

# BDJ

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### **Ethics and professionalism are important parts of our practice in dentistry**

Dentistry, like many other professions, has multiple “Codes of Ethics” for its members to follow. We talk of ethical behavior and read about ethical misconduct, but what exactly are ethics? Are they innate? Can they be learned? Are they a choice? Are they a habit?

Ethics is the study of what is right and wrong. It is the process involved in determining the most morally desirable course of action when confronted with a situation where a decision is required.

Ethical behavior may, to some extent, be innate. Just as our intelligence and personality has a genetic component, so may the characteristics that make some people choose to act ethically or unethically. Some individuals seem to have this innate sense, which may be a more reliable means of distinguishing between right and wrong rather than relying on any written “Code of Ethics”.

Many factors influence one’s ethical behavior. Some of these are: parental and family values, religious and cultural background, important figures in one’s upbringing, schooling and education, peers and colleagues, and the media. Everyone’s collection of past experiences contributes to their own ethical reflection, a strong driving force in how they make ethical decisions.

For dentists, there are additional factors influencing one’s ethical behavior beginning in dental college and upon entering practice. Compassion, integrity, and good relationships with their patients were attributes most valued in role models.

Not only is there value in teaching ethics, it is a must. To get a driver’s license you must first pass a test setting out the “Rules of the Road.” Similarly, before graduating and being licensed to practice dentistry, it is necessary for dental students to learn and be tested on the technical aspects of procedures they can perform and to be informed about professional codes of conduct, also known as a “Code of Ethics.”

Emile Durkheim says that “habits are the real forces which govern us.... and as they acquire force; they are transformed into rules of conduct.”

Courses teaching ethics and professionalism starting in first year and reinforced often throughout their attendance at the dental school support and inspire excellent ethical behavior and strengthen self-reflection and moral reasoning. These are essential for the wellbeing of individual students, the dental profession as a whole and the patients we serve.

The Golden Rule, ‘treat others as you want to be treated’, be honest, don’t steal, cheat or lie are fundamental to and the basis for ethical and professional conduct. Ultimately it is the person’s own choice to follow what they have been taught, choose to be ethical and to value ethical decision making.

Whether ethics are innate, learned, by choice or habit is open to debate. However it should be widely agreed that regardless of how they are obtained, it is critically important that dental surgeons should aspire to acquire the skills necessary to identify, develop and internalize appropriate morals which will lead to a more ethical profession and practice of dentistry.

The future of dentistry is in the hands of our graduating dental students and providing them with a sound ethical and professional basis for practicing dentistry is in the best interests of the students, dentists, the profession and the public we serve.

**Dr. Md. Humayun Kabir**

Editor-in-Chief

Bangladesh Dental Journal

## A retrospective study of mandibular fracture in a 2-year period

Amin MR<sup>1</sup>, Chowdhury MAP<sup>2</sup>, Sarwar MG<sup>3</sup>, Moula SM<sup>4</sup>, Kabir MH<sup>5</sup>, Ahmed TI<sup>6</sup>, Ahmed I<sup>7</sup>, Khondker MMH<sup>8</sup>

### Abstract:

*This retrospective study evaluated the epidemiology, treatment and complications of mandibular fracture associated, or not associated, with other facial fractures, when the influence of the surgeon's skill and preference for any rigid internal fixation (RIF) system devices was minimized. The files of 700 patients with facial trauma were available, and the files of 300 patients with facial trauma were available, and 155 files were chosen for review. Data were collected regarding gender, age, race, date of trauma, date of surgery, addictions, etiology, signs and symptoms, fracture area, complications, treatment performed, date of hospital discharge, and medication. 155 patients suffered mandibular fractures associated, or not, with other maxillofacial fractures, and a total of 155 mandibular fractures were found. The incidence of mandibular fracture was more prevalent in males. The most common site was the Parasymphysis, followed by the condyle.*

**Keywords:** mandibular fracture, epidemiology, facial trauma.

*(Bangladesh Dental Journal 2016; 32: 1-3)*

### Introduction:

Mandibular fracture is the first or second most common facial bone fracture, occurring twice as frequently as fractures of the midface bones. The incidence is about 38% of all facial bone fractures. Mandibular fractures constitute the bulk of the trauma treated by oral and maxillofacial services.<sup>1,2</sup> Mandibular fractures constitutes the bulk of the trauma treated by oral & maxillofacial services.<sup>3</sup> Fractures of mandible present a unique problem to the facial surgeons. They were described in ancient

Egypt around 1650 BC.<sup>4</sup> As a given force is applied, the bone no longer behaves elastically so internal displacement of the molecules and permanent deformity of the bone occurs.<sup>5</sup> A WHO statistics reports indicated that each year one million people die and between 15 and 20 million are injured due to RTA.<sup>6</sup>

The aim of the current retrospective study was to investigate the pattern of mandibular fractures in Dhaka in two years periods of 2014 and 2015 of Dhaka Medical College Hospital for evaluating the epidemiology, treatment and complications of mandibular fractures associated, or not associated, with other facial fractures, when the influence of the surgeon's skill and preference for any rigid internal fixation (RIF) system devices was minimized.

### Patients and methods:

There were 300 files of patients with facial trauma who had been treated between 2014 and 2015 at Dhaka Medical College Hospital. In 155 mandibular fractures associated, or not, with other facial bone fractures were found.

Data were collected regarding sex, age, date of trauma, date of surgery, dentition, etiology, signs and symptoms, fracture area, treatment performed, date of hospital discharge, and drug therapy.

All patients were treated by the same oral and maxillofacial surgeon. When each patient arrived at the hospital for the first medical appointment, all dentate

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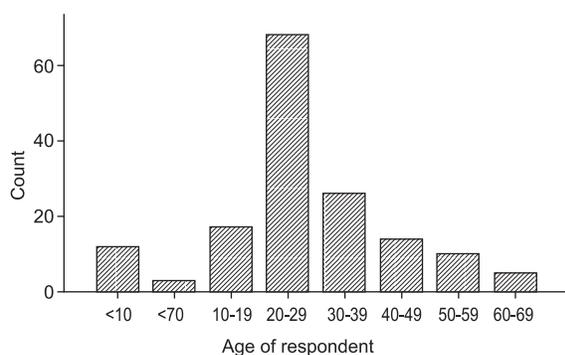
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and some partially dentate subjects who presented with mandibular fractures in the body mandible, parasymphysis, and symphysis, were treated initially with a dental splint for reapproximation and immobilization of fractures. A circumdental stainless-steel wire was used on at least two stable teeth on each side of the fracture to achieve immobilization. The RIF technique was used in all surgical treatments, and intermaxillary fixation (IMF) was not necessary beyond the introperative period. Fixation of mandibular fractures was performed using miniplate.

Initial radiographs were necessary for preoperative evaluation and establishment of a treatment plan. The postoperative radiographs were used to check fracture reduction and the position of plates and screws. Radiographs were also used for long-term follow-up. All patients were asked to return for post-surgery clinical evaluations. Follow-up visits were scheduled weekly up to one month post-surgery and monthly thereafter.

**Results :**

Mandibular fracture occurred in 124 male patients (80%) and 31 female patients (20%) resulting in a male : female ratio of 4:1. Their ages ranged from 4 to 70 years (Fig.1).

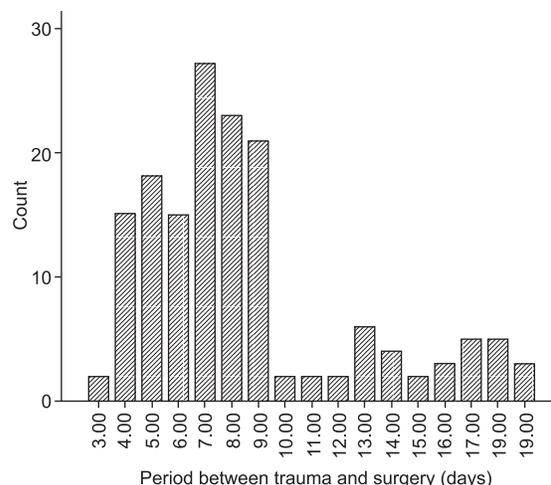


**Fig.-1:** Distribution of patients age (years)

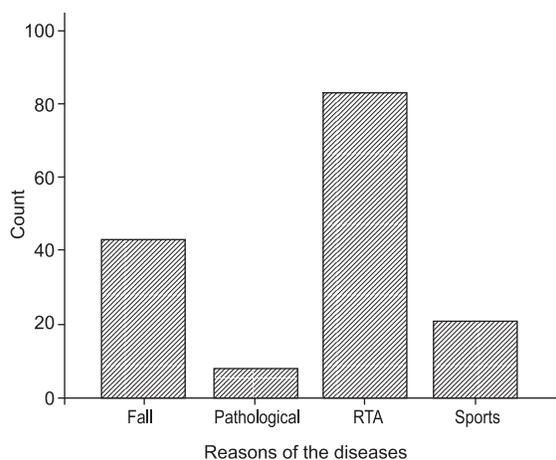
Of the 155 patients maximum 26% received their surgery after 07 days as the injury, whereas the remaining 74% surgery was done 10 days although some patients underwent surgery within 3 to 20 days (Fig-2).

The distribution of signs of mandibular fractures in this sample is shown in table-1. The most common sign was facial swelling (72.9%), followed by Trismus (60.64%) and Malocclusion 59.35%.

The etiology most frequently observed in this study was traffic accidents, which affected 124 (80%) (Fig.-3)



**Fig.-2:** Period between trauma and surgery



**Fig.-3:** Distributin of trauma etiologies

The distribution of the 155 mandibular fracture sites is shown in Table-2. The most common fracture site was parasymphysis (40.6%), followed by Condyle (29%) and Body (28.4%). There was a slight side predilection in the Parasymphysis and Condyle site.

**Discussion:**

Traffic accidents are the most common etiology for mandibular fractures in developing countries, whereas support accidents are the most common cause in developed countries, where traffics laws are more widely respected<sup>7</sup>. Most of the patients in this study were male (80%). The treatment modalities for mandibular fractures proposed in the literature are non-surgical and surgical.<sup>8-10</sup> The authors routinely use dental splints in fractures located at the body mandible, parasymphysis, and symphysis at the first appointment. Dental splint devices were constructed using a circumdental stainless steel wire, involving at least two stable teeth on each side of the fracture.

Mandibular fractures occur in a significant proportion of patients requiring prompt diagnosis of fractures and soft tissue injuries. Each year, increasing numbers of patients are admitted to the hospital with this fracture. The characteristics of mandibular fracture depend on various factors such as geographical place, culture, and socioeconomic background of the communities. However, epidemiological surveys across the world have exposed that some aspects of the facial fracture patterns remain similar among the various nations. The male predominance in our study in harmony with other reports from other countries such as Canada,<sup>11</sup> France,<sup>12</sup> India,<sup>13</sup> Iran,<sup>14</sup> Nigeria.<sup>15</sup> The predominance of males is due to most of females are housewives and were not greatly involved in the economic activity of the society. There were two studies from Iran showed females were more common than males.<sup>16,17</sup> This may be due to their living in mountainous (northwestern Iran), environmental and cultural backgrounds women are much more involved in outdoor activities (driving, etc.) resulting in their increase vulnerability to fracture accidents. In addition to that, women were involved in outdoor socioeconomic activities.

The peak incidence of fracture was in 20-29 years. represents an active period when individuals are more energetic involved in high speed transportation and outdoor activities.<sup>18-20</sup>

### Conclusion:

In this study, the authors did not find many cases of complex fractures, and appropriate treatments were performed as soon as possible. Treatment was carried out by the same experienced surgeon for all 155 patients, and antibiotic therapy was employed when it was indicated. The tooth in the fracture line was removed when the tooth was mobile, had periodontal or periapical pathology, was partially impacted or was carious. The authors think that these precautions are the reason why there was not an excessive rate of complications.

This retrospective study of the epidemiology and treatment of mandibular fractures revealed that the therapy applied was effective in treating this type of fracture and showed rates of success comparable with published data around the world.

**Recommendations:** We recommend evaluating the fracture mandible after other next eight years.

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# Use of Temporalis myofascial flap for reconstruction of maxillectomy defect

Rahman MM<sup>1</sup>, Mamood MA<sup>2</sup>, Rubel ATMT<sup>3</sup>, Tymur FR<sup>4</sup>, Talukder MA<sup>5</sup>, Haider IA<sup>6</sup>

## Abstract:

*Reconstruction of maxillectomy defects after tumor resection or trauma ranges from simple obturator, skin graft to pedicled flaps and to free tissue transfer. Several soft tissue flaps can be used for reconstruction of maxillectomy defect. Keeping the parameters of reconstruction in mind it is ideal to reconstruct the maxillectomy defect with either the free flaps or the regional flaps. Of all regional flaps, the temporalis myofascial flap (TMF) provides a high degree of reliability, vascularity, adequate bulk, and proximity to the defect in the oral and maxillofacial region.*

*Post maxillectomy defects in 12 patients were reconstructed using temporalis myofascial flap in Dhaka Dental College Hospital between March 2013 and December 2014 of which 08 were male and 04 female. Malignant disease involved maxilla in 11 cases (squamous cell carcinoma in 09 cases, adenoid cystic carcinoma in 01 case, osteosarcoma in 01 case) while 01 patient had benign tumour (Ameloblastoma) of maxilla.*

*Acceptable functional and aesthetic outcome were observed in all the cases. Temporalis myofascial flap was considered a good choice for reconstruction of most of the intraoral defects especially those in palatal and buccal region.*

*(Bangladesh Dental Journal 2016; 32: 4-8)*

## Introduction:

The maxillary defect after ablative tumor surgery always involves the mucosal lining, the midface skeletal structures and the adjacent soft tissue.<sup>1</sup> Reconstruction of such a defect remains challenge because of the 3-dimensional structure of the midface. The final goals for maxillectomy defect reconstruction are to give support to the orbital content and minimizing changes in globe position, orbital volume, to maintain a patent nasal airway and oronasal separation, speech quality, and potential dental

rehabilitation and to restore an adequate and symmetric facial contour with the other side of the face.

Individuals diagnosed as having cancer of the head and neck is overwhelmed by the notion of potential functional sequelae owing to treatment involving surgery, radiation therapy, and chemotherapy. Limited ability to speak and eat often lead to social isolation, loss of employment, and decreased quality of life.<sup>2</sup> All of this may cumulate to patients' inability to care for themselves and their families. Loss of employment causes the financial burden on society when patients come to rely on social welfare systems. Compromised communicative functions resulting in a distressing impact on quality of life.<sup>3</sup>

In the past, a prosthetic obturation was the only reconstruction option but it has limitation like instability, poor retention, and oronasal incompetence. The resection of oral cavity tumor and malignancies often causes functional disabilities like deglutition and articulation, poor speech, nasal regurgitation of food, and also aesthetic outcomes.<sup>4</sup> Thus surgical procedures performed on the region of head and neck require synchronous tissue reconstruction in order to close the defect of the removed tumor. Palato-maxillary defects are inherently challenging because they generally involve more than one mid-facial structure, are composite in nature and the complex three-dimensionality of the region must be accounted for. Various methods of palato-maxillary reconstruction include regional flaps, and free grafts both simple and complex are advised. The choice of reconstruction method should be based on

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reliability, length of surgical procedure, burden on the patient, and an acceptable functional and aesthetic outcome. Free flaps and regional flaps are best for reconstruction of larger defects. Free flaps have the advantages of availability of bulk, minimal donor site morbidity and vascularity. However, these flaps need a high degree of surgical and technical expertise and considerable operative time. Considering these factors loco regional flaps for such reconstructions are always a preferred option. Of all regional flaps the temporalis muscle provides a high degree of reliability, vascularity, adequate bulk, and proximity to the defect in the oral and maxillofacial region.<sup>2,3,4</sup>

We present our own experience in using the temporalis myofascial flap (TMF) for the reconstruction of palato-maxillary tissue following the extensive ablation of the maxilla without major complications.

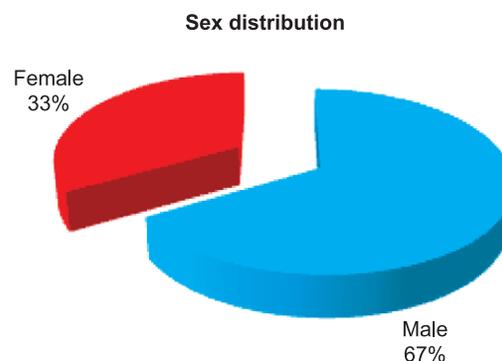
#### Materials and methods:

This Descriptive study was carried out at the department of Oral and Maxillofacial Surgery Dhaka dental college hospital. This study was completed from March 2013 to December 2014. Total 12 patients were included in this study age ranging from 31 to 65 with average age of 52 years. Patients with large defect after oncologic resection of maxilla were included in this study. Patient who had undergone radiation therapy, previous surgery or trauma to the temporal region were not included in this study. Medically compromised patients, who could not tolerate general anesthesia, excluded from the study.

The temporalis muscle was exposed by using a coronal incision with a preauricular extension. Dissection carried out at a subgaleal plane to expose the muscle. Then, it was mobilized subperiosteally from its deep origin in the temporal fossa. Anteriorly, the muscle was elevated from the lateral aspect of the orbit and inferiorly down to the temporal crest. Particular care was taken to preserve the blood vessels entering from its inferior aspect. The zygomatic arch exposed to rotate the muscle beneath the arch into the oral cavity. In two cases segment of arch were resected to facilitate the rotation. In three cases coronoidectomy were done to increase the arc of rotation. The muscle pulled through the tunnel and sutured intraorally. A drain placed at the subgaleal plane, the coronal flap repositioned, and the incision closed in layers. Vitality of flap was assessed by color of flap (normal, pale or bluish), Suture dehiscence, and marginal necrosis, presence of infection or pus discharge. Finally, degree of satisfaction in mastication, mouth opening, and speech, facial nerve function and flap esthetics was documented. The collected data analyzed by SPSS statistical package version 11.0.

#### Result:

We investigated a total 12 patients with maxillectomy defect. Among them 8 were male and 4 female. Age ranges from 31 to 65 with average 52 years.



**Fig.-1:** Sex distribution of the study.

Eleven patients had malignant disease of maxilla (09 were squamous cell carcinoma, 01 adenoid cystic carcinoma and 01 osteosarcoma) while other one had benign tumour (Ameloblastoma).

**Table-I**

#### Diagnosis of disease

| Name of the disease          | Number of cases |
|------------------------------|-----------------|
| Oral squamous cell carcinoma | 09              |
| Adenoid cystic carcinoma     | 01              |
| Osteosarcoma                 | 01              |
| Ameloblastoma                | 01              |

Flap taking was uneventful in all patients. But minor complications like partial wound dehiscence was observed in 2 cases, marginal flap necrosis in 1 and wound infection in 1 case. They were managed by local wound care and secondary wound closure. The single case of wound infection was managed by regular dressing and proper antibiotic administration based on cultural sensitivity test.

**Table-II**

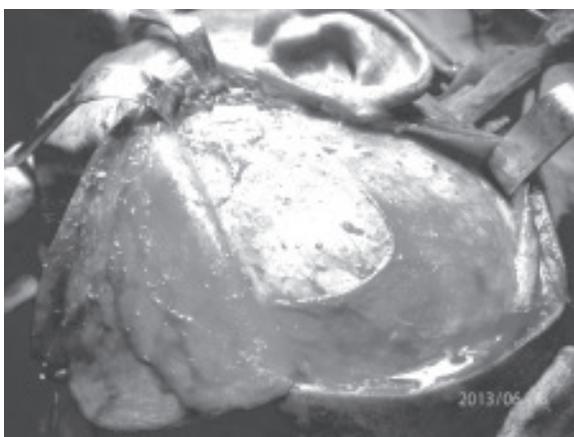
#### Complications

| Complications            | Case |
|--------------------------|------|
| Full flap necrosis       | none |
| Marginal flap necrosis   | 01   |
| Partial wound dehiscence | 02   |
| Wound infection          | 01   |

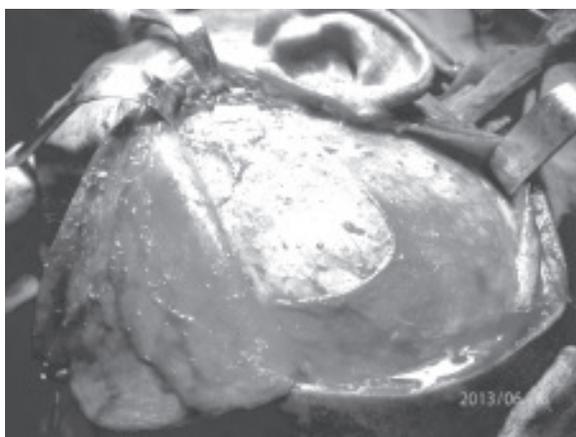
In 11 patients mouth opening remained normal; one patient developed limited mouth opening later becomes normal after exercise. Quality of speech found satisfactory in all the cases. Difficulty of mastication was observed in 2 cases while 10 other normal masticatory function. Acceptable facial aesthetic found in 10 patients and 2 other had mild facial asymmetry (depression of ipsilateral cheek ). None developed oronasal communication.

**Table-III**  
*Outcome*

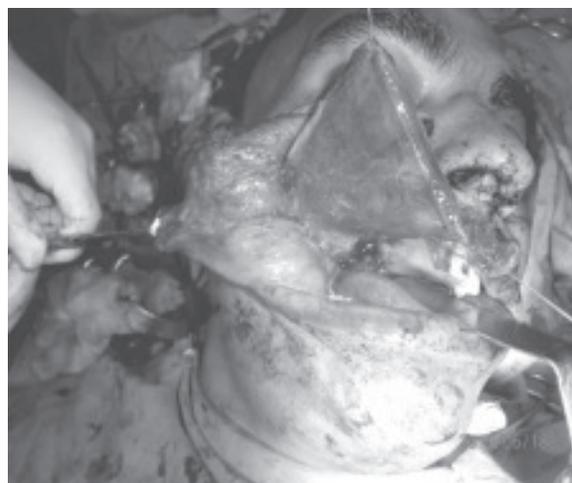
| Outcome                     | Case |
|-----------------------------|------|
| Adquate mouth opening       | 12   |
| Good speech                 | 12   |
| Oronasal communication      | none |
| Acceptable facial aesthetic | 10   |
| Good masticatory function   | 10   |



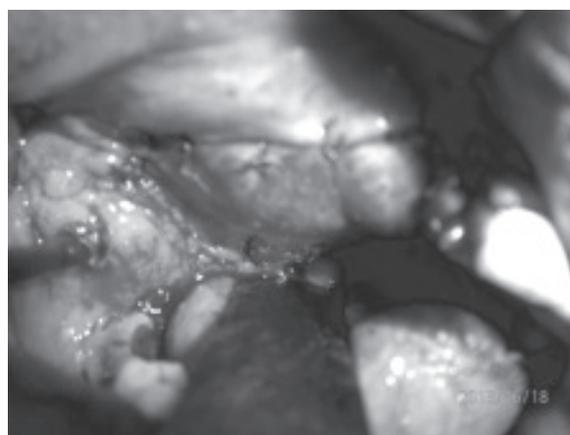
**Fig.-1:** *Exposing of the flap*



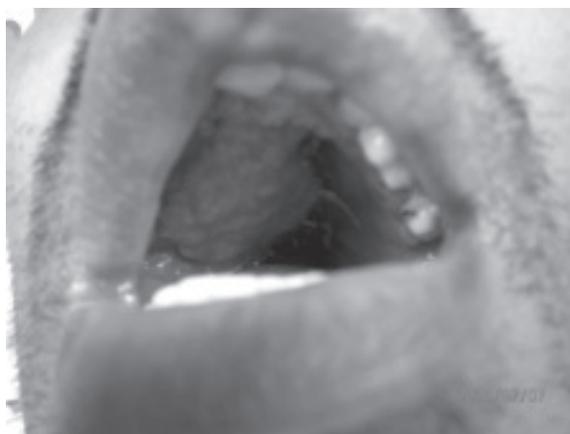
**Fig.-2:** *Elevation of the flap*



**Fig.-3:** *Insertion of flap inside the oral cavity.*



**Fig.-4:** *Suturing of the flap inside the oral cavity*



**Fig.-5:** *Sixth postoperative day.*

**Discussion**

Post maxillectomy defects are associated with cosmetic deformity and functional disability. Purpose of reconstruction of such a defect is to obturate the nasal

and orbital cavities, separating them from the oral cavity and maintain the facial contour.<sup>5</sup> Causes of post maxillectomy defects include ablative surgery of maxillary cancer or aggressive benign tumour of maxilla.<sup>1,2</sup> Classification systems for midfacial defects were based on the extent of maxillectomy, the size of palatal defect and integrity of the orbital support.<sup>5</sup> Midfacial defects can be simply divided into soft-tissue and bone defects.

Various options for reconstruction of maxillectomy defects are available. Each technique has its advantages and limitations. Traditional reconstruction includes skin grafting and placement of a simple prosthesis for maxillary defect. Common regional flaps for reconstructing midfacial defects are cervicofacial rotation flap,<sup>6</sup> forehead flap,<sup>7</sup> facial artery musculomucosal flap<sup>8</sup>, and temporalis muscle flap.<sup>9</sup> A variety of free tissue transfers have been advocated and favored by most of the surgeons to repair midfacial defects. The most popular are free scapular fasciocutaneous flap,<sup>10</sup> free fibular osteocutaneous flap,<sup>11</sup> and radial forearm flap.<sup>1</sup> Free flaps are reliable and flexible. The main drawbacks of free tissue transfer are the long operative time, expensive cost, and the additional morbidity in another operative site.<sup>3</sup>

Among all the loco regional flap temporalis myofascial flap is a preferred option due to its proximity, reliability, pliability and ease of harvesting. Although Temporalis myofascial flap has been criticized because of its short arc of rotation modifications of the surgical procedures can be made in order to increase the arc of rotation of the flap. These include resection of the coronoid process and division of the zygomatic arch.<sup>6</sup>

Temporalis myofascial flap was first used by Golovine more than 100 (In the year of 1898) years ago, and it remains a very reliable regional flap for the reconstruction of the maxillofacial defects. The proximity of the oral cavity, palate and the middle third of the face in addition to the reliable vascular pedicle makes the temporalis myofascial flap valuable for reconstruction.<sup>1</sup>

In 2002, Abubakar and colleagues did a study in Virginia, USA on the Temporalis muscle flap in reconstruction of intraoral defects<sup>4</sup>. The criteria used to evaluate the results of this technique included flap necrosis, facial nerve deficit, limitation of mouth opening and cosmetic deformity from scarring of incision or loss of muscle volume in temporal fossa.<sup>12</sup>

In 2004, Wong TY don study in Taiwan on Temporalis muscle flap for intraoral reconstruction and found that Temporalis muscle flap is simple and safe to apply, it can

extend further in the posterior oral cavity and has fewer complications.

In 2005, Estelle's Ferriol JE et al did a study in Spain on Temporalis muscle flap and found that the Temporalis myofascial flap is an excellent choice for maxillofacial region defects reconstruction and no total necrosis of even a single case out of 22 was noted.<sup>13</sup>

In our study among 12 patients all had flap survival (100%).similar observation was found the study of Abubakar in 2002<sup>4</sup>. His sample consisted of eight patients reported 100% success rate. in another study ahmed s et al showed 90% success rate and 10% failure due to diabetes and old age.\* warrich

We observed marginal necrosis of 1 flap (8.3%) out of 12 patients. Ahmed s et al showed 6.66% of marginal necrosis in a series of 30 cases. On outcome analysis we found good quality of speech, mastication and mouth opening in almost all the cases. None developed oronasal communication. Nearly similar result found in study of abubakar in 2002 probably due to reduced number of sample in both the study.

Thus temporalis myofascial flap was found to be a suitable, reliable and easy reconstructive tool for post maxillectomy defect.

### Conclusion:

Based on our study and review of other studies it can be said that temporalis myofascial flap is a good option for reconstruction of post maxillectomy defect due its reliability, survival and aesthetic consideration. In comparison to free flap less operative time made temporalis myofascial flap as a preferred option for midfacial reconstruction. Moreover with zygomatic osteotomy and coronoidectomy this flap can be mobilized for longer distance.

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# pH of the periapical environment after applying Calcium Hydroxide into root canals in vitro

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## Abstract:

*The purpose of this study was to determine pH in the periapical region after application of calcium hydroxide containing sealer into experimental root canals. After cleaning and shaping root canals in 10 recently extracted, single rooted human teeth, was obturated with calcium hydroxide containing sealer (sealapex). The remaining group was served as control. In group A1 nothing was added to the vial of saline solution. In group A2 canal has been instrumented and obturated with sealapex. The pH of saline solutions was determined at intervals of 1 hour, 1 day, 1 week and 4 weeks after teeth were placed in them. The pH levels of two solutions were compared with each others to that of saline solution only.*

*(Bangladesh Dental Journal 2016; 32: 9-12)*

## Introduction:

Calcium hydroxide has been widely used in endodontics since Hermann introduced it to dentistry in 1920. Particular attention has focused on the effect calcium hydroxide has on the facilitation of the formation of hard tissue<sup>1,2</sup> and is frequently used in treatments such as pulp capping<sup>3,4</sup> pulp amputation<sup>5</sup>, and as a root canal filling material.<sup>6,7</sup> Its usage has recently been on the increase due to the expectation that calcium hydroxide would be less detrimental to tissue than either phenol or formaldehyde,<sup>8-11</sup> that it would provide excellent bactericidal and sedative effects,<sup>10,11</sup> and that it prevents exudation.<sup>11</sup>

The high pH level of calcium hydroxide in root canal fillings promotes a state of alkalinity in tissues immediately adjacent to the compound. When dissolved in water, calcium hydroxide dissociates into hydroxide ions in a solution makes it alkaline, and thus antibacterial.<sup>10</sup>

The purpose of the study was to compare the surface pH level of sealapex sealer at various time intervals in vitro study.

## Materials and methods:

Thirty extracted human permanent teeth with single root canals were stored in 10% formaldehyde solution. All of the teeth are cleaned and all root canals shaped to a minimum of a #40 k-files 1 mm from the anatomical apex. Irrigation during cleaning and shaping was accomplished using a 5.25% sodium hypochlorite solution.

Thirty (10 ml of each ) aliquots of normal saline solution were placed in screw capped glass vials, and the pH level of the solution in each vial was determined with a pH meter. The pH meter has been previously calibrated with solution with known pH. Groups A1 and A2 served as control groups. The experimental group (B1) of solution received roots obturated with laterally condensed gutta-percha and sealapex sealer.

The pH level of solution in each vial was determined with the pH meter at 1 hour, 1 day, 1 week and 4 weeks following placement of the tooth in vials.

After the pH levels of the solutions in the control and experimental groups were determined at the various time intervals, mean and standard deviation were calculated. The significance of difference was determined with one way ANOVA and Hochberg, post hoc multiple comparison tests, p- value < 0.05 was considered as significant.

## Results:

The present study was concerned about the potency of different types of root canal sealers in terms of pH level. The results of this study was presented on tables and graphs.

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**Table-I***Distribution of groups by pH changes after 1 hour: (N =30)*

| Group | N  | Mean   | SD    | Minimum | Maximum |
|-------|----|--------|-------|---------|---------|
| A1    | 10 | 7.4930 | 25087 | 7.17    | 7.88    |
| A2    | 10 | 7.7190 | 24732 | 7.35    | 8.25    |
| B1    | 10 | 8.0070 | 56358 | 7.08    | 8.79    |

**Table-II***ANOVA: pH between groups after 1 hour*

| Group    | P Value | Significant |
|----------|---------|-------------|
| A1 Vs A2 | .057    | NS          |
| A1 Vs B1 | .000    | S           |
| A2 Vs B1 | .006    | S           |

**Table-III***Distribution of groups by pH changes after 24 hours. (N = 30 )*

| Group | N  | Mean   | SD     | Minimum | Maximum |
|-------|----|--------|--------|---------|---------|
| A1    | 10 | 7.550  | 18698  | 7.28    | 7.89    |
| A2    | 10 | 8.1540 | .21598 | 7.86    | 8.59    |
| B1    | 10 | 8.5600 | .33513 | 7.87    | 8.96    |

**Table-IV***ANOVA: pH between groups after 24 hours*

| Group    | P Value | Significant |
|----------|---------|-------------|
| A1 Vs A2 | .002    | S           |
| A1 Vs B1 | .000    | S           |
| A2 Vs B1 | .097    | NS          |

**Table-V***Distribution of groups by pH changes after 1 week. (N= 30 )*

| Group | N  | Mean   | SD     | Minimum | Maximum |
|-------|----|--------|--------|---------|---------|
| A1    | 10 | 7.5440 | .18698 | 7.28    | 7.89    |
| A2    | 10 | 7.7190 | .24732 | 7.35    | 8.25    |
| B1    | 10 | 8.0070 | .56358 | 7.08    | 8.79    |

**Table-VI***ANOVA: pH between groups after 1 week*

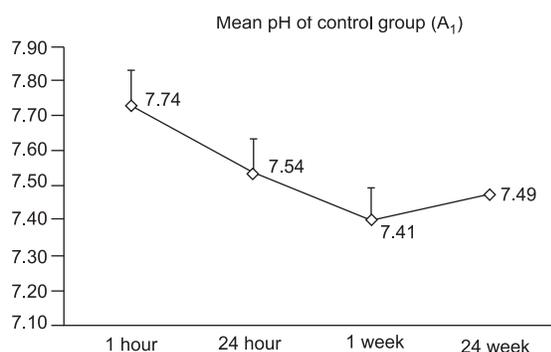
| Group    | P Value | Significant |
|----------|---------|-------------|
| A1 Vs A2 | .780    | NS          |
| A1 Vs B1 | .000    | S           |
| A2 Vs B1 | .001    | S           |

**Table-VII**  
Distribution of groups by pH changes after 4 weeks ( N= 30 ).

| Group | N  | Mean   | SD     | Minimum | Maximum |
|-------|----|--------|--------|---------|---------|
| A1    | 10 | 7.4930 | .25087 | 7.17    | 7.88    |
| A2    | 10 | 7.7190 | .24732 | 7.35    | 8.25    |
| B1    | 10 | 8.0070 | .56358 | 7.08    | 8.79    |

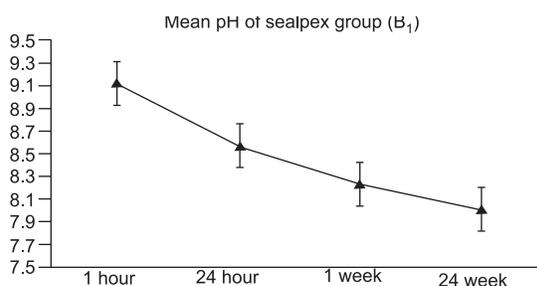
**Table-VIII**  
ANOVA: pH after 4 week

| Group    | P Value | Significant |
|----------|---------|-------------|
| A1 Vs A2 | .875    | NS          |
| A1 Vs B1 | .046    | S           |
| A2 Vs B1 | .641    | NS          |



**Fig.-1:** Mean pH of control group.

Figure-1 shows the distribution of the mean pH of group (A1) for control groups at four points of time.



**Fig.- 2:** Mean pH of Sealapex group ( B2).

Figure shows the among experimental group (B2 ) the average pH of sealapex was highly alkaline at 1 hour (9.13).

#### Discussion:

In present study, regular observations were made over an extended period on how calcium ions released through

the apex into distilled water affected the pH in the periapical area.

Calcium ion release and an alkaline pH for a material that contains calcium hydroxide important for good biological and microbiological performance of the material<sup>11</sup>.

In the present study, it was found that average pH of sealapex was found highly alkaline at one hour. In course of time a trend of uniform decline in evident over time. Trusted et. al. suggested calcium hydroxide placement in the root canal elevates the pH producing an alkaline environment in the surrounding tissues by the diffusion of hydroxyl ions through the dentinal tubules. Increased pH is bactericidal and diffusion of hydroxyl ions through dentinal tubules into the periradicular tissues neutralizes the acid pH.

#### Conclusion:

The pH of the root canal sealer has a very important role in prognosis of endodontic treatment. Considering the results of the present vitro study, it can be concluded that calcium hydroxide containing sealer can maintain alkaline with high pH.

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# Evaluation of tensile bond strength of fifth, sixth and seventh generation bonding systems to dentin

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## Abstract:

**Introduction:** A durable interfacial adhesion between tooth and biomaterial is essential for an ideal restoration. Dental adhesives were developed to provide a strong bonding interface between the tooth substrate and the restorative material being using in restorative dentistry. **Objective:** The purpose of this study was to evaluate the micro-tensile bond strength ( $\mu$ TBS) of three generations bonding system. **Materials and Methods:** 45 teeth were taken on the basis of inclusion and exclusion criteria and randomly divided into 3 groups. Groupings were done according to three different generation bonding system application. For  $\mu$ TBS measurement each part of tooth was serially sectioned to obtain stick shape sample with  $1 \pm 0.2\text{mm}^2$  of bonding area. A universal testing machine Hounsfield, Germany (1 ton) was used to conduct  $\mu$ TBS test at a crosshead speed at 1mm/min. The tensile load at which fracture occurred were recorded and results were transformed in Mega Pascal (MPa). **Results:** Differences in  $\mu$ TBS were found in all three samples groups. The tensile bond strength of fifth generation bonding systems was higher than sixth and seventh bonding systems. There was almost no difference between the tensile bond strength of sixth and seventh generation, but the difference was statistically significant ( $p$  value: 0.001). **Conclusion:** Fifth generation bonding systems provide better tensile bond strength than sixth and seventh generation bonding systems.

**Keywords:** Bonding system,  $\mu$ TBS.

(Bangladesh Dental Journal 2016; 32: 13-18)

## Introduction:

Bonding to dentin is far more challenging because dentin is a composite of apatite crystal “fillers” embedded in a collagen matrix. Usually the dentinal surface is covered with a smear layer that adheres weakly to the underlying intact dentin.<sup>1</sup>

The mechanism of dentin adhesion, enhanced by hybrid layer formation was proposed by Nakabayashi<sup>2</sup> in which

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diffusion and impregnation of resin into partially decalcified dentin followed by polymerization create a resin reinforced layer or the hybrid layer. The penetration of adhesive monomers into the superficially demineralised dentin and subsequent polymerization into large molecular weight resin polymers are indispensable for creating an ideal hybrid layer. A durable interfacial adhesion between tooth and biomaterial is essential for ideal restoration.<sup>3</sup> Dental adhesives were developed to provide a strong bonding interface between the tooth substrate and the restorative material being using in restorative dentistry.<sup>4</sup>

Adhesive dentistry has advanced greatly over the last decade.<sup>5</sup> Generations of adhesives were developed to obtain an effective bond at the dentin. Studies about adhesive systems aim to provide well qualified and long lasting adhesion, practical application and decrease of the working time in order to decrease the technical sensitivity of the adhesive. Bond strength measurement in a laboratory last is one of the most effective methods of characterizing commercial dentin bonding products. Using a micro tensile test it is possible to evaluate the adhesive system bonding strength on dentine. The micro tensile test is increasingly used to evaluate the strength of such tooth adhesive bond.<sup>3</sup>

A tensile stress is cause by a load that tends to stretch or elongate a body. Strength is the stress that is necessary

to cause fracture or a specified amount of plastic deformation. In a tensile test, the bond is broken by a force working at a 90° angle (perpendicular) to the tooth surface.<sup>6, 7</sup>

The study was undertaken to investigate the degree of tensile bond strength produced by three generations bonding agents. Fifth generation (total etch): Prime and Bond NT (Dentsply, USA), sixth generation (self etch): FL Bond II (Shofu, Japan) and seventh generation (self etch): G-Bond (GC, Japan) were examined in this study.

Fifth generation -Prime & Bond NT is a self-priming, light-cured bonding agent that contains nanofillers of amorphous silicone dioxide. Sixth generation -FL-BOND II, is a radiopaque, fluoride releasing adhesive system features a unique primer and bonding agent to provide an excellent bond to both enamel and dentin with a secure marginal seal. Seventh generation - G-Bond has been developed to enable fast-and-easy bonding procedures: one step and provide a bonding agent that does not contain HEMA (2-hydroxyethyl methyl meth acrylate).

Several studies were done to compare between the generations, between different techniques such as total etch versus self etch, between different manufacturer products of same generation, between enamel and dentin, between different dentinal areas but researcher still not concluded in any suitable results.

The purpose of this study is to evaluate the micro tensile bond strength of three generation bonding materials to dentin and to find which generation produces greater tensile bond strength.

#### **Materials and methods:**

This is a prospective comparative in-vitro study. The duration of study is from January 07 to December 08. The sample size of this study was forty five. After application of bonding material and composite restorative materials on teeth, stick samples were prepared for measurement of bond strength. Only freshly extracted human mandibular and maxillary premolars that are extracted due to orthodontic purpose are included in the study, collected from Department of Orthodontics, Faculty of Dentistry, BSMMU. Sample tooth were fix in a low speed diamond saw, occlusal enamels were removed. Sectioning of tooth was done perpendicular to its long axis for creating a flat dentine surface. The dentin surfaces were thoroughly rinsed with water and the selected bonding systems were applied according to each manufacturer's directions.

45 teeth were randomly divided into 3 groups. Each group contains 15 teeth. Groupings were done according to three different generation bonding system application.

**Group A:** Fifth Generation Bonding System -Prime & Bond NT, Dentsply, USA

**Group B:** Sixth Generation Bonding System- F L Bond II, Shofu, Japan

**Group C:** Seventh Generation Bonding System- G Bond, GC Corporation, Japan

**Group A:** Application of fifth generation (Prime Bond NT Dentsply) bonding system: Etching gels (Dentamerica) were applied for 15 sec on the prepared tooth surfaces. Removal of etching gels was done with vigorous water spray. Rinsing of the conditioned areas was done thoroughly for at least 10 sec. Blot drying of the conditioned areas were done with moist cotton pellets. Using applicator tips, application of generous amount of Prime and Bond NT bonding material were done to thoroughly wet all the tooth surfaces. These surfaces were kept wet for 20 sec and additional applications of adhesive materials were done as necessary. Removing of excess solvents was done by gently drying with clean, dry air from a dental syringe for at least 5 sec. Surfaces had a uniform glossy appearance after application. Curing was done using Selector Light Curing machine for 10 sec.

**Group B:** Application of sixth generation (F L Bond II, Shofu, Japan) bonding system: Applications of FL primers were done onto the restorative surfaces with micro applicators and after 10 sec drying were done thoroughly with air. Air blowing was not done after applying bonding material. Light-curing of the bonding agent immediately was done using Selector Light Curing machine and light curing was done for 10 sec.

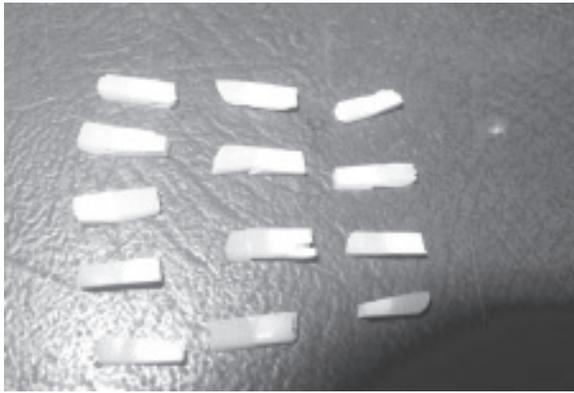
**Group C:** Application of seventh generation (G Bond, GC, Japan) bonding system: Prepared tooth surfaces were dried by gently blowing with and air syringe. G Bond bonding materials were applied on tooth surfaces with applicator tips after shaking the bottle and leave undisturbed for 5-10 sec. Air drying was done thoroughly for 5 sec. The final result were a thin, rough, adhesive film with the appearance of frosted glass and which did not visibly move under further air pressure. Light curing was done for 10 sec.

#### **Method of preparing samples for $\mu$ TBS measurement:**

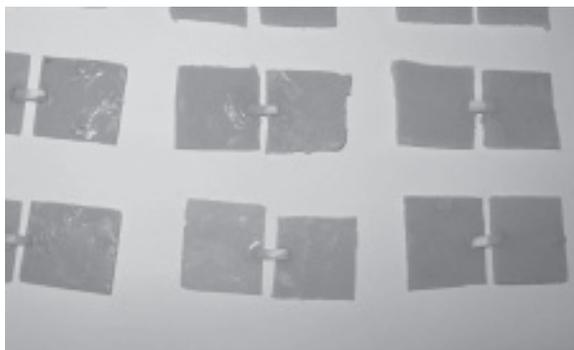
A resin block using 3M ESPE Z100™ Light cured composite restorative materials were fabricated using a layered technique in the occlusal direction up to a final

height of 4mm. Each layer was light cured for 40 sec using Selector light curing machine.

Roots were cut off at their middle third using a diamond disc. The teeth were then individually fixed in acrylic resin block. For tensile strength measurement each tooth were serially sectioned by slow speed diamond saw in the occluso-gingival direction to produce 1mm thick slabs. The block were then rotated 90 degrees and serial section were repeated using a diamond disc under water irrigation to obtain stick shape sample with  $1 \pm 0.2 \text{ mm}^2$  of bonding area. Five to six standardized sticks will be made from each tooth, but only three suitable dentine composite sticks per tooth were chosen for bonding test use. The sticks were kept moist during preparation for the micro tensile test (maximum 20 min).



**Fig.-1:** *Stick samples*

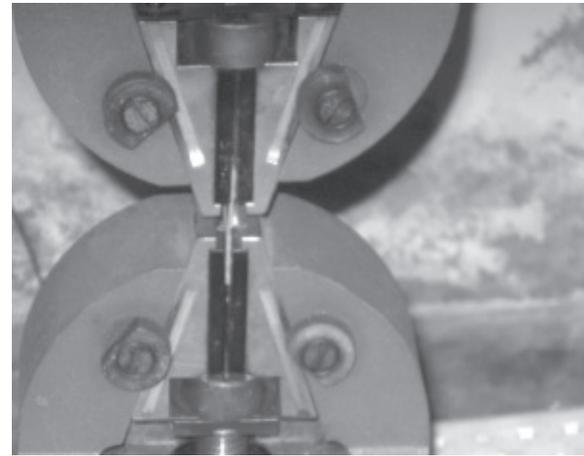


**Fig.-2:** *Attachments of samples on acrylic plates*

Both end of the specimen were attached to acrylic plates with cyanoacrylate glue for micro-tensile strength test. A universal testing machine Hounsfield (1 ton), Germany was used to conduct iTBS test at a crosshead speed at 1mm/min.

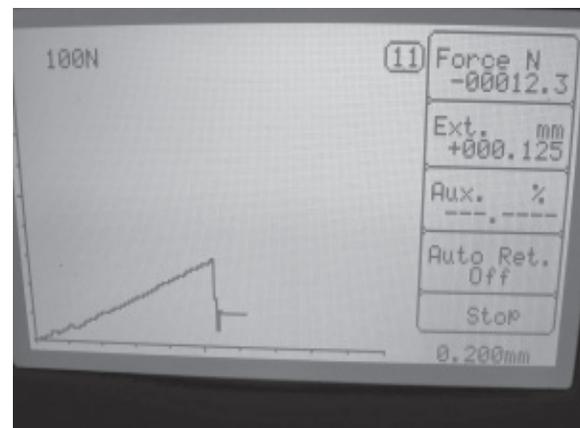


**Fig.-3:** *Insertion of sample*



**Fig.-4:** *After de bonding of samples*

The tensile load at which fracture occurred were recorded and results were transformed in Mega Pascal (MPa).



**Fig.-5:** *Bond strength measurement*

| Test   | 1      | 2      | 3      |
|--------|--------|--------|--------|
| Max    | 14.333 | 21.333 | 40.333 |
| F.Brak | 0.333  | 6.333  | 10.333 |
| E.Brak | 0.888  | 0.440  | 0.440  |
| (0.0)  | 7.000  | 6.666  | 10.000 |
| (0.0)  | 11.666 | 0.666  | 10.000 |
| (0.0)  | 0.333  | 14.333 | 10.000 |
| (0.0)  | 0.333  | 10.666 | 10.000 |
| (0.1)  | 0.000  | 16.333 | 27.333 |

Fig-6: Results of bond strength in graph

The results were tabulated and mean tensile strength values were evaluated for Group-A, Group-B and Group-C. Data collections were done from all sample groups for measurement of bond strength (Mpa).

**Results:**

The present study was under taken to evaluate the tensile bond strength of fifth, sixth and seventh generation bonding system. Tensile bond strength (MPa) differences were found in all three samples groups (Table-I). The tensile bond strengths of fifth generation bonding systems was significantly different, and was higher than sixth and seventh bonding systems. There was no significant difference between the tensile bond strength of sixth and seventh generation. Tensile Bond strength measurements

of different generations were recorded on data collection sheet. The summarized data were then presented in form of tables and line charts.

**Statistical analysis:**

All the relevant collected data were compiled on a master chart first. Statistical analysis of the results was done by computer software device as statistical packages for social science (SPSS ver. 16.0). The results were presented in tables, figures, diagrams etc. The significant data were tested for multiple comparisons by Bonferroni multiple comparison tests. For significant of differences, ANOVA was performed. A ‘p’ value <0.05 was considered as significant.

In present study, group A shows highest tensile bond strength. Group C shows lowest tensile bond strength. Tensile bond strength of group B and C was not significantly differing from each other. Significant mean tensile bond strength differences were found among three groups in ANOVA test.

Multiple Comparison (Bonferroni ‘t’) test was done as the test of significance.

Group A vs. Group B p=0.001, Group A vs. Group C p=0.001

Group B vs. Group C p=0.001

Tensile bond strength (MPa) differences were found in all three samples groups.

**Table-I**

Mean distribution of bond strength and resin tags length of the studied samples group:

|                             | Group A |      | Group B |      | Group C |      | P value |
|-----------------------------|---------|------|---------|------|---------|------|---------|
|                             | (mean   | ±SD) | (mean   | ±SD) | (mean   | ±SD) |         |
| Tensile Bond strength (MPa) | 38.4    | ±1.8 | 21.7    | ±2.2 | 29.0    | ±2.5 | 0.001   |

Group A= Fifth Generation Bonding System

Group B= Sixth Generation Bonding System

Group C= Seventh Generation Bonding System

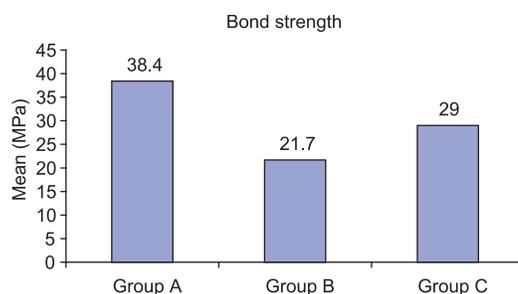


Fig-7: Bar diagram showing mean distribution of tensile bond strength length of the studied samples

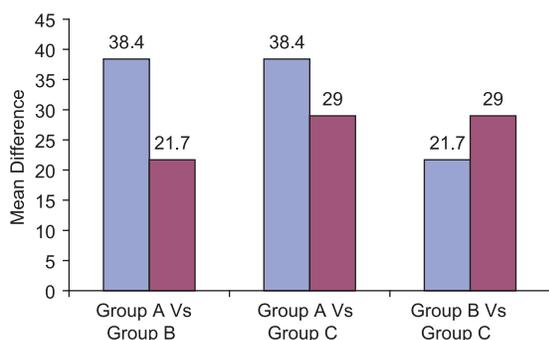
**Table-II**  
Comparison of tensile bond strength among the three samples groups

| Variables                   | Groups             | Mean Difference | P value |
|-----------------------------|--------------------|-----------------|---------|
| Tensile bond strength (MPa) | Group A Vs Group B | 16.6            | 0.001   |
|                             | Group A Vs Group C | 9.4             | 0.001   |
|                             | Group B Vs Group C | 7.2             | 0.001   |

Group A: Fifth Generation Bonding System

Group B: Sixth Generation Bonding System

Group C: Seventh Generation Bonding System



**Fig.-8:** Bar diagram showing comparison of tensile bond strength among the three samples groups

### Discussion:

The micro tensile bond strength of three generation adhesive systems to dentin is evaluated in this study. The bonding materials tested in this study revealed considerable variations in the micro tensile bond strength in different generations.

Several studies were done to evaluate bond strength: tensile and shear bond strength. Bond strength measurements have become a well-recognized method to analyze an important part of the in vitro performance of dental adhesives it permits testing of a very small area and have supported the development of improved bonding systems and techniques. The highest bonding strength was found in fifth generation bonding system. But technique sensitivity and application time is still a problem in fifth generation. Sixth and seventh (Self etch) adhesive systems were produced as an alternative for total-etch systems to reduce the technique sensitivity and application time.

Self-etching adhesive systems offer reduced application time and lower technique. There is a possibility for chemical interaction between functional monomers of some self-etching systems and tooth tissue compared with etch-

and-rinse systems.<sup>8</sup> Several studies regarding the efficacy of new adhesive systems can be found in the literature showing promising results. Due to the complexity of dentin, such as the high percentage of organic components, the variability in surface moisture, varied regional tubule orientation differences in permeability and presence of sclerotic dentin, a wide range of results are seen among different studies.<sup>9</sup>

The  $\mu$ TBS of nine dentin adhesive systems to dentin substrate's peripheral and centre regions were evaluated in this study. For both bonding areas, the highest bonding strength was found for Prime & Bond NT the lowest bonding strength was found for Promt L Pop.<sup>3</sup>

A trend in adhesive dentistry is to provide simpler and faster adhesives. Therefore, many manufacturers have launched an 'all-in-one' adhesive. None of the contemporary 'all-in-one' adhesives, however, can compete with the more traditional multi-step adhesives. Further studies can be done regarding durability of bonding systems.

The ultimate goal is to develop self-adhesive restorative biomaterials that no longer need an adhesive for bonding to tooth tissue. Although glass ionomers and their derivatives can be considered as self-adhering restoratives, they lack other clinically relevant properties, such as sufficient mechanical strength, wear resistance, polish ability and thus aesthetics. In brief, the concept of 'minimally invasive dentistry' may require a different set of restorative materials with physical and chemical properties adapted to the biomechanical needs of these new techniques.<sup>10</sup> Among several factors that may interfere with the quality of bonding, the type of adhesive systems used is of great importance. Systems employing a separate acid etching step are apparently more sensitive to dentin characteristic depth than are self-etching systems.<sup>11</sup>

Dental adhesive developments shortened the etching time and enabled etching and bonding of dentin as well as enamel. Today, clinicians have a variety of esthetic and functional materials to choose from when faced with the need to perform cosmetic dentistry. As dentists, we are always looking for products that are quick and simple to use yet high-performing and effective. Laboratory studies have shown an overall downward trend in bond strengths; especially with the one-step version.<sup>12</sup> Caution is advised with new bonding systems until controlled clinical studies are available.

### Conclusion:

Fifth generation bonding systems provide better tensile bond strength than sixth and seventh generation bonding systems.

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# Satisfaction level of patients regarding attitude of Dentists in private dental clinics

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## Abstract:

*To develop a strong patient relationships with high levels of satisfaction is challenging, but it is the ultimate goal. This study was conducted at five different private dental clinics in Dhaka city during the period between Jan- June 2009. A total number of 96 patients were interviewed to assess the satisfaction. During treatment generally 63.6% male were to be satisfied regarding the behavior of dentist. In case of female respondents only 39.02% thought that the attitude of dentist during treatment were satisfactory but majority (60.98%) voted for not satisfactory. Among the respondents majority with higher level of education were found to be satisfied more with the attitude of dentists during treatment ( $P < .05$ ). 69% respondents were happy with consultancy time given by dentist and 68.8% of the patients expressing satisfaction with privacy.*

*(Bangladesh Dental Journal 2016; 32: 19-23)*

## Introduction:

As the health care industry shifts towards a consumer-oriented approach in the delivery of care patient satisfaction surveys have become an increasingly important tool in measuring the quality of dental services.<sup>1,2</sup> Measurement of patient satisfaction stands poised to play an increasingly important role in the growing push toward accountability among health care providers. Overshadowed by measures of clinical processes and outcomes in the quality of care equation, patient satisfaction measurement has traditionally been relegated to service improvement efforts by hospitals and larger physician practices, and to fulfilling accreditation requirements of health plans, while some plans tie satisfaction scores to financial incentives as a portion of their calculation of payment bonus to primary care physicians with capitation contracts.<sup>3</sup>

Some authors describe four specific reasons for investigating patient satisfaction. First, satisfaction is an

objective of care; second, satisfaction is also a consequence of that care, and therefore an outcome; third, satisfaction can contribute to the effects of care, as a satisfied patient is more likely to comply with advice; finally, satisfaction is also the patient's judgment on the care that has been provided<sup>4</sup>.

As with every organization that is concerned with satisfying the users of its products or services, dental service providers are becoming more involved with patient satisfaction. This is due to increased evidence that the association between satisfaction, patient compliance and success of the treatment determines the quality of health care<sup>5</sup>. In recent reports, patient satisfaction is defined as a health care recipient's cognitively-based evaluation of, and affectively-based response to the important aspects of the structure, process and the result of their service experience. Newsome & Wright and Goedhart et al. have shown that health care is accepted as a complex mixture of the emotional, the physical, and the immaterial, and its consumers are directly involved in quality assessment.<sup>6</sup> Thus, a marketing-oriented model is not appropriate for most medical services, and their consumption should be evaluated differently from that of a consumer product<sup>7</sup>.

Patient satisfaction is an important component of dental care. It influences patients' compliance, their use of dental services, and their anxiety, and it is also associated with health outcomes and health status.<sup>8</sup> Perceived health, the nature of the provider-patient interaction, and structure of the dental care delivery system are also significant factors, which determine the level of dental service satisfaction<sup>8-12</sup>.

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**Methods and Materials:****Study design:**

A cross sectional study was carried out to evaluate the level of satisfaction of the patients regarding attitude of dentist of the private dental clinics.

**Place of study:**

The study was carried out at five different private dental clinics in Dhaka city.

**Sample Size:**

The sample size was determined by the formula

$$N = Z^2 pq / d^2$$

Here,

N= Desired sample size, Z= Standard normal deviate,

Usually 1.96 that corresponds to 95% confidence limit

p= 50% (As level of satisfaction in private dental care setting in unknown)

$$q = 1 - 0.50$$

d= Degree of accuracy desired usually set at 0.05%

So, required sample size will be

$N = (1.96)^2 \times (0.50) \times (0.30) / (0.05)^2 = 384$  (Inflated the sample to 400 considering non-response and data discrepancy.) Considering the time and logistic limitation a multiple (.25) of the sample were targeted

$$\text{Final anticipated sample } 400 \times .25 = 100$$

Due to incompleteness of data 96 was preceded for final analysis and hence the total sample size considered in 96.

**Sampling technique:**

Patients were approached on their immediate exit from the dentist's clinic. Those who consented to participate were interviewed. Twenty each patient were targeted from each clinic, finally a total of 96 patients from the 5 clinics were recruited for the study and interviewed.

**Ethical consideration:**

Informed written consent was taken from the participant after explaining all the facts potential dangers (nothing significant) to the subjects. As there is no invasive procedure involved in the study, no further potential of ethical issue to be raised. The participants were assured that the information acquired will be used for academic purpose. They were assured of confidentiality, and for the purpose of data analysis no individual data were reported rather de identified data was preceded for analysis.

**Data Presentation:**

Data were presented in the form of table and graphs. Descriptive statistics were presented with frequency table. Association was presented in the form of cross table and

test statistics were added in the foot note of the table. Bar and pie charts were generated to illustrate descriptive statistics

**Results:**

In this cross-sectional study data were collected from five different private dental clinics at Dhaka city. A total number of 96 patients were interviewed for patient's satisfaction and socio-demographic information like age, sex, education, occupation, etc. The findings of the study were as follows:

**Table-I***Distribution of the respondents by Age*

| Age in group   | Frequency | Percent |
|----------------|-----------|---------|
| <20 years      | 12        | 12.5    |
| 21 to 30 years | 18        | 18.8    |
| 31 to 40 years | 33        | 34.4    |
| 41 to 50 years | 23        | 24.0    |
| >50 years      | 10        | 10.4    |
| Total          | 96        | 100.0   |

Mean-36.54, SD±10.5, Minimum-18, Maximum-60

Table-I shows that among the 96 respondents majority (34.4%) were at the age group (31-40) and followed by 24%, 18.8% 10.4% were (31-40), (41-50) and >50 years age. Mean age of the respondents were 36.54±10.5.

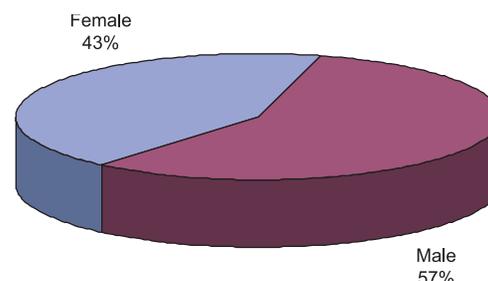
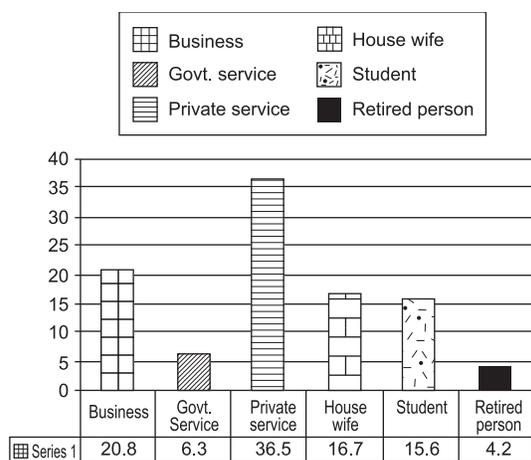
**Fig.-1: Distribution of the respondents by Sex**

Figure 1 shows that majority 57% of respondents were male and rest 43% were female.

**Table-II***Distribution of the respondents by Level of education*

| Level of education   | Frequency | Percent |
|----------------------|-----------|---------|
| Secondary            | 3         | 3.1     |
| SSC                  | 10        | 10.4    |
| HSC                  | 32        | 33.3    |
| Graduation and Above | 51        | 53.1    |
| Total                | 96        | 100.0   |

Among the 96 respondents majority 53.1% have education at the level of graduation or above, 33.3% (32) have educational level HSC, 10 respondents passed SSC and only 3.1% have education at the level of Secondary.



**Fig.-2:** Distribution of the respondents by Occupation

According to figure 2 it is observed that majority of the respondents were private service holder (36.5%), the next

one is business man (20.8%), followed by house wife (16.7%), student (15.6%), Govt. service holder (6.3%) and retired person (4.2%).

**Table-III**

*Distribution of the respondents by maintaining Privacy of the patient*

| Maintain Privacy of the patient | Frequency | Percent |
|---------------------------------|-----------|---------|
| Maintain Privacy                | 66        | 68.8    |
| Don't maintain privacy          | 30        | 31.3    |
| Total                           | 96        | 100.0   |

Table-III shows that 68.8% respondents found that doctor maintain privacy of the patient and rest 31.3% have complain about not maintaining privacy.

Table-IV shows overall satisfaction on patient-dentist interaction. 93.75% patients found that their dentist were friendly followed by 75%, 86.46% in dentist explained the procedures before treatment and dentist gave them advice after treatment.

Table-V reveal that level of education and attitude of the doctor is significant. Among the respondents majority with

**Table-IV**

*Distribution of the respondents by Patient- dentist interaction*

| Patients ' satisfaction on PDI Item                        | Patient -dentist interaction |              |              | Total        |
|--|------------------------------|--------------|--------------|--------------|
|  | Disagree                     | Neutral      | Agree        |              |
| Dentist was friendly                                       | 2<br>2.08%                   | 4<br>4.17%   | 90<br>93.75% | 96<br>100.0% |
| Dentist explained the procedures before start of treatment | 6<br>6.25%                   | 18<br>18.75% | 72<br>75%    | 96<br>100.0% |
| Dentist gave the advice after treatment                    | 13<br>13.54%                 | -            | 83<br>86.46% | 96<br>100.0% |

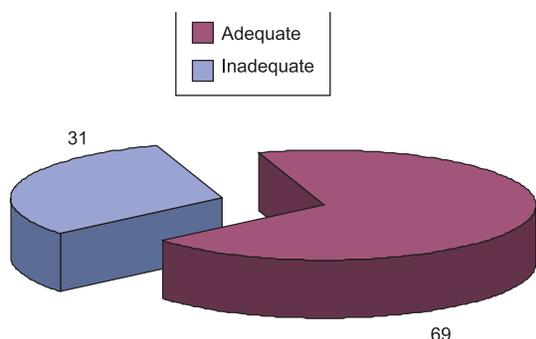
**Table-V**

*Distribution of the respondents by Level of education and attitude during treatment of doctor*

| Level of education   | Attitude during treatment |              |             | Total        |
|----------------------|---------------------------|--------------|-------------|--------------|
|                      | Very good                 | Satisfactory | Average     |              |
| Secondary            | 1<br>33.3%                | 1<br>33.3%   | 1<br>33.3%  | 3<br>100.0%  |
| SSC                  | 1<br>10.0%                | 8<br>80.0%   | 1<br>10.0%  | 10<br>100.0% |
| HSC                  | 14<br>43.8%               | 15<br>46.9%  | 3<br>9.4%   | 32<br>100.0% |
| Graduation and Above | 20<br>39.2%               | 14<br>27.5%  | 17<br>33.3% | 51<br>100.0% |
| Total                | 36<br>37.5%               | 38<br>41.7%  | 22<br>20.8% | 96<br>100.0% |

Chi-Square-19.69, df-6, P=0.003

higher level of education were found to be satisfied more with the attitude of dentists during treatment ( $P < .05$ ). Educated people were found to be less dissatisfied with the doctors.



**Fig.-3.** Distribution of the respondents by Time given by doctor during consultancy

In figure 3 sixty nine percent respondents were happy with consultancy time of the doctor where 31% thought the time given by doctor during consultancy was inadequate.

**Table-VI**

*Distribution of the respondents by sex and doctor's attitude during treatment*

| Sex of the respondents | Attitude during treatment |                  | Total        |
|------------------------|---------------------------|------------------|--------------|
|                        | Satisfactory              | Not Satisfactory |              |
| Male                   | 35<br>63.6%               | 20<br>36.4%      | 55<br>100.0% |
| Female                 | 16<br>39.02%              | 25<br>60.98%     | 41<br>100.0% |
| Total                  | 51<br>53.12%              | 45<br>46.88%     | 96<br>100.0% |

Table-VI shows regarding attitude of the dentist during treatment 63.6% male found satisfied & rest (36.4%) were not satisfied. Among the female respondents only 39.02% thought that the Attitude of dentist during treatment were satisfactory and majority (60.98%) voted for not satisfactory. The association between sex of the respondents and Attitude during treatment is statistically significant ( $P < 0.05$ ). Male were found to be more satisfied with Attitude of doctor during treatment than their female counter part.

### Discussion:

This cross sectional study was performed to analyze the satisfaction level regarding attitude of dentist among the selected patient at private dental clinic in Dhaka city. In this current study among the 96 respondents majority 34.4% were at the age group between 31 to 40 years, 24% at the age group of 41 to 50 years, 18.8% (18) were at the

age group between 21 to 30 years. Only 10.4% aged more than 50 years. Mean age of the respondents were  $36.54 \pm 10.5$  year, ranging from 18 to a Maximum of 60 year. Majority 57% of respondents were male and rest 43% was female. Regarding attitude of the dentist during treatment 63.6% male found satisfied. Among the female respondents only 39.02% thought that the Attitude of dentist during treatment were satisfactory and majority (60.98%) voted for not satisfactory. Among the respondents majority with higher level of education were found to be satisfied more with the attitude of dentists during treatment ( $P < .05$ ). 69% respondents were happy with consultancy time given by dentist. With privacy 68.8% of the patients expressing satisfaction.

Mahrous<sup>13</sup> analyzed the opinion of patients at the dental clinics of the college of Dentistry at Taibah University, Saudi Arabia. The result showed that overall satisfaction on patient-dentist interaction. Dentist explained the procedure before the treatment, which is very important aspect in the patient-dentist satisfaction domain represented with 78% of satisfaction among the patient. 98% respondent were agreed with that their dentist was friendly and 85.2% said that their dentist gave them advices after treatment. Regarding privacy of the treatment 90.7% were satisfied with the privacy. The present study revealed that 68.8% of the patients expressing satisfaction with privacy. Regarding patient dentist interaction 94% found their dentist was friendly, 75% respondent commend that their dentist explained the procedures before start of treatment & 86.5% respondent were happy with their dentist gave them advice after treatment.

Hayder Sur et al<sup>14</sup> described the factors that may influences patient satisfaction in dental out patient clinic at State Hospital in Turkey. Studies have shown that privacy was the most satisfactory attribute of dental services in the study group, with 82.1% of the patients expressing satisfaction. This was followed by ‘‘dentist’s attitude’’ (79.7%). ‘‘Explanation the procedures & diagnosis before starts of treatment’’ was the another important satisfactory issue, 72.1% of the patients expressing satisfaction with it. The findings of the present study agrees with the results reported in the literature, as 68.8% were satisfied with the privacy, 75% agreed with that their dentist explained the procedures before start of treatment & Regarding attitude of the dentist during treatment 63.6% male found satisfied, & rest (36.4%) were not satisfied. Among the female respondents only 39.02% thought that the Attitude of dentist during treatment were satisfactory and majority (60.98%) voted for not satisfactory.

Consumer opinion is an essential component and an important quality indicator in measuring the outcome of any medical service and thus assists health care providers in designing health management plans.<sup>15,16</sup> Regarded as an outcome of care and is one of the major factors that contribute towards better patient compliance and consequently to better clinical outcomes.<sup>17</sup> Patient satisfaction with dental care is a multidimensional concept reflecting patients' expectations, values and experiences.<sup>18</sup>

### Conclusion:

The results of this study indicated that majority of the patients were satisfied with the overall attitude of dentist, maintenance of patients privacy, patient-dentist interaction at different private dental clinics except for attitude of the doctors during treatment. Only 39.02% female found very good and majority (60.98) voted for not satisfactory. Among the male respondents 63.6% thought that the attitude of doctor during treatment were very good and rest (36.4%) were not satisfied. The association between sex of the respondents and attitude during treatment is statistically significant ( $P < 0.05$ ). Male were found to be more satisfied with Attitude of doctor during treatment than their female counter part.

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# Prevalence of Mandibular Condylar fractures in Oral and Maxillofacial Surgery Department of Dhaka Dental College and Hospital

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## Abstract:

*This was a cross-sectional study conducted in the department of Oral and Maxillofacial Surgery of Dhaka Dental College and Hospital from January 2009 to September 2010 presenting with mandibular condylar fractures. The main objective of the study was to assess demographic characteristics to find the causes, site and to observe prevalence of mandibular condylar fractures.*

*In the present study majority of patients were male and age belongs to 21 to 30 years. Road traffic accident was the main cause and prevalence of mandibular condylar fractures was 14.94%.*

*(Bangladesh Dental Journal 2016; 32: 24-26)*

## Introduction:

Injuries of maxillofacial complex represent one of the most important health problem worldwide. Particular interest is created by high incidence and diversity of facial lesions. Moreover maxillofacial fractures are often associated with severe morbidity, loss of function, disfigurement and significant financial cost.<sup>1</sup> In the past 50 years the incidence of mandibular fractures are increasing which is possibly related to changes in reporting of data but more likely is a result of advancement in the field of diagnostic imaging that allow a more accurate detection of these fractures. In any event fracture involving the condylar process are by no means uncommon and probably make up between one quarter and one third of all mandibular fractures.<sup>2</sup> Mandibular condylar fractures are common in maxillofacial traumas, accounting for 20% to 52% of all mandibular fractures.<sup>3</sup> According to Kelly, 1991 the most common unilateral fracture is of the condyle

and the most common bilateral fractures is of the condylar heads.<sup>4</sup> According to Villarrel et al., 2004 they are the most controversial fracture regarding diagnosis and management.<sup>5</sup> Most of the condylar fractures are not caused by direct trauma but follow indirect forces transmitted to the condyle from above elsewhere. Consequently condylar fractures are those commonly missed.<sup>6,7</sup>

There are two types of fractures intracapsular and extracapsular, but for practical purposes the anatomical level of the fractures is divided into three sites; the condylar head (intracapsular), the condylar neck (extracapsular) and the subcondylar region.<sup>6,8,9,10,11</sup> The fracture is classified as; undisplaced, deviated, displaced (with medial and lateral overlap or complete separation) and dislocated (outside the glenoid fossa). Lindhal (1977) also classified head fractures into horizontal, vertical and compression types.<sup>8</sup> Condylar head dislocation is more frequent in children.<sup>12</sup>

The proper management of fractured mandibular condyle is one of the most controversial in maxillofacial trauma. This controversy is reflected in the wide variety of opinions and proposed treatment modalities offered in literature. The commonly accepted and generally agreed on the goal of treatment is reestablishment of preoperative function of the masticatory system. This restoration typically involves the reestablishment of the preoperative

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relationship of the fractured segments, the occlusion and maxillofacial symmetry.<sup>2</sup>

It is believed that conservative approach should be regarded as the first choice of treatment for condylar fractures because as long as there is contact between proximal and distal bone fragments union will take place with an acceptable functional result. Closed reduction provide good results, conservative methods of treatment are technically simpler and can offer reduced overall morbidity with satisfactory functional results with infrequent ankylosis and avascular necrosis. A favorable conservative outcome depends on : a growing patient upto puberty, a fragment which is confined within the temporomandibular joint space. The duration of immobilization ranges from 2 to 4 weeks.<sup>13</sup> Early rehabilitation of jaw and functional rehabilitation as an essential part of the treatment.<sup>12</sup> In contrast surgical treatment is indicated primarily for adults with displaced fractures or dislocation of condylar head.

The complications of condylar fractures include pain, restricted mandibular movement, muscle spasm and deviation of mandible, malocclusion, facial asymmetry and an ankylosis irrespective of whether treatment was performed or not.<sup>14</sup>

As there is no systematic study in Bangladesh about prevalence of condylar fractures, this would help us in getting more information about demographic characteristics, etiology, site and prevalence of condylar fractures in the perspective of Bangladesh.

#### Materials and Methods:

It is a cross sectional study from January 2009 to September 2010 in Department of Oral and Maxillofacial Surgery, Dhaka Dental College and Hospital. Patients admitted to hospital and attended to outpatient department with mandibular fractures irrespective of age and sex.

A standardized structured data collection instrument was used to collect necessary information of the patients those who were examined in Oral and Maxillofacial Surgery Department of Dhaka Dental College and Hospital, which includes-

1. History of the patient : a questionnaire would use for demographic data and clinical history.
2. Clinical examination, radiological findings will be recorded in a check list.

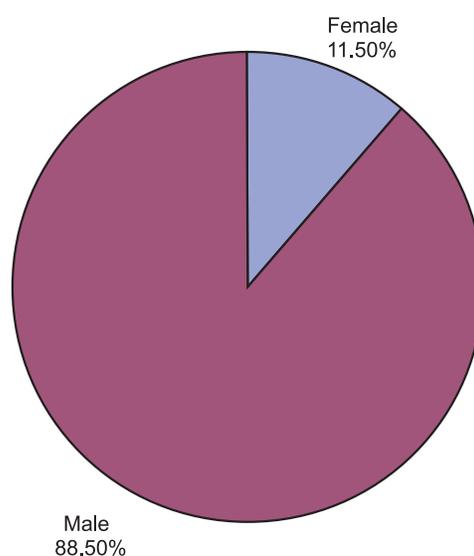
Data analysed by SPSS Ver. 15 statistical software.

#### Results:

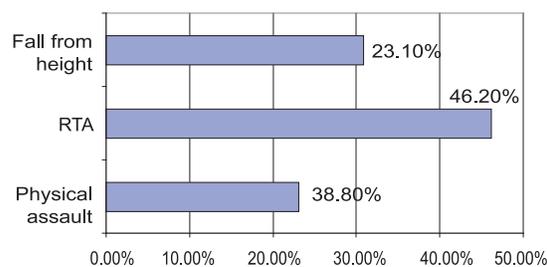
**Table-I**

*Age distribution of the patients ( n= 26)*

|                    | Frequency | Percent |
|--------------------|-----------|---------|
| 0-10 years         | 3         | 11.5    |
| 11-12 years        | 7         | 26.9    |
| 21-30 years        | 10        | 38.5    |
| 31-40 years        | 4         | 15.4    |
| 41-50 years        | 1         | 3.8     |
| More than 50 years | 1         | 3.8     |
| Total              | 26        | 100     |



**Fig.-1 : sex distribution of the patients ( n=26)**



**Fig.-2 : Causes of mandibular condylar fractures ( n= 26)**

**Table-II**

*Prevalence of mandibular condylar fractures*

| Mandibular fracture | Condylar fractures | Percent |
|---------------------|--------------------|---------|
| 174                 | 26                 | 14.94%  |

### Discussion:

Bangladesh is a developing country with 150 million people and road traffic system is very poor. Thus the prevalence of mandibular condylar fractures are significantly high due to road traffic accident. Epidemiological survey of condylar fractures in Bangladesh though not yet been done but several cross-sectional study on jaw fractures have been done.

This cross-sectional study was carried out in the department of Oral and Maxillofacial Surgery from January 2009 to September 2010 with a sample size of 26 patients presented with condylar fractures of mandible. The current study investigated the pattern, causes and management of condylar fractures of mandible.

In current study regarding age distribution it was found that highest percentage (38.5%) of patients were in the age ranges of 21-30 years followed by in the age group of 11-20 years (26.9%). The finding is almost similar with other studies. In 2009 Sawazaki in a case series of 263 patients of condylar fractures reported mean age of 28.4 years.<sup>15</sup> In 2004 Ahmed found in his study treated 230 patients with maxillofacial trauma that men 20-29 years of age sustained the most maxillofacial fractures.<sup>16</sup>

In this study condylar fractures patients were mostly male (88.5%). Male and female ratio was 7.67:1. Other studies also showed that majority of the patients were male but there was dissimilarity in the ratio of male and female. Sawazaki, 2009 found in his study male/female ratio was 3.05:1.<sup>15</sup>

In this study road traffic accident was found to have been the leading etiological factor (46.2%) followed by physical assault (30.8%) and fall from height (23.1%). Road traffic accident is the commonest cause of condylar fracture. It is due to overcrowding, unsecured road, violation of traffic rules and unskilled driving. The most common cause of condylar fracture was road traffic accident (57.8%).

In this study prevalence of condylar fracture among all mandibular fractures were 14.94%. Rahman, 2008 found in his study that condylar fractures among all mandibular fractures were 14%.<sup>17</sup>

### Conclusion:

This was a cross-sectional study conducted in the department of Oral and Maxillofacial Surgery of Dhaka Dental College and Hospital from January 2009 to September 2010 presenting with mandibular condylar fractures. The main objective of the study was to assess demographic characteristics to find the causes, site and to observe prevalence of mandibular condylar fractures. In the present study majority of patients were male and age belongs to 21 to 30 years. Road traffic accident was the main cause and prevalence of mandibular condylar fractures were 14.94%.

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# A comparison of antimicrobial efficacy between Calcium Hydroxide and Mineral Trioxide Aggregate against resistant endodontic microorganisms

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## Abstract:

*Microorganisms and their by products are the main cause of pathological changes in dental pulp (root canals) and periapical region. Facultative bacteria and fungi have been identified in therapy resistant persistent endodontic infection. The objectives of this study was to evaluate the antimicrobial efficacy of Calcium hydroxide and Mineral Tri Oxide Aggregate (MTA) against therapy resistant endodontic microorganisms and compared between them. Six standard bacterial stains were used: Staphylococcus aureus, Pseudomonas aeruginosa, Escherichia coli, bacillus subtilis, Candida albicans and Enterococcus faecalis. The agar diffusion method on Muller-Hilton media was employed. The plates containing media were inoculated with the specified bacterial suspensions. Two standard holes were prepared on each microorganism inoculated plate with a copper puncher and one hole was completely filled with Ca (OH)<sub>2</sub> and other with MTA . The plates were then kept at environmental temperature for one hour to ensure prediffusion and then incubated at 37°C for 24 hours. After 24 hours, the diameters of inhibition zones were measured. Tests were replicated for thirty times for each sample and mean values were taken. Zone of inhibition as measured for Ca (OH)<sub>2</sub> and MTA were statistically analyzed with Student's t-Test .Both Ca(OH)<sub>2</sub> and MTA were found to produce zone of inhibition against Staphylococcus aureus (ATCC 25923), Pseudomonas aeruginosa (ATCC 27853), Bacillus subtilis (BTCC 17), and Candida albicans (BTCC 493). Ca (OH)<sub>2</sub> showed highest activity against S. aureus and lowest activity against P. aeruginosa which was similar to the activity range of MTA against the mentioned organisms. But both of them failed to produce any activity against E. coli and E. faecalis. MTA was found to produce a lower efficacy than Ca (OH)<sub>2</sub> while comparing the zone of inhibition between them and statistically it was significant. Ca (OH)<sub>2</sub> and Mineral Tri Oxide Aggregate (MTA) showed antimicrobial efficacy against some therapy resistant microorganisms but they did not show antimicrobial efficacy against Escherichia coli and Enterococcus faecalis.*

**Keywords:** Calcium hydroxide, Mineral Tri Oxide Aggregate (MTA), antimicrobial efficacy.

(Bangladesh Dental Journal 2016; 32: 27-32) .

## Introduction:

Progress has been made in understanding the nature of root canal infection and periapical diseases. Success of

endodontic treatment and retreatment depends on elimination of bacteria and their substrate from the root canal<sup>1</sup>. Asepsis and sterilization in the root canal system is usually accomplished by biomechanical preparation with intra-canal medicaments. It has been shown that instrumentation and antibacterial irrigation renders 50-70% of infected canals free of microorganisms while the remaining canals content vital bacteria. So the importance of antimicrobial medicaments in root canal therapy can not be over looked. Therefore, there has been a continuous search for new endodontic medicaments that present an ideal combination of good antimicrobial, mechanical, physiochemical and biological properties.

Calcium hydroxide has been used as an root canal medicament, but sometimes found to be resistant in failed endodontic cases, especially in presence of certain resistant microorganism like Enterococci faecalis, E.coli etc.<sup>2</sup> Because of relative inefficient activity of calcium hydroxide, concerning the treatment of persistent infection

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cases, new endodontic materials search has been even more incessant.

**Mineral Trioxide Aggregate or MTA** is a new promising material, have shown a significant improvement over other materials in endodontics. Perforation, pathological incomplete root formation, periapical surgery, resorption etc. are often associated with failed or resistant endodontic cases, in which situation MTA has been proven as most effective repairing restorative material.<sup>3-7</sup> But regarding these situations, the antimicrobial efficacy of MTA and calcium hydroxide especially against resistant microorganisms has not been clarified yet. Therefore the objective of this study is to evaluation of antimicrobial efficacy of calcium hydroxide and Mineral Trioxide Aggregate on resistant endodontic microorganisms. and compared between them.

#### Materials and Methods:

The prospective comparative study was done in the Department of Conservative Dentistry and Endodontics, and the Department of Microbiology and Immunology, Bangabandhu Sheikh Mujib Medical University Hospital. *Staphylococcus aureus* (ATCC 25923), *Pseudomonas aeruginosa* (ATCC 27853), *Escherichia coli* (ATCC 25922), *Bacillus subtilis* (BTCC 17), *Candida albicans* (BTCC 493) and *Enterococcus faecalis* (clinically isolated) were collected (Fig 1) and preserved in crio vial with 20% glycerin broth and stored in liquid nitrogen at  $-196^{\circ}\text{C}$  temperature

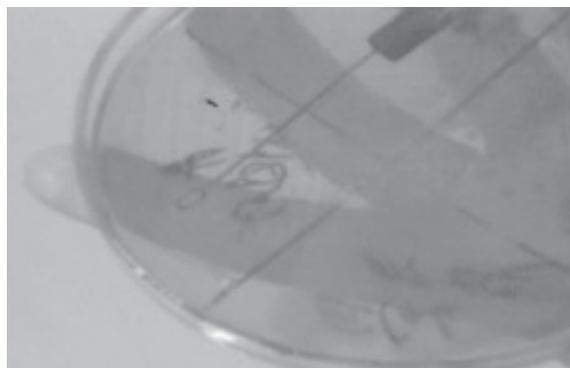


**Fig.-1:** Organisms containing plate

Mueller Hinton agar media was poured in sterilized Petri Dishes and left till the media turned into gel form. Prepared potato dextrose media was collected and preserved in the same manner.

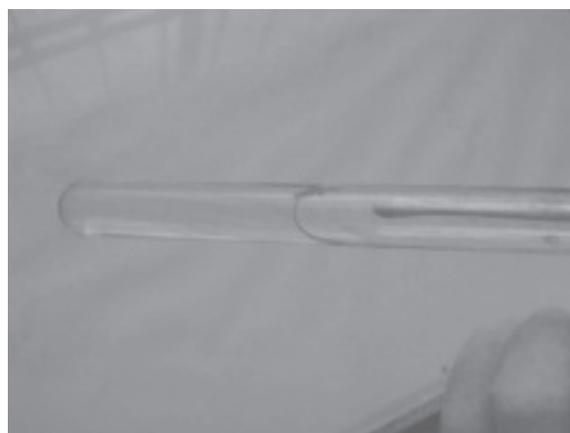
All the Prepared dishes were stored in refrigerator at  $4^{\circ}\text{C}$  until use. Immediately before inoculation, all the media containing plates were dried in dryer to make moisture free.

From the collected microbial specimens, using a sterilized swab, a lawn of single microbiological strain other than *Candida albicans* were taken (Fig 2) and spreaded over a sterilized Mueller Hinton Plate.



**Fig.-2:** Lawn of organism is being taken for preparation of standard suspension

*Candida albicans* was spreaded over a sterilized potato dextrose agar media. All the plates were incubated for 24 hours at  $37^{\circ}\text{C}$  in incubator. Different microbiological strains were sub-cultured in different plates. A standard microbiological suspension was prepared compare with 0.5 McFarland Scale. (0.5 McFarland Scale =  $1.5 \times 10^8$  CFU). The dried media in Petri dish was then inoculated with the prepared standard suspension of 0.5 McFarland Scale by sterile swab stick (Fig 3 & 4).

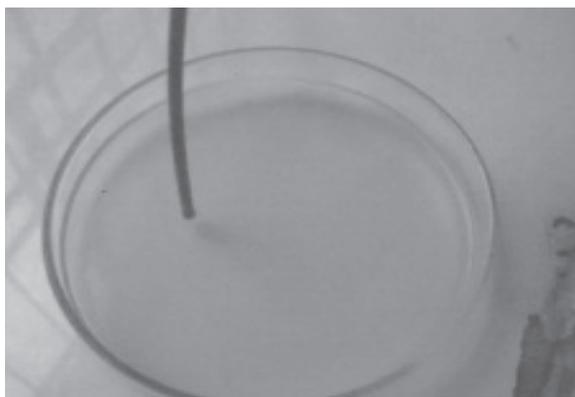


**Fig.-3:** Organism being taken from standard suspension by sterilized swab



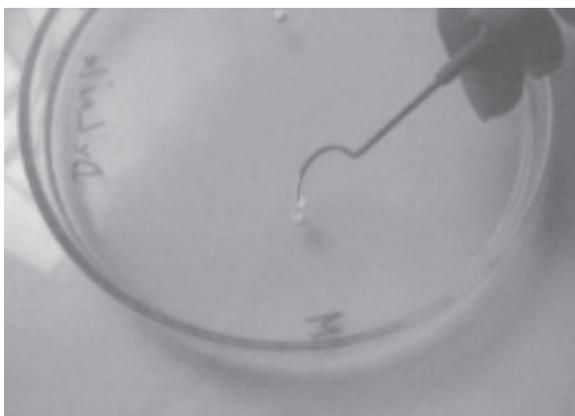
**Fig.-4:** Organism being inoculated on Muller Hilton media

Now two standard holes of 3 mm diameter and 4 mm depth were prepared on each individual micro organism inoculated plate with a copper puncher (Fig 5).



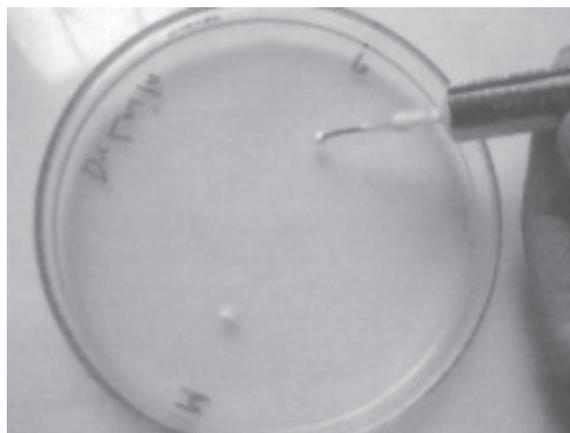
**Fig.-5:** Punching of media with copper puncher

Mineral trioxide aggregate paste (Pro root MTA, Dentsply, Tulsa, USA) or MTA paste was made in a creamy consistency. One prepared hole in inoculated media was then completely filled immediately by MTA following its preparation (Fig 6).



**Fig.-6:** Placement of prepared MTA into the punched cavity on organism inoculated media

Calcium hydroxide paste was directly poured into another hole from its tube with the help of a needle supplied by manufacturer (Fig 7).



**Fig.-7:** Placement of  $\text{Ca(OH)}_2$  into the punched cavity on organism inoculated media

All the micro organism inoculated plates were maintained at room temperature for 1 hour to allow pre diffusion of the materials, and then incubated at  $37^\circ\text{C}$  for 24 hours. After 24 hours, plates were taken out of the incubator and observed for formation of zones of microbial inhibition (Fig.8).



**Fig.-8:** Zone of Inhibition on Muller Hilton media

The zones were then measured with a millimeter ruler with accuracy of 0.5mm. Data were posted on respective data sheets. Tests were replicated for thirty times on each sample.

After completion of the procedure, data were collected and posted on data sheets. The statistical analysis was done for the test of significance.

Data were processed and analyzed using one way ANOVA with multiple comparisons facilitated by Student's t-Test test. A p value  $< 0.05$  was considered significant.

**Results:**

Both Ca (OH)<sub>2</sub> and MTA were found to produce zone of inhibition against *Staphylococcus aureus* (ATCC 25923), *Pseudomonas aeruginosa* (ATCC 27853), *Bacillus subtilis* (BTCC 17), and *Candida albicans* (BTCC 493). (Fig 8) MTA showed highest activity against *S. aureus* and lowest activity against *P. aeruginosa* which was similar to the activity range of Ca (OH)<sub>2</sub> against the mentioned organisms. But both of them failed to produce any activity against *E. coli* and *E. faecalis*. MTA was found to produce a lower efficacy than Ca (OH)<sub>2</sub> while comparing the zone of inhibition between them and statistically it was significant.

The findings of the study derived from data analysis are documented in tabular form (Table I- Table III).

**Table-I**

*Efficacy of MTA and calcium hydroxide on different microorganisms*

| Microorganisms <sup>#</sup> | Zone of inhibition <sup>#</sup> produced around holes (mm) |                   |
|-----------------------------|--|-------------------|
|                             | MTA  | Calcium hydroxide |
| <i>S. aureus</i>            | 14.65  | 24.48             |
| <i>P. aeruginosa</i>        | 8.20   | 12.20             |
| <i>E. coli</i>              | 0  | 0                 |
| <i>E. faecalis</i>          | 0  | 0                 |
| <i>B. subtilis</i>          | 10.70  | 15.83             |
| <i>Candida albicans</i>     | 12.27  | 15.73             |

# Means of thirty times assays.

Table-I shows that both MTA and Calcium hydroxide produced highest zone of inhibition against *S. aureus* But failed to produced any zone of inhibition against *E. coli* and *E. faecalis*.

**Table-II**

*Compare of efficacy of MTA and calcium hydroxide on different microorganisms*

| Microorganisms <sup>#</sup> | Zone of inhibition produced around holes (mm) |                             | p-value <sup>#</sup> |
|-----------------------------|---|-----------------------------|----------------------|
|                             | MTA (n = 180)                                 | Calcium hydroxide (n = 180) |                      |
| <i>S. aureus</i>            | 14.65 ± 0.53                                  | 24.48 ± 0.61                | < 0.001              |
| <i>P. aeruginosa</i>        | 8.20 ± 0.25                                   | 12.20 ± 0.25                | < 0.001              |
| <i>E. coli</i>              | 0   | 0                           | ————                 |
| <i>E. faecalis</i>          | 0   | 0                           | ————                 |
| <i>B. subtilis</i>          | 10.70 ± 0.70                                  | 15.83 ± 0.69                | < 0.001              |
| <i>Candida albicans</i>     | 12.27 ± 0.45                                  | 15.73 ± 0.69                | < 0.001              |

# Data were analysed using Student's t-Test and were presented as mean ± SD.

Table-II shows that In the culture media containing microorganisms like *S. aureus*, *P. aeruginosa*, *B. subtilis* and *Candida albicans*, the zone of inhibitions produced around the holes of MTA was observed to be significantly smaller than those produced around calcium hydroxide suggesting that the efficacy of calcium hydroxide is better than that of MTA on the four organisms (p < 0.001 in each case). However, neither calcium hydroxide nor MTA was found effective on *E. coli* and *E. faecalis* as no zone of inhibition was found to be produced in the media containing culture of these two organisms.

**Table-III**

*Comparison of zone of inhibition between MTA and Calcium hydroxide*

| Zone of inhibition(mm) | Group        |                            | p-value <sup>#</sup> |
|------------------------|--------------|----------------------------|----------------------|
|                        | MTA (n= 180) | Calcium hydroxide (n= 180) |                      |
|                        | 7.64 ± 5.76  | 11.38 ± 8.89               | < 0.001              |

# Data were analyzed using Student's t-Test Test and were presented as mean ± SD.

Table-III compares the zone inhibitions produced around the holes in culture plates of irrespective of different microorganisms. The zone of inhibition produced around holes containing MTA was observed to be significantly smaller (7.64 ± 5.76) compared to that produced around holes containing calcium hydroxide (11.38 ± 8.89 mm) irrespective of microorganisms (p < 0.001).

**Discussion:**

In the present study both Calcium Hydroxide and Mineral Trioxide Aggregate (MTA) showed antimicrobial activity against *S. aureus*, *P. aeruginosa*, *B. subtilis* and *C. albicans*. The findings are similar to the findings of Sipert et al.<sup>8</sup> who using similar methodology observed in vitro antimicrobial activity of MTA and calcium hydroxide based sealers (i.e. sealapex, fill canal, and Portland cements) against those organisms.

The reason for antimicrobial activity of MTA has been explained by the study of Duarte et al<sup>9</sup> who demonstrated that the antimicrobial activity is seem to be related with elevated pH. Furthermore MTA contains calcium oxide, which when mixed with water; forms calcium hydroxide and induces an increase in pH by dissociation of calcium and hydroxide ions. An increase in pH level (pH 12.5), creates an unfavorable environment for microbial growth<sup>10</sup> because high pH is considered as bactericidal. Hydroxyl

ions kill bacterial cells by damaging the cytoplasmic membrane, protein denaturation and damaging the DNA. Torabinejad et al<sup>11</sup> observed an initial pH of 10.2 for MTA, rising to 12.5 in 3 h. The antimicrobial activity of calcium hydroxide may also be related to ionization with subsequent release of hydroxyl ions and an increase in pH levels (pH 12.5). The antimicrobial activity of MTA-based materials against *Candida albicans* observed in the present study can also be explained by the sensitivity of this strain to high pH. Al-Nazhan and Al-Judai<sup>12</sup>, demonstrated that at a stable concentration of 50 mg/ml, white MTA was able to eliminate *C. Albicans* in vitro for up to three days.

Present study findings solely contradict with the study findings of Filho et al.<sup>10</sup> who observed in vitro antimicrobial activity of Endodontic sealers, MTA based cements and Portland cement. They showed that all above mentioned organisms including *E.coli* and *E. faecalis* also inhibited by those materials. However, the difference between our study and the study of Filho et al<sup>10</sup> may be due to using double layered agar plates and different concentration of microorganisms.

In the present study *E. coli* and *E. faecalis* were found to be resistant against the anti microbial activity of MTA and calcium hydroxide. Using agar diffusion method, Sipert et al<sup>8</sup> while observing in vitro antimicrobial activity for sealapex, fill canal, Pro Root MTA, and Portland cements found no antimicrobial activity of MTA and Portland cement against *E. coli*. Ribeiro et al<sup>13</sup> in an anaerobic condition, observed in vitro antimicrobial activities for MTA, calcium hydroxide and Portland cement; but found no antimicrobial activity against *E. coli* and *E. faecalis*. Miyagak et al<sup>14</sup> also showed MTA and calcium hydroxide containing sealer have no antimicrobial effect against *E.coli*, *E. faecalis* etc with same methodology. Studies have shown that *E. faecalis* got killed only at a pH greater than 10-12 due to an inbuilt proton pump which enables it to survive in such alkaline environments.<sup>15</sup> The materials may also need direct contact with the bacteria for acting.

While comparing the antimicrobial activity of MTA and calcium hydroxide, although the mechanism of action of antimicrobial activity of MTA and calcium hydroxide is more or less same, in the present study, Mineral Trioxide Aggregate showed an antimicrobial activity lower than calcium hydroxide. This result is similar with previous study.<sup>8,10,13,16</sup> This variation in antimicrobial activity between MTA and Ca(OH)<sub>2</sub> may be due to different diffusion and dissociation capabilities of two materials. Some substances have difficulty in dissociating and

diffusing in agar (semi-solid medium), not expressing their real antimicrobial effect.<sup>17</sup> A material that diffuses more easily will probably provide larger zones of microbial growth inhibition.<sup>18</sup> However, great care was taken to keep the plates for 1 h at room temperature to allow the diffusion of the agents through the agar and then incubated.

Although used by many authors, differences in agar medium, diffusion capacity of inhibitory agents, bacterial strains and cellular density, as well as anaerobic atmosphere may interfere with formation of inhibition zones around materials used in antimicrobial testing.<sup>8,13,16</sup> However, there is not a consensus regarding to a gold standard test for the appraisal of antimicrobial testing of cements and other solutions used in dental therapy.

### Conclusion:

According to the study findings, it can be concluded that MTA, though it was found effective against *Staphylococcus Aureus*, *Pseudomonas aeruginosa*, *Bacillus subtilis*, and *Candida albicans*; but it showed a lower efficacy than Ca(OH)<sub>2</sub>. On the other hand both Ca (OH)<sub>2</sub> and MTA found inactive against *E.coli* and *E. faecalis*. So considering all these findings it can be recommended that for achieving asepsis in endodontic infection, Ca(OH)<sub>2</sub> is preferable and should be used but continuing search should carry on to find out more effective material even against *E.coli* and *E. faecalis*.

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# Infection control measures in some selected NGO clinics in Dhaka City

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## Abstract:

*This descriptive type of cross sectional study was conducted in selected NGO clinics in Dhaka. There are 236 NGO clinics in Dhaka City. A total of 17 clinics were included in this study using simple random technique and 51 respondents were purposively selected among which 16 were doctors and 35 were paramedics. Semi-structured questionnaire by giving the questionnaire to the respondents and observation checklist were used for data collection. The study was conducted for a period of six months starting from January 2012 to June 2012. The main objective of the study was to assess the available infection control measures and their level of utilization in selected NGO clinics in Dhaka city. The study revealed that appropriate antiseptic solution were available in all the clinics (100%), sixteen clinics have plastic bucket, non-metallic spoon, detergent powder and sterilizer or autoclave machine. Availability of sterile gloves were only in 12 clinics. In all clinics instruments were decontaminated in 0.5% chlorine solution for 10 minutes after use. All medical officers and paramedics washed their hands after soiled instruments, touching body fluids and mucous membrane. Rate of use of utility gloves were less. Only 44% medical officers and 46% paramedics used utility gloves during handling contaminated waste.*

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## Introduction:

The term infection is the successful invasion, establishment and multiplication (growth) of microorganisms in living tissues of a host and producing signs and symptoms of disease. Usually an infection is the colonization of a host organism by parasite species. Infecting parasites seek to use the host's resources to reproduce, often resulting in disease. Colloquially, infections are usually considered to be caused by microscopic

organism or micro-parasites like viruses, bacteria, viroids, though larger organism like macro parasites and fungi can also infect. An infection is defined as Nosocomial when it is originated in hospital environment. Most of the Nosocomial Infections (NIs) -manifest when the patient stay in the hospital; however, hospital-acquired infections may have onset after the patient has left the hospital. These cases have been recognized as Hospital Acquired Infections (HAIs) Nosocomial Infections (NIs) occur worldwide and affect both developed and resource-poor countries. Infections acquired in health care setting are among the major causes of death and increased morbidity among hospitalized patient. They are a significant burden both for the patient and public health<sup>1</sup>.

Many factors promoted infection among hospitalized patients: decreased immunity among patient; the increasing variety of medical procedures and invasive techniques creating potential routes of infection; and the transmission of drug-resistant bacteria among crowded hospital populations, where poor infection control practices may facilitate transmission. Infection control largely depends on placing barriers between a susceptible host (person lacking effective natural or acquired protection) and the microorganisms. Protective barriers are physical, mechanical or chemical processes that help to prevent the spread of infectious microorganisms from: Person to person (patient, healthcare client or health worker); and/

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or, Equipment, instruments and environmental surfaces to people<sup>2</sup>.

Nosocomial (hospital acquired) infections are a significant problem throughout the world and are increasing. For example, nosocomial infection rates range from as low as 1% in a few countries in Europe and the Americas to more than 40% in parts of Asia, Latin America and Sub-Saharan Africa<sup>3</sup>. Protective barrier in infection control include hand washing, wearing gloves properly, use of antiseptic solutions, decontamination and cleaning, sterilization of necessary equipment, instruments and materials, high level disinfection facilities e.g. boiling in water or soaking instruments in various chemical disinfectant like - Formaldehyde, Hydrogen Peroxide, Glutaraldehydes etc. Decontamination is the first step in processing contaminated surgical instruments, reusable gloves and other items. Decontamination is a process that makes inanimate objects safer to be handled by staff before cleaning (i.e., inactivates HBV, HCV and HIV and reduces, but does not eliminate, the number of her contaminating micro-organism<sup>4</sup>.

The inability of hospital and clinic administrators in resource poor countries like Bangladesh, to provide the required protective equipment, especially sufficient new examination gloves, remain a problem. In addition, the challenges of providing clean water and achieving acceptable standards of medical instrument processing and waste removal remain unmet in many countries. In most cases, staff training to implement these new isolation precautions for every client attending a clinic or every hospitalized patient will require that resources be shifted from one priority area to another. Moreover the regular supervision needed to assure compliance is seldom affordable or available<sup>14</sup>. Hand-washing is the most effective way of preventing the spread of infectious diseases<sup>15</sup>. Infection control practice especially standard precautions encompass all the basic principles of infection control that are mandatory in all health care facility. Their applications extend to every hospital patient, regardless of their diagnosis, risk factor and presumed infectious status to patient and staff of acquiring an Infection. Standard precautions essentially provide a clean environment and promote patient safety at a very basic level.

#### Methodology:

This present study was a descriptive type of cross sectional study. It is conducted in the Department of Public Health

and Hospital Administration in National Institute of Preventive and Social Medicine (NIPSOM) in the period of January 2012 to June 2012 in 17 NGO Clinics in Dhaka City.

Study population was the entire provider both medical officers and paramedics working in the study site. A questionnaire and a check list for doctors and paramedics were prepared and used for data collection. Analysis of the data was finally done with Statistical Package for Social Science (SPSS) program of computer on the basis of different variables. Chi-Square test was followed to show association among the variables.

#### Results:

The results of the using of infection control facilities in some selected clinics are presented in the following tables.

Distribution of respondents by socio demographic data:

**Table-I**

*Distribution of the respondents by age: n=51*

| Age in years | Doctor N(%) | Paramedics N(%) | Total     |
|--------------|-------------|-----------------|-----------|
| 25-30        | 6(37.5)     | 12(34.3)        | 18(35.2)  |
| 30-35        | 8(55.8)     | 18(51.4)        | 26(50.9)  |
| 35-52        | 2(12.5)     | 5(14.3)         | 7(13.7)   |
| Total        | 16(31.3)    | 35(68.6)        | 51(100.0) |

Mean±SD 26.95±3.81

Age Range: 25-52 years Table-I shows that, 35.2% respondents were at the age of 25-30 years of which 37.5% were doctors and 34.3% were paramedic. 50.9% were in the age group of 30-35 years of which 50% and 51.42% were doctors and paramedic respectively. Rest of 13.7% was 35-52 years.

**Table-II**

*Distribution of the respondents by gender: n = 51*

| Gender | Doctor N(%) | Paramedics N(%) | Total    |
|--------|-------------|-----------------|----------|
| Male   | 9(33.3)     | 18(66.6)        | 27(52.9) |
| Female | 7(29.2)     | 17(70.8)        | 24(47.1) |
| Total  | 16(31.4)    | 35(68.7)        | 51(100)  |

Table -II: Shows that 52.9% were male of which 33.3 % were doctors & 66.6 % paramedics and 47.1 % were female of which 29.2% & 70.8% were doctors & paramedics accordingly.

There are 14 (82.4%) clinics having separate sink with running water for hand washing and cleaning contaminated items before sterilization, 12 (70.6%) clinics having sterile gloves for pelvic examination and procedure, 17 (100.0%) clinics having appropriate antiseptic solution for cleaning vulva, crevix (1:20 savlon solution), injection site (rectified spirit) and 16 (94.1%) clinics having plastic bucket for the preparation of chlorine solution shown in Table-III.

There are 16 (94.1%) clinics having detergent powder for cleaning decontaminated items, 16 (94.1%) clinics having tooth brush to clean toothed instruments, 15 (88.2%) clinics having Rack and hanger with clip for drying instruments and gloves, and 16 (94.1%) clinics having active sterilizer or autoclave for appropriate sterilization of instrument shown in Table-IV.

Among the all respondent 12 (75.0%) medical officers and 24 (68.6%) paramedics wash their hand before direct contact with a customer and 16 (100.0 %) medical officers and 35 (100.0%) paramedics wash their hand after handling soiled instruments, touching body fluids and mucos membrane shown Table-V.

Among the respondent 10 (62.5 %) medical officers and 28 (80.0 %) paramedics dispose sharp objects in puncture-resistant contain and only 07 (43.8 %) medical officers and 28(45.7 %) paramedics use utility glove during handling contaminated waste shown in Table-VI.

The results of the using of infection control facilities in some selected clinics are presented in the following tables.

**Table III**

*Frequency distribution of facilities among the Clinics which had sink, Sterilegloves, antiseptic solution and plastic bucket for infection control. [n=17]*

| Name of the facility            | No. of clinics | Percentage |
|---------------------------------|----------------|------------|
| <b>Sink with running water:</b> |                |            |
| Available                       | 16             | 94.1       |
| Not available                   | 01             | 05.9       |
| <b>Sterile gloves:</b>          |                |            |
| Available                       | 16             | 94.1       |
| Not available                   | 01             | 05.9       |
| <b>Antiseptic solution:</b>     |                |            |
| Available                       | 17             | 100.0      |
| Not available                   | 00             | 00.0       |
| <b>Plastic bucket:</b>          |                |            |
| Available                       | 16             | 94.1       |
| Not available                   | 01             | 05.9       |

**Table-IV**

*Frequency distribution of NSDP Clinics that had cleaning and autoclaving facilities for infection control. n = 17*

| Name of the facility              | No. of clinics | Percentage |
|-----------------------------------|----------------|------------|
| <b>Detergent powder:</b>          |                |            |
| Available                         | 16             | 94.1       |
| Not available                     | 01             | 05.9       |
| <b>Tooth brush:</b>               |                |            |
| Available                         | 16             | 94.1       |
| Not available                     | 01             | 05.9       |
| <b>Rack and hanger with clip:</b> |                |            |
| Available                         | 15             | 88.2       |
| Not available                     | 02             | 11.8       |
| <b>Sterilizer or autoclave:</b>   |                |            |
| Available                         | 16             | 94.1       |
| Not available                     | 01             | 05.9       |

**Table-V**  
*Frequently distribution of service provider who utilized hand washing measures for infection control during their service delivery.*

| Utilization of service facilities  | Service provider          |       |                      |       |
|--|---------------------------|-------|----------------------|-------|
|  | Medical officer<br>[n=16] |       | Paramedics<br>[n=35] |       |
|  | No.                       | %     | No.                  | %     |
| Hand washing before direct contact with a customer:                                      |                           |       |                      |       |
| Washed hand  | 12                        | 75.0  | 24                   | 68.   |
| Not washed hand  | 04                        | 25.0  | 11                   | 31.4  |
| Hand washing after handling solid instruments, touching body fluids and mucous membrane: |                           |       |                      |       |
| Washed hand  | 16                        | 100.0 | 35                   | 100.0 |
| Not washed hand  | 00                        | 00.0  | 00                   | 00.0  |

Among the all respondent 12 (75.0%) medical officers and 24 (68.6%) paramedics wash their hand before direct contact with a customer and 16 (100.0%) medical officers and 35 (100.0%) paramedics wash their hand after handling solid instruments, touching body fluids and mucous membrane shown in the above table.

**Table-VI**  
*Distribution of service provider who disposed sharp objects properly and used utility gloves during handling contaminated waste.*

| Utilization of service facilities                       | Service provider          |      |                      |      |
|---|---------------------------|------|----------------------|------|
|   | Medical officer<br>[n=16] |      | Paramedics<br>[n=35] |      |
|   | No.                       | %    | No.                  | %    |
| Disposed sharp objects in puncture-resistant container: |                           |      |                      |      |
| Disposed properly                                       | 10                        | 62.5 | 28                   | 80.0 |
| Did not dispose properly                                | 03                        | 37.5 | 07                   | 20.0 |
| Use of utility glove:                                   |                           |      |                      |      |
| Used  | 07                        | 43.8 | 16                   | 45.7 |
| Did not use   | 09                        | 56.2 | 19                   | 54.3 |

Among the all respondent 10 (62.5%) medical officers and 28 (80.0%) paramedics dispose sharp objects in puncture-resistant container and only 07 (43.8%) medical officers and 16 (45.7%) paramedics use utility glove during handling contaminated waste shown in the above table.

#### **Discussion:**

From the present study it is evident that maximum respondents were in age group of 30-35 years which is 50.9% and lowest percentage is 13.7% which in the age group 35-50 years. The age range was 25 to 52 years. A descriptive type of cross sectional study was done to assess the available infection control measures and their level of utilization in NGO clinics in Dhaka city. A total of 17 clinics were included in the study. Among the all respondents there were 16 medical officers (31.4 %) and 35 (68.6%) paramedics.

All the materials for infection control were available in 8 clinics (47%). Out of 12 items 11 items were present in 3

clinics (18%), 10 items in 2 clinics (12%), 9 items in 3 clinics (18%) and 8 items were present in 1 clinic (06%). The materials which were present in the clinics were active and functioning. Clinic manager is responsible for proper management of the facilities. In the study it was found that all the clinics have appropriate antiseptic solution for cleaning vulva, cervix (1:20 savlon solution), injection site (rectified spirit) and wooden stirrer for proper mixing of bleaching powder in the process of 0.5% chlorine solution preparation. 16 clinics (94.12%) had the facilities like bucket for chlorine solution, clean water and waste, non-metallic spoon, detergent powder, tooth brush and autoclave machine. 15 clinics (88.24%) used utility gloves for handling sharp instruments and during the preparation

of 0.5% chlorine solution. Though the other facilities for the preparation of 0.5% chlorine solution are available but some clinics do not have air tight non-transparent pot for bleaching powder.

All the clinics (100%) decontaminated the items for 10 minutes. They used timer for counting time exactly. 16 clinics (94.1%) clean decontaminated items in running water, using detergent powder and autoclave all the items by maintaining appropriate procedures. 14 clinics (82.4%) maintained appropriate time for boiling the instruments (Boil instruments for 30 minutes after boiling point).

Table-V shows that 75 % medical officer washed their hand before direct contact with a customer where as this rate is 68.6% in case of paramedics. But this difference is not statistically significant as the p value calculated by exact test is 0.453 (>0.05). Although the result shows a little more frequency in case of medical officer over paramedics. This Table also shows higher frequency (100%) in case of medical officer over paramedics regarding use of appropriate antiseptic solution. This difference is not statistically significant as p value is 0.6862 calculated by Fisher- Irwin exact test. There is no sufficient research document regarding hand washing by the service providers in different occasions of infection control. But a study by hand washing liaison group state that overall frequency of hand washing by all health care worker was 37%.

Fisher- Irwin exact test also reveal no statistical difference in this case as p value is 0.243 (>0.05). Almost 63 % medical officers disposed sharp object in puncture-resistant container, but this frequency is 80 % in case of paramedics shown in Table- VI. This difference is not statistically significant as the value of Chi-square is 0.969 with a p value 0.325 at df-1 (CI: 0.920-1.84). But as the Odds Ratio is 0.41, so medical officers are 59% more likely to dispose sharp object in puncture-resistant container. Regarding the use of utility gloves during handling contaminated waste, 44% medical officers and 46% paramedics follow this procedure. Although medical officers have higher frequency, but as the Chi-square result is 0.0297 with a p value 0.863, this difference is not statistically significant.

### Conclusion:

Hospital acquired infection (HAIs) is a major safety for both healthcare providers and the patients. Considering morbidity, mortality, increased length of stay and the costs, effort should be made to make the hospitals as safe as possibly by preventing such infections. In this study, knowledge and training of staff on infection control measure was poor. Washing hands of the staff before direct contact with patient and using utility gloves by the staff not up to the mark. Drawbacks were also seen in the

process of decontamination and sterilization of instruments.” Infection control practice” especially standard precautions encompass all the basic principles of infection control that are mandatory in all health care facility. Intense surveillance , intense control measure and adequate number infection control professionals are utmost important to control infections in clinics.

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# A study on oral health status of 5 to 12 years old school going children in rural Bangladesh

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## Abstract:

*Oral health is essential to general health and quality of life. Proper care of oral health should be taken regularly. It is very important to monitor the oral health condition from early life. Therefore a cross sectional study was done among primary school children of Mathbaria, Pirojpur, Bangladesh to assess the oral health status of rural Bangladesh. The study showed that the oral hygiene of school children was poor with high dental caries prevalence indicating lack of accurate oral hygiene practices. Hence, awareness regarding oral hygiene habits should be generated among students and their guardians by conducting regular screening programmes in schools for early diagnosis and rapid treatment.*

**Keywords:** Oral health, children, oral hygiene, awareness, rural Bangladesh.

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## Introduction:

Oral health is a state of being free from mouth and facial pain, oral and throat cancer, oral infection and sores, periodontal (gum) disease, tooth decay, tooth loss, and other diseases and disorders<sup>1</sup>. It assists a person to speak, eat and socialize without active disease, discomfort or embarrassment<sup>2</sup>. Oral health status is an essential part of our health, which has a direct impact on general health<sup>3</sup>. Poor oral health affects children nutrition, growth, and development as well as attendance at school<sup>4</sup>. More than 50 million school hours are lost annually because of oral health problems that affect children's performance at school and success in future life<sup>5</sup>. School age is a period of overall development<sup>6</sup>. During this period the child learns to become productive and constructive affiliates of the society<sup>7</sup>. If the right oral hygiene habits can be promoted during this period of life, practices will go a long way in keeping the good oral health of a child throughout the life<sup>8</sup>. Furthermore, if a disease can be prevented at an early stage, it will decrease the impact on the cost and methods

of treatment<sup>9</sup>. In order to evaluate the scale of the preventive task for oral disease it is necessary to diagnose the magnitude and severity of the disease. Therefore the present study was conducted with the objective of knowing oral health status as well as the burden of oral diseases among primary school children of Mathbaria, Pirojpur, Bangladesh.

## Materials and methods:

A cross sectional study was conducted in 3 rural primary schools of Mathbaria, Pirojpur, Bangladesh. Total numbers of 150 school children were taken from these schools for the study. Children were from 5 to 12 years of age. The children were examined in their respective schools by four professional dentists. All intra-oral examinations were done according to WHO.

Oral health survey methods using dental mirror, explorer and natural illumination after seating the children on a chair. Instruments were disinfected with an antiseptic solution after every uses. Modified WHO oral assessment form was used for evaluating the oral health condition of the students. The dental indices used for assessing for oral health status are as follows: OHIS – Oral hygiene index simplified, DMFT (Decalcifying, Missing, Filled Tooth) – Dental caries index in permanent dentition and deft index (decayed extracted filled tooth). Data was analyzed using descriptive and inferential statistics.

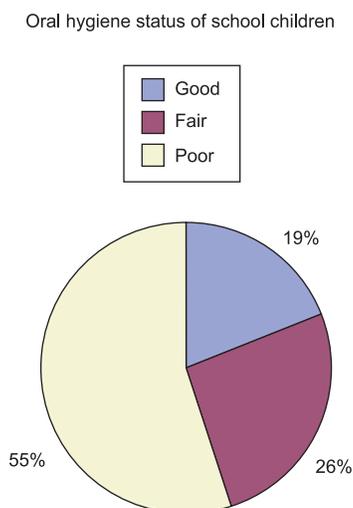
## Results:

The result showed that 55% students had poor oral hygiene, 26% had fair oral hygiene and rest had good oral hygiene. The frequency of gingivitis among the students was 47% among which 38% had mild and only 0.3% had

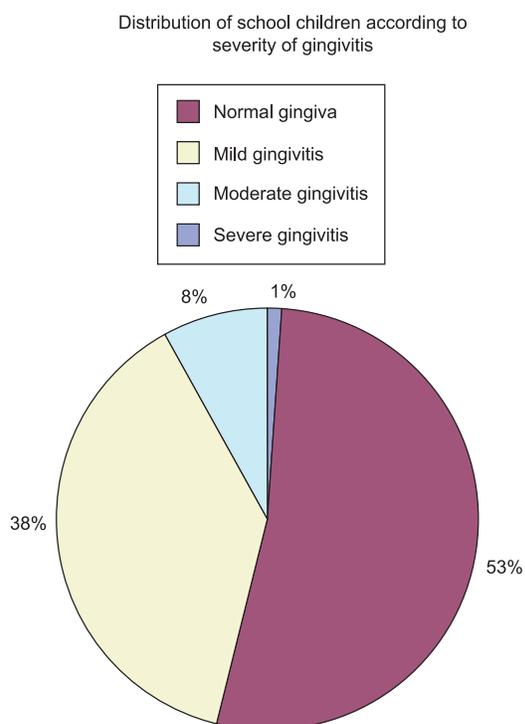
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severe gingivitis. The mean DMFT score of the students was 0.91. The chief contribution was by decayed teeth. The mean for missing teeth was 0.1 and filled teeth were 0.2. The mean ‘def’ score was 0.65 in which the major part was by decayed tooth (0.56) and for extracted teeth it was 0.10.



**Fig.1:** Oral Hygiene Status of School Children



**Fig.-2:** Distribution of School Children According to Severity of Gingivitis

**Table-I**  
*Distribution of DMFT Scores of School Children*

| DMFT score for permanent dentition | Mean | SD   |
|------------------------------------|------|------|
| Decayed Teeth                      | 0.89 | 0.89 |
| Missing Teeth                      | 0.10 | 0.53 |
| Filled Teeth                       | 0.20 | 1.80 |
| DMFT score                         | 0.91 | 0.91 |

**Table-II**  
*Distribution of def Scores of School Children*

| def score primary dentition | Mean | SD   |
|-----------------------------|------|------|
| Decayed Teeth               | 0.56 | 0.89 |
| Extracted Teeth             | 0.10 | 0.50 |
| Filled Teeth                | 0.00 | 0.00 |
| def score                   | 0.65 | 1.00 |

**Discussions:**

The study reveals that, maximum percentage (55%) of the children had poor oral hygiene, which indicates their lack of awareness of oral health and faulty oral habits. In this study high frequency of gingivitis was found which again reflects the ineffective maintenance of oral hygiene and pubertal changes in case of girls. According to world health organization, dental caries is still a major health problem as it affects 60-90% of school-aged children<sup>10</sup>. The present study reveals high prevalence of decayed teeth due to dental caries in both primary and permanent teeth, which might be due to high percentage of poor oral hygiene. In this study it was found that caries rate is high in permanent dentition than in primary dentition. The cause behind this could be due to the fact that permanent teeth are exposed to cariogenic diet from the time of eruption till the teeth are in situ<sup>11</sup>.

Since, the primary school children do not know much about dental diseases and methods of their prevention, therefore a study on oral health assessment at an early age can help to improve preventive dental practices and attitudes, which could be beneficial and constructive for the future of these children. Oral health means more than healthy teeth and is fundamental to general health and well being, significantly impacting on quality of life<sup>1</sup>. So, good oral health along with sound general health can be achieved by educating the parents, students and teachers about dental health through school dental health program. Awareness and

consciousness of the parents, teacher and the students about oral health can give a commitment for better future to the whole nation.

### Conclusions:

Information provided by the current study can be used as initial data. More wide-ranging epidemiological studies should be done at a district level to access and confirm various dental diseases and associated risk factors in this region. School dental health programmes should be arranged frequently in order to reach the goals of WHO and also because the children in this rural area do not have adequate access to qualified dental treatment.

### Conflict of Interest:

None declared.

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# A comparative study on CT scan and Ultrasonogram for the detection of metastatic lymphnodes from Oral squamous cell carcinoma

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## Abstract:

*Cervical metastasis has a tremendous impact on the prognosis in patients with carcinomas of the head and neck and the frequency of such spread is greater than 20% for most squamous cell carcinomas. It is possible to reduce the risk of undiagnosed metastasis with accurate imaging techniques and thus probably reduce the number of elective neck dissections. Aim of the study was to assess and compare the accuracy of CT scan and ultrasound in the prediction of lymph node metastasis in oral squamous cell carcinoma so that a suitable surgical neck dissection can be carried out and finally reduce the morbidity and mortality rate.*

**Materials and method:** *Twenty six patients with oral squamous cell carcinoma who underwent neckdissections (6RND, 20 SONND) were included in our study. All the patients underwent examination of neck preoperatively by Ultrasound and Computed Tomography for number detection. The findings were correlated with the results of post-operative histopathological examination of the neck nodes specimen. The results were obtained after statistical analysis by SPSS software.*

**Result:** *The sensitivity for Ultrasound scanning was 80%, while the specificity was 72% and the accuracy was 52%. In CT scan the sensitivity was 93%, the specificity was 82% and the accuracy was 88%.*

**Conclusion:** *The CT scan is more accurate technique than USG in assessing metastatic lymph nodes in patients with oral squamous cell carcinoma.*

*(Bangladesh Dental Journal 2016; 32: 41-44)*

## Introduction:

Oral cancer is the sixth most common cause of cancer related death in the world.<sup>1,2</sup> Squamous cell carcinoma is the most common malignant tumor in the head and neck region<sup>3</sup>. Lymphatic spread is the most important mechanism in the spread of the head and neck squamous cell carcinomas.<sup>4</sup> The presence of metastases in a lymph node is said to reduce the 5-year survival rate by about 50 %<sup>5</sup>. The presence or absence of nodal metastasis has a great impact on prognosis and survival of patients with head neck cancer. Nodal metastasis to one side decreases the

survival by 50%, while bilateral metastasis decreases survival by a further 25 %.<sup>6, 11,2,4</sup>

Various tools are available for investigating the presence and extent of nodal metastasis including computed tomography (CT), magnetic resonance imaging (MRI), ultrasonography (USG), ultrasound (US) with fine-needle aspiration cytology (FNAC)<sup>3</sup>. However, none of these investigative modalities shows 100% accuracy in identifying neck node metastasis<sup>3</sup>. The lymphatic dissemination of SCC is often detectable clinically or by USG but is most accurately assessed with CT imaging. Clinical palpation of cervical lymph nodes has many false negative and false positive results. It was said to be existed in 20 – 40% of cases.<sup>13,1</sup> Ultrasound scanning has improved the overall accuracy of diagnosis of cervical metastases. It is a cheap and highly reliable method without hazards of radiation exposure.<sup>9,17</sup> But its main drawback is it is fully operator dependent and it cannot recognize the lesion less than 5 mm. CT scan helps to determine the anatomical location of lymph nodes and is considered to be the most accurate imaging modality for detecting nodal metastases, because it simultaneously provides prompt and accurate co relation of functional and anatomical images<sup>7</sup>.

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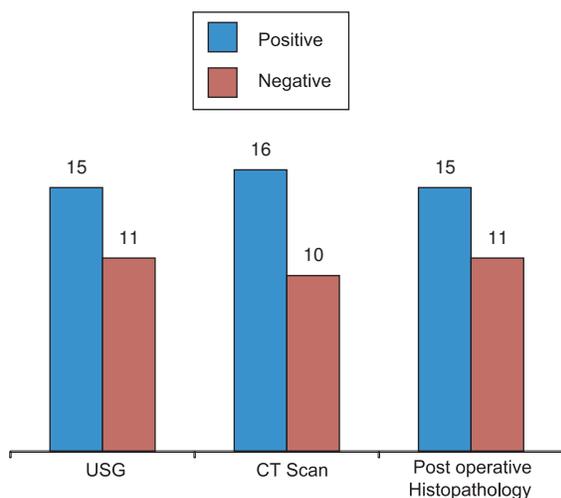
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**Materials and method:**

26 patients with oral squamous cell carcinoma were chosen from patients admitted to the Department of oral & maxillofacial surgery in BSMMU and Imaging was done in the dept. of Radiology and Imaging of BSMMU. Study period was Oct, 2013 to Sep, 2014.

Each patient was subjected to full history taking, then a complete head and neck examination was performed. Patients with distant metastasis, patients with previous radiotherapy and patients having previous neck resections other than skin lesions were excluded from the study. Ultrasound examination of the neck on both sides was carried out with high frequency (7MHz-10MHz). The criteria used to define a node as metastatic in ultrasound was the node with short axis diameter >8 mm, round in shape, with central hypoecogenecity, with loss of hilus, presence of necrosis, with irregular margin suggesting extracapsular spread and roundness index were considered malignant. CT scan examination was performed with Hitachi Sceneria 64 slice CT scan machine. Intravenous contrast (Omnipaque) was given as a bolus for all patients. A size of 11 mm or greater in the transverse plane was considered as a metastatic node. Central hypodensity with peripheral rim enhancement suggestive of necrosis also taken as metastatic lymph nodes. Besides, the post-operative histopathological data were analyzed. Ultimately CT and sonographic data as well as post-operative histopathological data from the surgically treated subjects were available as our database. Statistical analysis was performed using the sensitivity, specificity, Positive Predictive Value (PPV), Negative Predictive Value (NPV) and accuracy.

**Results and observation:**



**Fig.-1:** Distribution of findings of lymphnodes status of diagnostic aids

Figure 1 shows 15 positive and 11 negative LN in USG, 16 positive and 10 negative LN in Contrast CT and 15 positive and 11 negative LN in postoperative histopathology.

**Table-I**

*Comparison of ultrasonogram with histopathological examination*

| Investigation findings | Histopathological examination |                            |
|------------------------|-------------------------------|----------------------------|
|                        | True positive                 | False positive             |
| Ultra sonogram         | 12(46.15%)                    | 3 (11.54%)                 |
|                        | False negative<br>3(11.54%)   | True negative<br>8(30.77%) |

Table-I shows the findings of ultrasonogram where number of LN were 12(46.15%) true positive, 3(11.54%) false positive, 3(11.54%) false negative and 8(30.77%) true negative.

**Table-II**

*Comparison of CT scan with histopathological examination*

| Investigation findings | Histopathological examination |                            |
|------------------------|-------------------------------|----------------------------|
|                        | True positive                 | False positive             |
| CT Scan                | 14(53.85%)                    | 2 (7.69%)                  |
|                        | False negative<br>1(3.85%)    | True negative<br>9(34.62%) |

Table-II shows the findings of CT scan where number of LN were 14 (53.85%) true positive, 2(7.69%) false positive, 1(3.85%) false negative and 9(34.62%) true negative.

**Table-III**

*Comparison of USG with CT scan*

| Test parameter | USG        | Contrast CT scan |
|----------------|------------|------------------|
| True positive  | 12(46.15%) | 14(53.85%)       |
| False positive | 3(11.54%)  | 2 (7.69%)        |
| False negative | 3(11.54%)  | 1(3.85%)         |
| True negative  | 8(30.77%)  | 9(34.62%)        |

Table III shows on Ultra Sonogram 12(46.15%) specimens were true positive, both false positive and false negative were 3(11.54%) in number and rest 8(30.77%) were true negative. On CT scan 14(53.85%) were true positive, 2 (7.69%) were false positive, 1(3.85%) were false negative and rest 9(34.62%) were true negative.

**Table-IV**  
*Distribution of finding results according to the statistical test*

| Statistical test | Sensitivity | Specificity | PPV  | NPV  | Accuracy | P-value |
|------------------|-------------|-------------|------|------|----------|---------|
| USG              | 0.80        | 0.72        | 0.80 | 0.72 | 0.77     | 0.007   |
| CT Scan          | 0.93        | 0.82        | 0.88 | 0.90 | 0.88     | 0.000   |

Table-IV shows sensitivity, specificity, positive predictive value, negative predictive value, accuracy, positive LR ratio, negative LR ratio and significant p values of statistical test of clinical palpation, USG and Contrast CT scan.

#### Discussion:

The lymphatic metastasis to various levels of neck nodes in case of oral squamous cell carcinoma was preoperatively diagnosed by USG and CT scan. Specificity of CT scan in our study is 82%. The specificity of CT scan in our study is comparable to the previous studies.<sup>14</sup> In our study the values of CT scan were compared to USG for the detection of regional lymphnodes metastasis with other studies.<sup>16,10</sup> In our study the sensitivity of CT scan is higher than USG which can be correlated with other studies reported in the literature.<sup>14,10</sup> The specificity of CT scan is more or less similar to that of previous studies.<sup>15,10</sup> In our study USG showed sensitivity of 80%. So USG will enable the correct diagnosis of metastatic neck disease in only 80% of the cases with proved pathologic disease. Specificity, PPV, NPV and Accuracy of USG is less than CT scan. The sensitivity of CT scan is more than USG. It seems that USG offers no advantage over CT scan. USG is more accurate less accurate than CT scan as a diagnostic tool for neck node metastasis in oral squamous cell carcinoma. CT scan has higher sensitivity that is it can detect more number of positive cases and high negative predictive value indicating that probability of predicting a negative node as actually negative is high. To reliably select patients who do not need elective dissection criteria with a high negative predictive value should be chosen. To obtain this high negative predictive value, the number of false negative results should be as low as possible. So accordingly CT has got higher negative predictive value. In our study 3 patients with nodal metastasis were missed by USG and 1 was missed by CT scan. USG and CT scan missed 1 of the same case. The main error incurred by USG and CT scan was false negative results which were high in USG. Therefore sensitivity of USG (80%) and CT scan (93%). CT scan inaccuracy may be due to erroneous interpretation of scan and presence of microscopic disease in nodes below the threshold level of detection for CT scan. The results of the postoperatively resected neck nodes histopathology and the results of imaging studies

are presented in Table-I to III. The results of the statistical analysis are presented in Table-IV. So that the results of higher value of sensitivity, specificity, PPV, NPV and accuracy of CT scan prove that the method CT scan is more accurate technique than Ultra sonogram for the detection of lymphnodes metastasis from oral squamous cell carcinoma. Using Pearson Chi-Square test CT scan ( $p=0.000$ ) has reached statistically more significant in terms of predicting neck lymphnodes metastasis compared to USG ( $p=0.007$ ). So CT scan shows statistically more significant in our study.

#### Conclusion:

All of the pretreatment evaluation methods CT and USG yield results that are significantly different from the histopathologic results, suggesting that no pretreatment study can accurately assess the requirement to histopathologically stage the neck. CT scan findings are more correlated with the pathologic findings than USG. So CT scan is more accurate imaging technique than ultrasonogram for the detection of metastatic lymphnodes from oral squamous cell carcinoma.

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# Relationship between Protein Energy Malnutrition and prevalence of dental decay among the children of selected area in Dhaka city

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## Abstract:

**Background:** Due to lack of varying proportions of protein and calories, infants and young children are commonly found with malnutrition, more appropriately protein energy malnutrition (PEM) and are usually associated with several diseases and infection. It is the most common nutritional disorder in developing countries like Bangladesh, India, African countries etc. Protein-energy malnutrition occurs when there is a deficiency of protein, energy foods or both, which are relative to a body's need and proper growth. Growth assessment best explains the health and nutritional status of children, while also providing an indirect measurement of well-being for the entire population.

**Methods:** A cross-sectional study was carried out on November 2015 in slums of Mirpur, Dhaka City, in which we explored nutritional status in slum children aged between 4-17 years old and assess the degree of malnutrition by anthropometric measurements and clinically evaluated to determine the prevalence of dental caries on malnourished children.

**Results:** The malnourished children with mild grade was the most prevalent grade in this study, the prevalence of malnutrition was higher in girls than boys within the same age group; where the percentage of malnutrition was 12.6% in boys and 21.4% in girls for weight-height indicators. The prevalence of dental caries was also found to be higher in malnourished children when compared with well nourished children; dmft value according to nutritional status showed highly significant differences ( $p < 0.01$ ) between malnourished and well nourished children for both weight and height indicators. The risk of malnutrition has been linked to children with more siblings, poorer educational attainment and children with working mothers.

**Conclusion:** Most of the young aged slum children in our study had a poor nutritional status. Interventions such as skill-based nutritional education for parents and young children, raising awareness for timely dental check up and treatment.

**Key words:** Malnutrition, height, weight, dental caries slum children.

(Bangladesh Dental Journal 2016; 32: 45-49)

## Introduction:

Protein is a Greek word meaning the first rank; it performs several functions of the nutrients which include growth

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maintenance, repair of body tissue and regulates the key process within the body. Protein is one of the most plentiful substances in the body besides water. It can be obtained from various nutrients such as meat, fish, eggs, milk, grain, vegetables and soybean.<sup>1,2</sup>

Protein energy malnutrition occurs when there are lack of intake of protein or energy foods or both.<sup>2,3</sup> The dietary energy and protein deficiencies usually occur together. In case of mild PEM, it has a main deficiency in energy which has an acute course and; moderate PEM is chronic in nature with main deficiency in protein, while severe PEM is both chronic and acute, and it is composed of deficiencies in both protein and energy. Nevertheless, such a malnutrition status of the body during its development, can affect the oral structures.<sup>4</sup>

The main clinical symptoms that are commonly seen with protein energy malnutrition are the failure of the body to grow in height and weight.<sup>5</sup>

This type of malnutrition is the most common nutritional disorder in developing countries<sup>6</sup>; according to the United Nations International Children's Emergency Fund (UNICEF) more than 30% of children under 5 years of age suffered from moderate to severe protein-energy malnutrition (PEM) in 1995.<sup>7</sup>

The nutritional status of the body has an important role on the pre-eruptive stage of development of teeth. Lack of adequate intake of vitamin D, vitamin C, vitamin B and vitamin A and Protein Energy Malnutrition (PEM) have been associated with the disturbances in the oral structures. Enamel hypoplasia is a developmental disturbance of teeth which is characterized by hypoplastic grooves and/or pits in the enamel, caused by defective enamel matrix formation.<sup>4</sup> Some hypoplasia and pits on the surface of the enamel may be due to a lack of vitamin A. However, more diffused hypoplastic forms of the enamel have been reported with a vitamin D deficiency as well.<sup>8,9</sup> The structural damage of the teeth can signify the period in which there was lack of adequate nutrition.

Dietary deficiencies such as vitamin B and iron deficiencies are known to cause several other diseases like recurrent aphthous stomatitis, atrophic glossitis or a painful, burning tongue which is characterized by inflammation and defoliation of the tongue.<sup>10,11</sup>

Dental caries is the result of demineralisation of enamel and dentine attacked by organic acid acids formed by bacteria in dental plaque through the anaerobic metabolism of sugars derived from the diet.<sup>12</sup> The concomitant decrease in salivary flow and ingestion of sugars or other fermentable carbohydrates, results in fall in dental plaque pH caused by organic acids that cause an increase in the solubility of calcium hydroxyapatite in the dental hard tissues<sup>8</sup>. The pH at which demineralisation occurs is often referred to as the critical pH and is approximately 5.5. Saliva has natural defensive function against this process. While saliva promotes remineralisation, which means that the minerals in saliva are deposited in porous areas where demineralisation of enamel or dentine has occurred. Saliva is super-saturated with calcium and phosphate at pH7; this favours the deposition of calcium.<sup>9</sup>

The normal functioning of the salivary gland includes effective maintenance of a healthy oral cavity. Protein energy malnutrition has been associated with hypo functioning of the salivary glands, which causes decreased salivary flow rate, a decreased buffering capacity, and decreased salivary constituents, particularly proteins.<sup>4, 13</sup> PEM and vitamin A deficiency are associated with salivary

gland atrophy, which results in failure of the defensive mechanism of the oral cavity against infection and its ability to buffer the plaque acids. Navia states 'moderate malnutrition, particularly a lack of protein and deficiencies of certain micronutrients such as vitamins, zinc and iron, can influence the amount and the composition of the saliva, thus limiting the protective effects that it has in the oral cavity'.<sup>13</sup>

Dental caries is a common phenomenon among the children in Bangladesh which is more significant among the socio-economically poor people.

Dental caries is a common phenomenon among the children in Bangladesh which is more significant among the socio-economically poor people.

Dental caries is a common phenomenon among the children in Bangladesh which is more significant among socio-economically poor people. So this present study was conducted in a densely populated slum area of Mirpur, Dhaka city to find out the correlation between protein energy malnutrition and dental caries aged between 4-17 years children.

#### **Materials and Methods:**

This study was cross-sectional in nature and conducted in Mirpur region of Dhaka City on November 2015. A sample size of 310 slum children aged between 4-17 years was examined and consent was obtained from parents to participate in the study. The children were interviewed about their nutritional status and intra oral examinations were carried out in broad day-light using mouth mirror and explorer. The age groups were chosen so that the results of the study could be correlated in terms of primary tooth caries, mixed dentition caries and permanent tooth caries.

#### **Anthropometric measurement:**

It represented by the measurements of height and weight. The measurement of weight was done by using bathroom scale for weight records nearest to 0.1 kg. The child was weighted with minimum clothes without touching anything with 500 gram was subtracted from the total weight to compensate for underneath clothes. The measurements of height was done by using a measuring tape flat against the wall and the child standing up after removing the shoes with feet parallel to each other and the back is straight in upright position. The head was in position that Frankfort plane (the line between the lower border of the orbit and the upper margin of the external auditory meatus) was horizontal.

**Malnutrition classification:**

The degree of malnutrition was counted according to Z-score as mild and moderate and severe as the following:

Mild ( $Z=-1.0$  SD to  $-1.99$  SD)

Moderate ( $Z=-2.0$  SD to  $-2.99$  SD)

Sever ( $Z=-3.0$  SD and below)

The Z score=individual value-median of reference population/standard deviation of reference population.

**Dental caries examination:**

Dental caries diagnosis was recorded according to WHO classification. The examination was started from the upper right first molar to adjacent tooth till reach upper left first molar and passing to the lower right first molar. Examinations were done with all surfaces of all teeth. Caries was detected both visually and as well as by tactile method using explorers. Alphabetic coding systems were used for recording the status of primary teeth and numerical coding system was used for permanent teeth. The index used for dental caries examination was dmft/DFMT index.

**Results:**

A total of 310 children participated in the study, among them 47.4% were in the age group of less than 6 years and

53.1% in the range between 7-17 years as shown in Table-I. In this table, it was noted that the total number of decayed teeth (73) was comparatively higher in the age group between 7-17 years when compared with the range 1-6 years. However, in Table-II the prevalence of dental caries in females was more than males in the age group between 1-6 years.

In Table-III, the result of mean height of boys 108.07cm while for girls was 106.5cm and the weight was 17.96 kg for boys and 17.44 kg for girls with no significant differences for both indicators.

The prevalence of malnutrition was high according to z-score distribution as shown in Table-IV. It showed that the well nourished boys (87.4%) were higher than well nourished girls (78.6%). Therefore malnourishment was higher in girls than boys with mild degree of malnutrition for both genders. The percentage of malnutrition was 12.6% in boys and 21.4% in girls for weight-height indicators.

In Table-V, dmft value according to nutritional status showed highly significant differences ( $p<0.01$ ) between malnourished and well nourished children for both weight and height indicators.

**Table-I***Dental caries prevalence- Age wise*

| Age group | Number(n) | Percentage (%) | Any decayed teeth(n) |
|-----------|-----------|----------------|----------------------|
| 1- 6 yrs  | 147       | 47.4           | Yes (53)             |
|           |           |                | No (94)              |
| 7-17 yrs  | 163       | 53.1           | Yes(73)              |
|           |           |                | No(90)               |

**Table-II***Dental Caries prevalence- Sex wise*

| Age      | Sex    | Decayed Tooth |         | Total value |
|----------|--------|---------------|---------|-------------|
|          |        | No (n)        | Yes (n) |             |
| 1- 6 yrs | Male   | 45            | 26      | 71          |
|          | Female | 49            | 27      | 76          |
|          | Total  | 94            | 53      | 147         |
| 7-17 yrs | Male   | 41            | 39      | 80          |
|          | Female | 49            | 34      | 83          |
|          | Total  | 90            | 73      | 163         |

**Table-III**  
*Children height (cm) and weight (kg) by gender*

| Gender | No (n) | Percentage (%) | Height(cm) |       | Weight(kg) |       |
|--------|--------|----------------|------------|-------|------------|-------|
|        |        |                | Mean       | SE    | Mean       | SE    |
| Male   | 151    | 48.7           | 108.07     | 1.635 | 17.96      | 0.528 |
| Female | 159    | 51.3           | 106.54     | 1.678 | 17.44      | 0.519 |

**Table-IV**  
*Distribution of children according to nutritional status indicators*

| Indicators    | Gender | Normal      |      | Mild           |      | Moderate       |     | Severe          |   |
|---------------|--------|-------------|------|----------------|------|----------------|-----|-----------------|---|
|               |        | Above -1 SD |      | -1 to -1.99 SD |      | -2 to -2.99 SD |     | -3 and above SD |   |
|               |        | No          | %    | No             | %    | No             | %   | No              | % |
| Weight-height | Male   | 132         | 87.4 | 19             | 12.6 | 0              | 0   | 0               | 0 |
|               | Female | 125         | 78.6 | 30             | 18.9 | 4              | 2.5 | 0               | 0 |

**Table-V**  
*Caries experiences according to nutritional status*

| Indicator | Gender | Well nourished |        |       | t-test |         |         | Malnourished |       |       | t-test |         |         |
|-----------|--------|----------------|--------|-------|--------|---------|---------|--------------|-------|-------|--------|---------|---------|
|           |        | No             | Mean   | SE    | d.f    | t-value | p-value | No           | Mean  | SE    | d.f    | t-value | p-value |
| Weight    | Male   | 132            | .42    | .043  | 131    | 32.151  | .000    | 19           | .47   | .118  | 18     | 12.32   | .000    |
|           | Female | 125            | .40    | .044  | 124    | 29.599  | .000    | 34           | .32   | .081  | 33     | 19.11   | .000    |
| Height    | Male   | 132            | 110.99 | 1.643 | 131    | 66.955  | .000    | 19           | 87.79 | 3.803 | 18     | 22.82   | .000    |
|           | Female | 125            | 110.57 | 1.786 | 124    | 61.333  | .000    | 34           | 91.74 | 3.244 | 33     | 27.96   | .000    |

\*P<0.00 High Significant

### Discussion:

Both malnutrition and dental caries are complex conditions and multifactorial and many biological, genetic, environmental, socioeconomic and behavioural factors are known to be involved.<sup>4</sup> There is strong evidence supporting the association of dental decay with lack of adequate diet and quality<sup>14</sup> and the fact that irregular dietary intake has been linked to the development of malnutrition at a young age,<sup>4</sup> a link between dental caries and weight is biologically credible. Malnutrition is a serious universal problem<sup>15</sup> and is considered a major health problem in developing countries.<sup>4</sup> In particular, malnutrition is associated with increased susceptibility to caries because of decreased saliva secretion and composition.<sup>16</sup> The prevalence of dental caries is high in children from lower socioeconomic groups and is often deficient in diet and suffers retarded growth and development compared with their well nourished peers.<sup>17</sup>

The prevalence of malnutrition in this study measured by height for age, weight for age was found mostly to be

higher among females than males, the possible explanation for this finding are that girls are more active than boys these days and girls particularly living in slum area learn to work both at home and out at a very early age to minimize poverty or in order to help their families. They are often poorly nourished in regard to their work level during their growing period so they need more quantity and quality of food to carry higher energy requirement.<sup>18</sup>

The dmft, DMFT index is an important index for assessing caries intensity since caries is measured in term of the surface involved rather than the teeth. The sensitivity of this index is at its height when radiographic examination accompanies the clinical examination<sup>4</sup>. However in this study, it was not possible to have radiographic examination followed by clinical examination because the examination was simply carried out among children of a slum area. So there may be some underestimation of caries experience due to lack of radiographs, interproximal lesions could barely be detected clinically only.

The mean of dmft, DMFT in the study was higher in females than in males, this may be explained by the fact that the eruption pattern of teeth in girls is earlier than boys of same age group.<sup>19</sup> In addition lack of parental concern regarding preservation of baby teeth or seeking dental treatment or awareness towards oral hygiene leads to further deteriorating the oral health of their children.<sup>20</sup> It was also noted that Ds and Es were affected more frequently; this may be because of delayed shedding of deciduous molars. It has been found in the present study that the mean dmfs was higher among malnourished children than well nourished children which may be attributed to delay shedding of primary teeth and this lead to increase experience in primary teeth in comparison to their normal counterpart children, and also could be the reason that the irregular and deficient amount of nutrient intake among malnourished children than normal children and this lead to increase tooth susceptibility to dental caries through altered salivary secretion and low buffering capacity and change in tooth formation.<sup>21,22</sup>

#### Conclusion:

It can be concluded that the problem of protein energy malnutrition is common among the children of slum area in Bangladesh. Malnutrition is a risk marker for childhood caries. Children presenting with dental caries may be considered at risk for nutritional deficiencies. So the goal for both physicians and dentists should work on skill-based nutritional education for parents and young children and timely diagnosis and encourage treatment of the children suffering from dental caries and malnutrition.

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# Reconstruction of Maxillary defect using Masseter muscle flap: A case report

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### Abstract:

Despite the remarkable progress made in the field of oral and maxillofacial surgery, defects arising as a result of surgical removal of small and medium-sized tumors of the palate, retromolar trigon, posterior part of the floor of the mouth and the adjoining area, continue to present a challenge. Masseter muscle flap, a local regional flap offers a reliable method of reconstruction in selected defects without the disadvantages of cosmetic and functional loss. The use of masseter crossover flap permits a reliable closure without any significant complications and with early return of function. Here we present a case of mucoepidermoid carcinoma of the palate reconstructed with superiorly based masseter muscle flap after partial maxillectomy.

(Bangladesh Dental Journal 2016; 32: 50-51)

### Introduction:

The reconstruction of oral defects following surgical extirpation of oral cavity carcinoma presents a significant surgical challenge<sup>1</sup>. Once complete resection of the primary and regional metastases has been undertaken, subsequent functional recovery and aesthetics are extremely important when reconstruction is considered, the quality of life after intra oral tumour ablative surgery depends not only on the size of the tumour related defects but also on the type of reconstruction and the location of defects. The oral defect may be confined only to the mucosa or involve the overlying skin as well. Unrepaired mucosal defects following cancer ablation are considered unsatisfactory because of contraction and trismus. The retromolar trigone is a common site of involvement of squamous cell carcinoma in the oral cavity<sup>1,2</sup>. Primary closure of such a defect is fraught with the risk of breakdown, with consequent contamination of the oral cavity. A myocutaneous flap is unsuitable because of its bulk and the risk of consequent necrosis<sup>3</sup>. Rammohan Tiwari presented a new technique of oral and oropharyngeal closure using masseter muscle flap in 1987<sup>3</sup>.

### Case report:

Mrs. Shahanara Begum, a 60 years aged, unfortunate female from a remote area of Bangladesh, Hatia, Noakhali, presented with the complain of unhealing ulcer for five months. The lesion located in the right palate extending from right first premolar to right first molar area antero-

posteriorly and medially extended to mid palatine suture area (Fig. 1). The lesion approximately measured 2cm × 1 cm. There was an ipsilateral, palpable, single, mobile tender submandibular lymph node found to be inconclusive by



Fig.-1: Showing extension of the lesion

ultrasound investigation. Radiological investigation revealed destruction of alveolar bone, hard palate and right nasal floor pushed away (Fig: 2a and 2b).

Initial histopathological suspicious conclusion, squamous cell papilloma, lead to second biopsy and this time histopathology reveals mucoepidermoid carcinoma. The patient then underwent surgical excision of the lesion in the form of partial maxillectomy of the rt. Side of the maxilla with ipsilateral selective neck dissection level 1- 3. The surgical defect then reconstructed with superiorly based masseter muscle flap. The patient then got adjuvant EBRT.

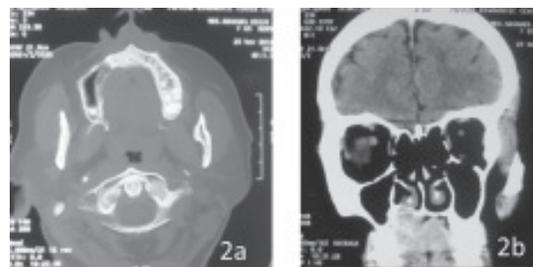
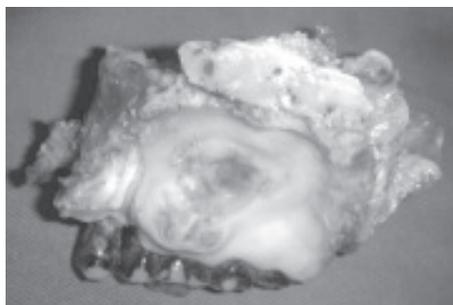


Fig: 2a and 2b: CT scan showing extension of the lesion, 2a (axial section) and 2b (coronal section).

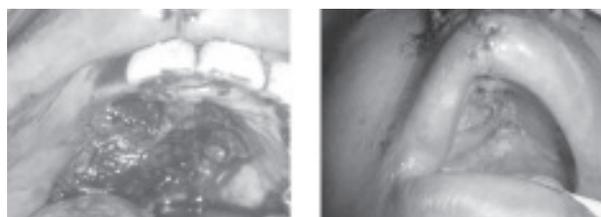
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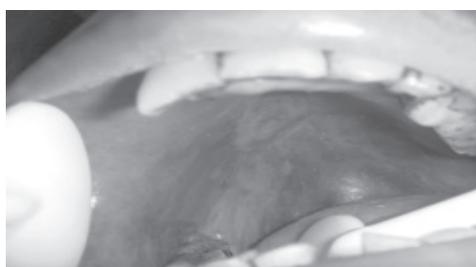


**Fig.-3:** Resected surgical specimen.

**Technique:** Adequate exposure for this intricate procedure necessitates the use of a fully opened side mouth gag placed on the contralateral side, while an assistant retracts the cheek laterally and the tongue medially. The opportunistic incision is used here rt. submandibular incision which is used originally for selective neck dissection. Although an intraoral incision can also be made on the anterolateral face of the mandible from the area of the ascending ramus to a point just posterior to the mental foramen.<sup>4,5</sup> The masseter muscle is first freed medially by raising the muscle off the mandible with the large, broad tipped periosteal elevator, sweeping the dissection to the level of the coronoid process superiorly and to the edge of the mandible inferiorly. The anterior and medial portion of the masseter muscle is thus exposed and is then stabilized with a forceps, while a lateral tunnel is sharply and bluntly raised with a scissors in a plane just above the masseteric fascia and medial to the soft tissues of the face. Having freed the muscle medially and laterally, it now must be detached from its insertion at the infero-lateral edge of the mandible<sup>6</sup>. Considerable bleeding can occur during this part of the procedure, it is, therefore, advised to clamp the inferior edge of the muscle before incising<sup>7</sup>.



**Fig: 4a** (per-operative) and **4b** (Third post-operative day), showing intraoral picture of reconstructed site.



**Fig.-5:** Reconstructed site after adjuvant radiotherapy showing excellent taking.

A tunnel is constructed medially through the buccinators muscle and mucosa. The inferior end of the dissected muscle is transferred to the surgical defect area through the prepared tunnel. Then the muscle is fixed with 3/0 vicryl. The patient is fed nothing by mouth for five days and can be fed through nasogastric tube or peripheral IV alimentation. The maintenance of oral hygiene is crucial here.

#### **Conclusion:**

The choice of the reconstructive procedure for intra oral tumors is governed by the status of the original tumour and the condition of the patient. Primary closure of the mucosa is invariably under some tension. Without lack of a second muscular layer this closure is fraught with the risk of leakage and contamination<sup>8</sup>. The ideal reconstruction mimics the tissues damaged or removed, it should strive to imitate the form, geometry and quality of the ablate structures. On analyzing the versatility of the masseter muscle flap for reconstruction of retro mandibular defects following post ablative cancer surgery in a series of four patients we would like to put across with our little expertise that the masseter flap is a locally available flap which is bulkier enough to reconstruct the retro mandibular regions with no significant complication, cosmetic deformity and functional disability. It is difficult to design a flap that is 100% successful at accomplishing all tasks simultaneously.

Trismus has not been a problem so long as physiotherapy is carried out immediately after reconstruction. The healing was excellent within 3 weeks. One case had delayed healing otherwise all had excellent healing. Epithelialization was spontaneous with no breakdown of the suture margins. There were no problems with speech and deglutition. There was no associated post- operative pain in the reconstructed site.

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# Management of prosthetic crown fracture of an endodontically treated tooth by fiber optic composite post-core-crown

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## Abstract:

*Restoration of teeth after endodontic treatment is becoming an integral part of the restorative practice in dentistry. It generally is agreed that the successful treatment of a badly broken endodontically treated teeth depends not only on the success of the endodontic treatment but also on good prosthetic reconstruction. The prosthetic treatment on seriously damaged, endodontically treated teeth often require an endodontic post as an additional retention element for core build up prior to crown restoration. This case report presents a 45 year male patient with prosthetic crown fracture of endodontically treated maxillary right central incisor tooth. The following clinical case represents the clinical steps involved in the utilization of a fiber-reinforced composite endodontic post core in a maxillary right central incisor and the subsequent treatment with a full veneer crown.*

**Key words:** Endodontically treated tooth, glass fiber post, composite resin core, full veneer crown.

*(Bangladesh Dental Journal 2016; 32: 52-55)*

## Introduction:

Endodontically treated teeth are structurally different from vital teeth, major changes include altered tissue physical characteristics, loss of tooth structure, possible discoloration and susceptible to fracture.<sup>1</sup> The longevity of endodontically involved teeth has been greatly enhanced by continuing developments made in endodontic therapy and restorative procedures. It has been reported that a large number of endodontically treated teeth are restored to their original function with the use of intraradicular devices.<sup>2</sup> These devices vary from a conventional custom cast post

and core to one visit techniques, using commercially available prefabricated post systems. In the last few decades, various prefabricated posts systems have been developed<sup>3</sup>. The selection of post design is important, because it may have an influence on the longevity of the tooth. Multiple factors which influence post selection i.e. amount of coronal tooth structure, tooth anatomy, position of the tooth in the arch, root length, root width, canal configuration, functional requirements of the tooth, torquing force, stresses, development of hydrostatic pressure, post design, post material, material compatibility, bonding capability, core retention, esthetics, crown material etc. The purpose of this case report is to describe the restoration of an endodontically treated tooth with glass fiber post and composite resin core with additional full veneer crown is usually indicated when the remaining coronal tooth structures is less.<sup>5,6</sup>

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## Case Report:

A 45 years old male patient Mr. Abdul Alim came to the department of conservative dentistry and endodontics, BSMMU, with the fracture of maxillary right central incisor which is endodontically treated and had crown prosthesis. Cardinal complaint was masticatory difficulty and loss of aesthetics. He gave a history of trauma on that area during mastication.

On extra-oral examination no abnormalities were detected. Intra-oral examination revealed a cervical crown fracture of maxillary right central incisor.

Intra-oral periapical radiograph revealed the tooth is endodontically treated and no radiolucent area around the root apex of the offending tooth with no root or alveolar bone fracture.

**Diagnosis:**

The case was diagnosed as a cervical fracture of maxillary right central incisor which is endodontically treated.

**Treatment plan:**

After considering the above conditions, treatment plan consist of composite resin core built up by glass fiber post and final restoration by full veneer crown.

**Treatment Procedure:**

After proper counseling, the consent of the patient was taken and mouth preparation was done by scaling. Two-thirds of the canal length was used for post. The gutta percha was partially removed from the root canal using peso reamer until it measured the estimated depth required for the post, leaving 4 mm of filling material at the apex to maintain a good seal. A radiograph was taken for post direction evaluation into the canal. An anti-rotational groove was given into the buccal wall of the canal. Then the post space was dried with air and cotton pellet. The glass ionomer luting cement was applied with a lentulospiral #40 into the post space and glass fiber post (GLASSIX – 1.50 mm diameter) was inserted into the canal. Excess cement was removed with the help of the blunt instrument. The post was stabilized for approximately 6 minutes for it to set properly.

After stabilization of the post the tooth was isolated with cotton roll and air dried. Uniform layer of 7<sup>th</sup> generation self-etch adhesive bonding (Beauty Bond) was applied according to manufacturer's instruction and light curing done for 10 seconds. Then the coronal part was built up incrementally with composite resin (Beautifil-II). Each increment was light cured for 20 seconds. Then the core was left alone for 10 minutes to allow polymerization shrinkage.

**Tooth Preparation:**

After core built up the tooth was prepared with a 1.5mm ferrule in order to ensure long term post and core performance beneath the crown restoration, without sharp line angles for the planned metal ceramic restoration. The color of the final restoration was selected with a shade guide. The selected shade was A<sub>2</sub>. After tooth preparation, impression was taken and model prepared, sent to the dental laboratory for fabrication of metal ceramic crown. Trial was done before final cementation of the crown. Masticatory function and optimal aesthetics were obtained and maxilla-mandibular relationship enhanced to a certain degree by fabrication of a definitive metal- ceramic restorations. Finally the metal-ceramic crown was cemented with glass ionomer cement. The patient was advised, not tearing hard food with this restored tooth. Definitive treatment outcomes in terms of function and aesthetics satisfied the expectations of the patient. After 1 month, the patient was recalled for follow up visit. Assessment of the stability of the crown was performed and found to be acceptable. The patient has no complained about the metal-ceramic crown till now.



*Fractured crown prosthesis*



*Fractured tooth*

*Fiber Optic Post**Composite Core**Full Veneer Crown**Fractured endodontically treated tooth**After fiber optic post***Discussion:**

A few studies have concluded that a post is not necessary in an endodontically treated anterior tooth with minimal loss of tooth structure. If an anterior tooth must be prepared to receive a crown after endodontic treatment because a good amount of tooth structure was lost, a post may be necessary to retain the core so that these teeth can resist functional forces.<sup>7,8</sup> The fundamental requirements of endodontic posts include high tensile strength, high fatigue resistance to occlusal and shear loading and stress-free distribution of the forces affecting the tooth root. Excellent fitting accuracy, biocompatibility and innocuous electro-chemical activity are also essential<sup>9</sup>. There are two main categories of posts: custom-fabricated and prefabricated. Many practitioners prefer to use a cast gold post and core for ET anterior teeth. Its major disadvantage, however, is esthetics, as the metal shows through the newer all-ceramic restorations. Another disadvantage of the cast post and core placement procedure is that it

requires two visits and laboratory fabrication<sup>10</sup>. An alternative is a prefabricated post that can be adjusted and inserted in a single visit. Now a day's many types of prefabricated posts are available, one of them is fiber-reinforced composite post. Endodontic posts fabricated from glass fiber-reinforced composite have favorable biomechanical properties, high tensile strength and at the same time exhibit elasticity characteristic that is similar to dentin. It is fabricated to bond with most resin cements and resin-based composite core materials. Since it is metal-free, they do not cause metal allergies or corrode. Finally it can be removed easily in case of an endodontic failure requiring re-treatment<sup>11</sup>.

The construction of a core buildup is necessary as the amount of residual tooth substance decreases. The buildup increases the retention and resistance provided by the remaining tooth structure. The core materials should have adequate compressive strength to resist intraoral forces, sufficient flexural strength, biocompatibility,

resistance to leakage of oral fluids at the core-to-tooth interface, ease of manipulation, ability to bond to remaining tooth structure, thermal coefficient of expansion and contraction similar to tooth structure, dimensional stability, minimal potential for water absorption and inhibition of dental caries.<sup>12</sup> The most commonly used core materials are cast gold, amalgam, resin-based composite and glass ionomer cement. Both cast gold and amalgam have been used successfully for many years, as they exhibit high strength and low solubility, and their coefficient of thermal expansion is similar to that of tooth substance. Both gold and amalgam are not esthetically pleasing, especially under the newer all-porcelain restorations. Mercury in amalgam has evidence to support the claim of toxicity. Resin-based composite offers an esthetically pleasing material especially in the anterior section under an all-porcelain restoration. It has good strength characteristics and low solubility. Glass ionomer cement, on the other hand, was shown to be weak in tensile and compressive strengths, and it had low fracture resistance as a core material in another study. Glass ionomer cement also exhibits a low modulus of elasticity, poor bonding characteristics to dentin and enamel, poor condensability and high solubility. Therefore, the use of glass ionomer cement as a core material should be avoided.

Fabrication of metal-ceramic crown over glass fiber post composite core systems is one of the treatment options. These restorations can provide ET teeth with the desired protection and aesthetic; however, they require extensive tooth preparation and can be expensive.<sup>13</sup>

### Conclusions:

Some studies, however, point out that posts do not strengthen teeth, but instead that the preparation of a post space and the placement of a post can weaken the root and may lead to root fracture. These studies further suggest that a post should be used only when there is insufficient tooth substance remaining to support the final restoration. In other words, the main function of a post is the retention of a core to support the coronal restoration.

Perhaps using new adhesive materials and technology, clinicians can bond the post securely to the dentin in the root canal space, the core to the post and the final restoration to the core and tooth.

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