

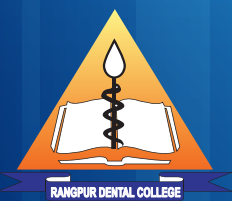
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Rangpur Dental College, Medical East-Gate, Dhap, Rangpur-5400, Bangladesh . Phone: +88 0521 53111
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Smoking and Alveolar Ostitis

Islam MS¹

Alveolar osteitis is the inflammation of the alveolar bone of either the maxilla or mandible. It is also known as dry socket, or less commonly, fibrinolytic alveolitis. This is classically seen as the postoperative complication of tooth extraction, which occurs commonly in extractions involving mandibular third molars. Alveolar osteitis occurs during healing phase of extraction sockets.^{1,2} 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.³

After the extraction of a tooth, blood is extravasated into the socket, and blood 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.³ 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 extracted 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.^{4,5}

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.⁶ 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.³ 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.⁷

Smoking reduces the neutrophil chemotaxis and phagocytosis thus impairing the production of immunoglobulin.⁸ Nicotine the active drug 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.⁹ The incidence of dry socket was significantly higher in smokers than in non smokers but there is a strong

association between the amount of smoking and the incidence of dry socket.

Numerous studies have been done on the postoperative complications from dental extractions most often of interest in alveolar osteitis.¹⁰⁻¹² The results were sometimes conflicting and identified inexperienced surgeon and tobacco use as contributing factors to alveolar osteitis. Monaco, et al.¹³ implicated smoking be a risk factor for alveolar osteitis. Meechan, et al.⁵ identified heavy smoking, difficult extractions, females, and mandibular posteriors as predisposing factors to alveolar osteitis formation. Hermes, et al.¹¹ suggested smoking is not responsible for the increased incidence of alveolar osteitis.

Smoking impairs endothelium-dependent relaxation of vessels. The immediate response of healthy endothelium to an increase in blood flow 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.^{8,14,15}

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Dr. Md. Shahidul Islam

Assistant Professor & Head

Department of Prosthodontics

Rangpur Dental College & Hospital, Rangpur
Bangladesh

E-mail: smshaheen0407@yahoo.com

Sarcoma of Jaw and Orofacial Soft Tissue: A Clinicopathological Study

Rahman MS¹, Islam MA², Pervez MA³, Alam S⁴, Habib MA⁵, Kawsar MA⁶, Ferdous Z⁷, Hasan M⁸

Abstract:

Background: Sarcoma of jaw and orofacial soft tissue is rare, constituting between 4-8% of all malignancies in the region. A few case reports of individual tumors are available while reviews of significant series is lacking. An observational descriptive study (March' 2007 to Feb' 2011) was performed at Oral and Maxillofacial Surgery department, Dhaka Dental College and Hospital. This study presents 20 cases of sarcoma collected over 4 years at a tertiary oral care centre in Dhaka, Bangladesh. **Objectives:** To find out the distribution & pattern of Sarcoma among all oral malignancy and to find out the age, sex, site, clinical presentation and the histological types of these tumors. **Method:** Histopathological types of the sarcomas were analyzed to indicate the numbers that occurred and also the pattern of occurrence according to age, gender, site and clinical presentation. **Result:** There were 138 maxillofacial malignancies of which 20 (14%) were sarcomas. Seven histopathologic types were found of which osteosarcoma (30%), fibrosarcoma (20%), Ewing's sarcoma (20%), malignant fibrous histiocytoma (15%) were predominant. The male to female ratio was 1.86:1. Patients with sarcoma were between 3.5 years and 70 years (mean age 34.3±20.3 years) with most patients (35%) in 35 to 45 years of life. Case presented with symptoms such as swelling (100%), pain (70%) and tissue ulceration (30%). Surgery was performed for 70% of cases treated while chemotherapy was used for 50%. **Conclusion:** In Dhaka Dental college hospital, sarcomas account for 14% of all maxillofacial malignancies with the osteosarcoma as the predominant type. Most affected were people in the fourth decade of life. Surgery was the main modality used for treatment while some patients had no treatment due to self discharge and late presentation.

Key words: Oral Malignancy, Sarcoma, Osteosarcoma

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Introduction:

Sarcomas are malignant neoplasm derived from cells of mesenchymal origin. The originating tissue is diverse and includes bone, cartilage, muscular, fibrous, vascular, fatty and neural tissue. In the oral and maxillofacial region, sarcomas are uncommon. Compared to carcinomas, sarcomas are rare. Incidence of sarcoma in jaw and orofacial soft tissue area varied depending upon different population reported by researchers. Sadat et al² reviewed 139 cases of oral malignancies from Bangladeshi population among which sarcomas were 12.9%, Budhy et al¹ found 4% sarcoma while squamous cell carcinoma made up 70% from East Java, Indonesia. Adebayo et al³

examined 406 maxillofacial malignancies from Kaduna, Nigeria of which 80 (20%) were sarcoma. Sarcomas may appear at any age, the earliest reported being Gallagher et al³⁰ in a 16 months old baby, Adebayo et al³ reported in one 24 months old baby, while Hoffman et al²⁸ reported one in patient 84 years old. It tends to affect considerably younger group than that of carcinomas. Male are slightly more affected than female by jaw and orofacial soft tissue sarcoma. According to Yamaguchi et al⁵ mean age was 42 years; male to female ratio was 3:1. The median age was 46 years and male to female ratio was 2:1 in 36 head and neck soft tissue sarcoma reviewed by Rabindra.¹² 31.3 ±14.1

1. Dr. Md. Shamsur Rahman, Consultant, 250 Bed Hospital, Moulvibazar, Bangladesh
2. Dr. Md. Amirul Islam, Assistant Professor, Oral & Maxillofacial Surgery, Dental Unit, TMSS Medical College, Bogra, Bangladesh
3. Dr. Md. Akram Pervez, Associate Professor, Department of Oral & Maxillofacial Surgery, Dental Unit, Chittagong Medical College & Hospital
4. Dr. Shamiul Alam, Assistant Professor, Department of Oral & Maxillofacial Surgery, Bangabandhu Sheikh Mujib Medical University
5. Dr. Md. Ahsan Habib, Assistant Professor & Head (Orthodontics & Dentofacial Orthopaedics), Rangpur Dental College, Rangpur
6. Dr. Md. Ali Kawsar, Assistant Professor & Head (Orthodontics & Dentofacial Orthopaedics), Dental Unit, TMSS Medical College, Bogra
7. Dr. Zannatul Ferdous, Lecturer, Dental Unit, TMSS Medical College, Bogra, Bangladesh
8. Dr. Moynul Hasan, Dental Surgeon, Dental Unit, TMSS Medical College, Bogra, Bangladesh

years were mean age and male to female ratio were 2.3:1 reported by Pandey.²⁶ Clinical presentation of orofacial sarcoma depends upon the histological types and location of the tumor. Adebyaot al³ reported that orofacial sarcoma presented with symptoms such as swelling (100%), pain (54%), and tissue ulceration (26%). Pandey et al²⁷ reported that symptoms of their patients were progressive swelling or mass which was present in all cases, painful in three (13.6%), painless in the rest, facial nerve palsy was present in one case and bleeding was present in another. The median tumor size was 5.5cm (range 0.6-13cm) according to Robindraetal.¹² Any type of sarcoma can affect the oral tissue. Sarcoma in the maxillofacial region has wide variety of histological types. Weber et al²¹ reported that the most common soft tissue sarcoma occurring in the head and neck region is rhabdomyosarcoma (RMS), followed by malignant fibrous histiocytoma (MFH), fibrosarcoma and neurofibrosarcoma. Osteosarcoma is regarded as the tumor most frequently manifested in the bones and the lower jaw⁶, chondrosarcoma one half as frequent as the osteosarcoma but twice as common as Ewing's tumor.²⁹ Adebayo et al³ found maxillofacial sarcoma as osteosarcoma (28%), chondrosarcoma (17%), rhabdomyosarcoma (12%) and fibrosarcoma (12%). Hard tissues are more affected (72%) than soft tissue (11%) by sarcoma in maxillofacial region.³ The primary sites of sarcoma according to Yamaguchi⁵ included the maxilla, maxillary sinus, mandible, buccal mucosa, temporomandibular fossa and submandibular region. Sarcomas grow rapidly, are invasive destroy surrounding tissues and usually spread by the blood stream. Their occurrence result in considerable morbidity and mortality. Head and neck sarcomas have high mortality rate with a high risk of recurrence. According to Penelet al²⁵ 2 years overall survival was 71% and the 5-year overall survival was 52.3%. Rabindraet al¹² reported overall survival was 49% at 5 year. In Bangladesh, few reports of maxillofacial sarcoma have been published but there is lack of detailed studies. So this present study was designed to evaluate the clinicopathologic characteristics of sarcoma in maxillofacial region which would shed some more light on this area.

Materials & Methods:

The study was carried out in the department of Oral and Maxillofacial Surgery, Dhaka Dental College Hospital from March 2007 to February 2011. Patients admitted with maxillofacial sarcoma irrespective of age and sex were selected for the study. Sample size of the study was 20, out of them 13 were male and while 7 cases were female. Histopathological types of the sarcomas were analyzed to determine the incidence and also the pattern of incidence according to age, gender, site and clinical presentation. A standardized structured data collection sheet was used to collect necessary information of the subject group. Data sheet included all of the variables regarding to the study. Data were screened for any discrepancy. After screening data were entered into template of SPSS@16 software.

Descriptive statistics were generated to see the distribution of baseline characteristics of the patient.

Results:

Tabl-1: Distribution of the respondents by Age

Age in group	Frequency	Percent
Less than 15 years	4	20.0
15 to 30 years	5	25.0
30 to 45 years	7	35.0
45 to 60 years	1	5.0
More than 60 years	3	15.0
Total	20	100
Mean 34.3±20.3, Min-3.50 and Max-70.00		

Majority of the respondents (35%) were in the age between 30 to 45 years, 5(25%) were aged between 15 to 30 years, 4(20%) were less than 15 years of age 3 (15%) were more than 60 years of age and only 1(5%) were found at the age between 45 to 60 years. Mean age was 34.3±20.3, min-3.5 years and max-70 years.

Table-2: Distribution of the respondents by sex

Histopathological diagnosis	Male	Female	Total
Osteosarcoma	4(20%)	2(10%)	6(30%)
Malignant-fibrous histiocytoma	2(10%)	1(5%)	3(15%)
Fibrosarcoma	3(15%)	1(5%)	4(20%)
Chondrosarcoma	1(5%)	-	1(5%)
Ewing's sarcoma	2(10%)	2(10%)	4(20%)
Rhabdomyosarcoma	-	1(5%)	1(5%)
Others	1(5%)	-	1(5%)
Total		7(35%)	20(100%)

Among the 20 respondents 13(65%) were male and rest 35% were female.

* Others- Ameloblastic fibrosarcoma

Table-3: Distribution of the respondents by Diameter of the lesion

Diameter of the lesion (Sq.cm)	Frequency	Percent
< 25 sq.c.m	12	60.0
25 - 50 sq.c.m	6	30.0
> 50 sq.c.m	2	10.0
Total	20	100.0
Mean 28.4±27.0, Mini-5 sq. cm and Max-120 sq. cm		

The above table shows that 12(60%) diameter of the lesion were < 25 sq.cm, 6(30%) were size between 25 - 50 sq.c.m and only 10% were found > 50 sq.c.m in diameter. Mean diameter was 28.4±27.0 and min-5 sq. cm and max- 120 sq. cm.

Table-4: Distribution of the Lesion in Maxillofacial region

Histopathological diagnosis	Mandible	Maxilla	Buccal mucosa	Oral cavity	Sinus	TM joint
Osteosarcoma	4	2	-	-	-	-
Malignant fibrous histocytoma	3	-	-	-	-	-
Fibrosarcoma	3	-	1	-	-	-
Chondrosarcoma	-	-	-	-	-	1
Ewing's sarcoma	3	-	-	-	1	-
Rhabdomyosarcoma	-	-	-	1	-	-
Ameloblastic fibrosarcoma	1	-	-	-	-	-
Total (20)	14(70%)	2 (10%)	1(5%)	1(5%)	1(5%)	1(5%)

By the site, most 14(70%) of the lesion were found at mandible, 2(10%) at maxilla and 1(5%) each at the site of buccal mucosa, oral cavity, sinus and TM joint.

Table-5: Distribution of the lesion by Histopathological findings and Clinical features

Clinical feature	Osteosarcoma	Malignant Fibrous histocytoma	Fibrosarcoma	Chondrosarcoma	Ewing's sarcoma	Rhabdomyosarcoma	Others	Total
Swelling	6(100%)	3(100%)	4(100%)	1(100%)	4(100%)	1(100%)	1(100%)	20
Pain	5(63.3%)	3(100%)	2(50.0%)	1(100%)	3(75.0%)	0(.0%)	0(.0%)	14
Ulceration	1(6.7%)	1(33.3%)	2(50.0%)	1(100%)	0(.0%)	1(100%)	1(100%)	06
Paresthesia	1(6.7%)	0(.0%)	1(25.0%)	0(.0%)	0(.0%)	0(.0%)	0(.0%)	02
Nasal Bleeding	0(.0%)	0(.0%)	0(.0%)	0(.0%)	1(25.0%)	0(.0%)	0(.0%)	01
Toothache	0(.0%)	1(33.3%)	2(50.0%)	0(.0%)	0(.0%)	0(.0%)	0(.0%)	03
Loose tooth	0(.0%)	1(33.3%)	0(.0%)	0(.0%)	1(25.0%)	0(.0%)	0(.0%)	03
Limitation of mouth opening	1(6.7%)	0(.0%)	1(25.0%)	1(100%)	0(.0%)	1(100%)	0(.0%)	04
Others	0(.0%)	0(.0%)	1(25.0%)	0(.0%)	0(.0%)	0(.0%)	0(.0%)	01
Total	6 (30%)	3(15%)	4(20%)	1(5.0%)	4(20%)	1(5.0%)	1(5.0%)	20(100%)

Among the 20 respondents majority 6 (30%) were diagnosed as Osteosarcoma, 3(15.0%) were found Malignant fibrous histocytoma, 4(20%) were diagnosed as fibrosarcoma, 1(5%) was chondrosarcoma, 4(20%) were Ewing's sarcoma, 1(5%) rhabdomyosarcoma and 1(5%) was other and all 20(100.0%) had a complaint of swelling, 14(70.0%) were presented with pain, 1(5.0%) with nasal bleeding, 6(30.0%) with ulceration, 2(10.0%) had paresthesia, 3(15.0%) had toothache, 3(15.0%) were presented with loose tooth, 4(20.0%) were limitation of mouth opening and 1(5%) had other clinical feature.

Discussion:

The incidence of maxillofacial sarcoma is unknown. Budhyet al¹ examined 994 histopathological specimens of maxillofacial malignancies from East Java, Indonesia. They found 42 (4%) sarcomas in their sample. Adebayo et al³ examined 406 maxillofacial malignancies from Kaduna,

Nigeria of which 80(20%) were sarcoma. Sadat et al² reviewed 139 cases of oral malignancies from Bangladeshi population among which sarcoma were 12.9%. In this study within the last 4 years, 20 (14%) sarcomas were found. However we believe that a yearly sarcoma incidence of 5 cases in the estimated population served by our center shows rarity of this lesion in the population.

The most common sarcoma is controversial. It depends on age group, site and possibly racial factors. According to Soule et al¹⁴ rhabdomyosarcoma is the commonest oral and maxillofacial sarcoma of childhood while in adults; osteogenic sarcoma (osteosarcoma) is predominant.⁷ It is the belief of Miller and Dalager¹⁶ that rhabdomyosarcomas are commoner among Caucasians than Negroes speculating a genetic factor in the Caucasoid stock.

In Ibadan, Nigeria, osteosarcoma accounts for 37% of

sarcomas over a 15 years period from the report of Daramola et al.¹⁵ Yamaguchi et al⁵ reviewed 32 cases sarcomas involving the oral and maxillofacial region of them 9 (28%) cases of osteosarcoma. As with other reports, the most common sarcoma in our series was osteosarcoma (30%) (Table 5). This is similar to the 30% incidence from Pretoria, South Africa.¹⁷ Among 6 cases of osteosarcoma found in our series, there were fewer females than males, ratio was 1:2. This is slightly higher than male to female ratio of 5:3 found from 8 cases.⁸

Unlike in the rest of the human body where osteosarcoma occurs mostly in the 2nd decade, that of the maxillofacial region occurs in older persons (mean age 38 years) from the study of Harrison and Lund.²² Six patients (30%) in our series with osteosarcoma were between 18-60 years old showing its bias for occurrence in adults (table 1).

Sarcomas can originate in any part of the body but certain types show a predilection for some parts of the maxillofacial region. Considering specific neoplasm's, osteosarcoma occurs more in the maxilla 8(58%) than the mandible 6 (42%) from the work of Mardinger et al.²³ Though soft tissue involvement by the tumor can occur it is rare. Table 4 showed that among 6 cases of osteosarcoma more occurred in the mandible (66%) than maxilla (34%). Sarcomas could be detected during routine examination for other conditions or due to non-specific symptoms. Since cure of orofacial malignancies is enhanced by early detection and initiation of adequate treatment, the dental surgeon or medical practitioner has a vital role to play in early detection particularly at the asymptomatic stage through opportunistic screening.¹⁸ The presenting features of sarcomas are non-specific and depend on tumor location, size, rate of growth, duration and the level of cancer awareness of the individual.¹⁸ Cases of osteosarcoma reported by Doval et al⁸, presented as swellings of the jaws while a few had pain, tooth loosening, derangement of teeth and ulceration. In our 6 patients main features encountered were swellings (100%), pain (83%), ulceration (16.7%), paresthesia (16.7%) and limitation of mouth opening (16.7%) (Table-6).

Chondrosarcoma is less common than osteosarcoma from reports, Rafindadi and Ayuba⁷, had 12% incidence of chondrosarcoma. This is found higher (5%) than our study (Table 5). The lesion occurs more in males than females, ratio 2:1^{31, 32}, but in our study only one case was found out of 20 maxillofacial sarcomas (Table 5). In the mouth and jaws, the lesion afflicts younger persons than in other parts of the body.²² In this study, one chondrosarcoma male patient was 65 years old. Primary chondrosarcoma affects

the maxilla more than the mandible. The site of the lesion in our patient was mandible among three forms of sarcoma reported by Rafindadi and Ayuba⁷, fibrosarcoma accounted for 38%. This is much higher than our result. There was sexual bias in 4 fibrosarcomas of the maxillofacial region found in our series which contrasts with the slight female predominance by a ratio of 1.3:1 in the Dutch report.⁹ Fibrosarcomas occur in the soft tissues of the maxillofacial region followed by the maxillary sinus, other paranasal sinuses and the nasopharynx.¹⁹ Slootweg and Müller⁹ considered the lesion in the jaws of Dutch population and found more in mandible (n=5) than maxilla (n=2). Our 4 cases were distributed between the mandible 75% and buccal mucosa 25%. Harrison and Lund²² noted that difficulties occur in distinguishing maxillary lesions on the basis of origin from soft tissues such as periosteum or intraosseous. The large sizes of tumors seen in this series emphasize this problem. Slootweg and Müller⁹ found that out of seven cases of fibrosarcoma, painful swelling occurred in 3 persons with tooth loosening, pathological fracture, trismus and paraesthesia of the lower lip in one case each. Out of four cases in our study all are presented with swelling with or without pain, ulceration, toothache, paresthesia and limitation of mouth opening.

Tumor rarity makes incidence of malignant fibrous histiocytoma among other oral and maxillofacial sarcomas difficult to find. It accounted for 15% of sarcomas in this study. There are slightly more males than females with malignant fibrous histiocytoma in the maxillofacial region.²⁰ We had three patients among them two were male and one were female. Harrison and Lund²² stated that the lesion occurs mostly in the 6th decade. Cases of malignant fibrous histiocytoma were between 13 and 54 years old (mean 34).²⁷ In our series, one patient was 9 years, one was 45 years and another was 70 years old (mean 41) demonstrating its predilection for older people unlike rhabdomyosarcoma. Malignant fibrous histiocytoma was found more in the hard tissues such as bone than in soft tissues.²⁶ Out of three lesions they reported, two were in the jaws while one occurred in the scalp. Our three cases were in the mandible (n=3) (Table 4). In this series, the lesion presented with swelling, pain, ulceration, and derangement of teeth. These are not dissimilar to features of malignant fibrous histiocytoma in another report.

Ewing's sarcoma is a highly malignant tumor which develops from medullary tissue of bone. It accounts for 4 to 5 percent of all primary bone tumors.²⁹ Ewing's sarcoma is the second most common malignant bone tumor of childhood and adolescent, yet it is a rare tumor. Less than 3% of all Ewing's sarcoma originates in the maxillofacial region, usually involving the mandible, 90% occur in the first three decades of life and males are more

often affected than females. Clinical symptoms such as swelling, pain and sensory disturbances are rather unspecific and sometimes be misleading.¹⁰ We had 4 cases of Ewing's sarcoma patients of them 2 cases were male and 2 cases were female. Three cases were involved in the mandible and rest was in the sinus. Patients age range was 3.5 years to 45 years (mean age was 25 years), we had two patients those age were above 40 years which is similar to Proamateet al¹³ study. Our Ewing's sarcoma patient's main clinical presentation was swelling and pain with ulceration, nasal bleeding and loose tooth.

Rhabdomyosarcomas can occur at any age but the lesion is commonest in the first decade of life making it the commonest maxillofacial sarcoma of childhood.¹⁴ Five cases were recorded in India by Pandey et al²⁷, whose mean age was 16 years (range 4-33years) with 80% in the 1st and 2nd decades. We had one case of rhabdomyosarcoma which involved in the oral cavity and patient age was 12 years, clinical presentation was swelling, ulceration and limitation of mouth opening.

Muller Susan et al²⁴ reported five cases of ameloblastic fibrosarcoma, the malignant counterpart of the ameloblastic fibroma, is a rare odontogenic tumor characterized by benign epithelium and malignant fibrous stroma. The mean age of the patients was 14.6 to 22 years. Park Hae Ryou¹¹ reported a highly malignant ameloblastic fibrosarcoma located in the right retromolar region. The patient was 17-years old male and his complaint was painful mass in this region. Clinically, the patient had an exophytic strawberry-appearing mass in the right retromolar area with loosen the lower right second molar. We had a male case of ameloblastic fibrosarcoma that was involved in the right retromolar area, presented with painless swelling with loose tooth; size was about 3×3cm.

Especially in developing countries such as Bangladesh, poverty, ignorance about medical problems and poorly developed medical infrastructure contribute to morbidity and mortality from malignant conditions such as sarcomas and carcinomas. While patient management is improved with adequate diagnostic and treatment facilities, health care must be accessible for the population to benefit. To improve the patient survival and freedom from recurrence, there is need for increased cancer awareness and funding for the health sector in Bangladesh. Also, regional cancer treatment centers are necessary to cope with the prevalence of malignancies in our environment.

Conclusion:

In Dhaka Dental college hospital, sarcomas account for 14% of all maxillofacial malignancies with the osteosarcoma as the predominant type. Most affected people were in the fourth decade of life. Surgery was the main modality used for treatment while some patients had no treatment due to self discharge and late presentation. The

need for improved medical awareness and upgrading of infrastructure was stressed.

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Address of corresponding:

Dr. Md. ShamsurRahman

Email: drshamsoms7@gmail.com

Contact: 01712-612113

Relationship between the Maxillary Anterior Teeth and the Horizontal Facial Reference Points in Bangladeshi Populations

Rahman MM¹, Islam MS², Rahman MM³, Hossain MA⁴, Islam S⁵, Das S⁶, Rahman MZ⁷

Abstract:

Background: Prosthetic rehabilitation of completely edentulous patients improves cosmetic appearance and functional efficiency which are the goals of the oral prosthetic procedures that also upgrade the self-esteem and self-confidence of the patients. Various techniques have been employed for selection of anterior teeth. Facial landmarks such as bi-zygomatic width, circumference of head, facial height, inter-canine distance and interalar width have been taken into consideration while arriving at the mesiodistal width of upper anterior teeth.

Objective: To determine the relationship between the maxillary anterior teeth and the horizontal facial reference points. **Methods:** Direct distance of facial landmarks was measured on each patient while he/she is sitting in upright position with his/her teeth in centric occlusion, lips relaxed and with unsupported head, looking straight forward to maintain natural head position. The facial measurements was carried out by using an electronic digital vernier and inter canine distance was measured by a flexible scale. **Results:** The study found mild to moderate positive relationship among the width of different facial landmarks and width of anterior teeth in curve line from tip of the canine to canine. **Conclusion:** The width of facial landmark may be used as a tentative predictor for the estimation of the Inter-Canine width in curve line.

Key words: Maxillary anterior teeth, Horizontal facial reference points, Inner inter canthal distance, Inter alar width, Bizygomatic width, Inter commusural width

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Introduction:

Prosthetic rehabilitation of completely edentulous patients improves cosmetic appearance and functional efficiency which are the goal of the oral prosthetic procedures that also upgrade the self-esteem and self confidence of the patients.¹ Various factors and concept controls the practice of beauty. Anterior teeth play the significant role for maintenance cosmetic appearance. Selection of teeth is the first and the most sophisticated stage of dental reconstruction. As anterior teeth of are frequently visible part, so appropriate size, shape and shade of the teeth should be selected to avoid artificial look, and this is problematic for denture users.

For the past few decades, many improvements have been made in the quality of denture teeth that make the denture more esthetic. An esthetically accepted denture teeth are

harmonized with the oral musculature, the shape and size of the face.² Several anatomic landmarks has positional relationships to some natural teeth. For replacing artificial teeth, these landmarks are used as reliable guides.³

Various methods are used for selecting the anterior teeth include; pre-extraction records such as photographs, extracted teeth, study model, existing dentures, face form and profile, maxillary arch design, gender, and age. Many studies have reported association between the anatomic structures, or features of a patient and the shape or form of the teeth.^{4,5}

Depending on the physical characteristics of the dentofacial structures, facial landmarks such as bi-zygomatic width, circumference of head, facial height, inter-canine distance and interalar width are considered for measuring the

1. Dr. Md. Mahbubur Rahman, Associate Professor & Chairman, Department of Prosthodontics, Faculty of Dentistry, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh
2. Dr. Md. Shahidul Islam, Assistant Professor & Head, Department of Prosthodontics, Rangpur Dental College & Hospital, Rangpur, Bangladesh
3. Dr. Md. Masudur Rahman, Associate Professor, Department of Prosthodontics, Faculty of Dentistry, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh
4. Dr. Md. Amzad Hossain, Assistant Professor, Department of Prosthodontics, Faculty of Dentistry, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh
5. Dr. Saiful Islam, Lecturer & Prosthodontist, Dhaka Dental College, Dhaka, Bangladesh
6. Dr. Suvashis Das, Assistant Professor, Department of Prosthodontics, Faculty of Dentistry, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh
7. Dr. Md. Zahedur Rahman, Assistant professor, Dept. of Science of Dental Materials, Rangpur Dental College, Rangpur, Bangladesh.

mesiodistal width of upper anterior teeth.⁶ Many studies have been conducted to establish the method for measuring width of maxillary anterior teeth.⁷⁻⁹

The interalar distance serves as a reference for selection of the width of anterior teeth. The width of alae of the nose is about same to intercanine distance.^{6,10} The corner of the mouth represents the distal limit of the upper canine.¹¹ The relationship between bizygomatic width and maxillary anterior teeth is 1:3.3. The bizygomatic width measured in edentulous patients, in some studies, no correlation has been observed between the bizygomatic width and mesiodistal width of maxillary anterior teeth.¹² The inter-inner canthal distance has over all a significant relation to the width of the teeth and can be a reliable predictor for estimation of the tooth width. IICD is a reliable guideline for selecting the width of maxillary anterior teeth.¹³⁻¹⁵

Attempts should be made to use of facial measurements as a guide for selection of anterior teeth for complete denture. More than one facial measurement could be used as predictor of maxillary anterior teeth width. The relationship of intercanine distance to intercanthal distance, interalar width, bizygomatic distance and intercommissural width should be maintain to select proper size of maxillary anterior teeth. So, the aim of this study was to find a reliable mathematical relationship between maxillary anterior teeth measurements and different horizontal facial parameters for predicting the proper width of maxillary anterior denture teeth.

Methods:

A snap-shot observational study was conducted over Bangladeshi people with different face forms. One hundred and eleven voluntary subjects were included in study from students of different dental colleges in Bangladesh by purposive sampling technique based on following criteria- dentate subject with healthy anterior teeth, normal occlusion or Angle's class-I occlusion and without any orthodontic treatment. Subjects with teeth agenesis or severe attrition, median diastema, class-II or class-III malocclusion, crowding, cross bite, severe over bite and over jet, ocular diseases, facial trauma or surgery and loss of anterior teeth were excluded from the study. Linear distance of facial landmarks were measured on each patient while he/she was sitting in upright position with his/her teeth in centric occlusion, lips relaxed and with supported head, looking straight forward to maintain natural head position. The measurements were carried out by using a digital vernier caliper which measure to the nearest of 0.01 mm.

The caliper was placed against the forehead and lowered toward the eyes. The arms of the caliper were adjusted so that they will be in gentle contact with the medial angle of the palpebral fissures of the eyes. Utmost care was taken

not to compress the soft tissues. The distance between these two anatomical landmarks was recorded. The interalar width was determined by measuring the external width of the ala of the nose at the widest point. The recording parts of the caliper were brought into contact with the outer surface of the alae without applying any pressure. The bizygomatic width was determined by measuring the distances between malar prominences on either side of face with recording parts of the caliper bringing into contact with the surface of the zygoma without applying any pressure. The width of the mouth was determined by measuring the lip's vermilion from commissure to commissure while patient's lips were relaxed. The lips were retracted with proper care and taking full precautions, the maxillary intercanine distance was measured using a flexible scale in a curve line following arch form from canine cusp tip to canine cusp tip. All measurements were made and recorded by same operator in presence of two dentist who were not involved in this study. The average of 3 readings for every distance was considered as a final reading.

Data Analysis:

The statistical analysis was performed using Special Package for Social Sciences (SPSS-V.19) computer program; and the Spearman's Correlation Coefficient and Mann-Whitney U test was done. For all the relationships, level of significance $p < 0.05$ was accepted as statistically significant.

Results:

Table I: Age, Sex & Face form of the study population (n=111)

Age (years)	Mean	Std. Deviation
	22.28	1.52
sex	n	%
Male	26	23.4
Female	85	76.6
Total	111	100
Face Form	n	%
Square	29	26.1 0
Tapered	31	27.9 0
Ovoid	51	45.9 0
Total	111	100

Age of the study subject ranged from 18 to 26 years, and mean±SD of age was 22.28±1.52 years, among them 26(23.40%) were male and 85(76.60%) were female. Twenty nine (26.10%) subject have square face form, 31 (27.9%) subjects' face forms are tapered and ovoid face form was in 51(45.90%) subjects (table I).

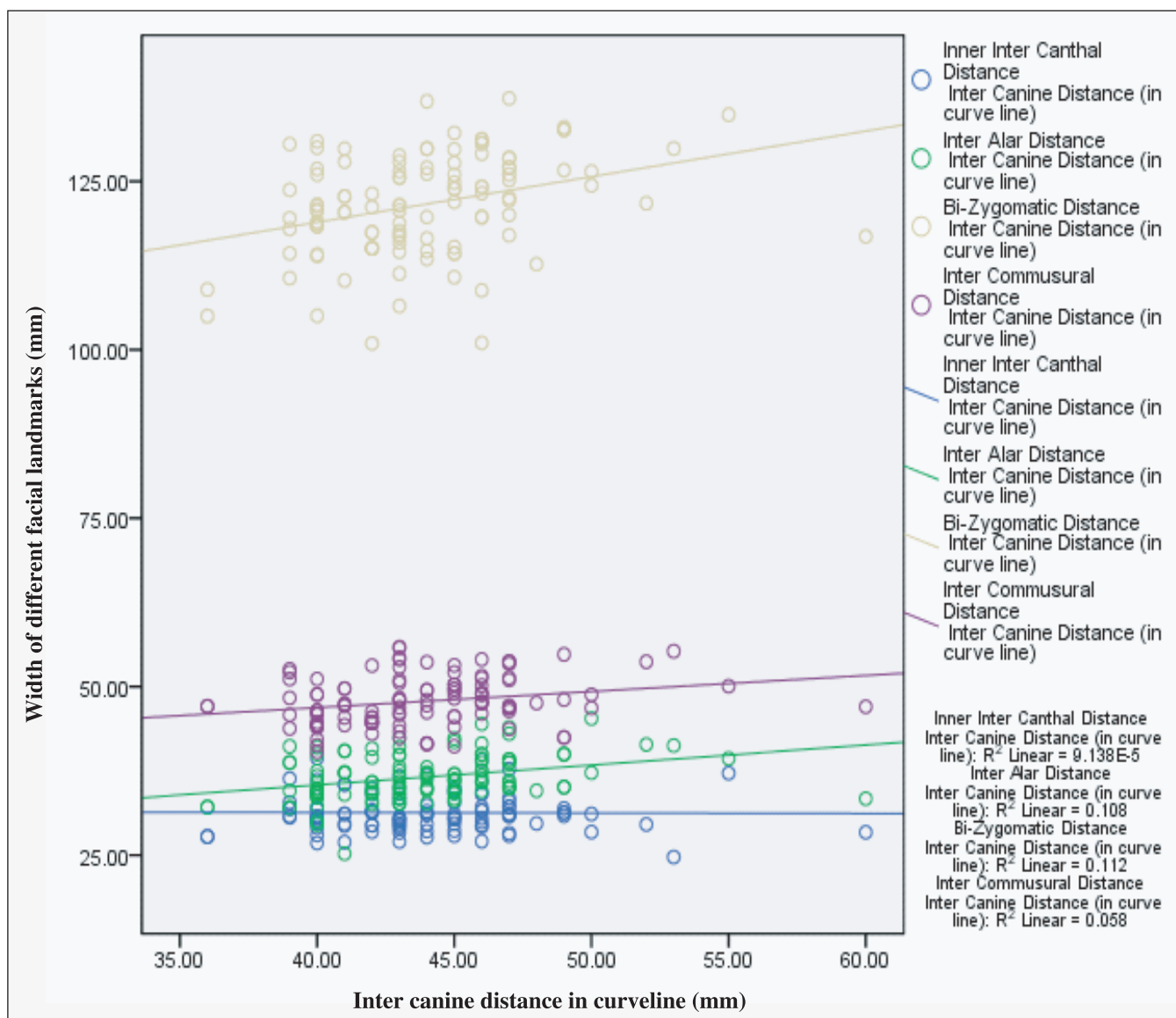


Fig-1: Scatter diagram showing relationship among the width of different facial landmarks and inter canine distance in curve line (n=111)

The study found positive relationship among the width of different facial landmarks and width of anterior teeth in curve line from tip of the canine to canine. Linear regression between inner inter canthal distance and tip of inter canine

distance is $R^2 = 9.138$, inter alar distance and tip of inter canine distance is $R^2 = 0.108$, bitygomatic distance and tip of inter canine distance is $R^2 = 0.112$ & inter commissural distance and tip of inter canine distance is $R^2 = 0.058$ (fig. 1).

Table II: Relationship of different facial landmarks and inter canine distance in curve line (n=111)

Intercanthal distance (mean±sd) mm	Intercanine distance (mean±sd) mm	Spearman's Correlation Coefficient 'r'	P value
30.51±1.95	46.94±4.14	0.036	0.708
Inter Alar Distance (mean±sd) mm	Intercanine distance (mean±sd) mm	Spearman's Correlation Coefficient 'r'	P value
36.12±2.64	46.94±4.14	0.329	0.01
Bi-Zygomatic Distance (mean±sd) mm	Intercanine distance (mean±sd) mm	Spearman's Correlation Coefficient 'r'	P value
122.66±6.84	46.94±4.14	0.367	0.01
Inter Commusural Distance (mean±sd) mm	Intercanine distance (mean±sd) mm	Spearman's Correlation Coefficient 'r'	P value
46.31±3.60	46.94±4.14	0.275	0.004

The study revealed that Inner Inter Canthal distance (mean±sd) is 30.51±1.95mm, Inter Alar distance (mean±sd) is 36.1225±2.64mm, Bi-zygomatic width (mean±sd) is 122.66±6.84mm, Inter Commusural distance (mean±sd) is 46.31±3.60mm and Inter Canine distance in curve line (mean±sd) is 46.94±4.14mm. A negligible positive relationship found between Inner Inter Canthal distance and Inter canine distance in curve line, their Spearman' Correlation Coefficient is 0.036, and P value is 0.708, which is statistically non-significant. A mild positive relationship found between Inter Alar distance and Inter canine distance in curve line, their Spearman' Correlation Coefficient is 0.329, and P value is 0.01, which is statistically significant. A mild positive relationship found between Bi-zygomatic distance and Inter canine distance in curve line, their Spearman' Correlation Coefficient is 0.367, and P value is 0.01, which is statistically significant. A mild positive relationship found between Inter Commusural distance and Inter canine distance in curve line, their Spearman' Correlation Coefficient is 0.275, and P value is 0.01, which is statistically significant (table II).

Discussion:

Selection of maxillary anterior teeth complete denture is a challenge when pre-extraction record is not available. Selecting mesio-distal combined width of upper anterior teeth is an important stage for selection of complete dentures teeth. A scientific and universally accepted method for appropriately determining the size of anterior artificial teeth has not yet been found. The recent scientific papers reveal different methodology, and different face and natural teeth parameters are used to select artificial teeth. This study attempted to present the recent views and research in this area, and to investigate and analyze the possibility for using anatomical parameters in prosthetic diagnosis and treatment plan Bangladeshi population.

A negligible positive relationship found between Inner Inter Canthal distance and Inter canine distance in curve line, their Spearman' Correlation Coefficient is 0.036, and P value is 0.708, which is statistically non-significant. Similar results observed among the Indian populations in a study conducted by Deogade et al¹⁶. Ljiljana, Ivana and Predrag¹⁷ found a low correlation between the inner canthal distance and inter canine cusp width ($r = 0.303$). On a Brazilian population sample Lucas et al.¹⁸ measured the inner canthal distance and the distance between the maxillary canine tips. A significant correlation was established between the determined variables ($r = 0.476$). Khalid¹² found a significant relationship between intercanthal dimension and the maxillary teeth dimensions ($P < .0001$) among the Saudi population. EL-Sheikh, Mendilawi and Khalifa¹⁹ found a significant correlation is found between intercanthal distance and maxillary intercanine distance in all Sudanese subjects (P -value 0.015). The authors conclude that the inner canthal distance can be used as a preliminary method for determining the width of the anterior teeth.

A mild positive relationship found between Inter Alar distance and Inter canine distance in curve line, their Spearman' Correlation Coefficient is 0.329, and P value is

0.01, which is statistically significant. The study finding is supported by study of Hossain, Islam and Islam²⁰ in respect of Bangladeshi populations. They found that interalar width has a weak correlation with that of maxillary canine in Bangladeshi subject group. Similar results observed among the Indian populations in a study conducted by Deogade et al¹⁶. Al-Sheikh and Al-Athel²¹ found a highly significant correlation between interalar and intercanine distance over the Saudi population. The findings of present study correlates with study by Ljiljana, Ivana and Predrag¹⁷ in which a mild positive correlation was established between the interalar width and combined width of anterior teeth ($r = 0.374$). Varjão and Nogueira²² found out that the average value of interalar width and the mean value of intercanine width for the white Brazilian population. The calculated Pearson's correlation coefficient was 0.238, which is a weak correlation between these two parameters. According to these results interalar width can be used to determine the width of maxillary anterior artificial teeth.

A mild positive relationship found between Bi-zygomatic distance and Inter canine distance in curve line, their Spearman' Correlation Coefficient is 0.367, and P value is 0.01, which is statistically significant. Jafari et al.²³ and Latta et al.²⁴ reported that there was no correlation between bilygomatic width and width of anterior teeth. Another study¹⁶ also concluded that the bilygomatic width is not a proper predictor of the mesiodistal width of upper anteriors. Kassab²⁵ found a significant correlation between intercanine distance and interzygomatic width in Iraqi populations. However bilygomatic width was not significantly correlated over the Indian populations observed by Sharma, Nagpal and Verma.²⁶ This dissimilarity of findings might be due to variation in ethnicity of study population.

A mild positive relationship found between Inter Commusural distance and Inter canine distance in curve line, their Spearman' Correlation Coefficient is 0.275, and P value is 0.01, which is statistically significant. The study finding is supported by study of Hossain, Islam and Islam²⁰ in respect of Bangladeshi populations. They found that width of mouth has a weak correlation with that of maxillary canine in Bangladeshi subject group. Stephan and Henneberg¹¹ have reported that the relation between mouth width and maxillary inter-canine distance is 1:0.75, and this ratio was constant in Europeans as well as Central/Southeast Asians. Latta²⁴ studied North American subjects and found no correlation between intercommissural width, interalar width and /or interpupillary width. Varjao²² found a weak correlation between intercommissural width and distal of the surfaces of canines for four different racial group.

Conclusion:

There are significant and mild to moderate positive relationship exist among the width of different facial landmarks and width of anterior teeth of Bangladeshi population. The width of facial landmark may be used as a

tentative predictor for the estimation of the Inter-Canine width in curve line. This can serve as a useful factor in anterior teeth selection in the absence of the pre-extraction records.

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Corresponding Author:

Dr. Md. Mahbubur Rahman

Associate Professor & Chairman
Department of Prosthodontics, Faculty of Dentistry
Bangabandhu Sheikh Mujib Medical University
Dhaka, Bangladesh
e-mail: mrahman590@yahoo.com

Serum Copper Status among the Patients with Oral Squamous Cell Carcinoma

Shardar MS¹, Rahman QB², Hossain S³, Alim MA⁴, Pervez MA⁵,
Uddin MK⁶, Shanta KN⁷, Sharmin S⁸

Abstract

Oral squamous cell carcinoma is an important health issue. The WHO predicts a continuing worldwide increase in the number of patients with oral cancer, extending this trend well into the next several decades. In Bangladesh, India, Pakistan, Sri Lanka it is the most common and accounts for about a third of all cancer. The study was conducted at the Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, Bangabandhu Sheikh Mujib Medical University, Dhaka. The present study was designed to measure serum copper level among 35 histologically diagnosed oral squamous cell carcinoma patients as case group. Another 35 healthy persons were selected as control group. Data analysis revealed that mean serum copper level in study group was 1377.1 ± 381.6 ppb ($\mu\text{g/l}$) and mean serum copper level in control group was 847.1 ± 174.0 ppb ($\mu\text{g/l}$), which is statistically significant ($p < 0.001$). In study group the copper level range was 600-2000 ppb ($\mu\text{g/l}$) and in control group copper level range was 450-1200 ppb ($\mu\text{g/l}$). The present study shows that the biological marker (serum copper level) may be associated with pathogenesis and progression of malignant lesion. Concerted efforts would therefore, help in early detection, management and monitoring the efficacy of the treatment for oral squamous cell carcinoma patients.

Key words: Oral Malignancy, Serum Copper, Oral Squamous cell carcinoma.

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Introduction:

Cancer is the second most common cause of morbidity and mortality in the world today after cardiovascular problems. Six million people die due to cancer every year. Oral cancer is heterogeneous and arise from different parts of the oral cavity, with different predisposing factors, prevalence, and treatment outcomes. It is the sixth most common cancer reported globally with an annual incidence of over 300,000 cases, of which 62% arise in developing countries. There is a significant difference in the incidence of oral cancer in different regions of the world¹.

Oral cancer is an important health issue. The WHO predicts a continuing worldwide increase in the number of patients with oral cancer, extending this trend well into the next several decades². In Bangladesh, India, Pakistan, Sri Lanka it is the most common and accounts for about a third of all cancer³. Oral squamous cell carcinoma is the most common carcinoma in Sri Lanka, accounting for approximately it forms 30% of all cancers in males⁴, whereas in the UK and USA, oral cancer accounts for only 2% of all malignancies⁵. In Bangladesh oral cancer accounts for 20% of whole body

malignancy, 90% of oral cancer is squamous cell carcinoma.^{6,7}

The discovery of immunological marker at a clinical, histological and molecular level is very helpful for diagnosis and treatment of oral squamous cell carcinoma. Significant reduction of mortality can be achieved by advance in early diagnosis and implementation of multidisciplinary treatment programs leading to improvement of survivorship and better quality of life.

Trace elements have been extensively studied in current years to assess whether they have any effects in oral precancerous lesions or oral cancer. As zinc and copper are essential for numerous enzymes and therefore it is reasonable to assume that variation in serum level of these biochemical markers may be associated with the development of oral pre-cancer and cancer. Deficiency of this nutrient may cause a diminished activity of defense mechanism against oxidation and initiation of the damaging processes. Since Selenium, copper, zinc and manganese are

1. Dr. Mohammad Shahiduzzaman Shardar, Registrar, Deptment of Oral & Maxillofacial Surgery, Khulna Medical College & Hospital
2. Dr. Quazi Billur Rahman, Professor & Chairman, Oral & Maxillofacial Surgery Department, Faculty of Dentistry, BSMMU, Dhaka.
3. Dr. Shakhawat Hossain, Assistant Professor, Oral & Maxillofacial Surgery Department, Faculty of Dentistry, BSMMU, Dhaka
4. Dr. Md. Abdul Alim, Assistant Professor, Department of Oral and Maxillofacial Surgery, MH Samorita Medical College & Dental Unit, Dhaka
5. Dr. Md. Akram Pervez, Associate Professor, Oral & Maxillofacial Surgery, Dental Unit, Chittagong Medical College Hospital.
6. Dr. Md Khabir Uddin, Assistant Professor, Chemistry of Dental Material Department, MH Samorita Medical College & Dental Unit, Dhaka
7. Dr. Kamrun Nahar Shanta, Assistant Professor, Conservative & Endodontics Department, MH Samorita Medical College & Dental Unit, Dhaka
8. Dr. Shaila Sharmin, Assistant Professor, Paediatric Department , MH Samorita Medical College & Dental Unit, Dhaka

the component of these enzymes so they treated as antioxidant. Some antioxidant such as glutathione and uric acid are produced by normal metabolism. Other nutrient such as carotenoids, vitamin E and vitamin C which must obtained through diet⁸.

A free radical is defined as an atom, group of atoms or molecules that has one or more unpaired electron. It is this electron imbalance that give rise in most cases to high reactivity of free radicals. There is a large number of foreign substances in our environment which ingested and metabolized by human body, generates free radicals in biological tissue. Some of free radicals are by product of normal metabolism in our body. In these free radicals such as super oxide anions radicals, hydrogen per oxide, hydroxyl radicals and single molecular oxygen are not removed quick enough then they may damaged DNA, cell membranes, enzymes and other cellular components. Thus they contribute to wide variety of disease process including pre-cancer and cancer⁹.

The superoxide anion radical may efficiently be removed by superoxide dismutase enzyme which is zinc and copper dependent. Thus the control of the initiation of free radical mediate tissue damage depend on the presence of the enzyme Cu, Zn superoxide dismutase (Cu, ZnSOD); in turn, the activity of the enzyme depends on the availability of the antioxidant minerals, mainly zinc and copper¹⁰.

Copper is an essential trace element, an important catalyst for heme synthesis and iron absorption. Following zinc and iron, copper is the third most abundant trace element in the body. Its role as a cofactor component of cytochrome oxidases, superoxide dismutase, tyrosinase, uricase, dopamine β -hydroxylase, lysyl oxidase and ceruloplasmin make it a key micronutrient for our oxidative pathways. The bioavailability of copper from the diet is about 65-70% depending on a variety of factors including chemical form, interaction with other metals, and dietary components. The biological half-life of copper from the diet is 13-33 days with biliary excretion being the major route of elimination¹¹. Copper metabolism is profoundly altered in neoplasm-tic disease. It has been found that serum copper concentration correlates with tumor incidence and burden, malignant progression and recurrence in a variety of human cancers¹²).

Involvement of copper ions in biological damage is caused by superoxide, a radical found in all living tissue has recently been documented. Superoxide radical or other reducing agents such as ascorbate, which reduce the copper complex, react with hydrogen peroxide to form hydroxyl radicals (OH) that damage protein, RNA and most important DNA. Repetative formation of OH radicals at a specific location – where the copper ion are found – is probably the mechanism of this process. These radicals may cause double stand breaks in the cellular DNA that are not repairable by cellular mechanisms, thus initiating the malignant process. Such course of events is an acceptable theory to explain the involvement of copper in malignancy¹³.

Khanna & Karodhar⁸ found the mean Copper level are 127.63, 128.27 and 116.60 $\mu\text{g}/100\text{ml}$ in pre cancer, cancer and normal group respectively. The p value was 0.012 which is statistically significant. Tiejian et al.¹⁴ found that people with high copper concentration had an increase risk of death from cancer. Leone et al.¹⁵ found that high copper values cause 50% increase in relative risk for all causes of death.

The elevation of copper level has been found in patients in many different types of cancer including oral squamous cell carcinoma. Serum copper level have also been found to the positively associated with stage of disease. An elevated serum copper level is a marker for oral squamous cell carcinoma, the low predictive value of such an elevation limits its usefulness in cancer screening¹⁶.

Copper, zinc, iron and selenium are essential for numerous enzymes and therefore it is reasonable to assume that variations in serum level of these bio-chemical markers may be associated with the pathogenesis of oral cancer. The importance of these elements opened the door for new diagnostic and therapeutic endeavors in many areas of medicine and specifically in the areas of oncology. Immunological and biochemical alterations in the serum of such patients can help not only in the early diagnosis, appropriate treatment but also as indicators of prognosis, as the disease progresses⁸. This study was done to evaluate serum copper level in oral squamous cell carcinoma patients.

Materials and Methods

A case control study was done from July 2011 to June 2011 at department of Oral and Maxillofacial Surgery, Bangabandhu Sheikh Mujib Medical University (BSMMU) and Dhaka Dental College Hospital. All bio chemical analysis was done in the department of Biochemistry, BSMMU. Histopathologically diagnosed cases of oral squamous cell carcinoma were included in the study. Patients who had taken minerals supplements during last six months, Patients suffering from chronic renal diseases, liver diseases and chronic obstructive pulmonary disease, Patient who had taken radiotherapy in the orofacial region, Patients with malignancy in other part of the body; Patients with anemia and Patients with pregnancy.

All patients were categorized in two groups: Study group: biopsy proven 35 OSCC patients were selected on the basis of inclusion and exclusion criteria for the assessment of serum copper level. Control group: 35 healthy persons were selected for the assessment of serum copper level. The healthy cases were selected from the family members and same gender of the patients to match the food habit, nutritional status, geographical site etc.

Standardized structured data collection instruments were used to collect necessary information of the subjects. With all aseptic precaution 5ml of venous blood was collected from subjects by venipuncture from antecubital vein using disposable plastic syringe. Then the blood was poured into a tube which was metal free and allowed to stand for half an hour at room temperature. Then the sample was centrifuged

at 2000 rpm for 5 minutes. Serum sample was separated and collected at di-ionized vial. Then the serum was frozen and stored at -30° c for further analysis. Measurement of serum copper concentration done by graphite furnace atomic absorption spectrophotometry (AAS).¹⁷

Data analysis: All statistical analysis was done by SPSS (Statistical Package for Social Science) software package, 22.0 for windows. Values were presented a mean±SD. 95% confidence limit was taken as level of significance. Student t-test was done to see the significant difference between the case and control.

Results

Table-1: Age distribution of the study & control group (n=70)

Age in years	Group-A (Case) (n=35) No. (%)	Group-B (Control) (n=35) No. (%)	p value
Mean±SD	52.3±12.41 (35-86) yrs	29.54±9.23 (20-50) yrs	<0.001*

Data were expressed frequency, percentage and Mean±SD. Figures in parentheses indicate range.

Unpaired Student's 't' test was performed to compare between groups.

n = Number of subjects; * = Significant;

The test of significance was calculated and p values < 0.05 was accepted as level of significance.

Table-1 shows the age distribution of the respondents; in case group age range was 35-86 years and mean age was 52.3±12.41 years. In control group, the age range was 20-50 years and mean age was 29.54±9.23 years.

Table-2: Sex distribution of the study and control subjects (n=70)

Sex	Group-A (Case) (n=35) No. (%)	Group-B (Control) (n=35) No. (%)	p value
Male	15(42.9%)	15(42.9%)	1.0 ^{ns}
Female	20(57.1%)	20(57.1%)	
Total	35(100.0%)	35(100.0%)	

Table-2 showed the age distribution of the respondents, 35 patients were selected for case group. The healthy cases were selected from the family members and same gender as the control group. So, male and female number is equal in case and control group. Male were 15(42.9%) and female were 20(57.1%) for both groups.

Regarding the study in case group mean serum copper level for male was 1363.3 ppb (µg/l) and for female 1387.0 ppb(µg/l). In control group mean serum copper level was 837.7 ppb(µg/l) for male and 855.5 ppb(µg/l) for female. Mean difference of serum copper level in both groups among male and female was statistically significant (p< 0.001) (figure 1).

Table-3: Socioeconomic status of the study & control subjects (n=70)

Socioeconomic status	Group-A (Case)(n=35)		Group-B(Control)(n=35)		p value
	No.(%)	S. copper Mean±SD	No.(%)	S. copper Mean±SD	
Low socioeconomic class	21(60.0%)	1406.8±338.9	21(60.0%)	847.7±162.9	<0.001*
Middle socioeconomic class	13(37.1%)	1375.0±439.8	13(37.1%)	858.3±202.1	0.001*
Upper socioeconomic class	1(2.9%)	750.0	1(2.9%)	700.0	-
Total	35(100.0%)		35(100.0%)		

* = Significant

Table-3 shows the socioeconomic status of the respondents, maximum 21(60.0%) were in low socioeconomic classes followed by 13(37.1%) middle socioeconomic classes.

Table-4: Serum copper level in case and control group (n=70)

S. Copper level	Group-A (Case) (n=35)		Group-B (Control) (n=35)	
	No. (%)	No. (%)	No. (%)	No. (%)
Normal level	16 (45.7%)	28 (80.0%)	-	-
Increased level	17 (48.6%)	-	-	-
Decreased level	2 (5.7%)	7 (20.0%)		
Total	35 (100.0%)	35 (100.0%)		

Normal values for serum copper

Male : 700-1400 ppb (µg/l)

Female : 800-1550 ppb (µg/l)

In this study 17(48.6%) persons were in increased level, 16(45.7%) in normal and 2(5.7%) were decreased level for case group. Maximum 28(80.0%) persons were in normal level, 7(20.0%) in decreased level for control group (table IV).

Table-5: Comparison of serum copper between two groups (n=70)

Serum copper level ppb (µg/l)	Group-A (Case) (n=35) Mean±SD	Group-B (Control) (n=35) Mean±SD	p value
Serum copper level Range	1377.1±381.6ppb(µg/l) (600-2000) ppb(µg/l)	847.1±174.0 ppb(µg/l) (450-1200) ppb(µg/l)	<0.001*

* = Significant

Table-5 showed the mean serum copper level was 1377.1±381.6 ppb(µg/l) and range (600-2000) ppb(µg/l) for case group. In control group mean serum copper level was 847.1±174.0 ppb(µg/l) and range (450-1200) ppb(µg/l). The mean difference in case and control group was statistically significant (p < 0.001).

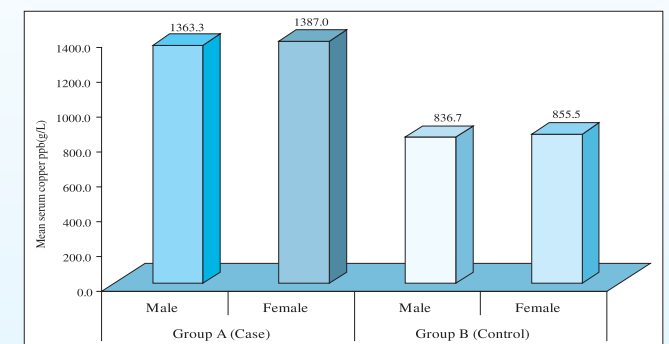


Figure-1: Bar diagram showing the gender basis serum copper in both groups.

Discussion:

Life style and other factors play an important role in the pathogenesis of oral cancer. Researcher across the globe endeavored to elucidate possible relationship of trace elements with the risk of cancer in humans. Attempts of clinical correlation were also made by several clinical epidemiologists in this regard to establish a causal mechanism of malignancy inflicted by deficiency or excess of trace elements¹⁸.

Tumour develops in complex, step-wise manner and many factors can influence this process. One of the crucial stages in tumour development is the initiation of blood vessel formation. Many studies point at the undeniable influence of microelements, particularly copper, on angiogenesis. It has been found that copper metabolism is profoundly altered during the development of human cancer and copper level in plasma correlates positively with tumour incidence, burden, malignant progression and recurrence. Copper ion seems to play an important role in the stimulation of angiogenesis, especially at the earliest stages of this process¹².

Involvement of copper ions in biological damage is caused by superoxide, a radical found in all living tissue has recently been documented. Superoxide radical or other reducing agents such as ascorbate, which reduce the copper complex, react with hydrogen peroxide to form hydroxyl (OH) radicals that damage protein, RNA and most important DNA. Repetitive formation of OH radicals at a specific location – where the copper ion are found – is probably the mechanism of this process. These radicals may cause double strand breaks in the cellular DNA that are not repairable by cellular mechanisms, thus initiating the malignant process. Such course of events is an acceptable theory to explain the involvement of copper in malignancy¹³.

Age is one of the important factors for oral malignancy. In our study maximum patients 40.0% were in 41-50 years age group, range from 35-86 years in case group and mean age was 52.3±12.41 years. In control group the maximum 57.1% were in 20-30 years age group and mean age was 29.54±9.23 years. The age was similar with the study of Sadat et al.¹⁹, where age range was 35-85 years, majority of the patients 34.5% belonged to the age group of 40-49 years. Hossain et al.²⁰, found mean age of oral squamous cell carcinoma patients was 54.13±14.4 years and mean age of the healthy persons were 32.62±8.48 years, that was nearly similar with our study. In other study, the mean age for OSCC patients was 53.06±11.09 years and the control group was (37.5±13.46) years,²¹ which is also similar to our study.

In our study, male were 15(42.9%) and female were 20(57.1%). Maximum 21(60.0%) were in low socioeconomic classes followed by 13(37.1%) middle socioeconomic classes. It was similar with the study of Sultana and Malik²². Risk factor for oral cancer includes betel quid, chewing tobacco, smoking, poor oral hygiene, chronic irritation, nutritional status, exposure to industrial

products or heavy metals, viruses, oral candidacies etc. Betel quid chewing was found to be a common habit in Bangladesh. Mature adults (40±years) of low socioeconomic status, i.e., rural residents, farmers and illiterate are more likely to chew betel quid. As a whole, low socioeconomic classes are more vulnerable for oral cancer due to smoking (bidi), betel quid chewing, poor nutritional, bad oral hygiene²⁰. It is also similar with our study.

The calcium hydro-oxide contain of lime in the presence of the areca nut may be primarily formation of reactive oxygen species, which might cause oxidative damage to the DNA of buccal mucosa cells of betel-quid chewers. Betel quid chewing may cause specific genetic change including mutation of the p53 gene which is a factor for the development of OSCC⁴.

In our study mean serum copper level in study group was 1377.1±381.6 ppb(µg/l) and mean serum copper level in control group was 847.1±174.0 ppb(µg/l), which is statistically significant (p<0.001).

Elevation of serum copper level may result from increased liver production of copper containing ceruloplasmin as an inflammatory response to the cancer or from a tumor induced decrease in catabolism of the serum ceruloplasmin¹⁶.

In study group the copper level range was 600-2000 µg/l and in control group copper level range was 450-1200 µg/l. The serum copper level is near about similar with the study of Ragendran and Sellappa, where serum copper was 1317.2 µg/l in OSCC patients group and 1120.9 µg/l in control group.

Our findings similar to the study of Balpande and Sathawane²¹ where serum level were on 1345.0±48.3 µg/l in OSCC group and on 1049.0±63.2 µg/l in control group. It is also similar with the study of Khanna and Karjodkar⁸, Jayadeep et al.²³ al. Coates et al.¹⁶, Arvind and Rao²⁴, Varghese et al.,²⁵ Swin and Ray²⁶ where serum copper level were increased in OSCC patients compared with healthy control subjects.

Conclusion:

Variations in serum level of these biochemical markers may be associated with the pathogenesis of oral cancer. It has been found that copper metabolism is profoundly altered during the development of human cancer and copper level in plasma correlates positively with tumour incidence, malignant progression. In present study there is a correlation for elevation of serum copper level in OSCC patients comparison with healthy control person. It can be concluded from the present study that serum copper level could be used as an auxiliary or additional test to clinicopathological diagnosis for oral squamous cell carcinoma patient.

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Address of Correspondence:

Dr. Mohammad Shahiduzzaman Shardar

Registrar

Deptment of Oral & Maxillofacial Surgery

Khulna Medical College & Hospital

Kulna, Bangladesh

Study on Fracture Strength of Collarless Metal - Ceramic Crown

Uddin MK¹, Rahman MM², Hossain MS³, Sirazee F⁴, Alim MA⁵, Sharmin S⁶

Abstract:

Background: Peoples are always interested to restore their decade teeth with natural looking color restoration. As the advent of new materials and new technologies this aesthetic demand is escalating high. Porcelain crowns and bridges are considered to be the most aesthetic restorations in dentistry. But it tended to fracture very easily. **Purpose:** The objective of this study was to evaluate fracture strength of collarless metal ceramic crowns according to their metal coping designs. **Materials and Methods:** It was an experimental in-vitro study. Thirty (30) samples (collarless metal-ceramic crowns) were used for the study. Among them, **Group-A:** consisted of 10 collarless metal-ceramic crowns with 1mm collarless porcelain. **Group-B:** consisted of 10 collarless metal-ceramic crowns with 1.5mm collarless porcelain, **Group-C:** consisted of 10 collarless metal-ceramic crowns with 2mm collarless porcelain. The metal die (tooth analog) was embedded in an autopolymerizing polymethyl methacrylate resin blocks and samples were cemented on metal die (tooth analog). Then the samples were tested on a universal testing machine at a cross head speed of 1mm/min. The load was directed incisally along the long axis of tooth analog (metal die) until the porcelain fracture had occurred. Data were collected from each and every samples of fracture strength (N). After coding and editing, collected data were analyzed by using ANOVA and Bonferroni test. **Result:** The fracture strength of group-A (1253.7±99.97N) was significantly greater than that of group-B (893.8±76.98N). The fracture strength of group B (893.8±76.98N) was also greater than group-C (672.0±181N). **Conclusion:** It can be concluded that greater the height of collarless porcelain lesser the strength of collarless metal ceramic crown.

Key words: Fracture strength, Collarless metal ceramic crown, Shoulder porcelain, Direct lift technique, Umbrella effect

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Introduction:

To improve the fracture strength metal substructure are used beneath porcelain which is called metal ceramic crown. These metal ceramic crowns are strong enough to withstand all sort of mechanical forces in the mouth during mastication. However, in many cases, the metal cervical collar on the facial margin was unaesthetic and unacceptable to patients. This metal collar caused dark gingival discoloration. This phenomenon was named "umbrella effect" which is characterized by gray marginal gingival and dark interdental papilla².

An idea to combine the aesthetic of porcelain with the strength of metal develops the concept of Collarless Metal Ceramic Crown and Bridge in Dentistry³. Collarless metal ceramic crowns are those crowns in which the labial margin are made up of porcelain (shoulder porcelain) instead of

metal⁴. Its strength is higher than the strength of an all ceramic crown and it has an esthetic cervical configuration⁵.

Materials and Methods:

Biomechanical preparation of a resin maxillary left canine tooth on the typhodont was done as conventional method. Tooth was prepared using different types of burs with a hand piece with water cooling system. Depth grooves were prepared to get adequate tooth reduction. Axial surfaces were kept parallel as far as possible (about 6° tapering) to get maximum retention. Axial reduction was done 1.5mm circumferentially, incisal reduction was done 2mm, labial finish line was shoulder and lingual finish line was chamfer. The line angles were rounded. The prepared resin maxillary canine was cast in a nickel-chromium alloy for the

1. Dr. Md. Khabir Uddin, Assistant Professor, Science of Dental Material Department, MH Samorita Medical college and Dental Unit, Dhaka
2. Dr. Md. Mahbubur Rahman, Associate Professor & Chairman, Department of Prosthodontics, Bangabandhu Sheikh Mujib Medical University, Dhaka
3. Dr. Md. Shahahdat Hossain, Assistant Professor, Department of Prosthodontics, Chattogram International Dental College, Chittagong, Bangladesh
4. Dr. Foysal Sirazee, Assistant Professor, Department of Conservative Dentistry and Dental Radiology, Chattogram International Dental College, Chittagong, Bangladesh
5. Dr. Md. Abdul Alim, Assistant Professor, Department of Oral and Maxillofacial Surgery, MH Samorita Medical college and Dental Unit, Dhaka
6. Dr. Shaila Sharmin, Assistant Professor, Paediatric Dentistry Department, MH Samorita Medical college and Dental Unit, Dhaka

fabrication of metal die (tooth analog) on which 30 samples were fabricated. Wax patterns for group A, B, C were prepared with inlay casting wax by adding in layers method and invested in a phosphate bonded investment material. The castings were done with the same nickel-chromium alloy. The casting irregularities were removed with rotary instruments and air abrading with aluminum oxide with the help of a sandblasting machine. The metal copings were finished and trimmed on the labial aspect with definite distance from the cavosurface margin. On lingual surface, the metal copings were ended at the cavosurface margin for these groups. The above stated measurements were done using index and digital Vernier caliper.

The veneered surfaces of the copings were finished with abrasive wheel to obtain thickness of 0.5 mm. Porcelain build up were done using the direct lift off technique. The porcelain build up for castings were initiated with two application of opaque porcelain and consequently fired. Shoulder porcelain was brushed towards the gingival margins. Then it was curved with a concavity designed to eliminate the over contouring of the final restoration. This layer was dried and fired. A second corrective layer of shoulder was applied and fired. Then dentinal porcelain was applied over the opaque and shoulder porcelain. Incisal porcelain was applied and fired. The crown was contoured with the abrasive wheels. Measurements were made with a digital vernier caliper to ensure that the total thickness of metal and porcelain was uniform of 1.5mm. Then the porcelain was glazed.

Thirty samples were fabricated and divided into 3 groups: Group-A:10 metal ceramic crowns with 1.0mm collarless porcelain, Group-B:10 metal ceramic crowns with 1.5mm collarless porcelain, Group-C:10 metal ceramic crowns with 2.0mm collarless porcelain. The internal surface of the castings and the surface of the metal analogs were air abraded with aluminum oxide. Finished crowns were cemented on tooth analog with glass ionomer luting cement and allowed to set. The crowned specimens were embedded in an auto cure acrylic resin blocks. The acrylic was within 2mm of the margins of the crowns. All the resin block was ground flat to ensure that each specimen was secured and in correct alignment when compressive forces were applied.

A Universal Testing Machine was used to determine the fracture strength of samples. A crosshead rod speed of 1mm/min was used. The load was directed to the long axis of the metal die analog until the catastrophic failure or fracture occurred. The compressive load (N) required for fracture was recorded for each sample. The result obtained after compressive load were subjected to statistical analysis.

Result:

The mean failure loads of group A, B, C were 1253.7±99.97N, 893.8±76.98N, and 672±181.0N, respectively. The highest failure load 1460N was found for the group A (Table -1), lowest failure load 672N was found for the Group C. In One-way ANOVA revealed that there were significant differences between the mean failure loads of the crowns investigated ($P < .05$, Table 2). Bonferonitest indicated significant differences between

group A and the other groups ($P < 0.05$). There was a trend that the failure load decreased as the reduction of metal framework increased

Table-I: Distribution of collarless metal ceramic crowns on the basis of fracture strength among three study groups.

Groups	N	Fracture Load	
		Newton	Mean±SD
Group A	10	1253.7±99.97	(1099.0 -1460.0)
Group B	10	893.8±76.98	(788.0 -1009.0)
Group C	10	672.0±181.0	(340.0 -884.0)

Table-II: Comparison of collarless metal-ceramic crowns on the basis of fracture strength among tree groups.

Statistical analysis	
Groups	(p value)
Group A vs. Group B vs. Group C	< 0.001*
Group A vs. Group B	< 0.001*
Group A vs. Group C	< 0.001*
Group B vs. Group C	0.002*

Data were expressed as Mean ± SD. Figures in parentheses indicate ranges. Statistical analysis was done by ANOVA and Bonferonitest. The test of significance was calculated and p values < 0.05 was accepted as level of significance.

Group A (Collarless metal-ceramic crowns with 1.0mm collarless porcelain)

Group B (Collarless metal-ceramic crowns with 1.5mm collarless porcelain)

Group C (Collarless metal-ceramic crowns with 2.0mm collarless porcelain)

* = Significant at <0.01

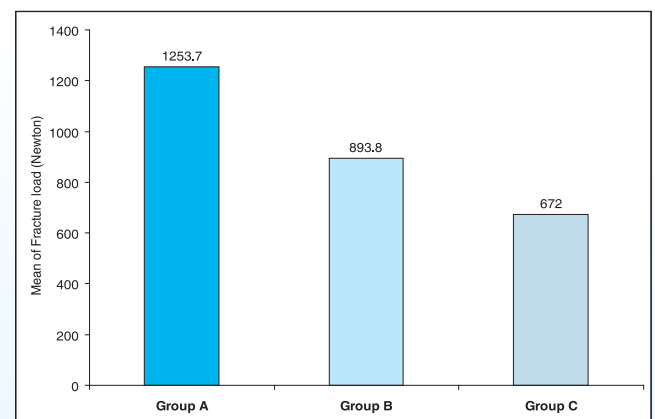


Figure-1: Bar diagram showing the distribution of collarless metal ceramic crown on the basis of fracture strength among three study groups (measured by Newton). Group A (Collarless metal-ceramic crowns with 1.0mm collarless porcelain)

Group B (Collarless metal-ceramic crowns with 1.5mm collarless porcelain)

Group C (Collarless metal-ceramic crowns with 2.0mm collarless porcelain)

Discussion:

The goal of this study was to confirm the capability of collarless metal-ceramic crowns to survive the maximum human incising force. In the present study, group A had the greatest fracture strength. The strength of the 2 mm collarless porcelain group C was the lowest among them, at a mean failure load of 672 N.

In Waltimo's study, the mean maximum incising force of anterior teeth was 263 N for men and 243 N for women⁶. Kiliaridiset al.⁷ reported that physiological maximum incisive biting forces might vary up to 290 N, primarily depended on facial morphology and age. All of the failure loads in the present study were much higher than those of reported maximum incisal forces. From these results, it may be suggested that the 1- 2mm facial porcelain margin group can be used safely in natural teeth if the marginal fit is acceptable and if it is cemented to prepared teeth without any crack or fracture of the porcelain.

O'Boyle et al.⁸ advised 1mm of facial metal reductions for anterior metal ceramic crowns, according to them, there was a drastic improvement in aesthetics with 1mm of the metal reduction, without any significant decrease in the fracture strength. Ulusoy and Toksavul evaluated the fracture resistance of metal ceramic restorations with different metal framework reduction. They concluded that the amount of metal reduction increases, the vertical fracture resistance decreases⁹. However, Gardner et al. found that the fracture strength of porcelain facial margin was significantly higher than porcelain fused to metal margin.

Fabrication methods of collarless metal-ceramic crown have been developed and improved. Recently, the direct lift technique has become the most popular method because of its simplicity. However, it has a weak point of technique sensitivity. If the direct lift technique were used in the fabrication of crowns with the modified collarless coping, margin porcelain buildup would be very difficult. As the amount of unsupported porcelain increased, the qualities of the crowns became less reliable. The most difficult part of the procedure was to complete the porcelain margins of crowns. If sufficient condensing of margin porcelain powder was not accomplished, cracks or voids could be trapped into the porcelain bulk. Even if direct lift-off was done correctly, the margin porcelain could be deformed toward the inward direction during firing schedules. The shape of the melted porcelain could be changed by the shrinkage of the porcelain or by gravity. This phenomenon occurred much more in group C, which had a greater bulk

of margin porcelain. Before the next margin correction build-up, the technician had to grind and correct the inner portion of the margin porcelain on the die, so the internal angle of facial porcelain veneer might become round, and the internal gap might become greater. There were some reports that the internal marginal gap was greater than the external marginal gap in porcelain margin of collarless metal-ceramic crowns. This phenomenon could have caused the lower fracture strength of the porcelain margin.

Conclusion:

It can be concluded that in collarless metal-ceramic crowns, increased the height of collarless porcelain decreased the fracture strength. Metal-ceramic crowns of 1mm collarless porcelain have greater strength than metal-ceramic crown of 1.5mm or 2.0mm.

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Reproductive Health Status of Women of Santal Society and its Relationship with their Socio-economic and Environmental Factors in Rajshahi City

Awal MA¹, Yeasmin F², Sazzad J³, Islam S⁴, Zaman S⁵, Ferdous Z⁶

Abstract

This cross sectional type of descriptive study was carried out with a view to assess reproductive health status of women of Santal society and its relationship with their socioeconomic and environmental factors in Rajshahi city. The sample size was 152 were selected purposively. Age group of 26-30 years comprised of 34.2% majority (75%) of the respondents was literate. The mean age of the respondent at marriage was 19.38±2.52 years. Majority (69.1 %) of the girls Started menstruation at age of less than 10 years of less than and the mean age of the respondents at menarche was 10.30±1.38 years. Majority (57.9%) belonged to income group of Taka 5001-100000 and the average monthly family income was Tk. 6391.45± 2345.46. Majority (51.3%) of the respondents had two children, most of them (77.0%) were housewife, 59.9% lived in semi pacca house. Tube well water was used by (40.1%) of the respondents for drinking purpose, most (85.5%) of the respondents had electricity in their residence, most (88.8%) had sanitary latrine in their residence and majority (89.5%) used to bath in residence. About 43% of them did not use any contraceptive method and OCP was used by 47.4%, most (96.7%) of the husbands did not have interest about using condom, most (96.7%) of the respondents did not have history of abortion, most of them (94.7%) did not have history of MR, 81.6% did not have history of white discharge. Majority (95.39%) of the respondents had children, majority (94.08%) of the respondents had breastfed their children, majority (84.87%) of the respondents did not have own land, majority (74.34%) of the respondents knew about sexually transmitted infection and most (71.71%) of the respondents had been treated for STI by clinician. There was statistically highly significant relationship between educational status of the respondents and using contraceptive method at first sexual contact ($p < 0.001$). There was no statistically significant association of age at marriage of the respondents with using contraceptive methods and knowing STI ($p > 0.05$). 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: Reproductive Health, Santal Society, Women Knowledge, Environment, Bangladesh

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Introduction:

Since how long the Santals landed in the territory of at present is Bangladesh, is not precisely known. Some believe that the Kherwars reached the land of Bengal immediately after the first clashes with the invading Aryan tribes (2500 B.C.). With every probability the Santals landed in Bangladesh with their actual ethnic identity, not after 1000 B.C. It is probable that the Santals scattered throughout Bengal at the time of the Muslim invasion of this region during the last decades of the 12th century or at the

beginning of thirteenth century. In Bangladesh, the Santals are found mostly in North Bengal (Northern part of Bangladesh) especially in the greater districts of Dinajpur, Rangpur, Bogra and Rajshahi. According to the census of 1881, the Santals resulted present in the district of Khulna, Pabna and Chittagong in the south. Many say that the Santals, who are in Sylhet, are the ones who migrated from the districts mentioned above came here mainly to work in the tea gardens as laborers. In short, the Santals of

1. Dr. Md. Abdul Awal, Lecturer, Department of Public Health, Varendra University, Rajshahi, Bangladesh
2. Dr. Forida Yeasmin, Assistant Professor, department of Physiology, Rangpur Dental College, Rangpur, Bangladesh
3. Dr. Jarin Sazzad, Department of Medicine, Upozilla Health complex, Charghat, Rajshahi, Bangladesh
4. Dr. Sadrul Islam, Emergency Department, Rajshahi Medical College Hospital, Rajshahi, Bangladesh
5. Dr. Shahriar Zaman, Department of Dental Public Health, Udayan Dental College, Rajshahi, Bangladesh
6. Dr. Zannatul Ferdous, Lecturer, Dental Unit, TMSS Medical College, Bogra, Bangladesh

Bangladesh are almost all derived from those emigrated from the Santal Pargana in India and nothing distinguishes them from those who are still living there, with the exception, perhaps of the use of Bangla words that are Santalized.¹ Reproductive health is a crucial part of general health and a central feature of human development. It is a reflection of health during childhood, and crucial during adolescence and adulthood, sets the stage for health beyond the reproductive years for both women and men, and affects the health of the next generation. The health the newborn is largely a function of the mother's health and nutrition status and of her access to health care. Reproductive health is a universal concern, but is of special importance for women particularly during the reproductive years. Although most reproductive health problems arise during the reproductive years, in old age general health continues to reflect earlier reproductive life events. Men too have reproductive health concerns and needs though their general health is affected by reproductive health to a lesser extent than is the case for women. However, men have particular roles and responsibilities in terms of women's reproductive health because of their decision-making powers in reproductive health matters. At each stage of life individual needs differ. However, there is a cumulative effect across the life course events at each phase having important implications for future well-being. Failure to deal with reproductive health problems at any stage in life sets the scene for later health and developmental problems. Because reproductive health is such an important component of general health it is a prerequisite for social, economic and human development. The highest attainable level of health is not only a fundamental human right for all, it is also a social and economic imperative because human energy and creativity are the driving forces of development. Such energy and creativity cannot be generated by sick, tired people, and consequently a healthy and active population becomes a prerequisite of social and economic development.² Health-promoting behaviors have been recognized as major factors for maintenance and improvement of health the findings of the present study confirm the importance of social support and modifiable variables (socio-demographic) in the occurrence of health-promoting behaviors in women and accredit the theoretical relationships among the concepts of the health-promotion model. This study asked adolescent girls who had been menstruating for one to three years how they would prepare younger girls for the event, and how they would advise parents to prepare their daughters. To this end, 157 9th-grade girls rated their own experience of menarche (in terms of preparation, initial response, parents' roles, and sources of information) and answered four open-ended questions. The girls emphasized the need for emotional support and assurance that menstruation was

normal and healthy--not bad, frightening, or embarrassing. They stressed the pragmatics of menstrual hygiene and the subjective experience of menstruation (how it would actually feel), while down-playing the biological aspects and the link between menstruation and self-definition as a woman. Most girls had talked about menstruation with their mothers, but few had discussed it with their fathers. They saw mothers as critically important but often unable to meet their needs. Many girls felt uncomfortable talking about menstruation with fathers wanting them to be supportive but silent; others believed that fathers should be excluded completely. Responses suggested several ways early preparation could be revised, including a shift in focus from the biology of menstruation to the more personal, subjective, and immediate aspects of the experience. Responses also supported a conceptualization of menstrual education as a long-term, continuous process, beginning well before menarche and continuing long after.⁴ The onset of menstruation is one of the most important physiological changes occurring among girls during the adolescent years. Menstruation heralds the onset of physiological maturity in girls. It becomes the part and parcel of their lives until menopause. Apart from personal importance, this phenomenon also has social significance. In India, menstruation is surrounded by myths and misconceptions with a long list of "do's" and "don'ts" for women. Hygiene-related practices of women during menstruation are of considerable importance, as it may increase vulnerability to Reproductive Tract Infections (RTI's). Poor menstrual hygiene is one of the major reasons for the high prevalence of RTIs in the country and contributes significantly to female morbidity. Most of the adolescent girls in villages use rags and old clothes during menstruation, increasing susceptibility to RTI's. Adolescents constitute one-fifth of India's population and yet their sexual health needs remain largely unaddressed in the national welfare programs. Poor menstrual hygiene in developing countries has been an insufficiently acknowledged problem. In June 2010, the Government of India proposed a new scheme towards menstrual hygiene by a provision of subsidized sanitary napkins to rural adolescent girls. But there are various other issues like awareness, availability and quality of napkins, regular supply, privacy, water supply, disposal of napkins, reproductive health education and family support which needs Simultaneous attention for promotion of menstrual hygiene. The current article looks at the issue of menstrual hygiene not only from the health point of view, but also considers social and human rights values attached to it. Sexual risk behaviors associated with poor information on sexuality have contributed to major public health problems in the area of sexual and reproductive health in teenagers

and young adults in Colombia. To report our experience with the use of Doctor Chat Mobile to provide sexual education and information among university students in Bogota, Colombia, and knowledge about the sexual risk factors detected among them. A mobile app that allows patients to ask about sexual and reproductive health issues was developed. Sexual and reproductive risk behaviors in a sample of young adults were measured before and after the use of the app through the validated survey Family Health International (FHI) Behavioral Surveillance Survey (BSS) for Use with Adults between 15 and 49 Years. Study was carried out with a 257 sample of university students between 18 and 29 years with access to mobile phones. Although there were no differences between the pre- and post intervention results, the study revealed different risk behaviors among the participating subjects. These findings highlight the importance of promoting high-impact educational strategies on this matter and the importance of providing teenagers and young adults with easily accessible tools with reliable health information, regardless of their socioeconomic status.⁶ Women's education level was the single most significant negative determinant of child marriage. The rigid enforcement of the legal minimum age at first marriage could be critical in decreasing child marriage.¹⁰ Programs should aim to retain girls in school for longer periods not only to raise the age at first marriage but also for sound reproductive health and overall social development of Bangladesh.¹¹

Methods:

The study was cross-sectional and descriptive in design. The sample size of this study was 152. In order to obtain representative samples, a purposive sampling technique was applied. Structured questionnaire was used to collect data 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. Final analysis of the data was carried out using percentage, absolute numbers for categorical variables in IBM SPSS 16.0. For some purpose Excel program was also used.

Results:

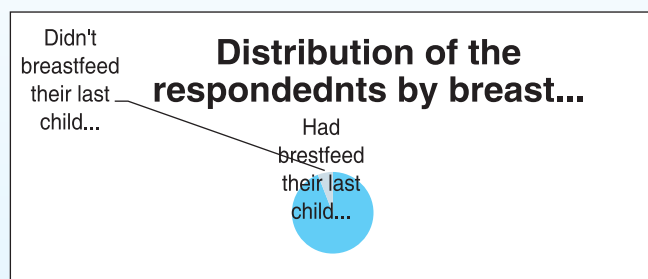


Figure-1: Distribution of the respondents by breastfeeding their last child.

It was found that majority (94.08%) of the respondents had breastfeed their children and only (5.92%) did not breastfeed.(Fig.no.01)

Table-1: Relationship between educational status of the respondent and contraceptive method used at first sexual contact.

Educational Status or the respondents	Contraceptive method used at first sexual contact			Total
	Yes	No	Unknown	
Illiterate	3(7.9%)	6(15.8%)	29(76.3%)	38(25.0%)
Primary	2(7.4%)	9(33.3%)	16(59.3%)	27(17.8%)
Class VI to XII	14(16.9%)	48(57.8%)	21(25.3%)	83(54.6%)
Graduate	1(25.0%)	3(75.0%)	0(0.0%)	4(2.6%)
Total	20(13.2%)	66(43.4%)	66(43.4%)	152(100.0%)
	$\chi^2=34.02$	$df=6$	$p<0.001$	

Regarding relationship between educational status of the respondents and contraceptive method used at first sexual contact it was found that among the respondents (54.6%) who had education level of class VI to XII (16.9%) used contraceptive at first sexual contact, (57.8%) did not use and (25.3%) did not know to use contraceptive method at first sexual contact. Among the respondents (17.8%) having primary level education, (7.4%) used contraceptive at first sexual contact, (33.3%) did not use and (59.3%) did not know to use contraceptive method at first sexual contact. Among the respondents (2.6%) who were graduates, (25%) used contraceptive at first sexual contact and (75%) did not use contraceptive method at first sexual contact. Among the illiterate (25%) respondents, (7.9%) used contraceptive at first sexual contact, (15.8%) did not use and (76.3%) did not know to use contraceptive method at first sexual contact. The relationship between educational status of the respondents and using contraceptive method at first sexual contact was statistically highly significant ($p<0.001$) (Table-1).

Table-2: Relationship between educational status of the respondents and husband's interest about using condom

Educational Status or the respondents	Contraceptive method used at first sexual contact			Total
	Yes	No	Unknown	
Illiterate	3(7.9%)	6(15.8%)	29(76.3%)	38(25.0%)
Primary	2(7.4%)	9(33.3%)	16(59.3%)	27(17.8%)
Class VI to XII	14(16.9%)	48(57.8%)	21(25.3%)	83(54.6%)
Graduate	1(25.0%)	3(75.0%)	0(0.0%)	4(2.6%)
Total	20(13.2%)	66(43.4%)	66(43.4%)	152(100.0%)
	$\chi^2=34.02$	$df=6$	$p<0.001$	

Regarding relationship between educational Status of the respondents and husband's interest about using condom it

was found that among the respondents (54.56%) who had education level of class VI to XII (2.4%) of the husband were interested about using condom and (97.6%) did not get interest. Among the respondents (17.8%) having primary level education, (3.7%) of the husband were interested about using condom and (96.3%) did not get interest. Among the respondents (2.6%) who were Graduate. none of the husband were interested about using condom and (2.7%) did not get interest. Among the illiterate (25.0%) respondents, (5.3%) of the husband were interested about using condom and (94.7%) did not get interest. There was no association between educational status of the respondents and husbands interest about using condom ($p>0.05$) (Table-2)

Table-3: Relationship between age at marriage of the respondents and using contraceptive method

Age at marriage	Using contraceptive method			Total
	Yes	No	Sometimes	
Less than 18 years	44(67.7%)	4(6.2%)	17(26.2%)	65(43.0%)
18-22 years	51(64.6%)	6(7.6%)	22(27.8%)	79(52.3%)
23 years and above	7(6.9%)	0(0.0%)	0(0.0%)	7(4.6%)
Total	102(67.5%)	10(6.6%)	39(25.8%)	152(100.0%)
	$\chi^2=3.73$	df=4	$p>0.05$	

Regarding relationship between age at marriage of the respondents and using contraceptive method it was found that among the respondents (43.0%) who were in the age group of less than 18 years, (67.7%) used contraceptive method, (6.2%) did not use contraceptive method and (26.2%) used sometimes. Among the respondents (52.3%) bearing age group 18-22 years, (64.6%) used contraceptive method, (7.6%) did not use contraceptive method and (27.8%) used sometimes. Among the respondents (4.6%) who were in the age group of 23 years and above, (6.9%) used contraceptive method. The relationship between age at marriage of the respondents and using contraceptive method was not statistically significant ($p > 0.05$) (Table-3)

Table-4: Relationship between at marriage of the respondents and knowing STI

Age at marriage	Knowing STI		Total
	Yes	No	
Less than 18 years	13(20.0%)	52(80.0%)	65(43.0%)
18-22 years	22(27.8%)	57(72.2%)	79(52.3%)
23 years and above	4(57.1%)	3(42.9%)	7(4.6%)
Total	39(25.7%)	113(74.3%)	152(100.0%)
	$\chi^2=3.73$	df=4	$p>0.05$

Regarding relationship between age at marriage of the respondents and knowing STI it was found that among the

respondents (43.0%) who were in the age group of less than 18 years, (20.0%) knew STI and (80.0%) did not know. Among the respondents (52.3%) bearing age group 18-22 years, (27.8%) knew STI and (72.2%) did not know. Among the respondents (4.6%) who were in the age group of 23 years and above, (57.1%) knew STI and (42.9%) did not know. The relationship between age at marriage of the respondents and knowing STI was not statistically significant ($p > 0.05$) (Table-4).

Discussion:

This was a cross sectional type of descriptive study which was carried out with a view to assess reproductive health status of women of Santal society and its relationship with their socio-economic and environmental factors in Rajshahi city. It was found that out of 152 majority (94.08 %) of the respondents had breastfed their children (Fig.-1). It was also found that among the respondents (54.6%) who had education level of class VI to XII, (16.9%) used contraceptive at first sexual contact. Among the respondents (17.8%) having primary level education, (7.4%) used contraceptive at first sexual contact. Among the respondents (2.6%) who were graduate, (25.0%) used contraceptive at first sexual contact. Among the illiterate (25.0%) respondents, (7.9%) used contraceptive at first sexual contact. The relationship between educational status of the respondents and using contraceptive method at first sexual contact was statistically highly significant ($p<0.001$) (Table -1). Both women and men rated unprotected vaginal intercourse as more pleasurable than protected vaginal intercourse. However, men’s pleasure ratings for unprotected vaginal intercourse were higher than women’s. Furthermore, men and women’s pleasure ratings for condom-protected intercourse were correlated with their actual condom use behaviors.⁷The study showed that among the respondents (54.6%) who had education level of class VI to XII, (2.4%) of the husband were interested about using condom. Among the respondents (17.8%) having primary level education, (3.7%) of the husband were interested about using condom. Among the respondents (2.6%) who were Graduate, none of the husband was interested about using condom. Among the illiterate (25.0%) respondents, (5.3%) of the husband were interested about using condom. There was no association between educational status of the respondents and husband’s interest about using condom ($p>0.05$) (Table-2). It was found that among the respondents (43.0%) who were in the age group of less than 18 years, (67.7%) used contraceptive method. Among the respondents (52.3%) bearing age group 18-22 years, (64.6%) used contraceptive method. Among the

respondents (4.6%) who were in the age group of 23 years and above, (6.9%) used contraceptive method. There was no statistically significant association between age at marriage of the respondents with using contraceptive method ($p>0.05$) (Table no.3). Present study showed that the respondents (43.0%) who were in the age group of less than 18 years, (20.0%) knew STI. Among the respondents (52.3%) bearing age group 18-22 years, (27.8%) knew STI. Among the respondents (4.6%) who were in the age group of 23 years and above, (57.1%) knew STI. There was no statistically significant association between age at marriage of the respondents and knowing STI ($p>0.05$) (Table-4). In Vietnam, misconceptions regarding STI exist, and rural women delay seeking care for STI.⁸ The practice of adolescent marriage continues in communities throughout Bangladesh, with adolescent childbearing a common result. In addition, social stigma for childless women, emigration of husbands, and the belief that using modern contraceptives prior to the birth of the first child results in infertility also inhibits couples from delaying their first pregnancy.⁹

Conclusion:

The majority had sanitary latrine, semi pucca house, electricity, used tube well for drinking water. Majority respondents used contraceptive methods and most husbands did not have interest about using condom. Majority respondents knew about sexually transmitted infection.

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Comparison of Compressive Strength among the Conventional Luting Agents

Sharmin S¹, Rahman MM², Gafur A³, Rahman MM⁴, Rab MA⁵, Uddin MK⁶, Rahman MZ⁷, Islam MS⁸

Abstract:

Background: Strength parameters greatly influence the selection of luting agent. So, adequate clinical success to be achieved with dental restorations evaluation of compressive strength of luting agent is essential.

Objectives: The aim of this study was to compare compressive strength among the conventional luting agents.

Methods: In this study 60 samples were taken from three cement and they were divided into three groups. Each group of the cement is divided into two subgroups using two brand of each group & used as sample. Compressive strength were measured by universal testing machine. Statistical analysis was done by unpaired student t-test to compare the data among individual group & Kruskal-Wallis- H test was done to compare data among the groups. **Results:** The mean compressive strength of six cement samples was expressed with the help of table & with bar diagram in separate figures respectively. Fuji-I glass ionomer luting agent had greater compressive strength found in this study. **Conclusion:** Within the limitations of the present study, it was found that Fuji- I glass ionomer luting had the highest compressive strength among the conventional luting agent used.

Key words: Compressive strength, Luting agents, Crown, Bridge

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Introduction:

A restoration that is constructed outside the patient's mouth and is subsequently cemented permanently in the mouth requires a luting agent to aid retention and to infill small spaces between the restoration and the prepared tooth. A clinical evaluation of luting agents is not easy because much of the material is hidden by the seated restoration. However, there is inevitably an exposed line at the restoration margin. The cement must be able to resist dissolution or erosion at this site. The word luting is derived from a latin word lutum which means mud. Dental luting agent provide a link between restoration & prepared tooth, bonding them together through some form of surface attachment.¹

The loss of luting cement between tooth tissue & restoration may lead to loss of retention, marginal discolouration, secondary caries, hypersensitivity etc. Therefore it can be considered that selection of luting cement is prerequisite before placing them into the tooth tissue. However, key factor to success is the choice of a proper luting agent and the cementation procedure. The selection of the luting agent is dependent on specific clinical situation, the type of

restoration utilized and the physical, biologic and handling properties of the luting agent. Although it is important to choose the best luting agent for each clinical situation, far greater variation in physical properties result from improper manipulation of a given luting agent than exist between different type of cements.²

Different types of luting cement behaved mechanically in different ways. Particular cement may be more suitable than others for specific applications. Dental luting cement fail by microcrack formation and bacterial ingress or by gross failure and crown dislodgement. Both of these failure modes are related to mechanical properties and deformation.³ The mechanical properties do not necessarily represent their actual clinical performance, they are used to guide the effects of changes in their composition or processing on these properties.⁴ The resistance to fracture within a restorative material is specified by a fracture stress, which is often referred to as strength of the material.⁵ The compressive strength (CS) is an important property of restorative materials, particularly in the process of mastication. This test is more suitable to compare brittle

1. Dr. Shaila Sharmin, Assistant professor, Pediatric dentistry, MH Samorita Medical College & Dental Unit, Dhaka, Bangladesh
2. Dr. Md. Mahbubur Rahman, Associate Professor & Chairman, Dept. of Prosthodontics, Faculty of Dentistry, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh
3. Dr. Abdul Gafur, Senior Scientific Officer, Department of Pilot Plant & Process Development Centre, B C S I R, Dhaka, Bangladesh
4. Dr. Md. Masudur Rahman, Associate Professor, Department of Prosthodontics, Faculty of Dentistry, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh
5. Col. Md. Abdur Rab, Maxillofacial Surgeon, Combined Military Hospital, Dhaka, Bangladesh
6. Dr. Md. Khabir Uddin, Assistant Professor, Department of Science of Dental Materials, MH Samorita Medical College & Dental Unit, Dhaka, Bangladesh
7. Dr. Md. Zahedur Rahman, Assistant professor, Dept. of Science of Dental Materials, Rangpur Dental College, Rangpur, Bangladesh.
8. Dr. Md. Shahidul Islam, Assistant Professor & Head, Department of Prosthodontics, Rangpur Dental College & Hospital, Rangpur, Bangladesh

materials, which show relatively low result when subject to tension.^{6,7} To test compressive strength of a material, two axial sets of force are applied to a sample in an opposite direction, in order to approximate the molecular structure of the material.⁴ In this test a compressive force is applied to a cylindrical specimen across the diameter by a compression plates.⁶ Strength properties of a luting agent define its ability to resist disintegration during function. Adequate compressive strength ensures integrity of the adhesive joint under vertical functional load while tensile strength provides resistance against horizontal forces.⁸

Since most of mastication forces are compressive in nature, it is important to investigate materials under this condition. This test is more suitable to compare brittle material, which shows relatively low result when subject to tension.⁴ The aim of this study was to compare the compressive strength among the conventional luting agents.

Methods:

A comparative in vitro study was carried out in the department of prosthodontics, faculty of dentistry, BSMMU and department of Pilot Plant & Process Development Centre (PP & PDC), B C S I R, Dhaka, Bangladesh from July 2013 to June 2014 for the duration of one year. Three different type of luting agents were used as study samples and they were placed in three different groups. In each group two brands of each type of luting agent were used as sample. On the basis of luting agent used, the samples were divided into following groups. Group A- Consisted of 20 specimens of zinc phosphate cement & further divided into: Group A₁: Consisted of 10 specimens of one type. Group A₂: Consisted of 10 specimens of another type. Group B- Consisted of 20 specimens of zinc polycarboxylate cement & further divided into: Group B₁: Consisted of 10 specimens of one type. Group B₂: consisted of 10 specimens of another type. Group C- Consisted of 20 specimens of glass ionomer cement & further divided into: Group C₁: Consisted of 10 specimens of one type. Group C₂: consisted of 10 specimens of another type.

Teflon made splittable cylindrical mold of size 5mm in diameter & 7.5mm in height was made. After tightening with screw the mold was placed on the glass slab so that its one end remains open. The luting agents selected for the test were mixed according to manufacturer's instruction on another glass slab. The mixed cement was poured through the open end with the help of spatula until it was slightly above the end of the mold. The cement was allowed to set. After that mold with set cement was rubbed against wet 320 grit silicon carbide paper until cement was flattened with mold surfaces. The samples were separated from the mold by unscrewing it with the help of screwdriver. Cylindrical specimens were used because it is internationally accepted and also it was convenient to place between platens of universal testing machine to measure compressive strength.

The samples were stored in distilled water at room temperature for 24 hours. Ten samples were made for each

type of luting agents & tested for compressive strength by vertically mounting between platens of universal testing machine. The amount of load required to split the samples were displayed in the screen attached with universal testing machine and the readings were subsequently recorded by software.

The following formula⁹ was used to calculate the compressive strength in Mpa.

$$\text{Compressive strength} = 4P / \pi D^2$$

Where, P = Ultimate load at fracture

$$\pi = 22/7 \text{ (constant)}$$

D = Diameter of specimen

T = Thickness of specimen

All the collected data of compressive strength of conventional luting agent specimen from the computer software (QMAT) were transferred to the data collection sheet on the basis of grouping and specific parameters. Statistical analysis was performed by using SPSS (Statistical Package for social Sciences) windows version 20. Unpaired student t-test was done to compare the data among individual group and Kruskal-Wallis H test was done to compare the data among the groups. In the interpretation of results P value < 0.05 was considered as significant.

Table I: Specification of tested materials

Group A ₁	Zinc phosphate Cement (Elite)	(G C Corporation, Japan).
Group A ₂	Zinc phosphate Cement (China)	(Shanghai Rong Xiang Company, China).
Group B ₁	Zinc polycarboxylate Cement (Cimex)	(Dentamerica, (U S A).
Group B ₂	Zinc polycarboxylate cement (China)	(Shanghai Rong Xiang Company, China).
Group C ₁	Glass Ionomer Cement (Fuji-I)	(G C Corporation, Japan).
Group C ₂	Glass Ionomer Cement (China)	(Shanghai New Century company, China).

Results:

Table-II: Mean compressive strength of Luting cement used in MPa

Samples	Compressive strength	
	(Mpa)	
	Mean	±SD
Group A (n=20)	75.73	±3.83
Group A ₁ (n=10)	77.86	±3.81
Group A ₂ (n=10)	73.59	±2.50
Group B (n=20)	60.43	±4.37
Group B ₁ (n=10)	64.01	±2.47
Group B ₂ (n=10)	56.86	±2.42
Group C (n=20)	88.17	±8.82
Group C ₁ (n=10)	95.83	±3.89
Group C ₂ (n=10)	80.51	±4.32

Table-II showed that the highest mean compressive strength 95.83 MPa was found in group C₁ & lowest mean compressive strength 56.86 MPa was found in group B₂.

Table-III: Comparison of compressive strength (Mpa) among three Luting cement used by unpaired student's t-test

Statistical analysis	
Group	p value
Group A vs Group B	< 0.001**
Group A vs Group C	< 0.001**
Group B vs Group C	< 0.001**
Group A ₁ vs. Group A ₂	0.09 ^{ns}
Group A ₁ vs. Group B ₁	< 0.001**
Group A ₁ vs. Group B ₂	< 0.001**
Group A ₁ vs. Group C ₁	< 0.001**
Group A ₁ vs. Group C ₂	1.00 ^{ns}
Group A ₂ vs. Group B ₁	< 0.001**
Group A ₂ vs. Group B ₂	< 0.001**
Group A ₂ vs. Group C ₁	< 0.001**
Group A ₂ vs. Group C ₂	< 0.001**
Group B ₁ vs. Group B ₂	< 0.001**
Group B ₁ vs. Group C ₁	< 0.001**
Group B ₁ vs. Group C ₂	< 0.001**
Group B ₂ vs. Group C ₁	< 0.001**
Group B ₂ vs. Group C ₂	< 0.001**
Group C ₁ vs. Group C ₂	< 0.001**

Statistical analyses were done by unpaired student t-test. The test of significance was calculated and p values < 0.05 was accepted as level of significance.

* = Significant

ns = Not significant

Table-IV: Comparison of compressive strength (Mpa) among three Luting cement used by Kruskal-Wallis H test

Group	Mean Rank	Sub-group	Mean Rank	p value
Group A (n=20)	32.43	Group A ₁ (n=10)	36.55	<0.001*
		Group A ₂ (n=10)	28.30	
Group B (n=20)	10.50	Group B ₁ (n=10)	15.50	
		Group-B ₂ (n=10)	5.50	
Group C (n=20)	48.58	Group C ₁ (n=10)	55.50	
		Group-C ₂ (n=10)	41.65	

Data were expressed as Mean Rank. Statistical analyses were done by Kruskal-Wallis H test. The test of significance was calculated and p values < 0.05 was accepted as level of significance.

* = Significant

ns = Not significant

n = Number of samples.

Table-IV showed statistically significant different among all groups & subgroups used in this study.

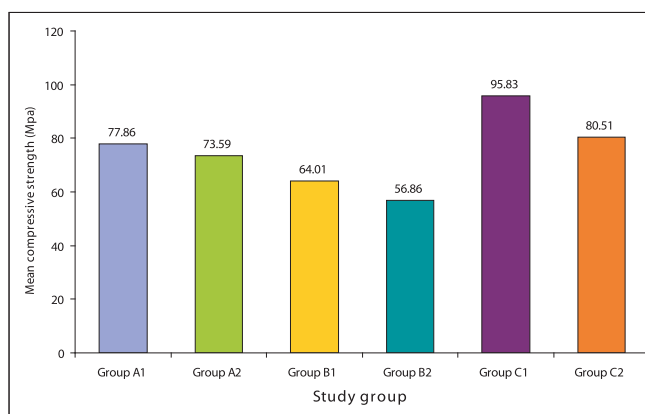


Figure-1: Bar diagram showing the mean compressive strength (Mpa) in different study group (n=60).

n = Number of samples.

Discussion:

Numerous dental treatments necessitate attachment of prosthesis and appliances to the teeth by means of a luting agent.⁹ Long terms clinical success of indirect restorations mainly depends on luting agent used. Loss of luting agent between tooth tissue & restoration may lead to loss of retention, marginal discolouration, and secondary caries hypersensitivity. Therefore selection of luting agent is prerequisite before placing them into tooth tissue.¹

If a body is placed under a load that tends to compress or shorten it, the internal resistance to such a load is called compressive strength. Dental restorations are subjected to stresses from masticatory action which is compressive in nature. Three main types of conventional luting agents were used in this study. Zinc phosphate luting agents when properly manipulated, exhibit a compressive strength of upto 104 megapascals (MPa). The compressive strength varies with the powder liquid ratio. The recommended powder liquid ratio for zinc phosphate cement is about 1.4 gm powder to 0.5ml liquid. The compressive strength of zinc polycarboxylate cement range from approximately 55 to 67 MPa & P/L ratio are in the range of 1.5 parts of powder to 1part of liquid by weight. The compressive strength of glass ionomer cement is comparable to that of zinc phosphate cement. The powder liquid ratio recommended by the manufacturer should be followed.⁹

White & Zhaokun (1993)¹⁰ conducted a study where conventional powder liquid glass ionomer ALAs demonstrated significantly greater compressive strength is similar to the results showed in table III in this study. Powers et al,¹¹ (1976) found in their study that zinc phosphate had the higher compressive strength than zinc polycarboxylate which is similar to the result found in table -III in this study.

In the present study Table-IV revealed statistically significant differences of compressive strength among all groups & subgroups respectively. In this regard George et. al,¹² (1999) conducted a study where ANOVA revealed significant differences of compressive strength among core

materials.

Conclusion:

After completion of the study, it was found that there is significant differences of compressive strength exists between group C₁ (Fuji-I Glass Ionomer) with all other group of luting cement used. Finally it can be concluded that Fuji-I Glass Ionomer luting agent had the highest compressive strength among the conventional luting agent used.

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Corresponding Author:

Dr. Shaila Sharmin

Assistant Professor & Head

Department of Pediatric Dentistry

MH Samorita Medical College & Dental Unit

Dhaka, Bangladesh

Endodontic Management of Odontogenic Extra Oral Sinus Tract: A Case Report

Sheikh MAH¹, Alam MS², Begum S³, Sheikh AK⁴, Muna L⁵

Abstract:

The cutaneous sinus tract of dental origin may be misdiagnosed easily as specific dental symptoms are usually absent sometimes. This case report describes the treatment of a patient presenting with complaints of purulent discharge over the chin for 10 years and occasional mild pain. The lesion was initially diagnosed as a superficial skin infection and was treated by Dermatologist and Surgical specialist for several years with a number of systemic and topical antibiotics which provided only temporary relief. Physical examination revealed a small retracted skin lesion over the chin about 20mm×15mm in diameter. The skin opening of the lesion was crusted but with redness and minimal swelling. Radiographic examination revealed radiolucent area of teeth no 31,32,41 indicating chronic periapical abscess. Intraoral examination showed poor oral hygiene and teeth no 31,32 are discoloured. The teeth were restorable, so nonsurgical endodontic therapy was performed. No systemic antibiotic therapy was provided rather Tab. Paracetamol (500mg) was given as necessary for mild pain. The patient responded well and the cutaneous lesion healed uneventfully.

Key words: Sinustract, Endodontic treatment

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Introduction:

A sinus tract is an abnormal channel that originates or ends in one opening. An orofacial fistula is a pathologic communication between the cutaneous surface of the face and the oral cavity. Orofacial fistulas are not common, but intraoral sinus tracts due to dental infections are common. Cutaneous sinus tracts of dental origin have been well documented in the medical literature⁽¹⁻⁷⁾, dental literature⁽⁸⁻¹³⁾, and dermatological literature¹⁴. However, this lesion continues to be a diagnostic dilemma.

Patient usually seeks treatment from a physician or a surgeon instead of dental surgeon and often undergoes multiple antibiotic regimens with eventual recurrence of the cutaneous sinus tract. Misdiagnosis usually leads to a destructive treatment of the local skin lesions that is not curative but is often mutilating. On the other hand, the recognition of this entity leads to simple and effective treatment consisting of removal of the infected pulp tissue, biomechanical preparation and obturation of the root canal with biocompatible material resulting in minimal scarring of skin.

An odontogenic cutaneous fistula usually arises as sequelae to bacterial invasion of the dental pulp through a breach in the enamel and dentine by a carious lesion, trauma or other causes.^{3,5} The inflammatory process begins in a necrotic pulp and spreads into the surrounding periodontal ligament

and bone. If treatment is not initiated at initial stage, the pulp becomes necrotic and infection spreads beyond the confines of the tooth into the peri-radicular area resulting in apical periodontitis. The inflammatory and immunological processes then induce bone resorption. The marrow spaces are involved, resulting in the formation of a localized abscess, the suppurative osteitis. The inflammation then spreads peripherally until the cortex of the bone is destroyed and a subperiosteal abscess forms.⁹ Depending on factors like gravity, virulence of microorganisms and most importantly anatomic arrangement of adjacent muscles and fasciae, either a cutaneous sinus or an intraoral sinus forms.¹⁰ Chronic dental periapical infections or dentoalveolar abscesses cause the most common intraoral and extraoral fistulas. These periapical infections can lead to chronic osteomyelitis, cellulitis and facial abscesses. Infection can spread to the skin if it is the path of least resistance.

A cutaneous sinus may develop as early as a few weeks^{11,13} or as late as 30 years.^{12,13} Approximately 80% of reported cases are associated with mandibular teeth and 20% with maxillary teeth.^{11,13} The most common areas of involvement are the chin and submental regions.^{1,11} Other sites of drainage are the cheek, canine space, nasolabial fold, nose, upper lip and inner canthus of the eye.^{1,11,12,13}

1. Dr. Md. Abdul Hannan Sheikh, Dept. of Conservative Dentistry & Endodontics, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh
2. Prof Md. Shamsul Alam, Chairman, Conservative Dentistry & Endodontics, BSMMU, Dhaka, Bangladesh
3. Dr. Sharifa Begum, Associate Professor & Head, Dept. of Conservative Dentistry & Endodontics, Rangpur Dental College, Rangpur, Bangladesh
4. Dr. Abdul Kader Sheikh, Associate Professor, Dept of Neurology, BSMMU, Dhaka, Bangladesh
5. Dr. Lazina Muna, Post Graduate Trainee, BSMMU, Dhaka, Bangladesh



Fig: Initial photograph



Fig: Initial radiograph



Fig: Extra oral opening

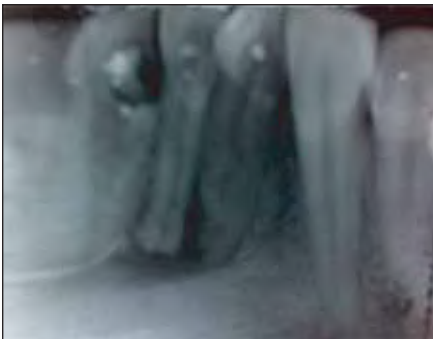


Fig: Sinus tract exploration



Fig: Intra oral photograph



Fig: Working length determination



Fig: Obturation x-ray



Fig: Follow up x-ray after 3 months



Fig: Extra oral photograph after 3 months

Case report:

A 35 years old female named Nurunnahar hailing from Tangail reported to department of Conservative Dentistry and Endodontics ,BSMMU with complaints of purulent discharge over the chin for 10 years and occasional mild pain. The lesion was initially diagnosed as a superficial skin infection and was treated for several years with a number of systemic and topical antibiotics which provided only temporary relief. Extraoral examination revealed an erythematous symmetrical nodule approximately 20mm × 15mm in diameter over the chin. The nodule was soft palpable elicited purulent discharge from it. There was also a cord like palpable tract extending from the cutaneous lesion to the oral cavity inside. On intraoral examination,teeth no 31,32 found discoloured and mild tender on percussion on teeth no 31,32,41. The teeth were firm (no detectable mobility) and did not reveal any periodontal defects on probing. Vitality tests revealed that teeth no 31,32,41 were nonvital. A periapical radiograph

showed a large radiolucency and sinus tract exploration also indicates those teeth.

Basing on history, clinical examination, clinical tests and radiological findings, final diagnosis was made as chronicperiapical abscess with cutaneous sinus tract on chin. Treatment plan was made as endodontic treatment of teeth no 31,32,41 followed by permanent restoration.

Treatment procedure:

At first, reassurance and counseling of the patient was done about treatment plan and procedure. Appropriate mouth preparation and isolation was done with cotton roll. Straight line access cavity and coronal flaring was done. Thorough toileting of cavity were performed to remove debris and necrotic tissue. After negotiation of the canals, working length was established. The root canals of three teeth were cleaned thoroughly by alternative filing and irrigation with

NaOCl and normal saline. Preparation was done up to 40 k file at final working length of those teeth by standardized technique. After copious irrigation with 2.5%NaOCl, the canals were dried with absorbent paper points and Ca(OH)₂ paste was placed by lentulospiral as an intracanal medicament for 1 week. Temporary restoration was done with zinc oxide eugenol cement.

After 1 week patient was recalled, the extra oral draining lesion became smaller in diameter. The canals were obturated with gutta-percha points with lateral condensation technique and final restoration was made with composite filling materials. A postoperative radiograph was taken at the same visit for obturation evaluation. When the patient was re-examined after approximately 2 weeks, she was found to be completely asymptomatic, with no recurrence of the previous swelling. After 3 months clinically the draining lesion had completely healed, with little scar tissue left on that place and periapical radiolucency also reduced. The patient was advised for revisit at 6 months and then yearly up to minimum 04 years.

Discussion:

The clinical case of odontogenic cutaneous lesions described in this study had been previously misdiagnosed and managed inappropriately. Diagnosis is challenging for many reasons. This can be due to the fact that this lesion does not always arise in close proximity to the underlying dental infection and only about half of patients ever recall having had toothache.⁶ A clinician's high index of suspicion can lead to early and correct diagnosis. A thorough history taking and intraoral examination are critical for making the appropriate diagnosis and may spare the patient much unnecessary treatment. In suspected cases, early consultation with a dental surgeon is of great importance in providing appropriate differential diagnosis and clinical care.² The clinical differential diagnosis includes pustule¹⁰ actinomycoses^{11,15,16} osteomyelitis,^{9,19} orocutaneous fistula,¹ neoplasms, local skin infections (carbuncle and infected epidermoid cyst), pyogenic granuloma, chronic tuberculosis, and gumma of tertiary syphilis. Other causes are salivary gland fistula, thyroglossal duct cyst, branchial sinus, dacryocystitis, and suppurative lymphadenitis.^{15,17}

Pustule is the most common of all purulent draining lesions and is readily recognized by its superficial location and short course.¹⁰ Actinomycosis exhibits multiple draining lesions and characteristic fine yellow granules in the purulent discharge. The tooth is often not involved radiographically.⁹ If a sinus tract does not close after appropriate removal of the primary cause, the most common alternative cause is actinomycosis.²⁰ Osteomyelitis of jaw is usually secondary to some type of exogenic trauma, acquired infection after extraction of diseased teeth, impacted teeth, or retained roots. It rarely gives rise to a cutaneous sinus and is mostly associated with history of some debilitating systemic disease or fracture.⁸ Orocutaneous fistula is a common sequelae of trauma to the head and neck region and leads to continual leakage of saliva or to lower face or neck.¹⁰ Malignancy usually

presents as fixation to underlying skin with involvement of underlying osseous structures.^{8,18} A salivary gland fistula has a characteristic location and associated patient history. Moreover, the defect is not through and through as in orocutaneous fistula. Probing the duct and performing sialography aid diagnosis.¹⁰ Thyroglossal duct cyst and branchial sinus are developmental lesions and therefore are observed early in life. The former, however, is found high in midline and is stressed when the tongue protrudes, whereas the latter is found in the lateral neck region.^{21,22}

A classic lesion is an erythematous, smooth, symmetrical nodule, 1-20 mm in diameter with or without drainage. A chronic lesion often leads to retraction of skin secondary to scarring. A cord like tract can be felt attached to the underlying bony structure. Patients may experience intermittent remission of the symptoms. Intraoral examination may reveal dental caries or restorations and periodontal disease, but the examiner should keep in mind that even the tooth involved can appear normal.⁷ In this clinical case described here, the radiograph clearly revealed obvious periapical radiolucency which are associated with diseased tooth. If the sinus tract is patent, a lacrimal probe or gutta-percha cone can be introduced into the sinus opening and passed through the sinus until it meets the area of the tooth, an intraoral periapical radiograph should then be taken. As far as definitive treatment is concerned, root canal therapy or surgical extraction is the treatment of choice.^{7,8} Some difference exists in the literature regarding the removal of sinus tract itself. Winstock²² recommends excision of the cutaneous lesion and sinus in continuity at the time of treatment of the dental pathology with immediate plastic repair of the cutaneous site. Kwapis and Baker²³ believe that because a sinus tract heals by scar formation, its effects on skin depression are most noticeable during facial movements like mastication or speaking; thus, it should be removed concomitantly at the time of treatment. But most authors believe that once the primary odontogenic cause is removed, the sinus tract and cutaneous lesion heal without treatment. The residual scarring can be surgically revised if it is cosmetically unappealing for the patient.⁴ Healing occurs by secondary intention in most cases. Cosmetic surgical treatment may be required at a later date if the healing results in cutaneous retraction or dimpling.^{1,11,12,13}

In this case patient was low socioeconomic status; she was very happy with the treatment outcome and will not go for cosmetic surgery. The patient was advised for intracoronal bleaching for discoloration.

A cutaneous sinus tract is a localized entity and is not an indication for antibiotics. The antibiotic therapy is actually unsuccessful and may be misleading in that the drainage may stop temporarily.⁵ But they should be considered in patients with diabetes, immunosuppression, or signs of systemic infection.⁴ The histology of these tracts is often characterized as fragments of granulation tissue that are focally lined by stratified squamous epithelium.¹ Some

controversy exists about whether these tracts are lined by epithelium. Thoma²⁴ believes that tracts are epithelial-lined if they are of chronic duration. Seltzer²⁵ says that sinus tracts can be lined with either granulomatous tissue or epithelium. Histologically, these tracts are composed of fragments of granulation tissue, which are often focally lined by stratified squamous epithelium.

Conclusion:

Consequences of misdiagnosis are immense leading to a destructive treatment of the local skin lesions. Even skin biopsy may produce unnecessary scarring. On the other hand, the recognition of this entity leads to simple and effective treatment consisting of the removal of infected pulp canal tissue, resulting in minimal cutaneous scarring. This case highlights the fact that dental aetiology should be considered as a part of a differential diagnosis for any orofacial skin lesions. So the presence of sinus tract around the face and neck should alert a medical practitioner to the necessity of routine dental examination. Early referral to a competent dental specialist can prevent unnecessary suffering, useless empirical therapy and extensive tissue destruction.

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Address of Correspondence:

Dr. Md Abdul Hannan Sheikh

BDS, MCPS, DCD, FCPS.

Dept. of Conservative Dentistry & Endodontics
Bangabandhu Sheikh Mujib Medical University
Dhaka, Bangladesh

E-mail: drhannan65@gmail.com

Palliative Care Dentistry-A Gratuity for Geriatrics

Gautam V¹, Gupta SJ², Gupta A³

Abstract:

Palliative care concerns for dealing with patients in the end phase of their life. These patients should receive a treatment which focuses on the prevention and relief of suffering by means of early identification and assessment and treatment of pain and other problems, physical, psychosocial and spiritual. The Dental treatment alongwith consisting of straining curative treatment approaches, also focuses on the improvement of the quality of life. The aim of this paper is to give a view of general dental problems in geriatrics/old age people and their treatments that might not only relieve them of their disease but have a positive impact on their psychology, as during this phase of life our only aim should be to put back a smile on their face.

Key words : Geriatrics, Palliative, Mucositis, Candidiasis, Xerostomia

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Introduction:

Dentists can play an important role in the care of geriatric patients by providing total comfort and care of the oral cavity. A functional oral cavity is very essential for patient's ability to thrive. Palliative care dentistry has been defined as the study and management of patients with active, progressive, far-advanced disease in whom the oral cavity has been compromised either by the disease directly or by its treatment; the focus of care is quality of life¹. Several debilitating orofacial conditions occur in the elderly, pain being the most common.² Hence, alleviation of pain and prevention of infection in the oral cavity should be the main concern in providing total, active comfort for the patient. Through routine assessments and interventions by a dentist on the palliative care team, comfort and care for the patient may be improved by the maintenance of oral hygiene and procedures to hydrate the oral mucosa. In addition, routine dental assessments may recognize dental disease and facilitate dental interventions for caries, periodontal disease, oral mucosal problems or prosthetic requirements. This multidisciplinary approach to palliative care, including a dentist, may reduce the oral debilities that influence the patient's ability to speak, eat or swallow. The prevention of infections, treatment of problems like dry mouth or xerostomia, mucositis and candidiasis as well as the removal of sore spots are some of the important aspects of palliative oral treatment. They can have an immediate positive impact on the patient's personality and boost them with self confidence bringing back their lost smile.

Changing demographics and improved medical management of disease are placing increasing demands on dental providers for increased knowledge of oral manifestations of systemic disease and their dental management³.

Orofacial Age Changes

'Oral Cavity' is a mirror of one's health. Ageing not only affects the body but it can lead to oral disease, discomfort and poor appearance making older people susceptible to a wide array of discomfort and psychological trauma. Oral cavity shows various degenerative changes as age progresses. Few of these changes may be correlated to one or more diseases that a person has acquired over a life time or to drugs given to treat these diseases. However, some changes are physiological and result simply as a consequence of increasing age. Age-related oral changes are seen in the oral hard and soft tissues as well as in bone and the oral mucosa⁴. The different structures in the mouth go through several changes as enumerated below:

Teeth

Normally absorption of certain elements from saliva keeps a tooth strong enough, healthy and able to oppose diseases. As age increases, enamel undergoes attrition, and these results in alteration in the mechanical characteristics of the tooth, which consequently leads to changes in diffusion conditions leading to lesser absorption by the tooth⁵. This ultimately results in weaker and brittle teeth that are more

1. Dr. Vivek Gautam, Department of Periodontics & Implantology, I.T.S. Centre for Dental Studies and Research, Ghaziabad, Uttar Pradesh, India
2. Dr. Swyeta Jain Gupta, Department of Periodontics & Implantology, I.T.S. Centre for Dental Studies and Research, Ghaziabad, Uttar Pradesh, India
3. Dr. Amit Gupta, Senior Lecturer, Dept. of Oral & Maxillofacial Pathology & Microbiology, I.T.S. Dental College Hospital & Research Centre, Greater Noida, Uttar Pradesh, India.

prone to fracture and decay. With advancing of ages, wearing away of the surfaces of teeth by attrition and erosion leads to sensitivity to hot and cold. The age-induced changes occurring in dentine are much more obvious, the biological properties of this hard substance being fundamentally altered. Dentine of older people is characterized by the continuous narrowing of the lumen of the dentinal tubule, increasing calcification, reduction in the amount of peritubular fluid and reduced sensitivity⁵. This is more aggravated by the fact that lowering blood supply and increasing collagen content weaken the response of the tooth tissue to any kind of injury and its ability to repair or heal itself. Because of these changes, hard foods that did not cause any problems before cause cracks in the teeth and bits to be scraped off. Gradual narrowing of the circumference of the pulp volume, decrease in pulp density and dystrophic or degenerating calcifications are also noted alongside compression of collagen fibres⁶. With increasing age, people become less able to practice proper dental care because of disabilities, which can contribute to further problems like pulpal pathology and caries. The above mentioned changes in the aged tooth add on to the effects of cancer therapy in a geriatric cancer patient. Patients undergoing head and neck radiotherapy are at life-long risk of developing osteoradionecrosis; subsequently, dental management protocols prior to radiation often entail aggressive approaches such as extractions⁷. Also, many older people have more plaque build up on their teeth. This is not because of their age. It's related to other physical changes that can make it more difficult to brush and floss every day. For example, people with arthritis or neurological problems may not be able to clean their teeth as well, or they may forget to do it.

Adaptative changes in oral mucosa

Tissues within the buccal cavity also undergo changes with ageing, which are observable in clinical practice⁸. Changes occur in arteries of the oral mucosa with age oral mucosa loses its elasticity and becomes inflexible. However, gradual loss in substance of tissue in the insides of the mouth and jaw bone with age can cause increasing difficulty in the form of denture instability for denture wearers.

Mucositis

Mucositis is the painful inflammation and ulceration of the mucous membranes lining the digestive tract, usually as an adverse effect of chemotherapy and radiotherapy treatment for cancer⁹. Cancer treatment may often lead to oral mucositis. In older age, because of some oral or paraoral diseases, patient might receive chemo or radio therapy which along with unhealthy nutrition can lead to mucositis

and stomatitis causing generalised soreness of oral mucosa and changes in sense of taste and smell. Chemotherapy acts on tissues that have a high rate of mitosis, and the oral cavity is frequently affected. Oral mucositis affects almost all patients undergoing high-dose chemotherapy and Hematopoietic Stem cell Transplantation (HSCT), 80% of patients with malignancies of the head and neck receiving radiotherapy, and a wide range of patients receiving chemotherapy¹¹. Reducing mitosis causes atrophy of tissues leading to ulceration, which may be further complicated by microbial invasion¹². Mucositis occurs within 5–7 days of chemotherapy with drugs such as 5-fluorouracil and methotrexate, which are potent mucositis agents. With 5-fluorouracil (5-FU), up to 40% cancer patients get mucositis¹³. Radiotherapy to the head and neck is associated with Grade 3 and Grade 4 oral mucositis in which the patient is unable to eat solid food and unable to consume liquids respectively¹⁴. The above mentioned changes in the oral cavity combined with several factors like medications and denture wearing in geriatric cancer patient further results in a loss of appetite.

Candidiasis

The incidence of candidiasis in palliative care patients has been estimated to be 70% to 85%¹. Poor oral hygiene, xerostomia, immunosuppression, use of corticosteroids or broad-spectrum antibiotics, poor nutritional status, diabetes and the wearing of dentures may often predispose to oral candidiasis. *Candida albicans* is the most common infectious organism encountered in candidiasis. It is a natural inhabitant of the oral cavity whose overgrowth is normally suppressed by other nonpathologic microorganisms and natural host defense mechanisms. The mere presence of a positive culture without clinical symptoms is not indicative of *Candida* infection¹³. In palliative care patients, candidiasis is primarily a result of xerostomia. Results of a previous study done to determine the epidemiology, aetiology, clinical features and microbiological aspects of oral candidosis in a cohort of cancer patients receiving specialist palliative care showed 66% of the patients had microbiological evidence of oral yeast carriage, whilst 30% of the patients had combined clinical and microbiological evidence of oral candidosis¹⁴. Oral candidosis is relatively common in community-based patients with advanced cancer. Hence, such patients should be screened for oral candidosis and should also be screened for reversible factors that predispose to oral candidosis, such as poor dental hygiene and salivary gland dysfunction

Xerostomia

Dry mouth is very common in older people. It is usually a side effect of medicines. Hundreds of medicines can cause

dry mouth. Salivary flow is decreased in old people causing a condition known as Xerostomia. Also radiotherapy to treat cancers of the head and neck results in xerostomia due to destruction of the salivary tissues within the treatment zone. The decrease in lubrication and the protective agents in saliva render the tissues more susceptible to trauma and invasion by pathogens. The tissues become ulcerated and erythemic¹⁵. Because of the ageing population, and the concomitant increase in medicated individuals, dentists can expect to be presented with xerostomia in an increasing number of patients in the coming years and therefore should be familiar with its diagnosis and treatment¹⁶. Oral soft tissues become thinner, are less hydrated and elastic, are more susceptible to infection, and require a longer time to heal as age progresses.

Bone

Loss in bone mass can result with age, which can cause osteoporosis (reduced bone formation). Loss of alveolar bone (part of the jaw that contains teeth) causes loss of facial height which makes a person look older than he/she is. The loss of bone also makes the lips fall in causing wrinkles to appear around the lips, making smile lines deeper and making the face sag. This appearance is more pronounced in people who have lost all of their teeth or a great number of them. Dental practitioners need to be able to identify what is considered to be within the normal physiological limits of the ageing oral tissue and hence what is abnormal and requires further investigation to facilitate appropriate referral. Osteonecrosis of the jaw has been described in geriatric patients taking bisphosphonates after oral surgery procedures, including the placement of dental implants¹⁷. Long term administration of bisphosphonates, especially intravenous preparations results in a condition called Bisphosphonate-Related steonecrosis of the Jaws (BRONJ)¹⁸.

Psychological Changes

One should keep in mind that any kind of pain or discomfort has a huge negative impact on the patient's psychology. Along with treatment of pain, what is required in such patients is a psychosocial counselling as in such phase of life; even the slightest of discomfort can make one think of big problems. It is also important for the dentist to counsel the patient before and after the treatment and educate them about the care to be taken from their side. Nowadays, novel approaches to hospital palliative care are formulated that suggest an expanded role for counsellors. It is unique in that the approach has a strong counselling base in providing the palliative service, rather than major reliance on advance practice nurses or palliative physicians. The counsellors spend the hours needed to assist families in making difficult end-of-life decisions.

Medications and Oral Side Effects

Older adults are likely to take medications that can impact oral health and affect dental treatment. Hundreds of common medications - including antihistamines, diuretics, pain killers, high blood pressure medications and antidepressants - can cause side effects such as dry mouth, soft tissue changes, taste changes, and gingival overgrowth. A chief medicine that leads to xerostomia is, to mention a few, Antihypertensive, diuretics, antidepressants, antihistaminic and radiation therapy too. Unfortunately these drugs are prescribed to adults very often and hence xerostomia is considered as a disease of geriatric patients.

Concerns for Older Women

Women who are menopausal or post-menopausal may experience changes in their mouths. Recent studies suggest that estrogens' deficiency could place post-menopausal women at higher risk for severe periodontal disease and result in tooth loss. In addition, hormonal changes in older women may result in discomfort in the mouth, including dry mouth, pain and burning sensations in the gum tissue and altered taste, especially salty, peppery or sour. Women considering Hormone Replacement Therapy (HRT) to help fight osteoporosis should note that this may help protect their teeth as well as other parts of the body.

Syndromes Affecting in Old Age

Eagles syndrome

Eagles syndrome is a medical condition in which the styloid process is abnormally long, extending over 1.18 in (30mm), and the stylohyoid ligament has undergone calcification. Eagles syndrome has been linked with aging and trauma and is more common in females than males. The condition may present symptoms of chronic dull pain, or sharp pains when swallowing, stretching the tongue, or turning the head.

Burning mouth syndrome

Oral mucosal conditions are more prevalent in older patients and many orofacial pain disorders, such as burning mouth syndrome are more common in patients over the age of 50 years¹⁹. This is a painful, burning sensation localized in the tongue affecting other areas of the oral mucosa. The description of the symptoms varies from patient to patient, which may be pain, burning, tingling, or numbness. Burning Mouth Syndrome or Glossodynia may occur as an isolated symptom or as one of a group of oral symptoms, such as taste abnormality and various oral dysesthesias, including dull, deep, continuous pain of the atypical facial pain variety. It can be seen in different dental as well as medical conditions and can be seen in any age group but is more common in females that too middle aged or old aged females. It can be related with menopause or some kind of allergy, dry mouth or some nutritional deficiencies.

Trigeminal neuralgia

Trigeminal Neuralgia is also known as tic douloureux. It is a pain syndrome recognizable by the patient's history; it is a painful neurological condition that occurs as a result of damage to or pressure on the fifth cranial nerve, also called the trigeminal nerve. It causes sudden, severe pain, usually on one side of the face. Contact with a stimulus (i.e., a touch) often can trigger a painful attack in patients who have tic douloureux. According to the National Institutes of Health (NIH), trigeminal neuralgia is more common in people over the age of 50, although the condition can occur at any age. Trigeminal neuralgia affects more women than men. It is less well known that pain which seems to be due to idiopathic trigeminal neuralgia is occasionally due to dental causes. For this reason it is suggested that such cases should be given very careful dental and oral examination before the commencement of drug therapy or surgery. Such an examination must be meticulous and may be tedious as well as time consuming. It should therefore be done by a dentist who is especially interested in pain and who is preferably associated with a centre for pain relief. A few cases may then have their pain relieved by such procedures as fillings, extractions or occlusal adjustment²⁰.

Palliative Care Treatments:

Burning mouth syndrome

Removal of local oral irritants, construction of plastic retainers to cover irregularities of the occlusion that magnify the side-effects of tongue habits, treatment of the muscular tension by correction of the malocclusion or by muscle relaxants such as diazepam, or treatment of the systemic disease, such as a connective tissue disease or diabetes mellitus are some of the treatment modalities. Some studies have also shown a greater percentage of patients taking clonazepam reporting either partial or complete relief of symptoms compared to diazepam²¹. Neurosurgical exploration of the lingual nerve for glossodynia of neuropathic origin may relieve some of the more distressing symptoms, especially if there is a nodule of scar tissue or neuroma formation at the site of damage to the lingual nerve. Some numbness may persist. Some relief from symptoms of Burning Mouth Syndrome also is usually obtained from the use of topical analgesics such as 0.5% aqueous diphenhydramine alone or mixed with 0.5% dyclonine or lidocaine or other analgesic ointments applied to the affected area. Cancerophobia (an excessive fear of cancer) may be a prominent feature of patients with Burning Mouth Syndrome. So, psychological counselling should be given. There are few self used home remedies to relieve the pain and the symptoms of Burning Mouth Syndrome.

- These are Avoid hot and spicy food.
- Do not use the mouth wash which contains alcohol. These can aggravate the symptoms of Burning Mouth Syndrome.
- Sip water frequently. One can chew ice chips when the symptoms of Burning Mouth Syndrome are acute.
- Sugarless gums can be chewed by the persons having Burning Mouth Syndrome.
- Avoid citrus fruits and juices as one should avoid the food which is acidic.

Mucositis and stomatitis

Treatments are primarily aimed at relieving pain. Xylocaine and dyclonine topical anesthetics provide comfort but must be used with caution as they will block the gag reflex and increase the risk of aspiration. Dyclonine has been shown to have anti-inflammatory activity in addition to its anesthetic qualities.²² The use of diphenhydramine hydrochloride 5% as a rinse to relieve pain has been used for herpetic stomatitis. Benzzydamine is a non steroidal analgesic with anti-inflammatory properties. It has been reported to relieve radiation induced stomatitits.²³ It should be prescribed in geriatric cancer patients only after consulting a physician. Before any of the above measures is initiated, it is important to identify local traumatic factors such as fractured restorations or teeth, or an impinging removable prosthesis. Patients should also be advised to avoid spicy foods, smoking and alcohol.^{24,25}

Oral candidiasis

Candidiasis may be treated by a amalgamation of topical and systemic applications. One topical agent is nystatin, which can be administered via different methods. Nystatin suspension ketoconazole and Clotrimazole troches, the fungicidal activity of nystatin depends directly on contact time with the oral tissues. Nystatin suspension also has high sugar content and must, therefore, be administered cautiously in the xerostomic dentate patient. Nystatin may occasionally cause gastrointestinal effects such as nausea, vomiting and diarrhea^{26,27}. Angular cheilitis can be treated with a cream made up of 0.5% triamcinolone and 2% ketoconazole. Clotrimazole troches may be dissolved slowly in the mouth; however, they contain sucrose, which can increase caries. Troches are more efficacious than suspensions due to their longer oral contact time²⁸ Clotrimazole vaginal cream may be applied as a thin coat on the tissue side of the denture.

Mouth dryness or Xerostomia

In such conditions certain steps should be taken to prevent the worsening of the conditions

1. Sucking on sugar free lozenges or sugar free gum to stimulate saliva production
2. Keeping hydrated by sipping water frequently
3. Using a humidifier while patient sleeps
4. Avoiding caffeinated drinks
5. Avoiding chewing tobacco

Treatment is indicated in extreme cases like xerostomia caused by radiation treatment. Pilocarpin is the drug of choice and can be consumed for a long period.

Denture care

Denture wearers should avoid plaque buildup on the denture as it can irritate the tissues under the dentures. Dentures should be thoroughly cleaned daily and removed at night to avoid bacterial growth. Elevated salivary Candida levels are more frequently encountered in denture wearers than in dentate patients.²⁹ The use of commercial hydrogen peroxide releasing agents has been found to be ineffective in the disinfection of the denture.^{30,31} Soaking the denture in bleach (15 ml) and water (250 ml) for 30 minutes will help purge the denture of odours. Partial dentures should not be soaked in bleach solution, as it will lead to metal fatigue. Dentures can also be soaked in benzalkonium chloride (1:750) for 30 minutes. Benzalkonium chloride should be formulated daily as Gram-negative bacteria can proliferate within 24 hours. Boiling the denture will cause denture base distortion,³² however microwaving it in water at high power for 5 minutes can disinfect the denture base. Repeated microwaving can result in hardening of PermaSoft denture linings.³³ Dentures should be stored in well-identified vessels in solutions of water, mouthwash, 0.12% chlorhexidine, Listerine antiseptic or 100 000 IU of nystatin suspension.³⁴ Candidiasis may be treated by a combination because mouths constantly change; dentures need to be checked for proper fit to avoid irritation, increased bone loss and infections.

Ulcers

Aphthous ulcers are common and can be treated by topical corticosteroids or tetracycline mouthwash. Severe viral infection (herpes simplex or zoster) will need aciclovir 200 mg every 4 hours for 5 days. Malignant ulcers are often associated with anaerobic bacteria that produce a foul odour; this responds to metronidazole, either as 400-500 mg taken orally or rectally every 12 hours or as a topically applied gel.

Infected mouth

Topical corticosteroids-Betamethasone 0.5 mg in 5 ml water as mouthwash or triamcinolone in carmellose paste is very effective in such cases and also Tetracycline

mouthwash, 250 mg every 8 hours (contents of one capsule dissolved in 5 ml water) can also be used for treating such conditions.

Patients with gum problems

Elder Patients suffering from periodontal problems are tending towards total extraction and dentures. They must be explained all advanced periodontal treatments which may increase the life of their teeth. Preserving natural teeth by any means will help in preserving alveolar bone. There are quite a few geriatric cases where they have a few upper and few corresponding lower teeth and they don't find any problem of chewing. They must be explained, of possible bone loss to an extent that, they cannot have in future, good prosthesis. All possible methods of replacements i.e. Crowns. Bridges or Implants are accessible to them.

Missing natural teeth

Dental implants: A dental implant is an artificial tooth root placed into your jawbone to hold a replacement tooth or bridge in place. While high-tech in nature, dental implants are actually more tooth-saving than traditional bridgework, since implants do not rely on adjacent teeth for support. When teeth are missing, the bone which previously supported these teeth begins to depreciate. This can result in remarkable changes in ones appearance, such as increased wrinkles around the mouth and lips that cave in and lose their natural shape. More and older people are selecting dental implants over dentures as a alternate option for lost teeth. Older adults have similar success rate with implants compared with younger people provided they are free of any systemic disease and cancer free. Currently, dental implants are contraindicated in patients being treated with intravenous bisphosphonates. All patients treated with bisphosphonates must have the risk of possible loss of implants and the risk of suffering a bony necrosis of the operated jaw explained to them, and give their informed consent prior to dental implant surgery.¹⁷

Pain free or flexi dentures: Many patients wearing conventional hard dentures experience pain because of the hard acrylic material of the denture or because of the sensitivity of mucosa with age. In all such cases, dentist can provide flexible dentures that are quite flexible because of the nylon base it is made off.

Conclusion:

Factors that may make older people more prone include general health status, diminished immune status, medications, depression, deteriorating memory, reduced salivary flow, functional impairments and variations in financial status. These are factors that are not in the hands

of the practitioner as among these are several factors that are bound to come with age. But as practitioners it is to ease these geriatric patients of pain and distress and give them a treatment that improves their quality of life. A geriatric cancer patient with a maxillectomy or mandilectomy defect, apart from feeling psychologically depressed, goes through numerous problems like eating, swallowing and inability to regurgitate. In such an end phase of patient's life, we must try our best to deliver treatments that make their remaining life worth living. Treatments like dentures, implant prosthesis, obturators for closing defects, speech aid prosthesis etc along with proper counselling would be a boon for such patients.

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Corresponding Author Details

Dr. Swyeta Jain Gupta

Department of Periodontics and Implantology,
I.T.S. Centre for Dental Studies and Research,
City: Ghaziabad, State: Uttar Pradesh Country: India.
Email: dr.swyeta@gmail.com
Country: India
Postal Code: 201308
Mob no: 9868236482

REVIEWERS OF ARTICLES IN THIS ISSUE

(Alphabetically)

Dr. Abdullah Al Mamun

Dr. Amer A Taqa

Dr. Antonija Tadin

Dr. A. N. M. Musa Siddique

Dr. Md. Abdul Awal

Dr. Mohammad Sayeed Ahmad

Dr. Md. Ismail Hossain

Dr. Md. Ariful Islam

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Dr. Sharifa Begum

Dr. Sheikh Shahriar Quader

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INFORMATION TO AUTHORS

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Aims and scope: Rangpur Dental College publishes half-yearly journal based in clinical and laboratory study. It features the best clinical and laboratory based study on various disciplines of medical and dental science to provide a place for medical and dental professionals to relate experiences which will help others to render better patient care.

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Preparation:

1. Manuscript should be written in English and typed on one side of A4 (290 x 210cm) size white paper.
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3. Margin should be 5 cm for the header and 2.5 cm for the remainder.
4. Style should be that of modified Vancouver.
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6. Pages should be numbered consecutively at the upper right hand corner of each page beginning with the title page.

Title Page: The title page should contain:

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- Name of each author with highest academic degree
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Summary/Abstract: The summary/abstract of the manuscript-

- Should be informative
- Should be limited to less than 250 words
- Should be suitable for use by abstracting journals and include data on the problem, materials and method, results and conclusion.
- Should emphasize mainly on new and important aspects of the study
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Introduction: The introduction will acquaint the readers with the problem and it should include:

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Illustrations: Only those illustrations that clarify and increase the understanding of the text should be used and:

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- Print photograph of each illustration should be submitted.
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- All drugs should be mentioned in their generic form. The commercial name may however be used within brackets.

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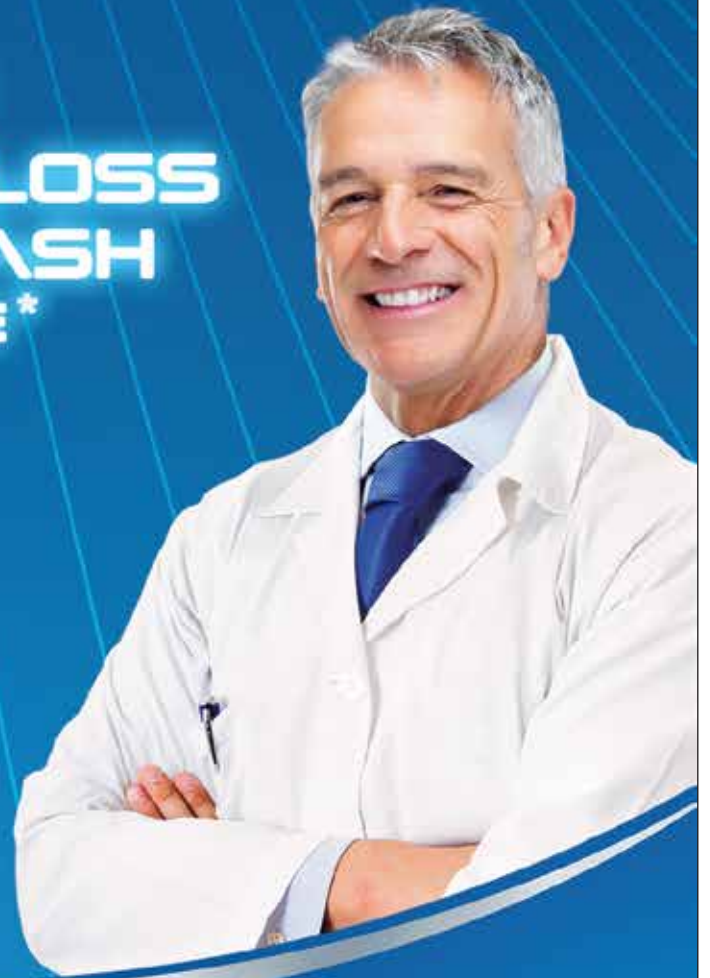


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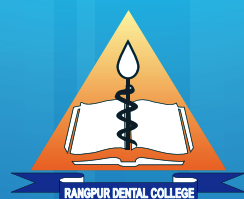
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