taking consent data were collected by face to face interview and clinical oral examinations of the students. Values for caries prevalence and incidence are expressed using the DMFT index. Here D- refers to decayed tooth, M- refers to missing tooth due to caries only, F- refers to filled tooth due to caries. Total of each component is DMF score. When we divide the total DMF by the

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number of individuals in a group we get the mean DMFT score.[4]

Results:

A total 200 students were interviewed for the study. Their socio-economic condition demographic characteristics of oral health status were mainly investigated. Data were presented in simple frequency tables and diagrams.

Table 1: Distribution of the respondents by socio-economic and demographic characteristics [n=200]

Characteristics		Number	Percentage
Age(in years)	5-8	75	37.5
	9-11	125	62.5
Gender	Male	68	34
	Female	132	66
Religion	Islam	178	89
	Hindu	22	11
Occupation	Service	90	45
	Driver	24	12
	Business	68	34
	Others	18	9

Table 1 showed that maximum numbers of respondents were between 9-11 years of ages and they were 125(62.5%), followed by 75(37.5%) respondents were 5-8 years.

Maximum number of respondents were female and they were 132(66%), followed by 68(34%) were male. 178(89%) respondents were Muslims, followed by 22(11%) were Hindus. 90(45%) parents were service holder, followed by 68(34%) parents were businessmen.

Table 2: Distribution of the respondents according to oral hygiene practice [n=200]

Oral hygiene practice	Number of respondents	Percentage
Types of tooth cleaning		
Use of tooth brush	168	84
Not use of tooth brush	32	16
Materials used for tooth cleaning		
Tooth paste	87	43.5
Tooth powder	73	36.5
Others	40	20
Frequency of tooth cleaning(in a day)		
Once	159	79.5
Twice	41	20.5
More than twice		
Time of tooth brushing		
Before meal	187	93.5
After meal	13	6.5
Changing tooth brush		
2-3 months	20	10.0
After 1 year	35	17.5
When required	145	72.5

Table 2 showed that out of 200 respondents 168(84%) used tooth brush along with 87(43.5%) respondents used tooth paste. Maximum respondents 159(79.5%) used to clean their teeth once daily and 187(93.5%) respondents used to clean their teeth before meal while only 13(6.5%) respondents preferred to clean their teeth after meal. Majority children 145(72.5%) change their tooth brush when required.

Table 3: Distribution of the respondents according to presence of caries [n=200]

Caries	Number of respondents	Percentage	No. of tooth involved
Present	126	63	159
Absent	74	37	
Total	200	100	

Table 3 showed that, maximum respondents 126(63%) have visible caries while remaining 74(37%) respondents had not visible caries on their tooth surface.

Table 4: Distribution of the respondents according to presence of missing tooth [n=200]

Missing tooth	Number of respondents	Percentage	No. of missing tooth
Present	132	66	182
Absent	68	34	
Total	200	100	

Table 4 showed that, maximum respondents 132(66%) have visible caries while remaining 68(34%) respondents had not any missing tooth in their mouth.

Table 5: Distribution of the respondents according to presence of filled tooth [n=200]

Filled tooth	Number of respondents	Percentage	No. of missing tooth
Present	38	19	50
Absent	162	81	
Total	200	100	

Table 5 showed that, maximum respondents 162(81%) have visible caries while remaining 38(19%) respondents had not any filling in their tooth surface.

Table 6: Distribution of the respondents according to DMFT [n=200]

Filled tooth	Number of respondents	Percentage	Total DMFT	Mean DMFT
Decay	126	159	50	1.95
Missing	132	182		
Filled	38	50		

Table 6 showed that out of 200 respondents 126 had decayed teeth followed by 132 respondents had missing teeth and 38 had filled teeth. The total DMFT score was 391 and the mean DMFT score was 1.95.

Discussion:

From this study we found that out of 200 respondents, 168(84%) used tooth brush along with 87(43.5%) respondents used tooth paste. Maximum respondents

159(79.5%) used to clean their teeth once daily and 187(93.5%) used to clean their teeth before meal while only 13(6.5%) respondents preferred to clean their teeth after meal. This study is consistent with the study of dental caries and periodontal disease among urban, rural and tribal school children.[5]

According to socio-economic status maximum 90(45%) parents were service holder with very low income, followed by 24(12%) parents were driver and rest of 68(34%) parents were businessmen. It is indicated that socio-economic status plays an important role in causation of dental caries. The result is consistent with other similar result of dental caries in Primary school children in rural area of Dhaka.[6]

Maximum respondents 159(79.5%) used to clean their teeth once daily and 187(93.5%) respondents used to clean their teeth before meal. The teeth cleaning time of primary school children were incorrect. The study result is consistent with other studies conducted in developing countries.

In this study out of 200 students 126 had decayed teeth followed by 132 respondents had missing teeth and 38 had filled teeth. The total DMFT score was 391 and the mean DMFT score was 1.95. This study is consistent with the study of oral health status among secondary school students in Harare, Zimbabwe and also with the study of oral health condition among selected school children in Dhaka city.[7-8]

Conclusion:

Dental caries continues to be a major dental problem to dentistry and should receive significant attention to every day practice, not only from the standpoint of restorative procedures but also in terms of preventive measures designed to reduce the problem.[9] It was concluded that these secondary students lack preventive and curative oral care and that the vast majority of the dentinal lesions observed. Various surveys have shown that dental caries in secondary school children is very common. So, preventive programs should be adopted to prevent dental caries of secondary school children. Every child should be taught about the importance of healthy teeth and mouth and relationship between dental health and general health, appearance and aesthetics. Every child must be encouraged to strictly observe dental and oral care procedures and avail professional care and services regularly. Supervised school oral health preventive programs such as daily tooth brushing and mouth rinsing should be considered by authorities.

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Original Article

Prevalence of Dental Plaque and its Relationship with Food Habit of the Students of Udayan Dental College, Rajshahi

Awal A[1], Saud N[2], Akhter T[3], Hayet SMA[4], Salam R[5]

Abstract:

This cross sectional type of descriptive study was conducted among the students of Udayan Dental College, Rajshahi with a view to estimate the proportion of dental plaque associated with oral hygiene. A total of 300 students were interviewed and examined. The respondents were selected purposively. Data were collected from the respondents by face to face interview according to a partially structured questionnaire. The mean age of the respondents was 20.97 (SD ± 1.76) years. Majority of the respondents (96.7%) were under graduate students. The average monthly income of the family was Taka 24293.33 (SD ± 6809.44). Majority of the respondents (60.7%) brushed their teeth twice a day and 72% of them brushed up and down and both surface of the teeth. Most of them (88%) used tooth paste and 96.3% used tooth brush. Among the respondents, 40.3% had no plaque, 43.7% had separate flecks at the cervical margin, 15.7% had plaque up to 1 mm and 0.3% had plaque wider than 1 mm. In this study dental plaque had no significant relationship with age ($p>0.05$), sex ($p>0.05$) but there was significant relationship with monthly family income ($p<0.05$), residence ($p<0.001$), frequency of tooth brushing ($p<0.001$), technique of tooth brushing ($p<0.001$), materials used for tooth brushing ($p<0.001$) and chewing habit ($p<0.05$). This study provided some important information which might help the concerned people to take appropriate measures and might be the basis for further in-depth study on this issue.

Key words: *Dental plaque, oral hygiene practices, predisposing factors, treatment need, Bangladesh.*

Rangpur Dent. Coll J 2016; 4(2): 7-10

Introduction:

Dental plaque is a biofilm, usually a pale yellow thing that develops naturally on the teeth. Like any biofilm, dental plaque is formed by colonizing bacteria trying to attach themselves to the tooth's smooth surface. It has been speculated that plaque forms part of the defense systems of the host by helping to prevent colonization of microorganisms that may be pathogenic[1].

Oral cavity contains the only known anatomical aspect of the human body that does not have a regulated system of shedding surfaces: the teeth.This allows microorganisms to adhere to the surface of teeth for long periods of time. These multiple species of bacteria become dental biofilm. Dental biofilm, more commonly referred to as dental plaque, is composed of about a thousand species of bacteria that take part in the complex ecosystems of the mouth. The natural, non-frequent regulation of tooth shedding plays a large role in making dental biofilm the most diverse biofilm in the human body despite the relatively small size of the teeth[2].

The human oral cavity is also called the human oral microbiome. This is because the human oral cavity can contain several environments at a given moment that could vary from tooth to tooth. Additionally it has been estimated that 25,000 species of bacteria reside in the mouth. This is in contrast to the previously estimated 700+ species. Studies have found that out of the 25,000 species that exist in the oral cavity, about 1,000 species can exist as part of the dental biofilm ecosystem. This is also in contrast to the previous estimate of more than 500 species as part of the dental biofilm. These 1,000 species have the ability to change their environment through a series of biotic relationships[3].

At first, the biofilm is soft enough to come off by using the fingernail. However, it starts to harden within 48 hours, and in about 10 days the plaque becomes dental calculus (tartar), which is hard and difficult to remove. Dental plaque can give rise to dental caries (tooth decay) the localized destruction of the tissues of the tooth by acid produced from the bacterial degradation of fermentable sugars and periodontal problems such as gingivitis and chronic periodontitis.[4]

Dental plaque is a soft whitish deposit that forms on the surface of teeth. It forms when bacteria (germs) combine with food and saliva. Plaque contains many types of bacteria.Calculus sometimes called tartar, is hardened calcified plaque. It sticks firmly to teeth. Generally, it can

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only be removed with special instruments by a dentist or dental hygienist[5].

Physical inactivity and an unhealthy diet have been implicated as risk factors for several chronic diseases that are known to be associated with periodontitis, such as cardiovascular diseases, obesity and diabetes. Studies investigating the relationship between periodontitis and physical activity and diet are limited. Therefore, this study was conducted to determine the relationship between physical activity, healthy eating habits and periodontal health status[6].

Methods

The study was cross-sectional and descriptive in design. The sample size of this study was 300. In order to obtain representative samples, a purposive sampling technique was applied in selecting the study participants among the targeted total population in among the areas. Nevertheless, it is important to take note of the limitations caused by such methods, in particular the selection bias (Fletcher et al. 1996). To collect the data, direct interview method with respondents is used in this study. The completed questionnaire was collected and checked for the completeness and clarity of the information to exclude missing or inconsistent data and then compiled together. Data was edited properly before analysis. An Excel Spreadsheet as master document was prepared first. Data analysis was done through SPSS 16.0.

Results:

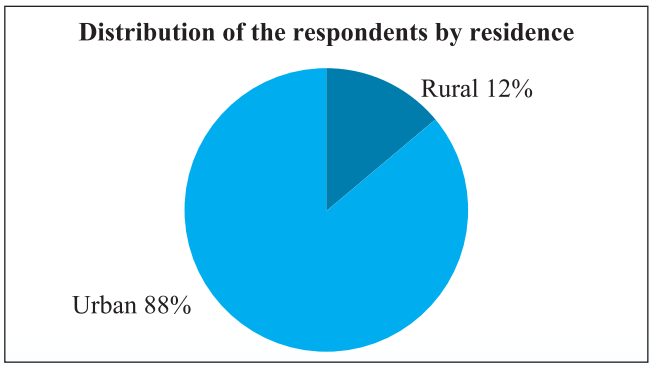

Fig-1: Distribution of the respondents by residence

Table No. 1: Distribution of the respondents by frequency of mouth wash

Frequency of mouth wash	Respondents	
	Frequency	Percentage
Once daily	161	53.7
Twice daily	22	7.3
No	117	39.0
Total	**300**	**100**

Most of the respondents (53.7%) used to mouth wash once daily followed by (39.0%) did not wash mouth and a few 7.3% used to wash mouth twice daily (Table no.1)

Table No. 2: Distribution of the respondents by dental plaque area measurement

Dental plaque area measurement	Respondents	
	Frequency	Percentage
No plaque	121	40.3
Separate flecks of plaque at the cervical margin of teeth	131	43.7
Plaque up to one millimeter at the cervical margin	47	15.7
Plaque wider than one millimeter but less than one third of surface	1	0.3
Total	**300**	**100**

Regarding dental plaque area measurement (43.7%) of the respondents had separate flecks of plaque at the cervical margin of teeth, followed by (40.3%) had no plaque and (15.7%) had plaque up to one millimeter at the cervical margin (Table no. 2).

Table No. 3: Relationship between sex of the respondents and dental plaque

Sex of the respondents	Dental plaque			Total
	No plaque	Minimum plaque	Moderate to severe plaque	
Male	39(35.1%)	49(44.1%)	23(20.7%)	111(37.0%)
Female	82(43.4%)	82(43.4%)	25(13.2%)	189(63.0%)
Total	**121(40.3%)**	**131(43.7%)**	**48(16.0%)**	**300(100%)**

X^2=3.64 df=2 p>0.05

It was observed out of 300 respondents, (63%) were female. Among them 43.4% had no plaque, 43% had minimum and 13.2% had moderate to severe plaque. Among the male respondents (37.0%), 35.1% had no plaque, 44.1% had minimum and 20.7% had moderate to severe plaque. It was found that there was no relationship between sex of the respondents and dental plaque. It was also observed that statistically there was no significant relationship between sex of the respondents and dental plaque (p>0.05) (Table no. 3)

Table no. 4: Relationship between income of the respondents and dental plaque

Income of the respondents	Dental plaque			Total
	No plaque	Minimum plaque	Moderate to severe plaque	
Lower income group	30(29.7%)	47(46.5%)	24(23.8%)	101(33.7%)
Higher income group	91(45.7%)	84(42.2%)	24(12.1%)	199(66.3%)
Total	**121(40.3%)**	**131(43.7%)**	**48(16.0%)**	**300(100%)**

X^2=10.29 df=2 p<0.05

Table showed that among the respondents (66.3%) who were in higher income group, 45.7% had no plaque. 42.2% had minimum and 12.1% had moderate to severe plaque. Among the respondents of lower income group, 29.7% had no plaque, 46.5% had minimum and 23.8% had moderate to severe plaque. It was evident that there was relationship between income of the respondents and dental plaque. It was also observed that statistically there was significant relationship between income of the respondents and dental plaque (p<0.05).

Table No. 5: Relationship between residence of the respondents and dental plaque

Residence of the respondents	Dental plaque			Total
	No plaque	Minimum plaque	Moderate to severe plaque	
Rural	5(13.9%)	8(22.2%)	23(63.9%)	36(12.0%)
Urban	116(43.9%)	123(46.6%)	25(9.5%)	264(88.0%)
Total	**121(40.3%)**	**131(43.7%)**	**48(16.0%)**	**300(100%)**

X^2=70.04 df=2 p<0.001

It was observed out of 300 respondents, (88.0%) were urban. Among them 43.9% had no plaque, 46.6% had minimum and 9.5% had moderate to severe plaque. Among the rural respondents (12.0%), 13.9% had no plaque, 22.2% had minimum and 63.9% had moderate to severe plaque. It was found that proportion of respondents having no dental plaque was more among the urban population than that of the respondents who had residence at rural area. It was also observed that there was highly significant relationship between residence of the respondents and dental plaque (p<0.001)

Table no. 6: Relationship between technique of tooth brushing and dental plaque thickness measurement.

Technique of tooth brushing	Dental plaque thickness measurement			Total
	No plaque on Gingival margin	Plaque at gingival margin	Moderately thick plaque	
To & fro	29(34.5%)	34(40.5%)	21(25.0%)	84(28.0%)
Up & down	136(63.0%)	70(32.4%)	10(4.6%)	216(72.0%)
Total	**165(55.0%)**	**131(43.7%)**	**31(10.3%)**	**300(100%)**

p<0.001

It was revealed that proportion of the respondents having no gingival (marginal) area was more among those who used to brush up and down than that of the respondents who used to brush to and fro. The relationship between technique of tooth brushing and dental plaque thickness measurement was statistically significant (p<0.001).

Discussion:

This study was carried out with a view to estimate the proportion of dental plaque associated with oral hygiene of the students of Udayan Dental College, Rajshahi. This study was a cross sectional type of descriptive study. The sample size was 300 which were selected purposively. The present study provided some important basic information about proportion of dental plaque among the students of Udayan Dental College, Rajshahi and its relationship with socio-demographic characteristics.

Most of the respondents (53.7%) used to wash mouth once daily followed by (39.0%) did not wash mouth and a few 7.3% used to wash mouth twice daily (Table no.1). It was revealed that (43.7%) of the respondents had separate flecks of plaque at the cervical margin of teeth, followed by (40.3%) had no plaque and (15.7%) had plaque up to one millimeter at the cervical margin (Table no.2). It was found that there was no relationship between sex of the respondents and dental plaque (Table no.3). It was evident that there was a significant relationship between income of the respondents and dental plaque. (p< 0.05) (Table no.4).It was observed that (88.0%) of the respondents were urban. Among them 43.9% had no plaque, 46.6% had minimum and 9.5% had moderate to severe plaque. Among the rural respondents (12.0%), 13.9% had no plaque, 22.2% had minimum and 63.9% had moderate to severe plaque. It was found that proportion of respondents having no dental plaque was more among the urban population than that of the respondents who had residence at rural area. It was also observed that there is highly significant relationship between residence of the respondents and dental plaque (p < 0.001) (Table no.5). Regarding relationship between technique of tooth brushing and dental plaque thickness measurement it was observed that 72.0% respondents used to brush up and down. Among them 63.0% had no plaque on gingival margin, 32.4% had plaque at gingival margin and 4.6% had moderately thick plaque. It was also found that 28.0% respondents used to brush to and fro. Among them 34.5% had no gingival margin, 40.5% had plaque at gingival margin and 25.0% had moderately thick plaque. It was revealed that proportion of the respondents having no plaque on gingival margin was more among those who used to brush up and down than that of the respondents who used to brush to and fro, which was statistically significant (p < 0.001) (Table no.6).

Conclusion:

Among the respondents (58.0%) who were in age group of 21-23 years, 44.8% had no plaque, 43.1% had minimum and 21% had moderate to severe plaque. There was association between residence, frequency of brushing teeth, technique of brushing teeth and materials used for brushing teeth with dental plaque (p < 0.001). The relationship between chewing habit and dental plaque was also significant (p < 0.05). There was no significant relationship between age and sex of the respondents with dental plaque (p < 0.05). There was association between age of the respondents, technique of tooth brushing and frequency of mouthwash with dental plaque thickness measurement (p < 0.001). There was no relationship between sex and chewing habit with dental plaque thickness measurement (p < 0.05).

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Original Article

Socio-Demograpohic and Clinical Characteristics of Type 2 Diabetes Mellitus Patients at Two Tertiary Level Hospitals in Maymensingh

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Abstract:

Background: *Diabetes mellitus is one of the oldest diseases known to man, which was first reported in Egyptian literature about 3000 years ago. The prevalence of diabetes mellitus is growing rapidly worldwide and is reaching epidemic proportions.* ***Objectives:*** *The aim of the present study was to evaluate socio-demographic and clinical characteristics of type 2 diabetic patients.* ***Materials & Methods:*** *An observational, cross sectional study was conducted among patients attending at the Mymensingh Medical College Hospital. Once the consultation by the physician was over, 300 patients were interviewed to know the socio-demographic and clinical characteristics of type 2 diabetic. Blood glucose level (2HPP), height and weight of the patients were also measured. Benedict's test was done to assess glycosuria.* ***Results:*** *In a pool of 300 type 2 diabetics, more than half were female (n=223, 74.30%). The mean age of the patients were found to be 50.59± 12.57 years. 35.7% patients were overweight, 7.0% patients were obese and 0.3% patients were morbidly obese. Out of 300 patients, 197 patients came from urban area and 103 patients from aural area. Among 300 patients, 197 patients come from urban area and 103 patients from rural area. Among 300 patients, 152(50.7%) were illiterate. The high-test numbers (214,71.3%) of patients were housewives. 168 patients (56%) had the family history of diabetes mellitus. 221 (73.7%) patients had uncontrolled glycolic level despite of treatment. The Benedict's test result was negative for 97 patents and positive for 203 patients. Among 300 cases, 188 patients had shown association with different co-morbid conditions and 112 patients had not shown any association with those.* ***Conclusions:*** *Hypertension was the most commonly associated disease (41%) with DM. Conclusion: Females are more prone to develop type-2 diabetes mellitus compared to males. The present study revealed that obesity, family history of diabetes mellitus, uncontrolled glycolic and co-morbidity were highly prevalent in type 2 diabetes mellitus subject.*

Key words: *Type 2 Diabetes mellitus, co-morbid condition, socio-demographic characteristics.*

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Introduction:

Human health and disease are unequally distributed though –out populations. This generalization applies to difference among population groups subdivided according to age and other demographic characteristics, among different countries, within a single country, and over time. When specific diseases, adverse health outcomes, or other health characteristics are more prevalent among one group than among another, or more prevalent is one country than in another, the logical question that follows is "Why" To answer the question

When did the event occur[1] diabetes mellitus is one of the oldest diseases known to man; the prevalence of diabetes mellitus is growing rapidly worldwide and is reaching epidemic proportioins.[2] It is estimated that when did the event occur[1] diabetes mellitus is one of the oldest diseases known to man, the prevalence of diabetes mellitus is growing rapidly worldwide and reaching epidemic proportions.[2] It is estimated that there are currently 422 million people with diabetes worldwide and this numbers is set to double in the next 20 years.[3] Diabetes mellitus, a chronic disease once thought to be uncommon in Bangladesh, but now it has emerged as an important public health problem. At present it is estimated that about 8.4 million people are affected throughout the country. The higher prevalence was found in urban areas predominantly among women. Urbanization and urban migration have been found in urban areas predominantly among women. Urbanization and urban migration have been established as a risk factor for an increased occurrence of diabetes. The trend has been authenticated by the world Health Organization (HWO).[4] There is strong evidence that modifiable risk factors such as obesity and physical inactivity are the main non genetic determinates of the disease.

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Obesity plays an important role for the increasing burden of diabetes in the developed world. Type 2 diabetes is much more common and accounts for around 90% of all diabetes cases worldwide. It is most frequently in adults but being observed increasingly in adolescents as well.[5] The goal of type 2 diabetes treatment is to lower the blood glucose with diabetic meal plan, physical activity. weigh loss (if needed) and medication (if needed).[6] If left untreated diabetes can cause many complication. Most adults with diabetes have least one co morbid chronic disease and up to 40% have at least three. Up to 75% of adults with diabetes also have hypertension. Other common co morbidities of diabetes are dyslipodemia, cardiovascular disease, kidney disease,[7] on alcoholic fatty liver disease and obesity. Co morbidity increase medical care costs for patients with type 2 diabetes.[8]

The purpose of this study was to assess the socio-demographic and clinical characteristics of type 2 diabetes mellitus patients at two tertiary level teaching hospitals in mymensingh. This study undoubtedly benefits the physicians for successful management and prevention of diabetes mellitus in the future.

Materials & Method:

An observational, cross sectional study was conducted from November 2015 to February 2016 among patients attending at endocrine outpatients department of the Community Based Medical College Hospital. Prescriptions slips were taken from the patients after taking the written consent and the relevant information was entered into the predesigned preformed to know the socio-demographic and clinical characteristics of type 2 diabetic patients. Height and weight of the patients were measured to calculate BMI. All filled questionnaires on the pattern of using and medication adherence to anti-diabetic were entered into the computer for subsequent analysis using SPSS meted version 20.1. Univarate analysis, particularly descriptive, was done for getting frequency tables, graphical presentations and cross-tabular representations of findings.

Blood glucose estimation by glucometer:

After taking informed consent and informing details about the procedure. 2 hours after breakfast blood glucose level of the patients were assessed.

Laboratory technique:

I collected mid stream urine sample from the patients and took those samples to experimental pharmacology room of Mymensingh medical college for conducing Benedict test. **Benedict's test** is a very simple effective method of ascertaining the presence or the among of glucose in the urine.

Interpretation

Observation	Interpretation
Blue	Nil
Green	+
Yellow	++
Orange	+++
Brick Red	++++

Inclusion criteria: 1) Only type 2 diabetic outpatients were included in this study. 2) Study was preformed over those patients who agreed to give written informed consent.

Exclusion criteria: 1) Type 1 diabetic patients were excluded from this study. 2) Hospitalized type 2 diabetic patients were excluded from this study. 3) Pregnancy. 4) Patients who refused to give informed written consent were excluded.

Results:

This present study was conducted on 300 type 2 diabetic patients to observe the socio-demographic and clinical charcteristics of type 2 diabetic patiens at outpatient department of two tertiary level hospitals in Mymensingh. According to table 1, the age structures of the patients have been categorized in years into three groups. Overall 77(25.7%) patients were in 40 years old while 172 (57.3%) patients were 41-60 years old, 51 (17.0%) patients belong to > 60 years age group. Most patients belonged to the middled age group 41-60 years. It comprised of 77(25.7%) male and 223 (74.3%) patients were 41-60 years old, 51 (17.0%) patients belong to > 60 years age group. Most patients belonged to the middle age group 41-60 years. It comprised of 77(25.7%) male and 223 (74.3%) famale in outpatient. Female patients were more than the male patients at the outpatient department. Out of 300 patients, 197 patients came from urban area and 103 patients from rural area. Out of 300 patients, 152(50.7%) were illiterate, 72(24.0%) had primry education, 25(8.3%) had junior education, 21(7.0%) had secondary education, 15(5.0%) had higher secondary education and 15(5.0%) had tertiary education.

Among 300 patients, 145(48.3%) patients had a history of DM less than 5 years, 102(34.0%) patients of 5 to 10 years and 53 patients (17.7%) of > 10 years. Accounts to table 2 out of 300 patients, 214(71.3%) were housewives, 27(9.0%) were service holder, 17(5.7%) were businessman, and rest of the 42(14%) belong to others group. According to figure 1: 168 patients (56%) had the family history of diabetes mellitus. According to table 3, out of 300 patients, 151(50.3%) had normal BMI level, 107(35.7%) were overweight, 21(7.0%) were obese, 20(6.7%) were underweight and 1(0.3%) was morbidly obsess. About 79 (26.3%) patients on anti-diabetic drugs had controlled optimal glycolic levels while 221(73.7%) patients had uncontrolled glycolic level. The Benedict's test result was negative for 97 patients and positive for 203 patients. According to figure 2, among 300 cases, 188(63%) patients had shown association with different co-morbid conditions and 112(37%) patients had not shown any association with those. According to table 6, a very high percentage (62.66) of diabetes patients were found to be co-morbid with different types o diseases that included hypertension (41%), followed by ischemic heat disease (11.66%), Asthma (5%) Dyslipidaemia (4.66%), Depression (4%), Diabetic neuropathy (3.33%), CKD (3%), Diabetic foot (3%). Hypertension was the most commonly associated disease (41%) with DM.

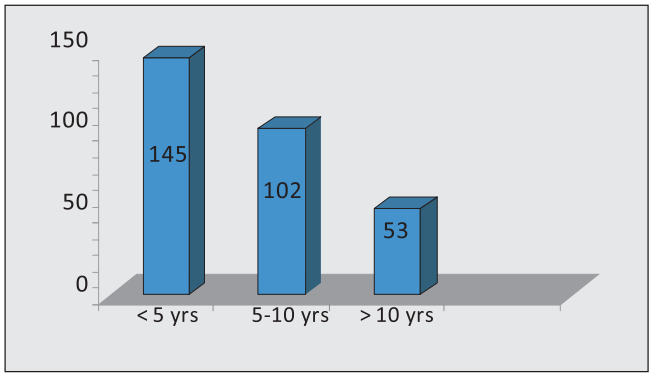

Figure-1: Bar diagram showing duration of DM

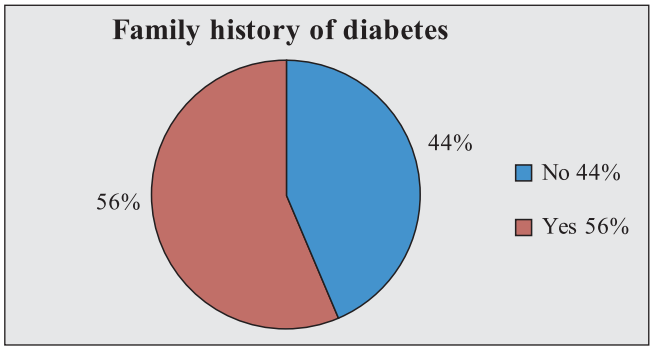

Figure 2: Pie chart showing family history of diabetes mellitus of the patients.

Table1: Body mass index of the study population (n=300)

Body mass index	Number	Percentage
Under weight	20	6.7
Normal	151	50.3
Over weight	107	35.7
Obese	21	7.0
Morbidly obese	01	0.3
Total	**300**	**100.0**

Table 2: Assessment of 2 hours after breakfast blood glucose level (n=300)

2 hours after breakfast	Number	Percentage
<10 mmol/L (controlled)	79	26.3
10-15 mmol/I (uncontrolled)	115	38.3
15.1-20 mmol/I (uncontrolled)	73	24.3
>20 mmol/l (uncontrolled)	33	11.0
Total	**300**	**100.0**

Table 3: Distribution of type 2 DM patients according to Benedict's test (n=300)

Benedict's test	Number	Percentage
Blue (Negative)	97	32.3
Green (+)	56	18.7
Yellow (++)	43	14.3
Orange (+++)	57	19.0
Brick red (++++)	47	15.7
Total	**300**	**100%**

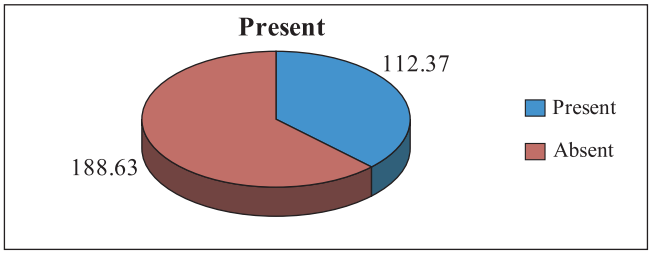

Figure 3: Pie chart showing co-morbidities of study population

Table 4: Prevalence of Co-morbidities associated with DM (n=300)

Co-Morbidities	Number	Percentage
Hypertension	123	41
Dyslipidaemia	14	4.66
Ischemic heart disease	35	11.66
Depression	12	4
Asthma	15	5
CKD or Renal failure	09	3
Liver disease	02	0.66
Diabetic Neuropathy	10	3.33
Diabetic foot	09	3
Gout	02	0.66
Chronic obstructive pulmonary disease	01	0.33

*Patients may suffer from more one co-morbid condition.

Discussion:

This study revealed that diabetes mellitus is more prevalent in female patients than in male patients. This may be assigned to the fact that women are more obese than men. The other reasons might be due to lack of physical activity, life style changes, dietary habit and stress. Similar results were obtained in the study conducted by Alam et al. (2014), Mann et al. (2009) and abeam et al. (2016)[5,10,11]. However other studies reported high prevalence of DM in men. This study also found a higher prevalence of diabetes was among aged patients, with a high percentage (57.37%) in the age group of 41-60 years. Mean age 50.59± 12.5 years. This result correlates with the study of sanity et al. (2014)[12]. A study from the Nepal reported higher mean age 58.1± 11.6 years in type 2 diabetic patients[13]. So this present study does not correlate with the Nepal study. In general elderly patient's area at a greater risk of developing type 2 diabetes mellitus. Positive family history of DM type 2 found in 168 (56%) patients due to genetically predisposition. Near to similar results were obtained in the study conducted by Valdez et al, where 51% patients had a positive family history suggesting the role co-existing factors[14]. In the present study, type 2 DM is more common in urban people (34.3%), similar to the study conducted in Bangladesh by Akter et al. (2014)[7]. Diabetes may be more common among urban residents due to sedentary life style or different dietary habits. In our study, majority, 214(71.3%) of the participants were housewives and service holder, 27(9.0%). This present study correlates with the study of abeam et al. (2015) but the percentage is not same[11]. In their study they observed that majority, 98(34%), of the participants were housewives and government employee, 50(17.4%).

Obesity is the important risk factor for type 2 DM. In the present study 35.7% patients were overweight, 7.0% patients were obese and 0.3% patients were morbidly obese. Dissimilar results were

obtained in the study conducted by Daousi et al.(2005).

They reported that 86% patients with type 2 diabetes were overweight or obese and 8.1% patients had morbidly obese. This variation occurs due to differences in dietary habits. Low education is another risk factor for developing diabetes mellitus. In our study we found that 50.7% patients were illiterate and 49.3% patients were literate. Another study conducted by Shrestha et al. (2013) reported 44% patients were illiterate, which is slightly lower compared to this study[13]. This duration of diabetes plays an important role in management of diabetes. Our study showed that most of the patients (48.3%) had a diabetic history of less than 5 years. Patients with long duration of diabetes are at a higher risk of developing complications. Near to similar results were obtained in the study conducted by sajith et al, where 43.81% patients had a diabetic history of less than 5 years[12].

Achieving and keeping good glycemic control is the goal of pharmacotherapy among diabetes patients, drugs this is not possible in a large percentage of them. About 26.3% patients on ant diabetic drugs had controlled optimal glycolic levels while 73.7% had uncontrolled glycemic levels. Several studies have documented from 50% to 86% patients had uncontrolled glycemic levels, which were quite similar to our studies. Our present study does not correlate with the study of Agarwal, Jadhav and Deshmukh. In their study they reported that 41% patients on antidiabetic drugs had controlled optical glycemic levels, while 59% had uncontrolled glycemic level. A total 188 (63%) patients suffered from co-morbid conditions. Hypertension accounted for 41% of the total complications which are lower than the study reported in Thailand (hypertension accounted for 55.53% of the total complication). Our study findings are also similar to the study conducted in Texas medical centre that hypertension is more common complication affecting 20-60% of people with diabetes[12]. These findings are significantly alarming, as hypertension is a predictor of cardiovascular disease.

Conclusion:

Type 2 diabetes mellitus being a chronic disorder reequips multiple therapeutic approaches including dietary and lifestyle modifications. Females are more prone to develop type 2 diabetes mellitus compared to males. The present study revealed that obesity, family history of diabetes mellitus, unconstructed glycemic status and co-morbidity were highly prevalent in type 2 diabetes mellitus subjects. So continuous patient education and awareness program are required. Most of the diabetic patients had co-morbid conditions. The level of mortality due to diabetes and its potential complications are enormous and pose significant health care burdens on both families and society. The result of the present study highlights the need for comprehensive management of diabetic patients, lifestyle changes, treatment of complications and co-morbidities.

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Case Report

Role of Triple Antibiotic Paste in Treatment of Immature Necrotic Teeth

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Abstract:

The development and progression of periapical lesions are associated with the presence of both aerobic and anaerobic bacteria. Immature teeth with apical periodontitis complicate this problem. A combination of antibiotic drugs (metronidazole, ciprofloxacin, and minocycline) is used to eliminate target bacteria, which are the possible sources of endodontic lesions. These case reports describe the treatment of immature teeth with large periradicular lesions using triple antibiotic paste. The follow-up radiograph of both cases showed progressive healing of periradicular lesions and root formation which confirmed the effectiveness of triple antibiotic paste in treatment of immature apical periodontitis.

Key words: *Triple antibiotic paste, immature teeth, apical periodontitis, apical barrier technique and apical revascularization*

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Introduction:

The immature tooth with a necrotic pulp and apical periodontitis presents multiple challenges to successful treatment.[1] The traditional technique of chemomechanical instrumentation and disinfection of the root canal system used in mature tooth are limited by the anatomy of the immature tooth, that are susceptible to fracture.[2]

When treating nonvital teeth, a main issue is eliminating bacteria from the root canal system. As instruments cannot be used properly in teeth with open apices, cleaning and disinfection of the root canal system rely on the chemical action of NaOCl as an irrigant and an intracanal medicament.[3] NaOCl is known to be toxic, especially in high concentrations. When rinsing immature teeth with open apices, there is an increased risk of pushing the irrigant beyond the apical foramen.[4] Therefore we must rely on the placement of a medicament to achieve adequate reduction of intracanal bacteria. A triple antibiotic paste consisting of metronidazole, ciprofloxacin, and minocycline has been shown to be very effective against the pathogens commonly found inside the root canal system.[5]

Traditionally, the treatment of immature permanent teeth with necrotic pulps involves long-term application of Calcium hydroxide to induce apexification at the root apex.[6] However, the technique has some disadvantages. It typically takes between 6 and 18 months for the body to form the hard tissue barrier and weakens the resistance of the dentin to fracture, emphasizing the need for an improved treatment technique.[7]

Mineral trioxide aggregate (MTA) which is a material with excellent sealing properties , was introduced by Torabinejad et al.[8] In vivo studies have confirmed biocompatibility of this material and have shown a hard tissue inductive effect and can be used as an apical plug allowing for prompt obturation of the root canal.[9]

More recent reports, have demonstrated that it is possible in humans to restore a functional pulp-dentin complex in the necrotic immature permanent tooth.[10]

The purpose of these case reports are to show the possibility of using triple antibiotic paste for the disinfection protocols in treatment of immature teeth with necrotic pulps.

Case-1:

Fig. 1a-Pre operative radiograph

Fig. 1b-File in place

Fig. 1c-Triple antibiotic paste placed

Fig. 1d-MTA plug

Fig1e- Obturation done with Composite coronal restoration

Fig. 1f-1 year follow-up

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A 19 year old male patient was referred to the Department of Conservative Dentistry of K.V.G Dental College, Sullia for evaluation on the left maxillary lateral incisor (tooth #10). On clinical examination, the patient was slightly symptomatic to percussion, and sinus tract was present that traced to the apex of tooth #10. Periradicular radiographic examination revealed that tooth #10 had an incompletely developed root and periradicular radiolucency (Fig. la). The diagnosis of pulp necrosis and chronic apical abscess with a sinus tract was made for tooth #10. Rubber dam was placed and access cavity prepared. Working length with 25 size K file was made (fig 1b). The root canal was irrigated with 2.5% NaOCI for 10 minutes and dried with paper points, and a mixture of ciprofloxacin, metronidazole, and minocycline paste as described by Hoshino et al[11] was introduced into the canal with a lentulo spiral (fig 1c). The access cavity was closed with cavit (3M, ESPE, Saint Paul, MN). No mechanical instrumentation was performed during the procedure. The patient returned 22 days later and the tooth was asymptomatic with resolution of sinus tract. After the canal debridement, a master gutta-percha point (Dentsply-Maillefer) was selected and adjusted to 3 mm short of the working length. An MTA plug (White MTA-Angelus, Angelus, Londrina, Brazil) was placed and adapted to the apical canal walls using the pre-adjusted gutta-percha point. The position of the MTA plug was checked radiographically (fig 1d) and a wet cotton pellet was placed on top of it before sealing the access cavity with Cavit. Lateral compact`ion of gutta-percha over the set apical MTA was followed by coronal composite restoration 1 week later. (fig 1e) One year follow up radiograph revealed complete healing of the lesion with hard tissue formation in the apex.(fig-1f)

Case-2:

A 14-year-old girl was referred to the Department of Conservative Dentistry of K.V.G Dental College, Sullia for evaluation on the left maxillary central incisor (tooth #9) (fig 1a). The patient gave history of trauma 7 years back. On clinical examination, the tooth was tender on percussion. Intra oral periapical radiograph revealed a periradicular radiolucency around the incompletely formed root of tooth #9(Fig 2b) .The diagnosis of pulp necrosis and chronic apical periodontitis was made in relation to tooth #9

The tooth was isolated, and an access cavity was made (fig 2c). Purulent discharge was observed. (fig 2d) When it stopped, a K-file was introduced into the canal until the patient felt some sensitivity, and a radiograph was taken (Fig.2e*)*. No tactile resistance was met with the K-file until the patient reported sensitivity. Copious irrigation was performed with 2.5% NaOCl for 30 minutes, and dried with paper points. Later a mixture of ciprofloxacin, metronidazole, and minocycline paste as described by Hoshino et al. [11] was introduced into the canal with a lentulo spiral(fig -2f). The patient returned a month later and reported no postoperative pain. The root canal was slowly flushed with 10 ml of 2.5% NaOCI, and irrigation was maintained with same solution for 15 minutes. A size #30 K-file was used to irritate the tissue gently to create some bleeding into the canal. The bleeding was left for 15

Fig.-2a: Pre operative

Fig.-2c: Purulent discharge from the canal

Fig.-2d: Access cavity

Fig.-2b: Pre operative radiograph

Fig.-2e: Ffile in canal

Fig.-2f: Triple antibiotic paste Placed in canal

Fig.-2g: MTA placed

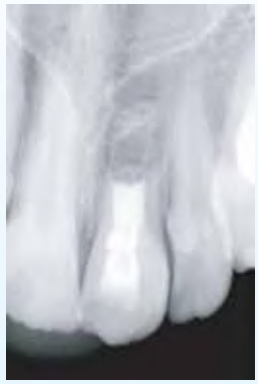

Fig.-2h: 6month follow up

minutes so that the blood would clot . MTA (Angelus, Londrina, Brazil) was carefully placed over the blood clot followed by a wet cotton pellet and Cavit (Fig. 2g*)*. Two weeks later, the patient returned, asymptomatic, and Cavit and cotton pellet were replaced with a bonded resin restoration. At the 6-month recall, the patient was asymptomatic, and the radiograph showed signs of resolution of the radiolucency, and the canal space occupied by blood clot was narrowed (Fig.-2h*)*.

Discussion:

The infection of the root canal system is considered to be a polymicrobial infection, consisting of both aerobic and anaerobic bacteria [12]. Because of the complexity of the root canal infection, it is unlikely that any single antibiotic could result in effective sterilization of the canal. More likely a combination would be needed to address the diverse flora encountered. A combination of antibiotics would also decrease the likelihood of the development of resistant bacterial strains.[13] Hoshino et al [11] performed an in vitro study testing the antibacterial efficacy of these drugs alone and in combination against the bacteria of infected dentin, infected pulps, and periapical lesions. Alone, none of the drugs resulted in complete elimination of bacteria. However, in combination, these drugs were able to consistently sterilize all samples. In- vivo studies also confirmed this. [14] We used the same combination to disinfect the root canal because it has been reported that the sterilization of the root canal and periradicular region results in good healing of periapical diseases [15]

Caution should be taken in general when giving local or systemic drugs. Although the volumes of the drugs applied in this therapy were small and there were no reports of side effects, care should be taken if patients are sensitive to chemicals or antibiotics.

Case selection is important in open apex treatment protocol. Apical revascularization should be encouraged and promoted for clinicians faced with pulp necrosis with an immature apex that is open greater than 1 mm in a mesiodistal dimension radiographically. The size of opening must be sufficient to allow ingrowth of vital tissue.[16] In case 1 the opening of the apex was minimal hence we decided to give MTA apical plug and for larger apex in case 2 we tried apical revascularization.

A 3-4-mm thick MTA plug was placed in the apical area of the root canal and conventional obturation was performed. Placement of the MTA plug facilitated obturation of the root canal without overextension of the filling material. Final obturation was carried out at a subsequent visit to avoid dislocation of the MTA plug beyond the apex. Studies have shown that intracoronal bonded restorations can internally strengthen endodontically treated teeth and increase their resistance to fracture[17] hence, we restored the tooth with composite restoration.

We created blood clot in the canal after disinfection in case 2. Induction of blood clot, with its constituent growth differentiation factors from periapical tissues, may act as a scaffold for the ingrowth of new tissue in the disinfected necrotic immature tooth. It serves as a pathway for the migration of cells including macrophages, fibroblasts, osteogenic cells and growth and differentiation factors important in wound healing process.[2]

Lastly the bacteria tight seal was coronally obtained by a double seal with MTA, to a level below the CEJ and bonded resin on it. Based on positive outcome of these cases we assume that this combination successfully sealed the tooth from bacterial leakage.

Conclusion:

Triple antibiotic paste is the choice, when large periradicular lesion in immature teeth is encountered. Such lesions in these cases were large but showed progressive healing after using a triple antibiotic paste in the canal and follow up radiographs confirmed the root development.

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Case Report

A Case Report on Treatment of Open Apex with MTA Plug

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Abstract:

Immature teeth with necrotic pulp and periapical lesion are difficult to treat via conventional endodontic treatment. The role of MTA is indispensable in managing this type of case. A 15 year old boy was presented with pain in his traumatized upper anterior teeth. On clinical examination both the maxillary central incisor revealed slight discoloration and fracture of the crown. Radiographic evaluation revealed open apex of the left central incisor and apex of the right central incisor was fully developed. Apexification with MTA apical plug was carried out in left central incisor and conventional root canal treatment was done in right central incisor. In three months follow up both the tooth were clinically and radiographically asymptomatic and the healing of the apical area of the left central incisor was continued. These finding suggests that MTA can induce formation of apical barrier in the case of non vital tooth with open apex mild pain. The patient responded well and the cutaneous lesion healed uneventfully.

Key words: *Apical plug, MTA, Apexification.*

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Introduction:

Complete asepsis and three dimensional obturation of the root canal system are essential for long term endodontic success. In certain cases such as immature teeth, absence of natural apical constriction creates a challenge. Therefore one of the aims of endodontic treatment is to form an apical barrier or a stop against which one can place root canal filling material avoiding overextrusion.[1]

The term apexification refers to that method of treatment aimed at inducing apical repair as a hard tissue barrier across an open apex. This technique usually used for endodontic management of the pulpless permanent tooth with an open apex. For this treatment procedure, different materials have been recommended. These are, Calcium hydroxide with or without antiseptic, freeze dried allogenic dentin powder, bone ceramic, tricalcium phosphate, osteogenic protein, collagen, calcium gel, MTA and Portland cement. In 1999 Torabinejad and Chivian introduced the use of mineral trioxide aggregate (MTA) as an apical plug [2]. Using MTA apexification can be carried out in single visit which is advantageous over traditional calcium hydroxide apexification which requires treatment time of 5–20 months to induce the formation of a calcific barrier.[3] The unpredictable and often lengthy course of this treatment modality presents challenges, including the vulnerability of the temporary coronal restoration to re-infection[4] and has several disadvantages such as variability of treatment time (average 12.9 months)[5], difficulty of the patients recall management, delay in the treatment and increase in the risk of tooth fracture after dressing with calcium hydroxide for extended periods.[6] For these reasons, single visit apexification has been suggested[7]. Mineral trioxide aggregate has been proposed as a material suitable for one visit apexification[4,8,9,10] ,because of its biocompatibility[11,12], bacteriostatic activity[13],favorable sealing ability[12] and as root-end filling material[12]. MTA offers the barrier at the end of the root canal in teeth with necrotic pulps and open apices[8] that permits vertical condensation of gutta-percha in the remainder of the canal.

The practical technique and a case report are presented in which MTA was used for apexification in open apex cases to develop an apical stop to facilitate obturation.

Case report:

A 15 years old male patient with noncontributory medical history, came to the department of conservative dentistry and endodontics, BSMMU with the chief complain of pain in his upper anterior teeth & history of trauma 2 yrs prior to the time of reporting. He did not consult with any dentist. Clinical examination revealed slight discoloration and

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Fig.-1 Initial Radiograph

Fig.-2 Pre operative photograph of the case

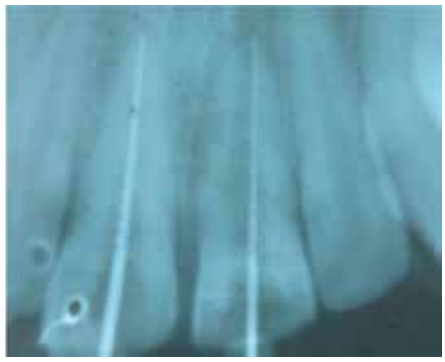

Fig.-3 Working Length Determination

Fig.-4 MTA Plug

Fig.-5 MTA Plugwith gutta percha obturation

Fig.-6 Post operative photograph of the case

Fig.-7: Follow Up (After 2 Months)

fractured crown on both upper central incisors. Percussion was normal. Vitality test with ethyl chloride revealed negative result on both incisor. Radiological examination revealed an immature tooth with wide open apices on the left central incisor and closed apex on the right one. So the diagnosis is necrotic and open apex left upper central incisor and necrotic with complete apex right upper central incisor. The treatment plan was apexification with apical plug of MTA on the left tooth and conventional root canal treatment on the right tooth followed by composite veener on the both incisors.

Straightline large access cavity with round diamond bur to allow removal of all necrotic tissue. Canal debridemet with barbed broach and hedstrom file. Copious irrigation with sodium hypocluoride (2.5%) and normal saline combindly in the presence of high volumic suction. Working length was established within 1 mm of the radiographic apex. (left incisor-24 mm, right incisor 25mm). Gentle circumferential filing, starting with a relatively large file and progressing through the apex. Drying the canal with sterile cotton dressing. Slurry of Calcium hydroxide with normal saline placed in to the canal with Lentulo. The access was filled with cotton pellet & zinc oxide eugenol cement. Patient was advised to revisit after one week.

On the next visit both tooth was symptomless. Temporay filling & cotton was removed. Calcium hydroxide was flushed from left incisor with copious irrigation of sodium hypochlorite and sterile water with light instrumentation. The canal was dried with sterile cotton dressing & as it was dry, Pro-Root MTA (densply), grayverity mixed with distilled water to a creamy consistency in a proportion of 3 : 1 and introduced in to the canal with Lentulo 1 mm short of the rediographic apex and condensed into the apical 1/3 (4mm) by gentle packing with apical plugger (4 mm short of the working length). Confirmation of apical plug with readiographA sterile cotton pellet moistened with sterile

water was placed over the canal orifice and the access cavity was sealed with temporary filling.

After 72 hours, the hard set of MTA was confirmed and the remainder of the rootcanal was obturated with vertical condensation of gutta-percha. At the same visit, calcium hydroxide dressing was flushed & the canal of right incisor was obturated with vertical compaction technique. The access filled with Glass ionomer filling. Post operative radiograph was taken to check the three dimensional obturation.

After 1week both incisor was laminated with lightcured composite restorative materials. The patient was adviced revisite for clinical & radiographic evaluations after 3, 6, 12 months.

Followup:
After 3months the tooth was clinically and radiographically asymptomatic and healing of the apical area is continued.

Discussion:
An immature permanent incisor tooth is define as one where the apex can be considered to be open.

Root canal treatment of these teeth requires a root end closure technique to form a complete calcificbarrier at the apex of the tooth against which a guttapercha filling can be condensed without the possibility of sealant or guttapercha going through apex into the periapical tissues. The aim of root canal treatment is to eliminate the microbial cause of the infection. Hence the antimicrobial irrigants sodium hypochlorite and normal saline were used and calcium hydroxide intracanal medicament for one week. The latter has been shown to eliminate bacteria in the root canal when applied for this period. H files were used because the aim is to clean the root canal walls of debris, not to "shape" the canal as the canals of immature non vital teeth are wide and have thin dentinal walls.

MTA has been developed by Torabinejad and co workers in 1990 at Loma Linda University, available as grey and white MTA. This bioactive silicate cement consists of tricalcium silicate, tricalciumaluminate, tetracalciumaluminoferrite, calcium sulphate dehydrate and silicate oxide. Presence of bismuth oxide makes it radioopaque.[13] pH of the material is 12.5 at three hours. It is osteoinductive & cementogenic agent that stimulates immune cells to release lymphokines required for the repair & regeneration of cementum & stimulate bone coulpling factors necessary for bioreminaralisation and healing of osseous periapicaldefact[14].It also provokes interleukin (IL) production in human osteoblast that can exibit raised level of IL-1 alpha, IL-1 beta, IL-6 & macrophage- colony-stimulating factor.[11] The mechanism of the biologic sealing by cementum diposition might be attributed to the diffusion of calcium ions through dentinal tubules to the root surface that can inhibit bacterial colonization & survival.[15] Both white & Gray MTA have potential to induce PDL- cell attachment, stimulate PDL fibroblasts to display the osteogenic phenotype & promote the production of osteonectin, osteopontin & osteoridogen & increase alkaline phosphates level.[16,17] It also resist bacterial leakage against E. faecalis, Enterobacteraerogenes, & staphylococcus epidermidis. However Gray MTA appears better sealing agent than white, due to its less leakage property (Gray: 9.1%, white: 36.4% after 42 days). Clinical studies have reported that 77% to 85 % open apex healed completely 1-3 year with MTA plug[12,18,19,20]

As it is hydrofillic, the presence of exudate, blood or tissue fluied enhance setting. A moist cotton pellet over MTA is also indicated to achieving hermetic seal due to setting expansion. MTA has a compressive strength comparable to IRM and Super EBA and reaches its maximum compressive strength in 72 hours.[21]) so, In this case, obturation done after 72hrs. Aminoshariae et al. (2003) evaluated placement of MTA using hand condensation resulted in better adaptation and fewer voids than ultrasonic condensation.[22] Accordingly, in these case hand condensation was used to compact MTA at the apex.

Unless there is specific reasons for delay & as one of the most common cause of failure of apexification is bacterial contamination due to loss of coronal restoration, the definitive restoration should complete as soon as possible. For more extensively damaged tooth ie. trauma, complete coronal coverage supported by post is indicated. However, In the presented case possible restoration of the access is light cured composite filling due to minimum tooth structure, requiring a durable semi permanent restoration, ease of placement & cost.

Conclusion:
MTA has numerous applications in endodontic therapy that range from apexification to pulpotomy. Apical barrier reduces the number of appointments, development of proper apical seal and provides excellent biocompatibility. The present clinical case confirm that MTA act as an apical barrier & can be considered to be a very effective mater for managing nonvital teeth with open apex.

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Case Report

Indirect Pulp Capping with Biodentine -A Case Report

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Abstract:

Indirect pulp capping can be performed to protect or maintain the vitality of the deep carious tooth that, if completely excavated, the decay would result in pulp exposure. In this case report the patient reported that mild to moderate sensitivity is experienced on thermal stimulation and tolerable, dull pain and discomfort associated with eating in the mandibular right first molar. The radiograph revealed a deep carious lesion, very close to the pulp, absence of radiolucencies in the periapical region, and absence of periodontal space thickening. Pulp sensitivity was confirmed by thermal pulp vitality test. Based on the main complaint and the clinical and radiographic examinations, the treatment plan was established to preserve pulp vitality. Clinical procedures consisted of removing the infected dentin, leaving dry affected dentin and entire cavity was filled with Biodentine. At 12 months follow-up, no clinical or radiographic pathological findings were found.

Key words: *Indirect pulp capping, Pulp vitality test, Biodentine.*

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Introduction :

Concepts and treatment principles of deep carious lesion are an area of debate and constant change.[1] Difficulties in assessing the true clinical status of the pulp tissue under deep carious lesion make difficult a precise diagnosis of tooth vitality.[2] An important priority in the treatment of deep carious lesions is to preserve pulp vitality. More conservative pulp management has the potential to reduce the need for a more invasive endodontic treatment.[3] A repair capacity of pulp tissue after removal of carious lesion without Pulp exposure is expected to occur.[4] However, after pulp exposure, such conservative treatment is questionable and unpredictable. In addition, if pulp has become infected and exposed during caries removal, successful outcome will be substantially reduced. In such cases, in order to avoid pulp exposures, a conservative procedure has been suggested: the indirect pulp capping (IPC). This treatment, which can be either an one step or a two-step procedure, has also been denominated stepwise excavation. IPC removes the infected dentin, leaving a thin layer of deeper affected dentin when complete carious lesion removal would result in pulp exposure.[5-7]

Retrospective and prospective studies showed that in both dentitions the success rate for IPC is similar, ranging from 73% to 95%after 2 weeks to 11 years of followup.[7]

The search for the ideal vital pulp therapy material has led researchers to investigate many different materials. These include $Ca(OH)_2$ compounds, zinc oxide, calcium phosphate, zinc phosphate, and polycarboxylate cements, calcium-tetracycline chelate, antibiotic and growth factor combinations, calcium phosphate ceramics, Emdogain, Bioglass, cyanoacrylate,hydrophilic resins, hydroxyapatite, resin-modified glass ionomers, recently MTA and Biodentine.[8]

In this case report, indirect pulp capping with Biodentine was performed to maintain pulp vitality of a permanent molar tooth with deep carious lesion.

New bioactive cement, Biodentine™ (Septodont, St. Maur-des-Fosses, France), was recently launched on the dental market as a dentin substitute. Biodentine™ consists of a powder in a capsule and liquid in a pipette. The powder mainly contains tri-calcium silicate as main core material, di-calcium silicate as second core material, calcium carbonate and oxide as fillers, iron oxides as shade and zirconium oxide as radiopacificr. The liquid consists of calcium chloride as accelerator and hydrosoluable polymer as water reducing agents. The powder is mixed with the liquid in a capsule in the amalgamator for 30 seconds. Once mixed, Biodentine™ sets in about 12 minutes. Biodentine™ can be used both on crowns and roots. Its crown uses include temporary closure, cervical filling, direct and indirect pulp capping and pulpotomy. On roots it has a place in managing perforations of root canals or the pulp floor, internal and external resorption, apexification and retrograde root canal obturation.[16,17]

Case Report:

A 25 years old male patient reported to the dept. of

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conservative dentistry & endodontics with the complain of mild to moderate sensitivity on thermal stimulation and tolerable, dull pain and discomfort associated with eating in the mandibular right first molar. No history of spontaneous and excruciating pulpal pain was reported. Status of the pulp and periradicular tissues was carefully evaluated.

The clinical examination revealed a deep carious lesion in the mandibular right first molar tooth without any frank pulp exposure. The tooth responds normally to percussion. Normal appearance of adjacent gingival tissue and tooth was asymptomatic on palpation. The radiograph revealed a deep carious lesion, very close to the pulp, absence of radiolucencies in the periapical region, and absence of periodontal space thickening. On vitality test, when ice stick was placed on the adjacent & the offending teeth, the offending tooth showed more sensitive than the healthy adjacent teeth which is in normal limit i.e. not exaggerated and quickly disappear after the stimulus is removed. A diagnosis of reversible pulpitis of right mandibular first molar was made.

Based on the main complaint and the clinical and radiographic examinations, the treatment plan was established to preserve pulp vitality by indirect pulp capping with Biodentine followed by permanent restoration with composite resin.

The whole treatment procedure was explained to the patient and consent was taken. After mouth preparation local anesthesia was administered and isolation was done with cotton roll. Firstly, surrounding caries was removed by using no. # 4 diamond bur at high-speed with air/water spray. Infected dentin from cavity walls was removed with a spoon excavator followed by low-speed round carbide burs compatible with the size of the cavity. Care was taken to avoid pulp perforation. Excavation was performed carefully to remove the carious dentine, leaving the dry demineralized affected dentin. Cavity was flushed with normal saline and dried with cotton pellets. Biodentine powder and liquid (Septodont) was mixed according to the manufacturer's recommendation in an automatic mixer (amalgamator) for 30 seconds. Then the putty like

Fig-1: Intraoral photograph

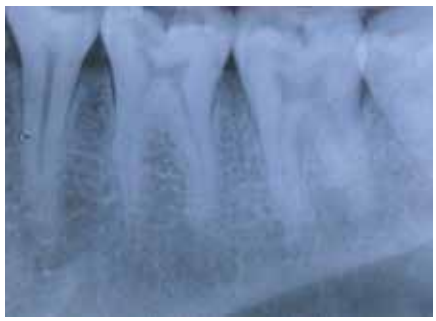

Fig-2: Initial radiograph

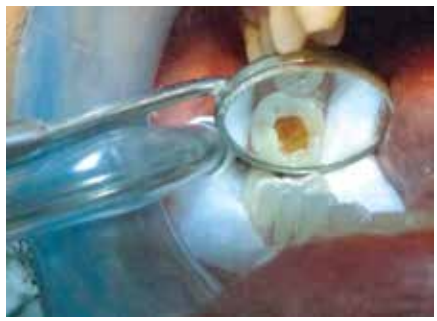

Fig-3: After cavity preparation

Fig-4: Placement of Biodentine

Fig-5: Placement of composite over Biodentine

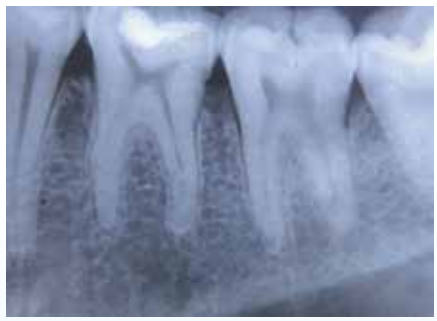

Fig-6: Radiograph after Biodentine placement

Fig-7: Follow up x-ray at 3 months

Fig-8: Follow up x-ray at 6 months

Fig-9: Follow up x-ray at 12 months

consistency mix was dispensed onto a mixing pad and was applied to the entire cavity using an amalgam carrier. About 12 minutes after mixing, occlusion was checked. Post operative radiograph was taken. After 7 days Biodentine filling was partially removed and topped by composite restoration. At 3, 6 and 12 months patient was recalled and vitality was checked, no clinical or radiographic pathological findings were found.

Discussion:

The choice for indirect pulp capping treatment in this case was based on careful pulp diagnosis, which was supported by evaluation of the history of pain, symptoms and clinical/radiographic findings. Most studies reported in the literature evaluated indirect pulp capping for treatment of deep carious lesion in primary molars while some clinical studies were carried out on the permanent teeth.[7]

Active caries lesion can be distinguished into two layers: infected dentin which is a superficial soft layer of collagen fibrils partially degraded that cannot be remineralized; and affected dentin, which is partially demineralized, with intact collagen fibrils that can be remineralized. However, the clinical recognition of these two layers is a difficult task because not only color and consistency of the dentin are absolute indicators of decayed tissue. Experience and clinical judgment are essential skills for appropriate removal of infected dentin, leaving the potentially remineralizable affected dentin. For some authors it is not necessary the complete removal of decay in a second step. Their clinical and radiographic results support the theory that the decay process was apparently arrested after IPC with a single visit procedure. According to Fairbourn, et al. the second appointment may not be necessary, if the final restoration maintains the cavity sealed and the tooth asymptomatic.[7]

As this case report demonstrates, stepwise excavation is not always necessary. The newer calcium silicate cements may be especially useful in achieving even greater success in these cases.

The prognosis of direct pulp capped teeth is much reduced in comparison with indirect pulp capped teeth. The success of the direct pulp capping of teeth is 37% after 5years and 13% after 10 years. This result compares with an 86% rate of success over 10 years, when teeth containing a hard carious lesion have been indirectly pulp capped. A study of the prognosis of direct versus indirect pulp capping on primary teeth also showed that indirect capped teeth will have better longevity. These studies demonstrate the importance of avoiding pulp exposure and placing indirect restorations to optimize the success of treatment.[9]

Patients' age is another factor to be considered since conservative treatments have been more indicated for young patients. In this study, the patient treated was 25 years old. It is known that there is a reduction of the cell population, the pulpal volume, and also the vascular supply with the increase of pulp age.[7]

The material of choice to be placed over the demineralized dentin is another issue of discussion in this case report.

Calcium hydroxide has been used as a lining material since the 1920s. Because of the basic pH of about 12, calcium hydroxide is both antibacterial and can neutralize the acidic bacterial byproducts. The high pH creates an environment conducive to the formation of reparative dentin. In addition, calcium hydroxide has the capacity to mobilize growth factors from the dentin matrix, causing the formation of new dentin.[10,11] Unfortunately, the self-setting calcium hydroxide liners are highly soluble and subject to dissolution over time.[12] Traditional calcium hydroxide liners are easily lost during acid etching. Dentin bonding agents that contain water, acetone or alcohol can also detrimentally affect the properties of calcium hydroxide.[13]

Adhesive resins can be acidic and cause pulpal irritation. Many dentin bonding agents and resin- reinforced glass ionomers are actually detrimental to the pulpal tisues.[14] According to Cavalcanti, et al. adhesive systems release cytotoxic substances for human dental pulp fibroblasts in culture. Costa et al. concluded that the total etching followed by application of One Step bonding agent cannot be recommended for deep cavities in permanent teeth. Due to certain disadvantages that the materials pose, other alternatives have been suggested.[7]

One such Alternative is Mineral Trioxide Aggregate [MTA]; originally developed as a root perforation repair material. It has been used for pulp capping as an eligible replacement for the Calcium hydroxide based materials, as it has demonstrated a promising clinical outcome. But MTA is also plagued with problems like long initial setting time and poor physical properties.[12,15]

One among the recently developed biomaterials is Biodentine [*Septodont, France*]. Based on a Calcium silicate system, this material can be a comparable replacement for MTA as it is said to overcome its disadvantages. It is touted to be "Dentine in a Capsule", because of its excellent biocompatibility, physical properties and bonding to the dental hard tissues.[16]

Biodentine™ was shown to be biocompatible material which shows no signs of cytotoxicity, genotoxicity ormutagenicity. The cement has no adverse effect on cell differentiation or specific cell functions i.e. it does not damage pulpal cells in vitro or in vivo and is capable of stimulating tertiary dentin formation. Hard tissue formation is seen both after indirect and direct capping with Biodentine™.[16,17,21,22,23]

During the setting phase of Biodentine™, calciun hydroxide ions are released from the cement. This results in a pH of about 12.5 and a basification of the surroundings.

This high pH inhibits the growth of microorganisms and can disinfect the dentine.[19,20]

Biodentine™ adheres to tooth surface by micromechanical adhesion. Its crystals succeed in growing within the dentine tubules leading to a micromechanical anchor, without the application of a conditioning treatment or bonding material. It is also suggested that there might be a possible ion exchange contributing to further adhesion of the cement giving it outstanding resistance to microleakage and bacterial infiltration.[17,18,24,25]

A study of indirect pulp capping on rat molars concluded that Biodentine™ was able to stimulate (thick and dense) reactionary dentine formation, which stopped after about three months when a sufficient dentine barrier was formed.[16,19,20]

A two years study of Robert Levin on Biodentine over 100 teeth showed that asymptomatic teeth (without signs of pulpitis) will remain vital and lack of post- operative pain irrespective if pulp was exposed or not.[19]

Conclusion :

Based on this case report it can be concluded that indirect pulp capping has the advantage of avoiding pulp exposure during carious tissue removal from teeth with deep carious lesions and also of changing the cavity conditions, promoting dentin formation and pulp repair. Patient need to be re-evaluated periodically to determine pulpal status. On the otherhand Biodentine™ is a very promising product, which with correct diagnosis can certainly contribute to a high degree to maintenance of the vitality of the dental pulp and to the retention of a tooth. Unfortunately at present little scientific data on Biodentine™ is available. More scientific studies on Biodentine are therefore absolutely necessary.

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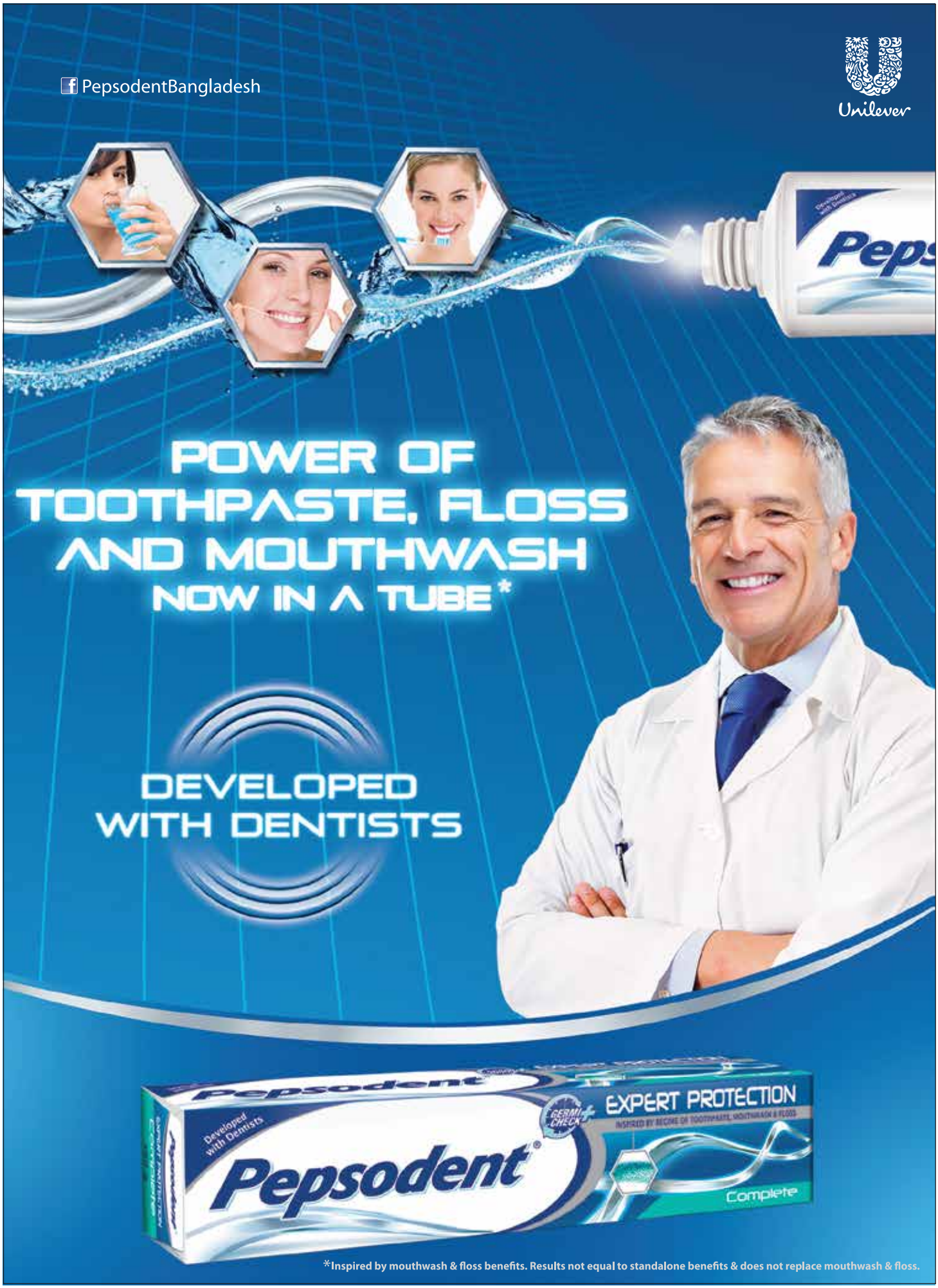
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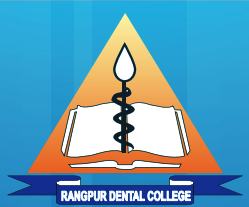

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