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Information to Authors

Chattagram International Dental College (CIDC) started its historical and memorable journey in the 2003 year. CIDC is the only Private Dental College in Chattogram which is smoothly running under the guidance of Chattogram University.

CIDC is approved by the Government of the Peoples Republic of Bangladesh and is recognised by the Bangladesh Medical and Dental Council (BMDC). CIDC is representing pioneer and exemplary academic and clinical oriented research institute of Bangladesh. About 65 Dental students completed their graduation from CIDC per annum.

Chattagram International Dental College commenced to publish a peer reviewed Journal from 1st January 2018 which is recognized by BMDC and having International Standard Serial Number (ISSN) 2707-2185. The journal intend to publish article of authors from any part of the globe, but has a special interest in publishing research articles of authors from Bangladesh and of relevance to developing countries. It interested in Editorial, Original (Research) articles, Special articles, Review articles, Short Communications, Case report and letters on new findings of Medical Science.

Chattagram International Dental College Journal is published in english, biannually eg. January and July with prior approval of Editorial board.

Appropriate measures has been taken to make the journal indexed / abstracted in major international indexing systems including the PubMed/MEDLINE, Index Medicus, Google Scholar, DOAJ, Hinari and Scopus etc.

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Manuscript (Papers) are submitted to the Editor-In-Chief or authorised persons at any time. Papers accepted for publication are subjected to peer review and editorial revision. With full title (Title should be concise and informative) two copies of papers (Along with CD) accompanied by a covering letter signed by Principal and Co-authors including name, academic degrees, designation, the departmental and institutional affiliation. Complete address, Cell number including Email address of Corresponding author should be mentioned. Not more than 7 (Seven) authors will be accepted for all manuscripts.

Manuscript should be typed in English (Font size and style : 10, Times New Roman) on one side of white bond paper of A4 size with margins of at least 2.5 cm, using double space throughout.

Manuscript may be additionally submitted by email also. Email : shahique_ jpni@yahoo.com Ms word 2003/2007). Rejected manuscript will not be returned.

Abstract

A structured abstract should not be of more than 250 words. It should be a factual description of the study performed organized with the heading of Background (Includes aim or objectives) Methods (Includes patient population, procedures and data analysis) Result and Conclusion. The abstract should contain the data to support the key findings or conclusions of the study and this should be self explanatory without references to the text. the first time an abbreviated term is used it should be spelled out in full form and follow with the abbreviation in parentheses for example :- CKD (Chronic Kidney Disease). Please do not cite any references in the abstract.

3 (Three) to 10 (Ten) key words may be provided below the abstract using terms from the medical subject heading (Index Medicus, NLM, USA).

Types of Manuscripts

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Single digit numbers used in the text should be in words except datas and reference numbers. Maximum length of text may be with in 3500-4500 words (Excluding abstract, table, figure and references). The total number of reference should not be less than 15 (Fifteen) for the original article.

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Its a medical based text of any disciplines. Maximum length of the Special article / Short Communication may be with in 2500-3000 words (Excluding abstract, table, figure and references). The total number of reference should not be less than 10 (Ten).

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Letter should be brief and to the point with in 500-600 words only.

It is noted that standard abbreviations should be used whenever. The full form for which the abbreviations stands followed by the abbreviation in parenthesis should preceede the use of the abbreviation in the text except for standard ones like $45^{o}c$, 35mg/L etc in all types of text.

References

Regarding references please follow the Vancouver style (Uniform requirements for manuscripts submitted to biomedical journals prepared by the International Committee of Medical Journal Editors (ICMJE guideline http://www.icmje.org).

Reference citations in the text should be numbered in arabic numerals at the end of the sentence eg [1,2] consecutively in order in which they are mentioned in the text.

Book references should have the name of the authors, chapter title, editors, Book name, the edition, place of publication, the publisher, the year and the relevant pages.

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The first six authors of a work should be named, followed by 'et al' if there are more than six. If less than six authors the name of the all authors may be mentioned.-

Examples

Book reference : Stoll BJ, Shane AL. Infections of the neonatal infants in RM Kliegman, BF Stanton, JWS Geme, NF Schor. Nelson text book of pediatrics. 20th edn. Elsevier. Philadelphia. 2016;1:909-925.

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Table

- All tables should be numbered using Roman numerals (I, II).
- Table should always be cited in text in consecutively using Roman numericals (eg Table I, II).
- Mentioned the caption at the top of table. Table should be planned as brief as possible.
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- Provide a caption at the bottom for each figures / graphs.
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According to guidelines of the Internation committee of Medical Journal Editors (http:// www.icmje.org) please provide only 4/5 table with Roman numerical I, II with caption at the top of the table and only 4/5 figures / graphs with Arabic numerical 1, 2, with caption at the bottom of the figures / graphs.

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Unmounted glossy print, B-2 size with good contrast (600 pixels). 3 Images / Photographys / Legends are allowed for whole text.

Declaration

The article should accompany a declaration signed by author and co-authors which includes a statement that neither the article nor any part of its essential subtance table or figures is published in any journal nor submitted elsewhere for consideration of publication before appearing in this journal. The declaration form must be collected from the office of Editor-In-Chief

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Competing Interests

Chattagram International Dental College Journal requires authors to declare any competing financial or other interest in relation to their work. Where an author gives no competing interests, the listing will read the author (s) declare that they have no competing interests.

Editorial

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Platelet Rich Fibrin : A Promising Tool in Regenerative Dentistry

Shahiqul Jabbar[1*]

Platelet Rich Fibrin (PRF) is the most innovative and commonly applied platelet concentrate in regenerative dentistry. PRF is an autogenous biomaterial consisting of growth factors and cytokines entrapped in a fibrin matrix. It provides an ideal environment for wound healing and tissue regeneration. According to Greek Physician Hippocrates (460-370 B.C.) "The natural healing force within each of us is the greatest force in getting well". With this concept the classical technique for PRF preparation was invented by Dr. Joseph Choukroun in 2000. For preparation of PRF, 10 ml blood sample is collected from the patient without anticoagulant. After collection of blood, it is immediately centrifuged at a rate of 3000 rpm for 10 minutes. After centrifugation, 3 layers are obtained in the test tube. The topmost layer consisting of acellular PPP (Platelet Poor Plasma) PRF clot in the middle and RBCs at the bottom of the test tube. The middle layer of PRF clot is then removed with sterile tweezers and separated from the underlying RBC layer using scissors and then transferred on a sterile dish and it should be used with in a minute to get maximum benefit. The junction of PRF to the RBC layer is rich in growth factors and therefore this region is also included. PRF membrane can be obtained by squeezing out the liquids present in the fibrin clot. Liquid removal from the PRF fraction can be done through mechanical pressure between gauze layers resulting in a fairly solid, gel-like material that can be used in various clinical applications as a filling material or as a suturing membrane. PRF membrane can also be prepared by compressing PRF clot in special tools like "PRF Box" resulting in standardized membranes of constant thickness and size along with PRF exudate. PRF exudate contains good amount of growth factors (TGF-β1, PDGF, VEGF etc.) matrix glycoproteins (Fibronectin, vitronectin etc.) and proteins specialized in increasing cell attachment to biomaterials and titanium and therefore can be used for biomaterial impregnation, rinsing surgical sites, hydration of graft materials and for storage of autologous grafts.

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Advantages of PRF Over PRP:

i) Preparation of PRF is simple and cost effective.

ii) It eliminates the use of bovine thrombin and thereby reduces the chances of cross infection and the risk of life-threatening coagulopathies.

iii) Slow natural polymerization of PRF on contact with glass surface of the test tube results in physiologic thrombin concentration, while in PRP, there is sudden fibrin polymerization.

iv) Fine and flexible 3-D structure of PRF is more favorable to cytokine enmeshment and cellular migration.

v) PRF has supportive effect on immune system and helps in hemostasis.

vi) PRF stimulates the expression of alkaline phosphatase and induction of mineralization, caused markedly by release of TGF-β1 and PDGF.

Role of PRF in Wound Healing

- Prolonged release of growth factors at the wound site
- Proliferation of fibroblasts and osteoblasts
- Promotes angiogenesis
- Induces collagen synthesis
- Guides in wound coverage
- Mechanical adhesion by fibrin
- Trapping of circulating stem cells
- Regulation of immunity.

Applications of PRF in Dentistry

Endodontics:

- In pulp revascularization procedures of necrotic immature permanent tooth
- In pulp regeneration.

Oral & Maxillo-Facial Surgery/ Implantology/ Prosthodontics:

- Extraction socket management
- Surgical site of 3rd molar to prevent osteitis
- Bone augmentation in sinus elevation procedure for implants
- Ridge preservation/ augmentation
- As an adjunct to palatal wound healing after harvesting a free gingival graft
- Reconstruction of large bony defects after cancer surgery
- Guided bone regeneration
- Injectable PRF is used as a potential therapy for TMJ disorders.

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Periodontology:

- For treatment of osseous/infra-bony defects
- For treatment of gingival recession/ soft tissue root coverage
- Periodontal regeneration/ Guided tissue regeneration
- Periapical lesions.

Orthodontics:

- Injectable PRF is used for accelerating orthodontic tooth movement.

PRF is a 100% autologous product which might be used beneficially as an adjunct in wound healing and regenerative dentistry. In addition to clinical trials, histopathological studies are also required to learn about the nature of the newly formed tissue in the defect and to understand the biology, efficacy and mode of action of PRF more effectively.

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Original Article

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Efficacy of Inferior Alveolar Nerve Block with Local Anaesthetic and Methylprednisolone in Third Molar Tooth Surgical Extraction: A Comparative Study with Conventional Therapy

Mohammed Hossain Bhuiyan[1*] Niaz Ahmed[1] Sanjoy Das[1] Mohammed Kamal Uddin[2]
Mohammad Abu Taher[3] Manjur-E-Mahmud[1]

Abstract

Background: *Surgical removal of impacted lower third molar tooth is usually associated with postoperative pain, swelling and trismus. The aim of this study was to evaluate the efficacy of a single dose of 40 mg methylprednisolone injected with local anesthetic agent during inferior alveolar nerve block preoperatively in reducing postoperative pain, swelling and limited mouth opening following lower third molar surgery.*

Materials and methods: *A prospective, randomized, controlled study was designed involving sixty patients. Patients were randomly divided into two groups. Each group consists of thirty patients for which first group (Group A) was given 40mg methylprednisolone with LA during IANB (Inferior Alveolar Nerve Block) preoperatively followed by post operative NSAID's. Second group (Group B) served as control was managed by conventional LA and postoperative NSAID's. Facial swelling, mouth opening, pain on a visual analogue scale (VAS) were assessed. Descriptive statistics and the independent-samples t-test were used to compare the two groups at $p < 0.05$*

Results: *There was a significant reduction in swelling on day 2 postoperative in the methylprednisolone group. Mouth opening was also significantly greater on day 2 in the methylprednisolone group. The VAS pain score was significantly lower on the day of the operation and first postoperative day in the methylprednisolone group, but did not differ significantly between the groups on the other postoperative days.*

Conclusion: *Methylprednisolone with local anesthetic agent was more effective in reducing postoperative swelling, limited mouth opening, and pain following impacted lower third molar extraction.*

Key words

Lower third molar surgery; Local anesthetic agent; Methylprednisolone injection; Postoperative sequelae; Single dose.

Introduction

Surgical removal of impacted tooth under local anesthesia in general dental practice is usually associated with postoperative pain, swelling and trismus andaffect the patient's quality of life[1]. Surgical removal of 3rd molars causes significant pain, swelling and trismus even when teeth are removed by gentle surgical technique. The pain and swelling resulting from the surgery are generally caused by different factor such as surgical trauma or endotoxin. The use of synthetic glucocorticoids in reducing such postoperative sequelae has been investigated extensively[2]. Althoughits success is still questionable, some studies demonstrated a statistically significant improvement in post operative sequelae when corticosteroids were administered.

The use of corticosteroids/steroids (eg: methylprednisolone) is another preventive strategy for limiting postoperative pain, swelling and trismus following 3rd molar extraction. Postoperative pain, swelling and oedema may be due to the conversion of phospholipids to arachidonic acid by phospholypase A2 and the resultant production of leukotrines, prostacyclines, prostaglandin and thromboxane A2 acting as mediators of inflammatory response. The use of steroid may inhibit the initial step in this process[3]. Clinical trials in Oral surgery have also supported the hypothesis that preemptive NSAID's and corticosteroids are effective in delaying and preventing many post operative sequelae[4]. The apparent interactions between the mechanisms of action of NSAID's and steroids suggests that cotherapy may provide beneficial inflammatory and pain relief in the absence of side effects. Co-administration of methylprednisolone maximizes the drug levels at the site of action and minimizes the systemic exposure at the site of tissue injury.

Most previous studies reported on administration of methylprednisolone through oral, intramuscular, intravenous routes and local submucosal infiltration around surgical site but no study has investigated the efficacy of methylprednisolone when administrated with local anaesthetics during inferior alveolar nerve block which is near to surgical site.

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The objectives of this study is to compare the effect of co-administered methylprednisolone with local anesthetic(2% lidocaine HCL with 0.0005% adrenaline) NSAID's and LA (2% lidocaine HCL with 0.0005% adrenaline) with conventional NSAID's on the postoperative mangement of pain swelling and trismus following removal of 3rd molar tooth extraction (Impacted lower 3rd molar).

Materials and methods

A total of 60 patients who attend the Oral and Maxillofacial Surgery Department of BSMMU during the period of July 2006 to June 2008 requiring surgical removal of impacted mandibular 3rd molar teeth under LA were included. All selected candidates were free of pain and other inflammatory symptoms that included swelling, hyperemia and decreased mouth opening at the time of surgery. Patients were randomly allocated into two groups. In group A (Study group) patients were given a combination of methylprednisolone (40mg) and LAat surgical site and post operative NSAID's (Diclofenac). Group B (Control group) comprised of patients who were given post-operative conventional NSAID's (Diclofenac) only but no adjunct mythylprednisolone.

Methylprednisolone 40mg (Inj.Depomedrol 40mg) given parentally with LA preoperatively. Oral preoperative antibiotic (500mg Amoxicillin thrice daily + 400mg metronidazole thrice daily) were administered to all patients 24 hours prior to surgery. In both group 2% lidocaine hydrochloride with 0.0005% adrenaline are used as inferior alveolar nerve block. NSAID's (Diclofenac 50mg)given 30 min preoperatively and there after 50mg 3 times daily for 5 days. All patients were placed on a fiveday antibiotic regimen. All the medications administered orallyexceptMethylprednisolone which was administered parentally.

Standard surgical extraction of the lower 3rd molar carried with buccal guttering technique after adequate elevation and reflection of bucccal mucoperiosteal flap. Tooth delivery was followed by meticulous irrigation of the surgical site with physiological saline (0.9%). The flap was repositioned and sutures accurately.

Assessments of the pain, facial swelling and mouth opening were done on 1st, 2nd and 5th postoperative days. Visual Analogue Scale (VAS) was used to measure pain intensity. The original VAS consists of a 10 cm horizontal line with two end points labeled as no pain and worst pain ever. The patient is asked to place a mark on the 10cm line at a point which corresponds to the level of pain intensity he or she presently feels. The distance in centimeters from the lower end of the VAS to the patients mark is used as a numerical index of severity of pain.

Facial width (Swelling) is measured by using the reference points at the tip of tragus of left and right ears with the gonium in between; repeating the procedure three times on each patient made the measurement. The average measurements were taken in cm and recorded. The measurements were carried out just before the surgery and a post operative day 1,2 and 5.

A vernier calibrated sliding caliper was used to measure maximum interincisal mouth opening ability of the patient. The reference points used was incisal edge of the maxillary central incisor and incisal edge of mandibular central incisor at maximum opening available. The measurements were made in triplicate and the average was recorded in millimeters (mm). The measurements were carried out just before surgery and at post operative day 1, 2 and 5.

Ethical guidelines of Helsinki Declaration VI (2000) were followed throughout the study. Written consent from all the subjects was taken. A standardized structured data collection sheet was used to collect necessary information of the study subjects.

Analysis of data was performed with the statistical software SPSS version 26 for windows (IBM). Both qualitative and quantitative tests were performed. For comparison between groups chi-square test was performed for qualitative variables and student't' test was performed for quantitative variables. Data were interpreted accordingly and were presented in tables, charts and bar diagrams.

Results

The case group was consisting of 20 male and 10 female patients and the control group was consisting of 15 male and 15 female participants. In case group minimum age was 20 and maximum age was 40 years. In control group minimum age was 18 years and maximum age was 40 years. The mean ± SD age of the case group was 28.17±5.91 years and the mean ± SDage of the control group was 26.80±5.69 years.

Surgical extraction of mesioangular impaction was performed in 13 (43.3%) patients of case group and in 15 (50%)patients of control group. 9 (30%) patients in case group and 8 (26.7%) patients in control group had vertical impaction. Distoangular impaction operation was done in 4 (13.3%) patients of case group and in 2 (6.7%) patients of control group. 4 (13.3%) patients in both groups underwent horizontal impaction operation. One patient of control group was done linguoversion impaction operation.

The mean of difference in pain on 1st POD in control and case were 59.77±12.1 and 49.23±6.73 respectively. The differences of pain intensity, before surgery and 1st POD was significantly low in case group than in control group ($p<0.001$). The mean of difference in measurement of facial width on 1st POD in control and case were 2.3±0.23 and 1.51±0.79 respectively. The differences of measurement of facial width before surgery and 1st POD was significantly low in case group than in control group ($p<0.001$). The mean of difference in measurement of mouth opening on 1st POD in control and case were 21.03±1.92 and 15.97±3.46 respectively. The differences of measurement of mouth opening before surgery and 1st POD was significantly low in case group than in control group ($p<0.001$) (Table I).

The mean of difference in pain on 2nd POD in control and case were 51.83±5.36 and 28.93±8.11 respectively. The differences of pain intensity, before surgery and 2nd POD was significantly low in case group than in control group (p<0.001). The mean of difference in measurement of facial width on 2ndPOD in control and case were 2.09±0.27 and 1.31±0.71 respectively. The differences of measurement of facial width before surgery and 2nd POD was significantly low in case group than in control group (p<0.001). The mean of difference in measurement of mouth opening on 2nd POD in control and case were 16.37±1.59 and 12.07±3.52 respectively. The differences of measurement of mouth opening before surgery and 2nd POD was significantly low in case group than in control group (p<0.001) (Table II).

The mean of difference in pain on 5th POD in control and case were 25.17±4.25 and 9.83±3.95 respectively. The differences of pain intensity, before surgery and 5th POD was significantly low in case group than in control group (p<0.001). The mean of difference in measurement of facial width on 5th POD in control and case were 0.9±0.2 and 0.32±0.27 respectively. The differences of measurement of facial width before surgery and 5th POD was significantly low in case group than in control group (p<0.001). The mean of difference in measurement of mouth opening on 5th POD in control and case were 9.5+1.31 and 4.93+2.85 respectively. The differences of measurement of mouth opening before surgery and 5th POD was significantly low in case group than in control group (p<0.001) (Table III).

The mean of percentage increase in facial width at 1st POD in control and case were 7.38±1.15 and 4.66±2.57 respectively. The percentage increase in facial width at 1st POD was significantly low in case group than in control group (p<0.001). The mean of percentage increase in facial width at 2nd POD in control and case were 6.68±1.03 and 4.03±2.27 respectively. The percentage increase in facial width at 2nd POD was significantly low in case group than in control group (p<0.001). The mean of percentage increase in facial width at 5th POD in control and case were 2.87±0.66 and 0.97±0.86 respectively. The percentage increase in facial width at 5th POD was significantly low in case group than in control group (p<0.001) (Table IV).

The mean of percentage decrease in mouth opening at 1st POD in control and case were 40.30±4.68 and 32.37±5.94 respectively. The percentage decrease in mouth opening at 1st POD was significantly low in case group than in control group (p<0.001). The mean of percentage decrease in mouth opening at 2nd POD in control and case were 31.42±4.25 and 24.31±25.93 respectively. The percentage decrease in mouth opening at 2nd POD was significantly low in case group than in control group (p<0.001). The mean of percentage decrease in mouth opening at 5th POD in control and case were 18.24±3.12 and 10.12±5.83 respectively. The percentage decrease in mouth opening at 5th POD was significantly low in case group than in control group (p<0.001) (Table V).

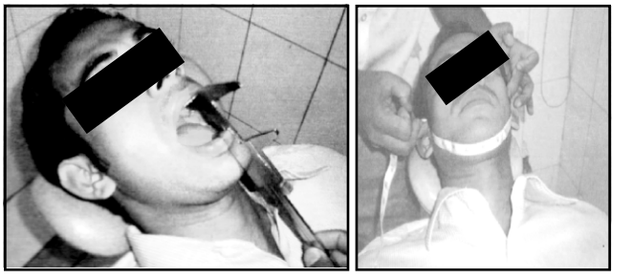

Figure Process of measuring interincisal opening and facial width

Table I Difference in pain intensity, measurement of facial width and measurement of mouth opening on 1st postoperative day (Group A= Case, Group B= Control)

Post operative day 1	Group	Mean	Std. Deviation	t	Df	p
Difference in pain intensity (100 mm VAS)	Group A	49.233	6.72967	-4.167	58	0.000
	Group B	59.766	12.0992			
Difference in measurement of facial width (in cm)	Group A	1.5133	0.79339	-5.214	58	0.000
	Group B	2.3000	0.23119			
Difference in measurement of mouth opening (in mm)	Group A	15.966	3.45895	-7.014	58	0.000
	Group B	21.033	1.92055			

Table II Difference in pain intensity, measurement of facial width and measurement of mouth opening on 2nd postoperative day (Group A= Case, Group B= Control)

Post operative day 2	Group	Mean	Std. Deviation	t	df	p
Difference in pain intensity (100 mm VAS)	Group A	28.933	8.10676	-12.90	58	0.000
	Group B	51.833	5.35681			
Difference in measurement of facial width (in cm)	Group A	1.3050	0.71394	-5.633	58	0.000
	Group B	2.0917	0.27452			
Difference in measurement of mouth opening (in mm)	Group A	12.066	3.52267	-6.096	58	0.000
	Group B	16.366	1.58622			

Table III Difference in pain intensity, measurement of facial width and measurement of mouth opening on 5th postoperative day (Group A= Case, Group B= Control)

Post operative day 5	Group	Mean	Std. Deviation	t	df	p
Difference in pain intensity(100 mm VAS)	Group A	9.8333	3.94866	-14.47	58	0.000
	Group B	25.1667	4.25144			
Difference in measurement of facial width (in cm)	Group A	0.3150	0.26979	-9.48	58	0.000
	Group B	0.9000	0.20342			
Difference in measurement of mouth opening (in mm)	Group A	4.9333	2.85190	-7.974	58	0.000
	Group B	9.5000	1.30648			

Table IV Percentage increase in facial width at 1st, 2nd and 5th POD in case and control group.

	Group	Mean	Std. Deviation	t	df	p
Percentage increase in facial width at 1st POD	Group A	4.6631	2.56731	-5.286	58	0.000
	Group B	7.3773	1.14838			
Percentage increase in facial width at 2nd POD	Group A	4.0337	2.27236	-5.809	58	0.000
	Group B	6.6798	1.03019			
Percentage increase in facial width at 5th POD	Group A	0.9697	0.86281	-9.549	58	0.000
	Group B	2.8682	0.66450			

Table V Percentage decrease in mouth opening at 1st, 2nd and 5th POD in case and control group

	Group	Mean	Std. Deviation	T	df	p
Percentage decrease in mouth opening at 1st POD	Group A	4.6631	2.56731	-5.286	58	0.000
	Group B	7.3773	1.14838			
Percentage decrease in mouth opening at 2nd POD	Group A	4.0337	2.27236	-5.809	58	0.000
	Group B	6.6798	1.03019			
Percentage decrease in mouth opening at 5th POD	Group A	0.9697	0.86281	-9.549	58	0.000
	Group B	2.8682	0.66450			

Discussion

Surgical procedures for extraction of unerupted 3rd molars are associated with significant morbidity including pain, swelling and trismus together with the possibility of temporary or permanent nerve damage resulting in altered sensation of lip or tongue[5]. These surgical procedures results in the release of chemical mediators, increase nerve ending sensitivity and retention of a protein rich fluid in the extravascular area[6]. It has been reported that post oral surgery pain is controllable with some NSAID's[7]. Nevertheless NSAID's are sometimes ineffective in preventing swelling associated with pain[8]. For this reason the use of diclofenac combined with methylprednisolone can be a good choice in terms of reducing the respective drug doses. Diclofenac is known to possess both analgesic and anti-inflammatory effect. Due to its anti-inflammatory effects, the administration of steroids may synergize the anti-inflammatory effect of diclofenac and contribute to the reduction of inflammatory exudates as well as oedema and pain. Therefore, the co-administration of diclofenac and steroid may be expected to reduce post operative pain more than that achieved with diclofenac alone[9].

A study reported that post-operative oedema decreased with the use of methylprednisolone during the extraction of a third molar tooth, yet swelling increased on postoperative days 2 and 3 although it was statistically less significant than the placebo group[10]. They stated that this could be attributed to the rapid metabolization and shortlasting effect of methylprednisolone.

In determining the optimal time to administer preoperative steroids, the time sequence of the permeability changes in inflammation must be taken into consideration. The major type of permeability response associated with the surgical trauma is called the early response. In this type, a strong permeability response may begin within few minutes of injury and reach a peak within 15 to 30 minutes or within 60 minutes with weaker stimuli since methylprednisolone onset is 30-60 mins[11]. It would seem rational on a pharmacologicalbasis to administer methylprednisolone dose at the start of operation.

Postsurgical facial oedema is difficult to quantify accurately, since it requires a threedimensional measurement with an irregular convex surface and can manifest itself internally as well as externally. Over the years numerous researchers have tried various techniques in an effort to objectively measure oedema most of which are indirect assessments of the altered contours of skin surface.Measurement tools mentioned in the literature have include visual analogue scales, trismus recordings, standardized stereo-radiographic or photographic measurements, computerized tomography, modified face bow devices, ultrasonography, facial plethysmographs or various other means of taking direct facial measurements[12]. In present study, a single measurement from the tip of tragus to gonium to the tip of contrataleral tragus was taken. It is noteworthy to mention herein that the cheek swelling following third molar surgery is

diffuse in different planes and is very difficult to measure accurately. The administration of methylprednisolone preoperatively produce a clear reduction in postoperative pain and cheek swelling. The mean increase in facial swelling on day 1,2 and 5 in study group was significantly less than that of control group. This result shows that administration of methylprednisolone enhances the control of post operative facial swelling.

In relation to inflammation in our study, the control group presented a bigger distance from tragus to tragus of the face and this difference was statistically significant 24 hours after surgery.

A lot of research has been done on the efficacy of NSAID's and glucocorticoids in the treatment of post operative inflammation, but is very difficult to compare the results of the different studies due to the great variety of inflammation assessment system used[13]. However, in our study, in the analyzed cases the methylprednisolone group has the best post operative, as it happens in Hollands study who reduced the inflammation in a 56% and also reduced the pain with the administration of 40mg methylprednisolone iv[10].

While there is not an effective and objective method for measuring inflammation, in the case of trismus all authors used the same method that we have done. The maximal mouth opening between the incisal borders of the lower and upper incisors was registered with a slide caliper before surgery and in each of the follow up.

In our study, the mean of difference in pain on 1st POD in case and control were 49.23±6.73 and 59.77±12.1, in 2nd POD 28.93±8.11 and 51.83±5.36, in, 5thP OD 9.83±3.45 and 25.17±4.25 respectively which was significantly low in case group than in control group ($p<0.001$).

The mean of difference in measurement of facial width on 1st POD in case and control were 1.51±0.79 and 2.3±0.23, in 2nd POD 1.31±0.71 and 2.09±0.27, in 5th POD 0.32±0.27 and 0.9±0.2 respectively which was significantly low in case group than in control group ($p<0.001$).

The mean of difference in measurement of mouth opening on 1st POD in case and control were 15.97±3.46 and 21.03±1.92, in 2nd POD 12.07±3.52 and 16.37±1.59, in 5th POD 4.93±2.85 and 9.51±1.31 respectively which was significantly low in case group than in control group ($p<0.001$).

In our study, we have observed that there wasa severetrismus 24 hours after surgery, that is, severe reduction of the mouth opening capacity, and that 5 days after surgery patients have not yet recovered their preoperative mouth opening capacity. There was significant difference between case and control group. Troullos et al. (1990) observes less trismus in patients treated with methylprednisolone than treated with ibuprofen[12].

Any way, it is important to highlight that there was a significant correlation between inflammation and trismus in the methylprednisolone group after 24 hours of surgery, facial swelling measures to evaluate inflammation. Significant correlation between trismus and distance from tragus to tragus, means that a more severe inflammation is always accompanied by a more severe trismus. The samething occurred 5 days after surgery, the more severe the inflammation, the more severe the trismus was.

We have given importance to highlight that there are several authors who are in favour of combining NSAID's and corticosteroids for the treatment of inflammation and trismus after the surgical extraction of lower third molar because they think it is the way to reduce inflammation and to avoid the limitation of mouth opening[13,14].

Limitations

Limited number of respondents was the first drawback in this study. Indirect assessment of the altered contours of skin surface in post surgical facial oedema is difficult to quantify accurately. Psychological component really exists because the patient fears that pain can appear when opening the mouth.

Conclusion

The purpose of this study was to assess the effectiveness and acceptability of inferior nerve block with methylprednisolone for controlling post operative pain, swelling and trismus after lower 3rd molar tooth surgical extraction and to compare the result with conventional method. In this study effectiveness and acceptability of methyl prednisolone with LA in inferior alveolar nerve block found better than conventional local anesthetics alone.

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Recommendations

Further studies with larger number of samples are recommended for more reliable information.

Disclosure

All the authors declared no competing interest.

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Original Article

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The Rates of Periodontal Diseases in Type-2 Diabetes Mellitus Patients in BIRDEM GeneralHospital, Dhaka

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Abstract

Background: *Type 2 diabetes mellitus has received the most attention among the various factors that can cause periodontitis, such as aging, genetic factors, poor oral hygiene, obesity and the virulence of the attacking microorganisms.The aim of the study was to observe the rates of Periodontal Diseases in type 2 diabetes mellitus patient specifically in BIRDEM General Hospital in Dhaka, Bangladesh.*

Materials and methods: *A total 720 patients were selected purposively who were suffering from different type of periodontal disease as well as type-2 diabetes mellitus were taken as study subjects. The data were analyzed by using the software MS-Excel 2016 & SPSS version 20.*

Results: *From the total 720 study people, the observed mean age was 52.08±11.21. The most sufferer 60.83% were female. The rates of periodontal diseases among the participants about 402(55.83%) of them had periodontitis which was highest in number. Respectively, 234(32.50%) of study subjects had gingivitis, 36(5%) had periodontitis with endodontic lesion, 30(4.17%) had necrotizing periodontal diseasesand the lest 18(2.5%) of them had periodontal abscesses. A highly significant result followed in the oral health knowledge & oral hygiene related behavior of the study subjects (p<0.0001).*

Conclusion: *Majority of the study subjects, diabetes patients demonstrated chronic periodontal damage, especially in age groups over 40 years. Demonstrating that age is a factor there feasibly linked to an increase in the rates in patients with periodontal disease and the severity of periodontal disease in individuals with diabetes. The patients were also lack of periodontal knowledge to avoid the disease.*

Key words

Diabetes; Gum diseases; Periodontitis; Periodontal disease.

Introduction

Periodontitis and diabetes are both highly alarming conditions, and many health professionals claimed that there lies an association between these two common diseases[1]. The studies have clearly found out that diabetes is a major risk factor for periodontitis and it increase the risk approximately three-fold in comparison to non-diabetic individuals, especially in case of poor glycemic control[1]. Severe periodontitis, is considered to be the sixth most prevalent chronic disease among the general population and it has affected about 750 million people worldwide and is thought to affect people's chewing ability, nutritional status and quality of life[2,3]. Basically Type 2 diabetes mellitus is thought to be a results from the body's ineffective use of insulin and it comprises 90% of people who were suffering from diabetes mellitus worldwide[4]. The prevalence of periodontitis is found to be significantly higher among middle-aged people with diabetes than in similar-aged people without diabetes[5]. Hence periodontitis has become a name of fare for most of the people specially in the Indian sub-continent. Unhealthy lifestyle, unconscious food intake, lack of physical activity has become the daily habits of most of the people. As a result, they were suffering from the diseases like diabetes. The number of diabetes patient is raising alarmingly. It is estimated that the number will rise to 366 million by the year of 2030 that was 171 million in 2000 which is 2.14 times more than the previous number[6]. In Bangladesh the situation is worse. With the increasing number of diabetes patients Diabetes mellitus is also becoming an alarming concern. The severe stage of this diabetes mellitus may lead to tooth loss, bone loss, or even cancer to the affected area. There is a strong connection between the diabetes patients and gum diseases. A person maybe unaware about his diabetes but suffering with gum problems and in this case a dentist could be the first identifier of diabetes for that patient. Hence, a person with gum problem may have the chance to have diabetes as well. Here the term periodontal denotes the gum diseases because of the infection and inflammation of the gums and bones in teeth area. The primary symptom of this periodontal diseases is that the gums become swollen and red and sometimes bleeding also happens.However, this study aims to observe the rates of Periodontal Diseases in type 2 diabetes mellitus patient specifically in BIRDEM General Hospital in Dhaka, Bangladesh.The objective of this observative cross-sectional

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study was to observe the rates of periodontal disease in type-2 diabetes mellitus patients attending in the BIRDEM General Hospital.

Materials and methods

This retrospective cross-sectional study was conducted in the Department of Dental Surgery in BIRDEM General Hospital, Dhaka, from January 2018 to December 2020. A total 720 patients were selected purposively following the inclusion& exclusion criteria.Patients with type 2 diabetes mellitus age more than 30 years were included in this study. Patients who are smoker, alcoholic, pregnant and suffering from others metabolic diseases were excluded from this study. The selected patients were suffering from different type of periodontal disease with type-2 diabetes mellitus came to this hospital for routine check-up.A structured questionnaire used to collect enough data with the consent of the patients.Clinically, the severity of periodontitis was determined by measuring the depth of the periodontal pocket with a periodontal probe calibrated in millimeters and went through the pocket to the bottom. At each of the six sites, a probe was put parallel to the long axis of the particular tooth and the depth of the periodontal pocket was measured. During probing, a pressure of 20-25gm was applied.Periodontal index was followed according to Ramfjord (1967) whilst assessment of gingivitis was done according to Loe and Silness index (1967). Descriptive statistics were used to interpret the study. In this study there performed by independent z-test, Chi-squre test. The data were analyzed by using the software MS-Excel 2016 & SPSS version 20. Statistical significance level was $p<0.05$.

Results

In this study, the Table-1shows the demographic distribution of the 720 patients who were purposively selected for this study. It shows that the age group 40-50 had the maximum 246(34.17%) study subjects indicates that the middle age people were the most sufferer of this chronic disease and the age group from 50-60 had the second highest percentage of 204(28.33%) and above 70 age group had the minimum percentage of 54(7.5%). It also shows the higher percentage of the male patients of 438(60.83%) and 282(39.17%) were the female. Among the participants most of them were Muslim and their percentage was 654(90.83%). Respectively, 42(5.83%) were Hindu, 18(2.50%) were christen and 6(0.83%) were buddha. The family income of 324(45%) of them was in between 16000-20000 and the participant with the highest income of more than 30000 was30(4.17%). 246(34.17%) of the participants were the service holder and 330(45.83%) of them were housewife. 156(21.67%) of the participants were graduate as well. 462(64.17%) of them were urban dwellers. Table-2 shows the percentage of oral health knowledge among the participants. 516(71.67%) of them had gum diseases which denotes a strong positive correlation among the diabetes mellitus and having gum diseases. Luckily, 204(28.33%) have no gum diseases. 486(67.50%) of them had the history of extraction or tooth loss and 234(32.50%) of them have no history of tooth loss in spite of them having gum diseases The most alarming was that 396(55%) of them use improper technique in tooth brushing. Only 42(5.83%) of them use proper technique in tooth brushing and 282(39.17%) of them use mixed technique. Though they had severed gum diseases only 162(22.50%) of them received periodontal treatment and 558(77.50%) of them didn't receive any periodontal treatment before. Only 114(15.83%) of the participants have had regular oral and dental check-up and 606(84.17%) of them had had no regular dental checkup. Only 10% of them frequently visited a dentist in 6month interval. To an utter surprise, 606(84.17%) of them never visited a dentist before! Besides, 162(22.50%) of them were chain smoker and 492(68.33%)were habituate to chewing betel leaf. Table-3 shows the types of periodontal diseases among the participants. It shows that 402(55.83%) of them had periodontitis.Respectively, 234(32.50%) of them have gingivitis, 36(5%) have periodontitis with endodontic lesion, 30(4.17%) hadnecrotizing periodontal diseases Although less but 18(2.5%) of them have periodontal abscesses. Table-4 presents the criteria of gingivitis among the participants. Among the total 234(32.50%) of the gingivitis sufferer, 90(12.50%) had mild gingivitis ,138(19.17%) had it in moderate rate and 0.83% had sever gingivitis. Table-5 shows the criteria of periodontitis among the participants. Among the total 402(55.83%) of the participants having periodontitis 156(21.67%) of them had marginal periodontitis. 126(17.50%) had moderate and 120(16.67%) had sever periodontitis.

Table I Distribute the study people according to demographic characteristics (N=720)

Characteristics		n	%	p-Value
Age	30-40	96	13.33	<0.0001
	40-50	246	34.17	
	50-60	204	28.33	
	60-70	120	16.67	
	>70	54	7.50	
	Mean±SD	52.08±11.21		
Gender	Female	282	39.17	<0.0001
	Male	438	60.83	
Religion	Muslim	654	90.83	<0.0001
	Hindu	42	5.83	
	Christen	18	2.50	
	Buddho	6	0.83	
Family Income (BDT)	10000-15000	162	22.50	<0.0001
	16000-20000	324	45.00	
	21000-25000	144	20.00	
	26000-30000	60	8.33	
	>30000	30	4.17	
	Mean±SD	19220.83±5293.78		

Education	Illiteracy	180	25.00	<0.0001
	Primary	108	15.00	
	Secondary	96	13.33	
	SSC &Equivilant	102	14.17	
	HSC &Equivilant	78	10.83	
	Graduation	156	21.67	
Occupation	Service holder	246	34.17	<0.0001
	Businessman	60	8.33	<0.0001
	Farmer	12	1.67	0.0708
	Labor	72	10.00	<0.0001
	Housewife	330	45.83	<0.0001
Residency	Urban	462	64.17	<0.0001
	Rural	102	14.17	
	Sub-urban	60	8.33	
	Slum	96	13.33	

Table II Oral health knowledge & oral hygiene related behavior of the study patients (n=720)

Variable	n	%	p-Value	
Gum Diseases	No	204	28.33	<0.0001
	Yes	516	71.67	
History of extraction or tooth loss due to Gum infection or tooth mobility	No	486	67.50	<0.0001
	Yes	234	32.50	
Method of tooth brushing	Proper Technique	42	5.83	<0.0001
	Improper Technique	396	55.00	
	Mixed Technique	282	39.17	
Any periodontal treatment received	No	558	77.50	<0.0001
	Yes	162	22.50	
Regular oral & dental check up by a dentist	No	606	84.17	<0.0001
	Yes	114	15.83	
Frequency of visit of a dentist	6-month interval	72	10.00	<0.0001
	1-year interval	30	4.17	
	>1-year interval	12	1.67	
	Never visited before	606	84.17	
Current smoker	No	558	77.50	<0.0001
	Yes	162	22.50	
Chewing betel leaf (paan)	No	492	68.33	<0.0001
	Yes	228	31.67	

Table III Distribution of the study patients according to the periodontal disease (n=720)

Name of periodontal diseases	n	%	p-Value
Gingivitis	234	32.50	<0.0001
Periodontitis	402	55.83	
Necrotizing periodontal diseases	30	4.17	
Periodontal abscesses	18	2.50	
Periodontitis with endodontic lesion	36	5.00	

Table IV Distribution of the criteria of gingivitis of the study people (n=234).

Criteria of Gingivitis	n	%
Mild gingivitis	90	12.50
Moderate gingivitis	138	19.17
Sever gingivitis	6	0.83
Total	234	32.50

Table V Distribute the study people according to the criteria of periodontitis (n=408)

Criteria of Periodontitis	n	%
Marginal periodontitis	156	21.67
Moderate periodontitis	126	17.50
Sever periodontitis	120	16.67
Total	402	55.83

Discussion

Periodontal disease is a group of diseases that affect the periodontium as a whole[7]. Years of research have been conducted on the relationship between diabetes and periodontal disease. The signs and symptoms of tooth support structure disintegration have now been identified as the sixth complication of diabetes mellitus, which is caused by hyperglycemia. As a result, glycemic levels are important in diabetes Mellitus complications[8-10].

In this study, we found the mean age of the study people was 52.08±11.21 with significant relationship (P<0.0001). Where most of them were in 40-50 age group.The male female ratio was 73:47.That means the higher percentage followed in the male patients of 60.83% and 39.17% were the female. Females found as the most sufferer than the males in this study. Similar observation followed in some other studies also[11,12]. Among the participants most of them were Muslim 90.83%, 5.83% were Hindu, 2.50% were Christen and 0.83% were Buddha. The family income of 45% of them was in between 16000-20000 and the income of 4.17% had more than 30000, 34.17% of the participants were the service holder and 45.83% of them were housewife. 21.67% of the participants were graduate as well. 64.17% of them were urban dwellers. All characteristics were statistically highly significant with the periodontal disease (p<0.0001).

Some studies depicted the link between the gum disease & periodontal disease[13,14]. In our study oral health knowledge among the participants followed as 71.67% of them has gum diseases which denotes a strong positive correlation among the diabetes mellitus and having gum diseases. Luckily, 28.33% have no gum diseases. 67.50% of them has the history of extraction or tooth loss and 32.50% of them have no history of tooth loss in spite of them having gum diseases The most alarming is that 55% of them use improper technique in tooth brushing. Only 5% of them use proper technique in tooth brushing and 39.17% of them use mixed technique. Though they have severed gum diseases only 22.50% of them received periodontal treatment and 77.50% of them didn't receive any periodontal treatment before. Only 15.83% of the participants have had regular oral and dental check-up and 84% of them have had no regular dental checkup. Only 10% of them frequently visited a dentist in 6month interval. To an utter surprise, 84.17% of them never visited a dentist before! Besides, 22.50% of them were chain smoker and 68.33% were habituate to chewing betel leaf. These oral health knowledges and the history of patients' life had a significant impact on periodontal disease. A study of conducted by Bridges et al found that the smoking status, glycemic control, socioeconomic status and previous dental care were significantly higher in diabetic These parameters were significantly higher in smokers than non-smokers[15]. Many studies conducted to highlight the relation of (pan) betel leaf chewing & periodontal disease and the therapy of oral disease heavily influenced by this[16,17].

The periodontal diseasesare classified according to the severity of disease. From a literature gingivitis and periodontitis are sometimes the first evidence that a patient has diabetes[18]. The types of periodontal diseases among the participants were, 55.83% of them have periodontitis, 32.50% of them have gingivitis. Although less but 2.5% of them have periodontal abscesses. 5% of them have periodontitis with endodontic lesion. A study conducted in U.S adults, about 75% was seen gingivitis, 13% had severe periodontitis, 35% had seen other form of periodontitis. On the patients had followed more than 30 years of age, as per our study[19]. The criteria of gingivitis among the participants from the total 32.50% of the gingivitis sufferer, 12.50% have mild gingivitis ,19.17% have it in moderate rate and 0.83% have sever gingivitis. Among the criteria of periodontitis in the participantsthe total 56.67% of the participants having periodontitis 21.67% of them have marginal periodontitis. 17.50% have moderate and 17.50% have sever periodontitis. The similar picture followed in a Bangladeshi study conducted by Mahmud SZ et al[20].

Limitations

The current study has certain limitations, such as the fact that it was conducted at a single hospital and that the sample size was small, which may not accurately reflect the entire reality.

Conclusions

Majority of the study subjects, diabetes patients demonstrated chronic periodontal damage, especially in age groups over 40 years. Demonstrating that age is a factor there feasibly linked to an increase in the rates in patients with periodontal disease and the severity of periodontal disease in individuals with diabetes. Furthermore, such patients may exhibit the following symptoms: Diabetes has become more severe and the symptoms have changed. Glycemic regulation is becoming more difficult, probably as a result of long-term exposure to sugar. Periodontitis causes long-term systemic inflammation. Diabetes individuals must have their dental health and periodontal status assessed and treatment plans updated on a frequent basis to reduce their chance of acquiring severe periodontal disease.

Recommendation

Periodontal surgery is a technique to control periodontal infections, which subsequently reduces blood sugar levels in type 2 diabetes. Diabetes control is also a step to circumvent periodontal disease, thus dental surgeons should be suspicious if their patients have this sort of periodontal illness.

Discloser

All the authors declared no competing interest.

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Original Article

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The Radius and Depth of Curve of Spee on Mandibular Arches of Human Permanent Healthy Dentition

Md. Riad Mahmud[1*] Md. Mahbubur Rahman[2] Shah Mohammad Shahadat Hossain[3]

Abstract

Background: *The Curve of Spee (COS) refers to anterior posterior curvature of the occlusal surfaces, beginning at the tip of mandibular canine and following the buccal cusp tips of the bicuspids and molars and continuing to the anterior border of the ramus. The aim of the study was to determine the radius and depth of the curve of spee on mandibular arches of human permanent healthy dentition.*

Materials and methods: *Twenty two people with balanced occlusion were included in this study. Any malocclusion, missing tooth, tooth wearing and mixed dentition involved people was excluded from this study. COS was measured on cast by using AutoCAD 2007 software. Descriptive analysis was performed, statistical values (Mean, standard deviation) for several readings and the frequency distribution by cross tabulation for each variable compared and 't' test was used to assess the statistical significance by using SPSS.*

Results: *The results showed that mean radius for right and left mandible was 97.91 (±4.46) mm and 100.83 (±4.14) mm these was significantly different from each other. The mean depth for right and left mandible was 1.62 (±0.33) mm and 1.70 (±0.29) mm that was non significantly different from each other.*

Conclusion: *The radius of COS in the left mandibular arch was different from right side and depth of COS also different from each other side.*

Key words

Curve of spee; Cast; Depth; Mandible; Radius.

Introduction

In human permanent healthy dentition, there exits an anteroposterior curve that passes through the cusp tip of the mandibular canine and the buccal cusp tips of the mandibular premolars and molars, and that extends in a posterior direction to pass through the most anterior point of the mandibular condyle[1].

This curve was first described by Ferdinand Von Graf Spee in 1890 therefore it was referred to curve of Spee. It was derived by studying skulls with abraded teeth to define a line of occlusion that lied on a cylinder tangential to the anterior border of the condyle, the occlusal surface of the second molar, and the incisal edges of the mandibular incisors. The center of this cylinder is located in the horizontal mid-orbital plane so that it had a radius of 6.5 to 7.0 cm (2.5 inch) Spee noted that it would be possible to locate the center of the curvature by reconstruction and measurement with the compass[2].

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The curve of Spee refers to anteroposterior curvature of the occlusal surfaces, beginning at the cusp tip of mandibular canine and following the buccal cusp tips of the bicuspids and molars and continuing to the anterior border of the ramus. If the curved line continues further back, it would ideally follow an arc through the condyle. The curvature of the arc would relate, on average, to part of a circle with a 4-inch radius[3].

The glossary of prosthodontic term defines the occlusual plane as "The average plane established by the incisal and occlusual surfaces of the teeth" Generally, it is not a plane but represents the planner mean of the curvature of these surfaces[4].

The curve of Spee exists in the sagittal plane and is best viewed from the lateral aspect; it permits the total posterior disclusion on mandibular protrusion, giving proper anterior tooth guidance[2].

The anteroposterior curve that is the Curve of Spee has been defined as the anatomic curve established by the occlusal alignment of the teeth, as projected onto the median plane, beginning with the cusp tip of the mandibular canine and following the buccal cusp tips of the premolar and molar teeth, continuing through the anterior border of the mandibular condyle[5].

The Curve of Spee may be pathologically altered in situations resulting from rotation, tipping, and extrusion of teeth, restoration of the dentition to such an altered occlusal plane, can introduce posterior protrusive interference[6]. Such interferences have been shown to cause abnormal activity in mandibular elevator muscles, especially masseter and temporal muscle, this can be avoided by reconstructing the curve of Spee to pass through the mandibular condyle, which has been demonstrated to allow posterior disclusion on mandibular protrusion[7].

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As the angle of condylar guidance is greater than the curve of Spee, posterior discussion is achieved[8]. Clinically, the curve of Spee is determined by distal marginal ridges of the most posterior teeth in the arch and the incisal edges of the central incisors[9]. The curves of Spee as a line from the tip of the canine touching the tips of the buccal cups of the posterior teeth[10]. The same definition is given by the latter, added that such curve is necessary to allow protrusive contact of incisor teeth without posterior tooth interferences.

Several researchers have investigated the functional significance of the curve. Spee himself suggested that this curve was the most efficient model enabling the teeth to remain in contact during the forward and backward gliding of the mandible during chewing. He was the first to suggest that this should be considered in the construction of dentures, to enable better mastication and to avoid lever effects during chewing[11].

The morphologic arrangement of teeth in the sagittal plane has been related to the slope of the articular eminence, incisal vertical overlap, molar cusp height, and the amount of posterior contact[12]. The curve of Spee ensures balanced occlusual function. Recent studies have suggested that the Curve of Spee has biomechanical function during food processing by increasing the crush-shear ratio between the posterior teeth and the efficiency of the occlusual forces during mastication[13].

Analysis of the curve of Spee may assist dentist to reconstruct occlusion in the sagittal plane. There is no acceptable reference for curve of Spee in Bangladeshi population. Determination of radius and depth of the Curve of Spee and its characteristics in the maxillary and mandibular arches would be beneficial for occlusal reconstruction. The orientation of the occlusion is an important clinical procedure in prosthodontics. The position of the occlusual plane of orientation forms the basis for ideal tooth arrangement. Proper management of the occlusual plane is an essential consideration when multiple long-span posterior restoration are designed, or when restorations are added to an existing tooth arrangement characterized by rotated, tipped or extruded teeth as excursive interferences may be incorporated[2].

The curve of Spee, which exists in the ideal natural dentition, allows harmony between the anterior tooth and condylar guidance. The COS continues to develop soon after eruption of first permanent molar and fully formed after eruption of the permanent second molar to the occlusal level, and remains same throughout lifelong. With the advancement of age the COS gradually becomes flatten due to pathological tooth wearing. Patient with Para functional habits, dislodged teeth the curve is lost.

Therefore, a reference value of COS can help for prosthetic occlusal rehabilitation. The characteristics of COS are also important to provide balanced occlusion, group function, and protected occlusion also in implant occlusion. The radius and depth of COS may reflect a reference in determining the teeth position into intra-arch and inter-arch relations.

Therefore, the study was conducted to evaluate the radius and depth of curve of Spee on mandibular arches of human permanent healthy dentition among the selected population of Bangladesh. The aim of the study to determination of the radius and depth of curve of Spee on mandibular arches of human permanent healthy dentition.

Materials and methods

This cross-sectional descriptive study was conducted in the department of prosthodontics of BSMMU and ethically cleared by university review board. Twenty two people with balanced occlusion were included in this study. Any malocclusion, missing tooth, tooth wearing and mixed dentition involved people was excluded from this study. The study was conducted in following procedures.

Impression Making and Cast Preparation

Impressions of mandibular dental arch were made with alginate impression material (Lygin, made in USA). After proper ringing, with running water the impressions were poured with type III dental stone (Diestone, made in USA). The impression material and dental stone were manipulated according to the manufacturer's instructions. The base of the cast was made by using rubber base former (Figure 6).

Photographic Imaging

Standardized digital images of the right side and left side of maxillary and mandibular dental casts were made with DSLR camera (Cannon D 700 with 100 mm lens) fixed on a tripod.

Photograph Standardization

- The camera to tooth distance was 150 cm for all pictures to eliminate image distortion.
- The right side and left side maxillary and mandibular dental casts were photographed beside a measuring tape, to ensure control of magnification.
- These casts were oriented so that the lens of the camera was parallel to the buccal surface of the posterior teeth with a water level.
- The imaginary line between the cusp of the canine and the distal cusp of the 2nd molar was oriented parallel to the horizontal axis of the camera display.

Computerized Analysis of Photographs

Each digital image of dental casts was transferred to a personal computer for analysis. The buccal cusp tips of the canines, premolars, and the molars of the maxilla and mandible were marked using a marker.

Measurement of the Radius and Depth of Curve of Spee

To measure the radius and depth of the curve of Spee, computer software (AutoCAD 2007) was used, following steps were taken

i) The image was horizontalized by angle tool with orthogonal line with base line.

ii) Scale calibration was done by linear measurement tool selecting 1 mm mark of the measuring tape. Then scale factor was calculated by dividing this 1mm with the value of the linear marks. (Scale factor = 1/ linear value). Then scale factor was selected and the base point was marked and the scale factor was placed and the image was calibrated.

iii) Circle with center was placed over the height point of the buccal cusps of canine, premolars and the molars.

Measurement the Radius of Curve of Spee

AutoCAD 2007 was used to measure the radius of COS. An arc was drawn using the arc tool in the draw box by joining the cusp tips of the canines, mesio-buccal cusp of the first molar and the disto-buccal cusp of the second molar of mandibular cast (figure 7) . Then the radius tool was selected from the dimension tool and the arc was marked and the value of the curve depicted the radius of the curve of Spee.

Measurement the Depth of Curve of Spee

AutoCAD 2007 was used to measure the depth of COS. A reference line was drawn from the buccal cusp of the canine to the disto-buccal cusp tip of the second molar along the center of the circles. Perpendicular lines (figure 8) were drawn from this line to the cusp tips of the premolars, the first molar, and the mesio-buccal cusp of the second molar by aligned tool in dimension box. The deepest of these distances was recorded to represent the maximum depth of the curve of Spee.

Data was collected by using data collection form and computer software analysis (AutoCad 2007) of the standerized photography of the diagnostic cast. Descriptive analysis was performed, statistical values (Mean, standard deviation) for several readings and the frequency distribution by cross tabulation for each variable compared. 't' test was used to assess the statistical significance. All of these were achieved by the statistical package for the social science (SPSS) software.

Results

The present study was conducted on 22 individuals, between ages of 19 to 30 years of selected Bangladeshi population to determine the radius and depth of Curve of Spee. In the general descriptive statistics it was found that the mean radius of curve of Spee (COS) for mandibular arch in the right and left side was 97.91 (±4.46) and 100.83 (±4.14) respectively (Table I). Mean depth of COS and their respective standard deviations in mandibular arch of right and left side (In mm) 1.62 (±0.33) and 1.70 (±0.29) respectively (Table III). Lowest frequency of radius of curve of spee in right mandible was 100 to 115 mm in one sample highest frequency in 7 samples about 95 to 100 mm (Figure 1).

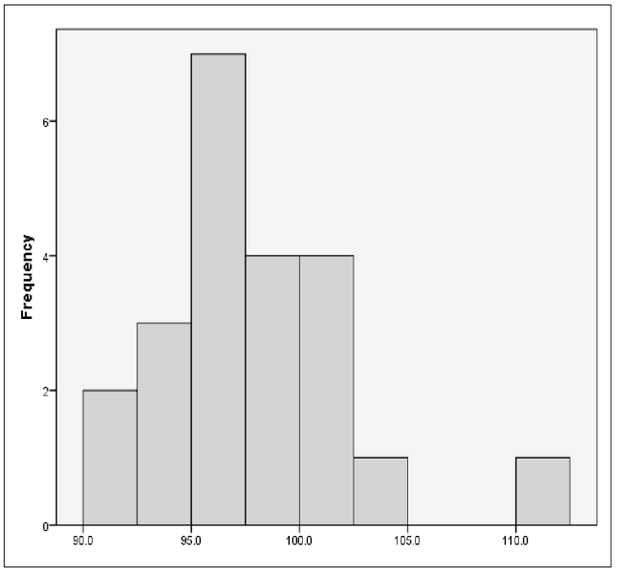

Figure 1 Distribution for Radius of curve of Spee of Right Mandible (In mm and n= 22)

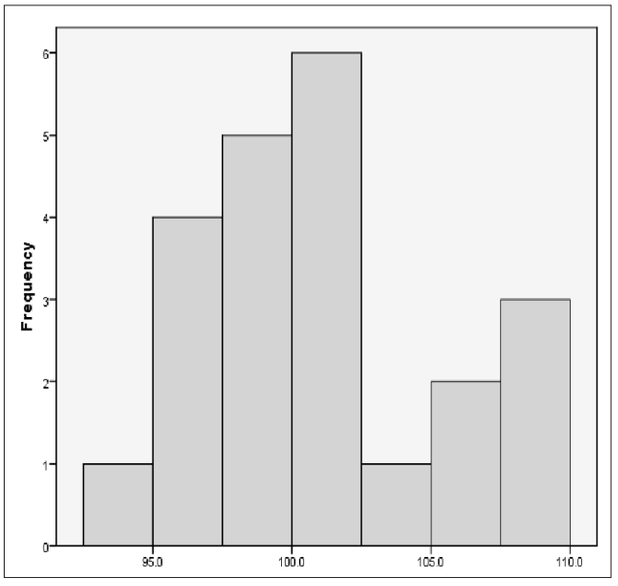

Figure 2 Distribution for Radius of curve of Spee of Left Mandible (In mm and n=22) Lowest frequency of one sample in 90 to 95 mm and 100 to 105 mm Highest frequency of 6 samples 100 to105 mm

Table I Mean radius of curve of Spee and their respective standard deviations in mandibular arch of right and left sides (In mm and n=22)

Side	Minimum	Maximum	Mean	S.D.
Right	90.5	112.1	97.91	4.46
Left	92.9	108.7	100.83	4.14

In table I the mean for right and left mandible was 97.91 (±4.46) mm and 100.83 (±4.14) mm.

Table II Comparison of the mean radius of curve of Spee between right and left mandible (In mm and n=22)

Side	Mandible		
	Mean	S.D.	p Value
Right	97.91	4.46	≤ 0.001
Left	100.83	4.14	

In table II, the mean radius of curve of Spee of the left mandibular arch was significantly greater than that of right side.

Table III Mean depth of curve of Spee and their respective standard deviations in mandibular arch of right and left sides (In mm and n=22)

Side	Minimum	Maximum	Mean	S.D.
Right	1.0	2.1	1.62	0.33
Left	1.1	2.1	1.70	0.29

In table III, the mean depth for right and left mandible was 1.62 (±0.33) mm and 1.70 (±0.29) mm.

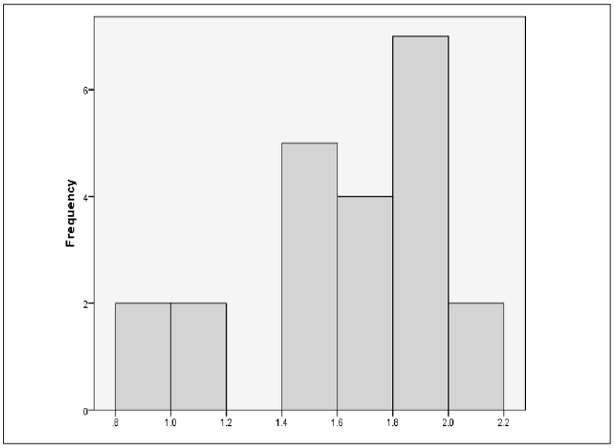

Figure 3 Distribution for Depth of curve of Spee of Right Mandible Lowest frequency of 2 samples in 0.8 to 1 mm, 1to1.2 mm and 2 to 2.2 mm Highest frequency of 7 samples in 1.8 to2.0 mm

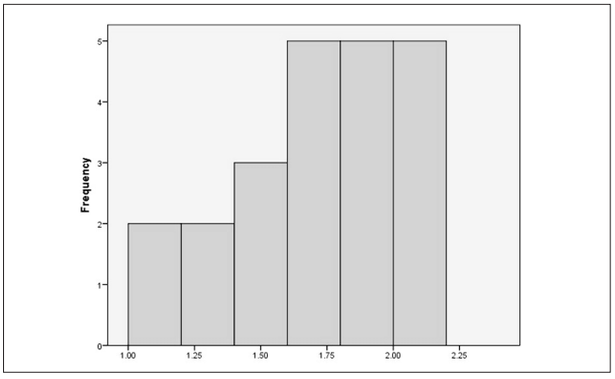

Figure 4 Distribution for Depth of curve of Spee of Left Mandible (In mm and n=22)Lowest frequency of 2 samples in 1 to 1.25 mm and 1 to 1.5 mm Highest frequency of 5 samples in 1.5 to 1.75 mm, 1.75 to 2 mm and 2 to2.25 mm

Table IV : Comparison on the mean depth of curve of Spee between right and left mandible among subjects (In mm and n=22)

Side	Mandib e		
	Mean	S.D.	p Value
Right	1.62	0.33	0.067
Left	1.70	0.29	

In table V, comparison on the mean depth of curve of Spee of both the left maxillary and left mandibular arch was greater than that of right side but the difference was non-significant.

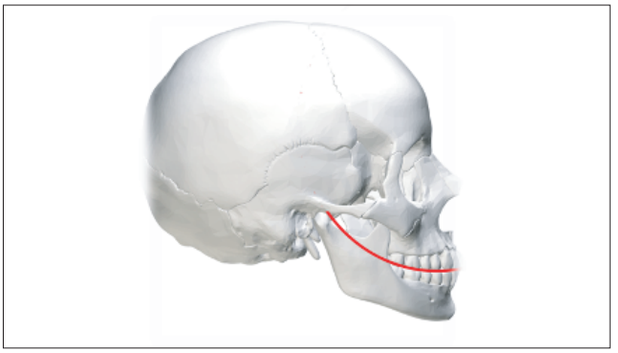

Figure 5 The curve of Spee in the maxillary and mandibular arches (Red marked arc pointed by arrow mark)

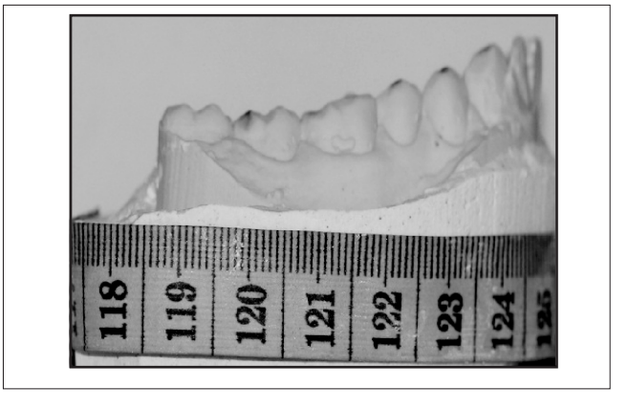

Figure 6 Study model with millimeter tape

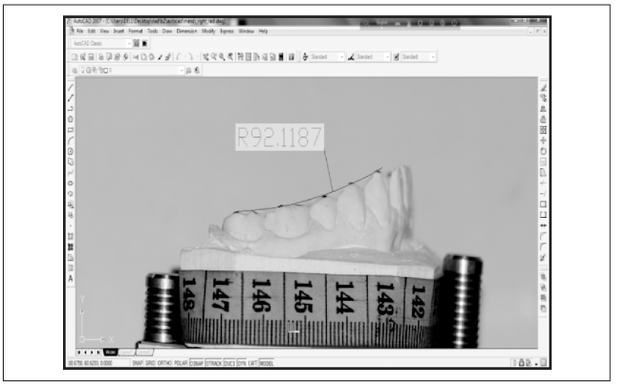

Figure 7 Measurement of radius of curve of Spee in Mandibular arch

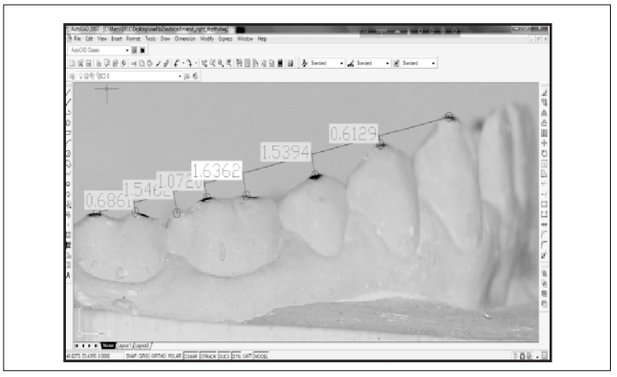

Figure 8 Measurement of depth of curve of Spee in Mandibular arch

Discussion

It has been proposed that in natural dentition the occlusal plane is curved because of the sagital inclination of the teeth. If this arrangement of teeth viewed form laterally a curve exist that touches the buccal cusps of cuspid, bicuspid and molars, is known as the "Curve of Spee". It is convex for the maxillary arch and concave for the mandibular arch. During Prosthodontic occlusal rehabilitation COS should be established to prevent interference and also compensatory mechanism should be provide for a balanced occlusion. Otherwise it would be detrimental to stomatognathic system. In the present study, the curve was described as an arc that best fit from the tip of the canine and the tips of the buccal cusps of the posterior teeth as followed by the other investigators.

This study was conducted on 12 men and 10 women of Bangladesh, ages from 19 to 30 years to determine the radius and depth of curve of Spee, and to measure and to compare the radius and depth of COS in the right and left mandibular arch and also between the maxillary and the mandibular arches. Subjects were selected according to inclusion and exclusion criteria. Study model was prepared from the impression of the maxillary and mandibular arches. Then Standardized digital images were done in the sagittal plane, which represents a two-dimensional representation of the mandibular arches of the selected subject. Computer software (AutoCAD 2007) analysis of the image was done to measure the COS. The obtained data was analyzed with computer software for the result.

Previous study showed that the mean radius of COS right and left of mandible was 99.680 mm[14]. In this study the mean for right and left mandible was 97.91 (±4.46) and 100.83 (±4.14). This was near to similar with the study above.

There was another study of 50 male and 45 female subjects found that the mean radius of curve of Spee of left side of mandibular arch is significantly greater than right side of mandibular arch in both male and female subjects[15]. In this study it was found that mean radius of curve of Spee on the left side of maxillary and mandibular arch were significantly greater than the right side ($p \leq 0.001$).

The direct measurement from study models of 16 male and 17 female subjects found that there was no significant difference of depth of curve of Spee of mandibular arch between right and left sides in both male and female subjects[9]. In this study the mean depth of COS with standard deviations for right and left mandible was 1.62 (±0.33) and 1.70 (±0.29).

While comparing the mean depth of COS in left mandible was partly greater than the right side of mandible but the difference was non-significant ($p > 0.05$). Thus the study reveals the similar results as obtained by other study except one study found significant difference in depth of curve of Spee of mandibular arch[16]. This may be due to small sample size, increase of sample size might bring more similar result.

This study was limited because of the sample size and also there might be genetic factors that distinguish this population from other groups.By the modern cutting-edge technology like three dimensional scanning (3D) digital sensor imaging, Computed Aided Design (CAD) this study could be more accurate and realtime.

Conclusion

It could be concluded that the value of radius and depth of the curve of Spee is not same in both side of mandible. The radius of left mandibular arch was significantly greater than the right side of mandible.The depth of left mandibular arch was not significantly greater than the right mandibular arch.

Recommendation

The reference of the radius and depth of curve of Spee can be followed during prosthodontic occlusal rehabilitations and orthodontic occlusal corrections. Further study with modern technology may bring more accurate result for the best clinical outcome.

Disclosure

The author declared no competing interest.

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Original Article

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Complication of Anaesthesia in Children: A Prospective Observational Study

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Abstract

Background: *It is said that, careful preoperative assessment and adequate planning of an appropriate anaesthetic are the cornerstones safe paediatric anaesthetic practice. For this reason, the pre-anaesthetic evaluation of the child is very important for all paediatric cases. Basically, any anaesthetic technique, either regional or general, has some major and/or minor complications. We have very few local data regarding the complications of anaesthesia in children.*
Aim of the study: The aim of this study was to assess the complications of anaesthesiology in children.

Materials and methods: *This was a prospective observational study that was conducted in the Department of Anaesthesiology & ICU, Chittagong Medical College, Chattogram, Bangladesh during the period from August 2020 to July 2021. In total 118 children, aged between 1-day to16 years prepared for anaesthesia associated surgery with proper document were finalized as the study population. A pre-designed questioner was used to collect patient's details, type of surgery, technique of anaesthesia, duration of anaesthesia and surgery. The incidence of intra-operative and post-anaesthesia recovery room complications was determined.*

Results: *According to the frequencies of intraoperative complications we observed that 7.63%, 5.93%, 4.24%, 3.39% another 3.39%, 2.54%, 7.63%, 5.93%, 5.08% and another 3.39% patients were associated with bradycardia, tachycardia, hypotension, hypertension, dysrhythmia, cardiac arrest, bronchospasm, laryngeal spasm, hypoventilation and apnoea respectively. On the other hand, in case of postoperative complications we found 10.17%, 6.78%, 5.93%, 5.08%, 20.34%, another 5.93%, another 5.08%, 4.24%, 8.47%, another 5.93%, another 4.24% and 3.39% patients suffered from delayed recovery, restlessness, pain, shivering, tachycardia, hypotension, hypertension, hemorrhagae, hypoventilation, respiratory arrest, laryngospasm and bronchospasm respectively.*

Conclusion: *Frequency of using general anaesthesia is significantly higher than any other technic of anaesthesia. In this study we observed, preterm infants are more prone in developing respiratory complications because of using anaesthesia. Anaesthesia-related morbidity and mortality can either be minimized or avoided with early identification and prompt management of any complication.*

Key words

ASA status; Complications; Intraoperative; Paediatric anaesthesia.

Introduction

Any anaesthetic technique, either regional or general, has some major and/or minor complications. For this reason, careful preoperative assessment and adequate planning of an appropriate anaesthetic are the cornerstones of safe paediatric anaesthetic practice. As there are very few local data regarding the complications of anaesthesia in children, we had conducted this study. Major differences in anatomy and physiology in the small infant have important consequences in many aspects of anaesthesia. The physical disparity between the adult and child diminishes at 10-12 years of age although major psychological differences continue till adolescence. Paediatric patients differ in their drug requirements because of their smaller body size, differences in body composition and handling capacity of drugs. Usually dosages are based on body weight, because it correlates so intimately with body water compartments. Paediatric anaesthesia morbidity and mortality in the perioperative period has been studied by Cohen et al[1]. An incidence of 35% was reported by the same author. In another multicenter study, complications related to anaesthesia in infants and children were also reported[2]. A study carried out in Nigeria revealed an incidence of 10% adverse events in paediatric surgical emergencies[3]. The French-Language Society of Paediatric Anaesthesia published theirresults of audits performed approximately 10 yr apart, both of which found a very low (less than 0.1% incidence) of long-term complications[4]. Another audit from the United Kingdom, consisting of more than 10,000 epidural catheters, reported similar results[5]. The Paediatric Regional Anaesthesia Network is a multicenter collaborative supporting a registry that collects data on every regional nerve block performed or supervised by an anesthesiologyst at more than 20 children's hospitals. The first comprehensive

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analysis of the Paediatric Regional Anaesthesia Network database examined almost 15,000 blocks, followed by focused analyses of specific block types[6,7]. The aim of this study was to assess the complications of anaesthesia in children. All the procedures were performed according to the motto of the study.

Materials and methods

This was a prospective observational study which was conducted in the Department of Anaesthesilogy & ICU, Chittagong Medical College, Chattogram, Bangladesh during the period from August 2020 to July 2021. In total 97 children, aged between 1-day to16 years prepared for anaesthesia associated surgery were recruited as the study population. A pre-designed format was used to collect patient's details, type of surgery, technique of anaesthesia, duration of anaesthesia and surgery. The incidence of intra-operative and post-anaesthesia recovery room complications was determined. The approval of the ethical committee and the proper written consent of the participants were obtained before starting the intervention. In the data sheet we included age, sex, ASA status, premedication indication and type of surgery, technique of anaesthesia, induction agents and agents used for maintenance of anaesthesia, analgesics, status of surgeons and anesthetists, intraoperative and recovery room complications, management and outcome. In the recovery room, the post operative patients were nursed in the lateral position. Standard observations included consciousness state, color, respiration, pulse and blood pressure. Patients were discharged to the ward 45 minutes after arrival and with stable vital signs. In case of any complication, the attendant anesthetist was notified and prompt action taken to assess and manage accordingly. According to the exclusion criteria severely ill patients, older than 16 years and patients with incomplete data were excluded from the study. Those patients who would benefit from intensive care management were transferred to Intensive Care Unit (ICU) after adequate stabilization. The data was entered into Excel spreadsheet and presented as frequency and percentages. Statistical analysis was done by using SPSS version 20.

Results

In our study among 118 participants 64 (54%) were male and 54 (46%) were female. So male were dominating in number and the male-female ratio was 1.19:1. Among total study population, the highest 43% (n=51) patients were found from 11 to 16 years' age group and it was followed by, 31% (n=36) from 5 to 10 years' age group and 26% (n=31) from <5 years' age group. In analyzing ASA scores of the participants at baseline we found, most of the cases were with ASA score I and it was 66.10%. Then 20.34% with ASA score II, 9.32% with ASA score III, 2.54% with ASA score IV and 1.69% with ASA V. In this current study most of the cases undergone to general surgery which was in 45.76%. Besides this, 17.80% to ENT surgery, 13.56% to orthopedics, 10.17% to maxillofacial surgery, 9.32% to ophthalmic surgery and 3.39% to cardiothoracic surgery. According to the anaesthesia technic in most of the cases (82.20%) general anaesthesia was used. Then in 10.17% cases general anaesthesia with local infiltration was used, in 5.93% cases general anaesthesia with caudal block was used and in 1.69% cases subarachnoid block was used. In analyzing the frequencies of several complications we found more frequencies of postoperative complication. According to the frequencies of intraoperative complications we observed that 7.63%, 5.93%, 4.24%, 3.39% another 3.39%, 2.54%, 7.63%, 5.93%, 5.08% and another 3.39% patients were associated with bradycardia, tachycardia, hypotension, hypertension, dysrhythmia, cardiac arrest, bronchospasm, laryngeal spasm, hypoventilation and apnoearespectively.

On the other hand, in case of postoperative complications we found 10.17%, 6.78%, 5.93%, 5.08%, 20.34%, another 5.93%, another 5.08%, 4.24%, 8.47%, another 5.93%, another 4.24% and 3.39% patients suffered from delayed recovery, restlessness, pain, shivering, tachycardia, hypotension, hypertension, hemorrhage, hypoventilation, respiratory arrest, laryngospasm and bronchospasm respectively.

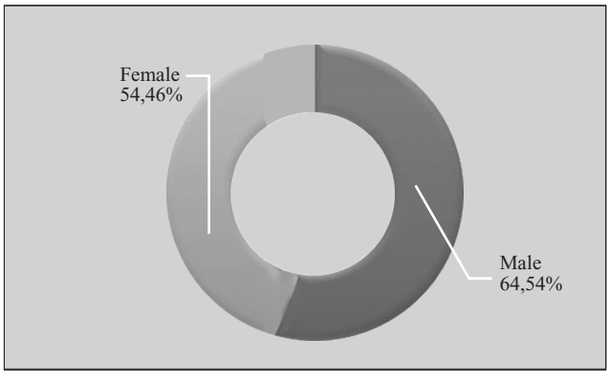

Figure I Male-female ratio of participants (n=118)

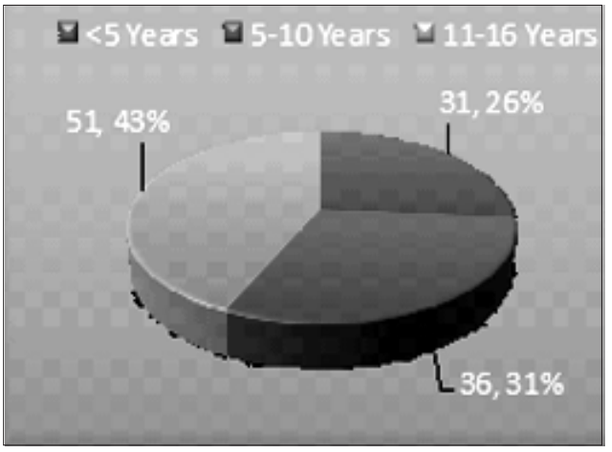

Figure II Age distribution of participants (n=118)

Table I Baseline ASA score distribution among the participants (n=97)

ASA Score	n	%
ASA I	78	66.10
ASA II	24	20.34
ASA III	11	9.32
ASA IV	3	2.54
ASA V	2	1.69
Total	118	100

Table II Distribution of surgical procedures among the participants (n=118)

Surgical Procedures	n	%
General Surgery	54	45.76
ENT	21	17.80
Orthopedics	16	13.56
Maxillofacial	12	10.17
Ophthalmic	11	9.32
Cardiothoracic	4	3.39

Table III Distribution of anaesthesia technics among the participants (n=118)

Technique	n	%
General anaesthesia	97	82.20
Gen. anes. with local infiltration	12	10.17
Gen. anes. with caudal block	7	5.93
Subarachnoid block	2	1.69

Table IV Distribution of intraoperative complications among the participants (n=118)

Intraoperative Complications	n	%
Bradycardia	9	7.63
Tachycardia	7	5.93
Hypotension	5	4.24
Hypertension	4	3.39
Dysrrhythmia	4	3.39
Cardiac arrest	3	2.54
Bronchospam	9	7.63
Laryngeal spasm	7	5.93
Hypoventilation	6	5.08
Apnoea	4	3.39

Table V Distribution of postoperative complications among the participants (n=118)

Postoperative Complications	n	%
Delayed Recovery	12	10.17
Restlessness	8	6.78
Pain	7	5.93
Shivering	6	5.08
Tachycardia	24	20.34
Hypotension	7	5.93
Hypertension	6	5.08
Hemorrhage	5	4.24
Hypoventilation	10	8.47
Respiratory arrest	7	5.93
Laryngospasm	5	4.24
Bronchospasm	4	3.39

Discussion

The aim of this study was to assess the complications of anaesthesia in children. To reduce the morbidity and mortality associated with paediatric anaesthesia, the anesthetist should have a sound knowledge of the physiologic, anatomic and pharmacologic peculiarities of each developmental stage of childhood. Although there was no direct relationship between ASA physical status and the incidence of perioperative complications, but the outcome of management was directly related to ASA status. Through our study we observed that, standard monitoring is essential in paediatric anaesthesia care particularly for early detection and prevention of dangerous complications such as bradycardia, hypotension, hypoxia and adverse temperature changes. The hallmark of paediatric anaesthesia has always been the precordial stethoscope because it allows constant monitoring of breath sounds, along with the heart sounds, rate and rhythm. Changes in clinical status happen quickly in the newborn with only subtle signs heralding serious alterations in the patient's clinical status. In our study we found, the commonest respiratory problems observed in this study were bronchospasm, laryngospasm, hypoventilation and apnea. Besides this, the upper respiratory tract infection is common in paediatric age group. The two cases of bronchospasm were treated with administration of 100% oxygen and intravenous steroid & salbutamol nebulization. Children aged less than 1 year appear to have an increased incidence of airway complications as do those anesthetized by less experienced anesthetists and those undergoing airway surgery[8,9].

Tracheal intubation may also increase the likelihood of an intraoperative respiratory event but the reported incidence of these complications varies considerably. In Cohen and Cameron's study, cough, laryngospasm, bronchospasm and decrease in oxygen saturation were reported to be increased 2-7 times in children with upper respiratory tract

infection undergoing anaesthesia and by 11 times if intubation of trachea was required[1,8]. A major concern for all anesthetists is when is it safe to anesthetize the child with an upper respiratory tract infection[10]. A running nose of recent onset, pyrexia or abnormal physical signs in the chest, are reasons to defer elective surgery. If the surgery is urgent, the anesthetist must be aware of increased risk of bronchospasm[11]. Cardiovascular insability in the form of tachycardia, bradycardia and hypertension can be due to pain, hypoxia, hypercarbia and haemorrhage. Complicationsarising at induction of anaesthesia in neonates and small infants in our study were mainly respiratory and cardiovascular. They may manifest as apnea, bronchospasm, laryngospasm, cyanosis, bradycardia as well as cardiac arrest. These are likely to be due to stimulation of the larynx during laryngoscopy and tracheal intubation at light planes of anaesthesia. Neonates and infants have very active airway reflexes and therefore require adequate depth of anaesthesia for laryngoscopy and tracheal intubation. The preterms infants are more prone to developing postoperative respiratory complications as evidenced by our study. In neonates, if bradycardia is not promptly treated with 100% oxygen, they readily develop hypoxic cardiac arrest. Hypoxia and dysrrhythmia are the commonest causes of cardiac arrest in neonates and infants. Neonates and infants have high oxygen consumption as against that of adult. The period of laryngoscopy and intubation should be as brief as possible so as to prevent dangerous level of oxygen desaturation. Cyanosis is one of the early signs that herald serious complication in newborns and infants. Cyanosis in this age group is reliable because they have high hemoglobin level. In order to avoid or minimize these complications occurring at induction to the barest minimum, a consultant anesthetist or an experienced anesthetist must always be in attendance to handle difficult cases. The practice has gained popularity in our center. This recommendation is born out of past experiences. Our study showed that consultant-anesthetist was in attendance during anaesthesia and surgery for more than eighty percent of cases. One of the problems of paediatric anaesthesia is the control of body temperature particularly in the neonate and in small babies. It is thought that babies have poor temperature regulating mechanisms and because of their large body surface area compared to their weight, they tend to loose heat to cold surroundings[12]. Anaesthesia, because of its depression on metabolism and dilatation of cutaneous vessels, tends to cause a progressive fall in body temperature[13]. This effect is worse in children and consequently there is tendency to hypothermia. Mean body core temperature of infants and children undergoing prolonged surgery tends to decrease because heat loss often exceed heat production[14]. Children who are hypothermic after operation tend to shiver, as non-shivering thermogenesis is largely replaced by shivering at about 1 year of age[15]. Measures taken to prevent hypothermia are the use of electric heating blanket, head wraps, warming of intravenous infusion and blood, and by switching off the air conditioner in the theatre. In the recovery room, pain was treated with opioid analgesics after excluding other causes of crying and discomfort. Our study showed a similar finding. The presence of pain implies inadequate analgesia following surgery. There have been a number of myths and misunderstandings related to pain in children which has led to historically inadequate treatment of paediatric pain[16]. Many anesthetists express profound fear about the use of opioids in children because of the complication of respiratory depression. It has been recognized that infants and children require adequate pain management and if not received may actually adversely affect patient outcome[17]. Age-appropriate pain assessment is essential and both subjective and objective assessment tools may be utilized depending on patient age and clinical status. Many pain assessment scales have been develop to assess pain in children[18]. Anaesthesia-related morbidity and mortality can either be minimized or avoided with early identification and prompt management of any complication. In our study the frequency of using general anaesthesia was found significantly higher than any other technic of anaesthesia.

Limitations

This was a single centered study with a small sized of sample. So the findings of this may not reflect the exact scenario of the whole country.

Conclusion

Frequency of using general anaesthesia is significantly higher than any other technic of anaesthesia. In this study we observed, preterm infants are more prone in developing respiratory complications because of using anaesthesia. Anaesthesia-related morbidity and mortality can either be minimized or avoided with early identification and prompt management of any complication.

Recommendations

For getting more specific findings we would like to recommend for conducting more studies regarding the same issue with larger sized sample.

Disclosure

All the authors declared no competing interest.

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Original Article

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Death due to Suicidal Poisoning : A Medicolegal Study in North-Eastern Region of Bangladesh

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Abstract

Background : *Suicide is a significant public health problem worldwide. A substantial proportion of suicides are committed using a poisonous agent. Exploring the poisonous substances used for suicide based on autopsy findings was the objective of the study.*

Materials and methods: *This retrospective study includes 335 autopsy records of the confirmed suicidal death cases obtained from the Department of Forensic Medicine, Sylhet M. A. G. Osmani Medical College, Sylhet. Data were collected from July 2016 to June 2020. A structured case record form was used to collect the demographic details and suicidal agents. Data analysis was performed with Stata (Version 16) using both descriptive and inferential statistics.*

Results: *The average age of the suicide cases was 27.73 ±13.03(SD) years and nearly two-thirds of them were in the 10 – 19 years and 21 – 30 years age groups. The male to female ratio was nearly one. But on average females were significantly younger than males (25.08 ±0.89 vs 30.37 ±1.07 years, p<0.001).The persons who committed suicide mostly lived in rural areas rather than urban areas (80.90 vs 19.1).*

The suicidal cases were equally reported among married and unmarried.Organophosphorus compounds (OPC) (91.34%) was the most frequently used agent among the cases followed by Zinc Phosphide (Rat killer) (2.99%), Methyl Salicylate (2.39%), and Benzodiazepines (1.79%). No statistical difference was noted among the poisoning agent and age group, sex difference, marital status, and residence.

Conclusion: *OPC poisoning is the commonest agent used for suicide in Bangladesh by both male and female. Health authorities should take necessary steps to prevent self-poisoning by OPC through appropriate legislation and restrictions on its use.*

Key words

Autopsy; Homicide; Insecticides; Poisoning; Suicide; Toxicological analysis; Young adults.

Introduction

Suicide is a significant public health problem worldwide. World Health Organization (WHO) estimated that more than 700,000 people died by suicide every year[1]. However, this is likely an underestimate, and true incidence might be much higher[2]. More than three-quarter suicides occur in low and middle income countries[1]. In Bangladesh, suicide kills more than 10000 people each year[3] with the majority of cases being young[4].

Several methods are used for suicide. Among them, ingestion of pesticides, hanging, and firearms are the most frequently used methods[1]. An estimated 27 to 37% of global suicides occur due to pesticide poisoning each year[5]. Poisoning is found to be the second commonest method of suicide in Bangladesh[3,4]. A previous suicidal death analysis in Dhaka Medical College Hospital found that nearly 31% of victims were of suicidal poisoning[6]. On the other hand, forensic investigation of deaths due to poisoning revealed that 91.33% of cases were suicidal[7]. Autopsy studies are important in determining substances used in self-poisoning. Although agrochemical pesticides are the most commonly used agent throughout the developing world, medicines are frequently used in other parts of the world[8]. An investigation of the substances used would reveal the ongoing pattern in deliberate self-poisoning in any region. A few autopsy studies have explored these areas in Bangladesh. Therefore, this study aimed to explore the poisonous substances used for suicide cases based on autopsy findings reported in the Department of Forensic Medicine, Sylhet M.A.G. Osmani Medical College, Sylhet.

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Materials and methods

This retrospective study was conducted based on autopsy records collected from the Department of Forensic Medicine, Sylhet M.A.G. Osmani Medical College, Sylhet encompassing a span of 4 years from July 2016 to June 2020.

Enrollment criteria:The Department of Forensic Medicine in this medical college receives cases for autopsy from the entire Sylhet district and a few neighboring districts. All cases that underwent autopsy in this department during the four year period were initially screened and confirmed suicide cases due to poisoning agents irrespective of age, sex, and demographic status enrolled. All unknown bodies or suspicion of alleged homicides or accidents were excluded.

A structured case record form was prepared based on the investigator's insight and previously published study. Data collection was focused on two areas: demographic details and suicidal agents. Demographic information of the study subjects was collected from the inquest reports accompanying the dead bodies, and information from specific identification of poisons was made from Chemical Examiner's report. A total of 2244 autopsies were performed during the period. Among them, 863 cases were suicides, and 380 cases were suspected of suicidal poisoning. After Chemical Examiners' report, 335 cases were confirmed as suicidal poisoning and had their substances identified. Reports of the confirmed cases were reviewed for data collection and analysis.

Ethical clearance was waived as the study is retrospective in nature hence formal consent to the patients was not applicable here. However, before a review of records and data extraction, formal approval was taken from the relevant authorities.

Retrieved data were entered in a Microsoft Excel spreadsheet and analyzed using statistical software Stata version 16. Continuous variables were expressed using mean and standard deviation and categorical variables were expressed with frequency and percentage. To establish the association between poisoning type and demographic variables, a chi-square test was used. In all cases, data were interpreted with 95% CI and p-value <0.05 considered for statistical significance.

Results

Of the 335 cases included, 50.15% (n=168) were male and 49.85% (n=167) were female.The male to female ratio was approximately one. In this study, the youngest victim was 7 years and the oldest patient was 70 years old. The mean age of the cases was 27.73 ±13.03(SD) years. The most vulnerable age group of the suicidal poisoning was those aged between 21 – 30 years (37.31) followed by 11-20 years (36.72%). The majority lived in the rural locality (80.80%) and nearly more than them were unmarried (54.33%). Cases were mostly Muslims (81.79%) (Table I).

Table I Demographic profile of suicide cases using poisoning agents (n=335)

Variable	n (%)
Age (Years) mean±SD Age range Age category	27.73 ±13.03 7 - 70
≤10	3 (0.90)
11 – 20	123 (36.72)
21 – 30	125 (37.31)
31 – 40	29 (8.6)
41 – 50	33 (9.85)
51 – 60	14 (4.18)
61 – 70	8 (2.39)
Sex	
Male	168 (50.15)
Female	167 (49.85)
Residence	
Rural	271 (80.90)
Urban	64 (19.10)
Marital status	
Married	153 (45.67)
Unmarried	182 (54.33)
Religion	
Muslim	274 (81.79)
Hindu	59 (17.61)
Christian	2 (0.60)

A total of 335 cases observed to have suicide using poisoning agents. Of all, predominant suicidal agent taken was Organophosphorus Compounds (OPC) (n=306, 91.34%). Other agents were zinc phosphide (Popularly used as rat killer) (n=10, 2.99%) methyl salicylate (n=8, 2.39%) benzodiazepines (n=6, 1.79%), methyl sulfate (n=1, 0.30%), sertraline (n=1, 0.30%), sulfuric acid (n=1, 0.30%) triclosan compound (n=1, 0.30%) and zinc sulfide (n=1, 0.30%). The overall distributions are statistically similar between male and female cases as described in Table II.

Table II Substance used for suicidal poisoning (n=335)

Substance name	n (%)	Female n(%)	Male n(%)	p-value*
Organophosphorus Compounds (OPC)	306 (91.34)	148 (88.62)	158 (94.05)	
Zinc Phosphide (Rat killer)	10 (2.99)	6 (3.59)	4 (2.38)	
Methyl Salicylate	8 (2.39)	7 (4.19)	1 (0.60)	0.208
Benzodiazepines	6 (1.79)	2 (1.20)	4 (2.38)	
Methyl sulfate	1 (0.30)	1 (0.60)	0	
Sertraline	1 (0.30)	1 (0.60)	0	
Sulfuric acid	1 (0.30)	0	1 (0.60)	
Triclosan compound (Chemical)	1 (0.30)	1 (0.60)	0	
Zinc Sulfide	1 (0.30)	1 (0.60)	0	

*p-value determined by Chi-square test.

Overall, 8.66% (n=29) cases used non-OPC compounds and 91.34% (n=306) used OPC compounds (Figure 1).

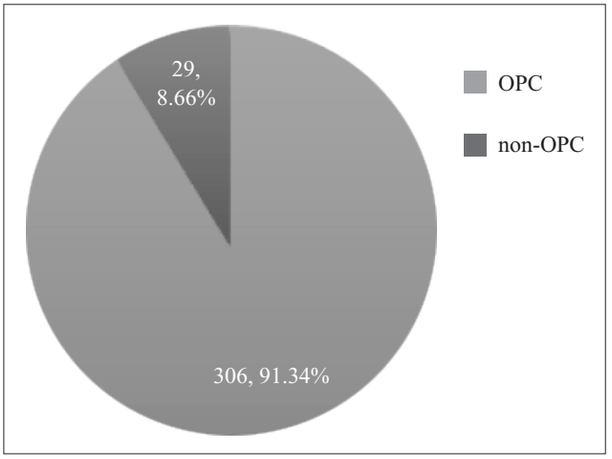

Figure 1 Substance used for suicidal poisoning (OPC or non-OPC)

The choice of using OPC and non-OPC substances as a suicidal agent is no more related to demographic characteristics of the suicide cases (p>0.05 for all). Detailing is described in Table III.

Table III Association demographic features with the substance used for suicidal poisoning

Variable	Substance used for poisoning		p-value*
	OPC n (%)	Non-OPC n (%)	
Age (Years), mean±SD Age group (Years)	27.49 ±0.73	30.31 ±3.01	0.266
≤ 10	3 (0.98)	0	0.573
11 – 20	112 (36.60)	11 (37.93)	
21 – 30	116 (37.91)	9 (31.03)	
31 – 40	27 (8.82)	2 (6.90)	
41 – 50	30 (9.80)	3 (10.34)	
51 – 60	12 (3.92)	2 (6.90)	
61 – 70	6 (1.96)	2 (6.90)	
Sex			
Female	148 (48.37)	19 (65.52)	0.077
Male	158 (51.63)	10 (34.48)	
Marital status			
Married	140 (45.75)	13 (44.83)	0.924
Unmarried	166 (54.25)	16 (55.17)	
Residence			
Rural	247 (80.72)	24 (82.76)	0.789
Urban	59 (19.28)	5 (17.24)	

*p-value determined by independent samples t-test, chi-squared test, and Fisher's exact test where appropriate.

The average age of female cases was 25.08 ±0.89 years (SD) and they were significantly younger than male cases (30.37 ±1.07 years, p<0.001). However, female and male cases didn't differ with marriage and residence (p>0.05) (Table IV).

Table IV Distribution of age, marriage, location of cases by sex (n=299)

Variable	Sex		p-value*
	Female n (%)	Male n (%)	
Age (Years) mean±SD Age group (Years)	25.08 ±0.89	30.37 ±1.07	<0.001
≤10	1 (0.60)	2 (1.19)	0.016
11 – 20	75 (44.91)	48 (28.57)	
21 – 30	62 (37.13)	63 (37.5)	
31 – 40	11 (6.59)	18 (10.71)	
41 – 50	12 (7.19)	21 (12.50)	
51 – 60	4 (2.40)	10 (5.95)	
61 – 70	2 (1.20)	6 (3.57)	
Marital status			
Married	72 (43.11)	81 (48.21)	0.349
Unmarried	95 (56.89)	87 (51.79)	
Residence			
Rural	131 (78.4)	140 (83.33)	0.255
Urban	36 (21.56)	28 (16.67)	

*p-value determined by independent samples t-test, chi-squared test and Fisher's exact test where appropriate

Discussion

Suicide by poisoning is a critical problem in this subcontinent. The easy availability of poisonous chemicals, particularly agricultural pesticides, in this region made it the most commonly used substance for suicidal poisoning[8]. Suicide is going rampant in Bangladesh. As of 2019, 3.7 persons per 100,000 population died by suicide[9]. Even amidst the COVID-19 pandemic situation, many suicides were reported[10]. As suicidal poisoning ranks second in methods of suicide, it was pertinent to study the substances used for suicide by poisoning[3,4].

We found that the suicidal poisoning cases were on average younger with the majority belonging to an age range between 11 to 30 years. The number of cases decreased with increasing age. This corresponds to the age pattern of all types of suicides in Bangladesh[4]. However, the proportion of sexes differed from studies analyzing all types of suicides. We found an almost equal proportion of males and females in our study, which is different in cases of media content analysis as well as autopsy studies of all types (both poisoning and non-poisoning) of suicide[4,6]. But our

findings correspond to global findings on suicides (Irrespective of methods) where men are found to have a lower frequency of suicide attempts with higher rates of completion, and women have a higher number of attempts with lower rates of completion[11]. Our analysis also reveals that female cases were significantly younger than males, which is concordant with findings from a national suicide incidence study by Mashreky and colleagues[3]. As women are married off at a young age in Bangladesh, and the factors associated with suicide in women mostly involve familial discord and spousal violence, therefore women who attempt suicide are relatively younger than men[3,12]. On the other hand, suicide risks are higher among men who are divorced, widowed, or separated, with unbearable comorbidities, or having a psychiatric illness[13]. Hence the age difference nearly similar proportions of married and unmarried cases was identified in our study. This is concordant with findings from Arafat and colleagues who found a similar distribution of marriage among completed suicide cases[14].
In concordance with the national suicide incidence study, we found that completed suicidal poisoning cases came predominantly from rural areas[3]. This is expected, as agricultural pesticides are commonly found in the households of farmers in rural areas, it is anticipated that suicide cases would be higher in that locality. But the pattern suggests victims intentionally collecting substances from common sources to make their attempts successful.

We found that OPC is the most frequently used substance in suicidal poisoning cases, and there were no demographic differences in the use of the chemical substance (OPC vs non-OPC) for suicide. As OPC is easily available as an agricultural pesticide, this is the compound of choice in South Asian regions for suicide[8]. Another possible reason could be its well-recognized toxicity in human bodies. Eddleston observed that knowledge of toxicity often increases self-poisoning practices[8].

Prevention strategies should be put forward to lower the number of self-poisoning cases in Bangladesh. Legislative prevention strategies like a restriction of highly hazardous pesticide use in agriculture have shown beneficial effects on pesticides suicide across Asia[15]. Also, national mental health acts should include plans to protect patients from suicidal attempts. Over the counter buying of specific medicines should be restricted and monitored closely to prevent abuse of medicine.

Limitations

This study was limited in that it was conducted in a single-center among a relatively small number of cases. Details exploration of the cases in light of motive, etiology, inciting factors, and other information were not possible due to lack of appropriate data. However, further nationwide studies should be conducted to explore the pattern of substance used in suicidal poisoning in finer detail.

Conclusion

Our study explored the suicidal poisoning cases from autopsy records in the north eastern region of Bangladesh. Completed suicides were frequent among male and young people. The organophosphorus compound was the predominately used agent for suicide. Proper strategic management needs to prevent suicide incidence is therefore essential.

Disclosure

All the authors declared no competing interest.

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Case Report

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Maxillary Central Incisor with Two Root Canals and Two Separate Roots: A Case Report

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Abstract

Background : *Maxillary central incisors have been reported as presenting with only 1 root canal and a single root in 100% of cases. Variations in the number of roots or canals in the upper central incisors are rare. Therefore, to achieve a technically satisfactory endodontic outcome, the clinician must have adequate knowledge of the internal canal morphology and be aware of the possible variations.*

Case Presentation : *The purpose of this paper was to report a clinical case with a varying number of roots in a right maxillary central incisor.*

Conclusion : *After the appropriate cleaning and shaping of the missed root canal, it was filled using the Cold lateral compaction technique. Follow up radiograph showed complete healing of the lesion after 36 months.*

Key words

Cold lateral compaction; Dental Operating Loope; Internal Anatomy; Maxillary Central Incisor.

Introduction

The success of root canal treatment is highly dependent on the cleanliness and shaping of the root canal system. The aim is to removal of the pulp tissue and bacteria and their by-products, while the canal is shaped in preparation to receive the filling material[1].

To achieve cleanliness and decontamination of the canal, adequate knowledge of the internal anatomy of the teeth and possible variations is essential. The use of a dental operating microscope with adequate instruments that permit visualization and negotiation of the root canal system is also important[2].

Since the first report by Hess in 1925, the maxillary central incisor has been reported as presenting with 1 root canal and a single root in 100% of cases[3]. In 1975, De Deus studied the internal dental anatomy of 1137 teeth. Among them were 37 maxillary central incisors and all of them had 1 root canal in a single root[4]. Further studies such as Vertucci in 1984 have also evaluated the internal anatomy of the teeth and reported the same findings[5].

Despite these findings of 1 root canal in a single root being presented in the vast majority of cases, some variations have been reported. Reid and his colleague reported 2 cases of maxillary permanent incisors with 2 root canals in a single root[6]. In 2003, Genovese reported a maxillary central incisor with 2 separated roots[7] .

In addition, Sponchiado and with his associate reported a case with this variation to the anatomy in a tooth with coronal

macrodontia[8]. In 2009, Gondin reported an upper incisor presenting 3 root canals[9].

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Case Report

A 24 years old female visited DKRC smile design & Orthodontics on 6th March 2018 for endodontic evaluation of right maxillary central incisor. Previously, 3 months ago the tooth got RCT done by a dental surgeon for the complain of pain. Now the chief complain of the patient is a tiny sinus tract on the root area and masticatory discomfort. Clinical examination showed almost normal number, size and color of all teeth in the jaw. A sinus tract identified as tiny red swelling on mesial aspect of the root area with slight percussion pain of the tooth. The size and shape of the right maxillary central incisor were identical to the left (Fig 1) and there was no periodontal problem. As history reveals previous endodontic treatment so no further advanced vitality test done.

Initial radiographic examination revealed that the tooth had 2 separated roots (Fig. 2). The palatal root exhibited radiopaque material, and the buccal supernumerary root showed a narrow canal and an apical radiolucent area. Sinus tract seems to be associated with the supernumerary.

After local anesthetization with 2% Lidocaine with 0.0005% Epinephrine the tooth was isolated, all the provisional cement was removed and the pulp chamber was irrigated with 2.5% sodium hypochlorite solution (i-dental Lithuania). Using a 3.5x magnification on a surgical loop, the gutta percha present in the palatal canal was assessed. The entrance of the buccal supernumerary root was obliterated. Using TRA 01 and TRA 24D ultrasonic tips (Dental Trinks, São Paulo, Brazil) and with the illumination and magnification provided by the loope, the buccal root was

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located and negotiated. Existing Gutta percha was removed with Gutta solvent 'Eucalyptol' (Dentsply, France). The working length was established using the initial radiograph and a radiograph was taken to confirm the patency of the canal. No treatment was performed on the palatal canal.

Chemical and mechanical instrumentation was performed with Gates Glidden burs (Dentsply Maillefer, Ballaigues, Switzerland) and manual files (Flexofile, Dentsply Maillefer, Ballaigues, Switzerland). At every change of instrument, the canal was thoroughly irrigated with sodium hypochlorite; after preparation, it was flooded with 17% EDTA ((i-dental Lithuania) for 3 min. Passive ultrasonic irrigation (PUI) was used for 20 sec to activate the hypochlorite (Endo activator, Dentsply, Ballaigues, Switzerland); this procedure was repeated 2 more times. After final hypochlorite irrigation, the root canal was dried with paper points. A dressing of calcium hydroxide with saline solution was left inside the canal for 14 days.

At the following appointment, the patient was asymptomatic with the disappearance of 'sinus tract'. After anesthesia and isolation the root canal was again accessed. The calcium hydroxide dressing was removed, the canal was irrigated with sodium hypochlorite then EDTA, and passive ultrasonic irrigation was performed using the same protocol as for the first visit, and finally the root canal was dried with paper points. Sealapex (SybronEndo, USA) cement and cold Gutta percha with lateral condensation technique were used to complete the root canal obturation. Final radiographs were taken from the orto, mesial, and distal aspects. At the end a final restoration with composite resin was given.

Three years after treatment, the patient was asymptomatic; the probing test was normal. Radiographic examination (fig. 3) revealed that the radiolucent area had become normal with characteristics of a healing area. The original lesion was completely healed, and there was no perforation at the buccal root.

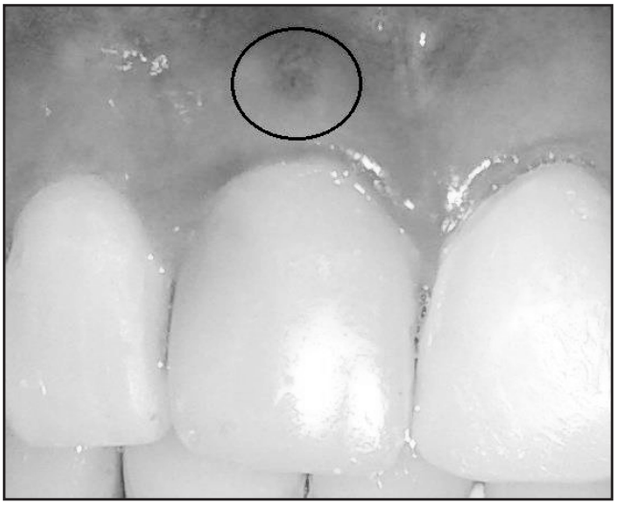

Figure 1 Identical central incisors with a sinus tract on the root area of right maxillary central incisor

Figure 2 Initial radiograph showing an additional root which was split from main root

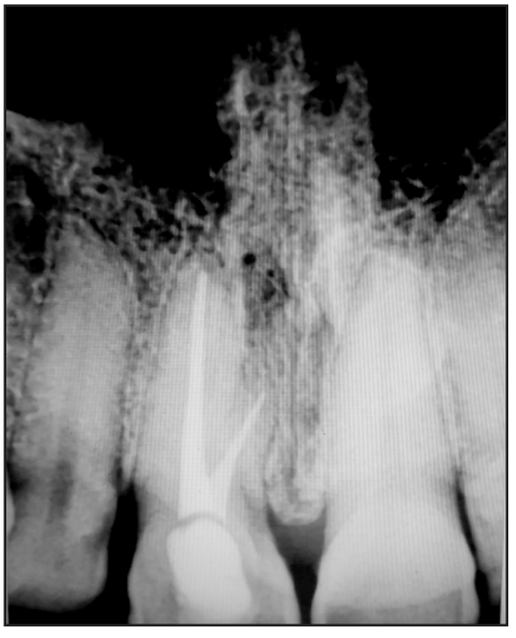

Figure 3 Three years after treatment. Patient was asymptomatic, the lesion was completely healed

Discussion

Conventional endodontic treatment, particularly in cases of anatomic variation, must be performed efficiently to ensure functionality of the tooth. Substantial coronal destruction may jeopardize prosthetic rehabilitation and encourage patients to reconsider prosthesis on implant. Teeth with a small coronal remnant and apical radiolucency may have a favorable outcome in cases where the root canal system is properly negotiated and filled. Root canal retreatment is

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usually more cost-effective than an implant-supported restoration[10]. Considering that the buccal root had no canal obturation, performing apical surgery in this case would have been unlikely to be successful[11].

Variations in the anatomy of the root canal may be associated with coronal aberrations such as dens invaginatus, talon cusp fusion, or germination, even with a clinically normal crown.[12,13,14]. In this case, the patient had no natural crown, precluding the assessment of the original morphology. The case reported herein exhibited a rare situation of a maxillary central incisor with 2 independent root canals, classified as a class IV as described by Vertucci.

The success in this case was largely dependent on the localization, negotiation, and proper treatment of the buccal root. In spite of having had previous appointments with a dental surgeon, the complete domain of the internal anatomy was not achieved. It is believed that the use of magnification and illumination may increase the success of accessing "calcified" canals or those with an uncommon morphology[15].

It is important to use ultrasonic tips with different shapes when removing calcifications, pulp nodules, or materials that obliterate the canal entrance. The utilization of microsonics is a safe way to deal with difficult anatomies by minimizing the risk of perforation or other adverse events[16]. Modern endodontic practice must involve not only knowledge of the internal anatomy, but also the technology necessary to adequately negotiate the entire root canal system.

Conclusion

The use of dental operating loope and the appropriate ultrasonic tips can be considered an important armamentarium to locate root canals. The root canal treatment of the tooth reported in this study was effective, less invasive and cost effective in comparison with an implant-supported single crown.

Disclosure

Both the authors declared no competing interest.

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Case Report

Chattagram International Dental College Journal

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A Case Report of Class II Division1 Malocclusion of a Growing Aged Patient Correction with Myofunctional Therapy

Md. Noman Faroq[1*] Md. Sher Ali[2] Shahiqul Jabbar[3]

Abstract

Background: *Growing individuals with skeletal Class II div-1 malocclusion in presence of patients mandibular deficiency and maxillary excess is a severe skeletal problem. Correction of mandibular deficiency and maxillary excess in askeletal Class II patient is a challenging work. The present case is a growing Bangladeshi female patient, aged nine years, who had a class II div 1 malocclusion with proclination of the upper anterior segment and retruded mandible, as described in the literature. Intraoral examination revealed a procline maxillary incisor, an exaggerated lower curve of spee and mild crowding in the upper and lower jaws. Additionally, the patient had a bite problem, was unable to grind food and had an unattractive smile. After establishing an appropriate adaptive bite, a myofunctional appliance was placed. A significant improvement in the patient's smile, facial profile, and lip competence were observed following treatment, as well a significant improvement in the patient's confidence and overall quality of life. The aim of this case report is to allow the orthodontist reader to learn the use of class II activator, which is easy to use and comfortable to wear.*

Case Report : *A nine-year-old female presented to the Orthodontic Department at Dhaka Dental College & Hospital with multiple complaints. Growing skeletal Class II div-1 malocclusion with proclination of the upper anterior segment and retruded mandible was managed by class II activator. Super imposition of pretreatment and post treatment cephalometric tracings shows desired treatment outcomes.*

Conclusion: *Enhancing the dynamic function, and reduces orthodontic relapse and thus maintains stable occlusion over time. Proper use of the activator will allow the patient to gain benefits throughout the neuromyofascial system – with fewer concerns for the orthodontist.*

Key words

Myofunctional applience; Orthodontic treatment; Retruded mandible.

Introduction

Malocclusions of Class II div 1 are more common than any other type of malocclusion in our country, with Class I malocclusion being the most common[1,2]. Over the last decade, an increasing number of adults have become aware of the benefits of orthodontic treatment and have begun to demand high-quality treatment in the shortest amount of time possible with the greatest efficiency and least expense[3]. Class II malocclusions can be treated in a variety of ways, depending on the problem's characteristics, including antero-posterior discrepancy, age and patient compliance[4].

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Extra-oral appliances, functional appliances and fixed appliances associated with Class II inter-maxillary elastics are all examples of treatment options available today[5]. Correction of Class II malocclusions in nongrowing patients, on the other hand, usually consists of orthognathic surgery or selective removal of permanent teeth, followed by dental camouflage to conceal the skeletal discrepancy. It has long been debated whether or not an extraction should be performed in an orthodontic practice[6-8]. Because they are conveniently located between the anterior and posterior segments, premolars are among the most frequently extracted teeth for orthodontic purposes. There have been a variety of reasons why different authors have recommended variations in extraction sequences, including upper and lower first or second premolars[9-14].

To correct Class II malocclusions in non-growing patients, two maxillary premolars or a combination of two maxillary and two mandibular premolars may be extracted[15,16]. Typically, it is not the skeletal characteristics of a Class II malocclusion that dictate whether it should be treated with two or four premolar extractions, but the dentoalveolar characteristics. When there is no crowding or cephalometric discrepancy in the mandibular arch, extracting only two maxillary premolars is generally indicated[17,18].

Among growing patients, the extraction of four premolars is most often indicated for crowding in the mandibular arch, a cephalometric discrepancy, or a combination of the two conditions[17-19]. Recent studies have demonstrated that patient satisfaction with camouflage treatment is comparable to that obtained with surgical mandibular advancement

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and that treatment with two maxillary premolar extractions results in a more favorable occlusal outcome than treatment with four premolar extractions[20,21].

Case Report

A nine-year-old female presented to the Orthodontic Department at Dhaka Dental College & Hospital with multiple complaints, including "I am unable to properly bite" and "I am unable to close my lips." A mesocephalic symmetrical face, covex profile, and retruded mandible were discovered during an extraoral examination. The patient had a full Class II molar and canine relationship, proclined maxillary incisors and a 07mm overjet on intraoral examination. A maxillary incisor proclination and a retruded mandible were discovered during a cephalometric examination.Our treatment goal was to address the patient's primary complaint, and the treatment plan was tailored to the patient's specific needs.

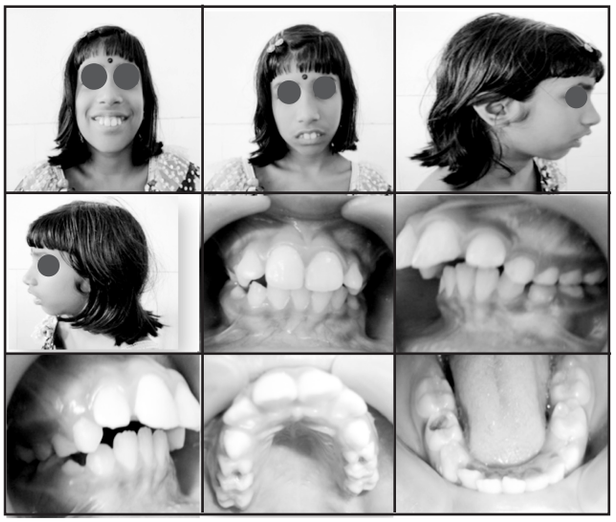

Figure 1 Pre-treatment extra-oral & intra-oral photograph

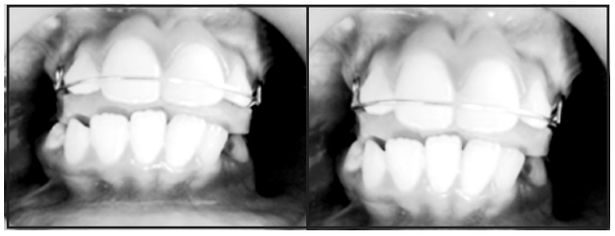

Figure 2 Treatment progress photograph

Diagnosis and Treatment Plan

A Skeletal Class II division 1 malocclusion with maxillary incisor proclination, convex profile, low mandibular plane angle, lip trap, incompetent lips, and increased overjet is diagnosed as orthodontic view in the presented case.

Establishing an ideal overjet and overbite, correcting the anteroposterior relationship, achieving Class I canine and molar relationships and achieving occlusal intercuspation are the therapeutic goals. As a result, our treatment strategy included the use of myofunctional appliance such as Class-2 activator to remedy the condition. After application of class II activator and proper monitoring, the patient's profile and smile were remarkably improved. Improvements in the patient's facial appearance were achieved by achieving lip competence and a straight profile. A functional occlusion with normal overjet and overbite was achieved. Class I canine and molar relationships were also achieved. The patient and her parents were very happy with the complete satisfaction.

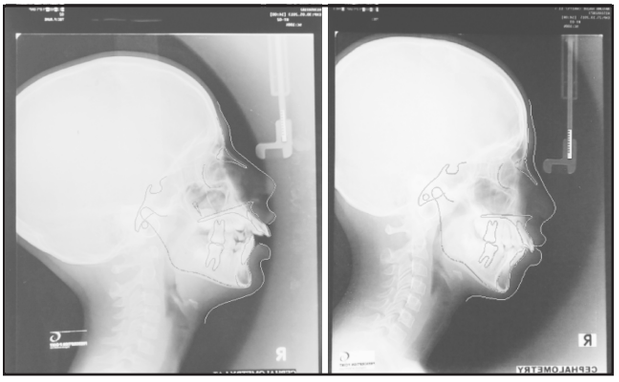

Figure 3 Pre & post treatment lateral cephalometry tracing

Table I Pretreatment Lateral Cephalogram Steiner's analysis

Parameters	Reference value (Caucasians)	Reference Value (Bangladeshi)	Pt's measurement
SNA*	82*	83.8*	82°
SNB*	80*	81.5*	70°
ANB*	2*	2.3*	12°
IIA	131*	117.7*	118°
MPA*	32*	25.8*	25°
U1 to NA*	22*	29.8*	20°
U1 to NAmm	4mm	8mm	8mm
L1 to NB*	25*	30.6*	29°
L1 to NBmm	4mm	8mm	7mm

Table II Post Treatment Lateral Cephalogram : Steiner's Analysis

Parameters	Reference value (Caucasians)	Reference Value (Bangladeshi)	Pt's measurement
SNA*	82*	83.8*	82°
SNB*	80*	81.5*	75°
ANB*	2*	2.3*	7°
IIA	131*	117.7*	115°
MPA*	32*	25.8*	35°
U1 to NA*	22*	29.8*	27°
U1 to NAmm	4mm	8mm	5mm
L1 to NB*	25*	30.6*	30°
L1 to NBmm	4mm	8mm	8mm

Figure 5 Pre and post treatment extra-oral& intra-oral photograph

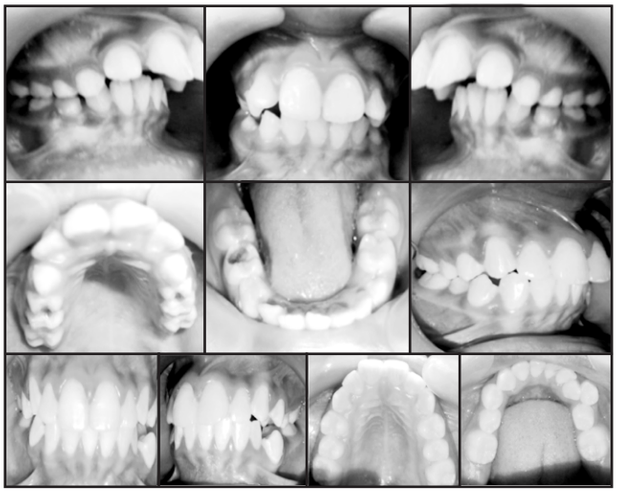

Figure 6 Pre and post treatment intra-oral photograph

Discussion

The nature of a Class II malocclusion is related to many factors, such as facial structure, maxillary and mandibular growth patterns, and dentoalveolar development. Individual variations of these factors have to be considered in relation to treatment procedures to correct the malocclusion. Correction of mandibular deficiency in a skeletal Class II patient with a vertical growth pattern poses a great challenge. The control of vertical dimension becomes very important as downward and backward rotation of mandible will exaggerate thefacial convexity. It appears that the control of vertical dimension is imperative for an optimal forward displacement of the correction of a skeletal Class II malocclusion[9]. Activator is one of the most widely used functional appliances for the sagittal advancement of the mandible with vertical control. Activators balance the skeletal bases through two double matched planes, upper and lower, where teeth are positioned with effects of propulsion, retropulsion and expansion[11,15,20]. Activator stimulates the growth and elicits tissue development toward a suitable chewing function. This appliance increases the activity of protractor and elevator muscles with concomitant relaxation and stretching of retractors. This produces a more favorable muscle pattern and also a change in bony structures as muscles adapt to new functional stresses. The effects of functional appliances in a skeletal Class II malocclusion includes reduction of ANB angle, restriction of maxillary growth, advancement of mandible, increasein lower facial height, correction of overjet, improvement in overbite, up righting of the maxillary incisors, protrusion of mandibular incisors, correction of dental Class II malocclusion, correction of facial convexity and reduction of mentolabial fold[22]. Our patient had skeletal Class II pattern. As she was in growing stage, our objective was functional advancement of the mandible and inhibition of further maxillary growth. Activator treatment option was presented to her. Activator was used for 12-16 h daily for 11 months. The patient wore the appliance regularly. The skeletal correction was achieved by mandibular base lengthening and restriction of increase in maxillary basal length. Patient had improved smile and profile after orthodontic treatment. Upper incisors were retracted to achieve normal incisor inclinations, overjet and overbite. Bilateral Class I canine relation was achieved with maximum intercuspation[21,22].

Conclusions

Myofunctional applience if undertaken after a thorough diagnosis leads to positive profile changes and an overall satisfactory facial aesthetics. A well chosen individualized treatment plan, undertaken with sound biomechanical principles and appropriate control of orthodontic mechanics to execute the plan is the surest way to achieve predictable results with minimal side effects.

Disclosure

All the authors declared no competing interest.

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Case Report

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Oral Submucous Fibrosis a Dreadful Complex Potential Pre-Malignant Condition : A Case Report

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Abstract

Background: *Oral Submucous Fibrosis (OSMF) is a chronic, insidious, and onerous disease affecting the oral mucosa, oropharynx, and, in rare cases, the larynx. It affects millions of individuals globally, with a prevalence rate of 0.4 percent in the Indian subcontinent. It makes opening the mouth difficult and might be disabling.*

Case Presentation : *A case of oral submucous fibrosis of a 23-year-old female patient is described, with an emphasis on a literature study.*

Conclusion : *Oral physicians' awareness of this issue can help in quick diagnosis and therapy, depending on the degree of involvement. Patients with OSMF require trismus correction as well as reconstructive surgery for any concurrent oral cancer.*

Key words

Betel nut; Oral Submucous fibrosis; premalignant disease.

Introduction

Oral Submucous Fibrosis (OSMF) is a premalignant condition that affects the mucosa of any region of the oral cavity, including the throat and esophagus in some cases. Submucosal inflammation is present, followed by fibroelastic alteration of the lamina propria with epithelial atrophy, resulting in stiffness of the oral mucosa and restriction of mouth opening, as well as the difficulty to chew certain foods[1]. There are a lot of people who use betel nut with slaked lime in East Indian, Sri Lankan, South Asian, and Southeast Asian cultures[2]. The relative danger associated with the usage of betel quid is exceptionally high, as demonstrated by a consensus workshop held in Kuala Lumpur, Malaysia[3]. The betel nut contains alkaloids, which have been shown to induce euphoria and alleviate fatigue[4]. Women are three times more likely than males to be affected by the illness, which is most prevalent between the ages of 45 and 54 years[5]. There has only been one known case in the literature of this condition occurring in a 4-year-old girl and that case was noted in the literature as being highly unusual. Premalignant lesions of high gradehave a malignant potential rate as high as 7.6 percent andare associated with a higher risk of developing cancer[6,7,8]. In the early stages, the most common symptoms and signs include burning sensation and erythematous lesion, which are followed by pale mucosa with white marbling[8]. Fibrosis and hyalinization of subepithelial tissue are the most crucial clinicopathological features of OSMF, which greatly affect the patients' quality of life. The formation of myofibroblasts and the constant expression of smooth muscle actin (α-SMA) are regarded to be indicators of increasing fibrosis, and they are assumed to be responsible for the alteration of the OSMF milieu, which ultimately leads to carcinogenesis[9]. It is believed that areca nut is responsible for the pathogenesis of OSMF, despite the fact that the specific cause and pathogenesis of the disease have not yet been fully determined. Meanwhile, significant improvement in the diagnosis and clinical treatment of OSMF-related diseases has been recorded in recent years. Patients with OSMF had a severe decline in their quality of life (Physically and mentally). Patients suffering from OSMF will experience acute mouth burn after consuming spicy foods. In addition, studies have revealed that inflammatory variables have a role in the commencement of the OSMF process. Another important event in the etiopathogenesis of OSMF is the development of oral mucosal inflammation as a result of the chewing of areca nut. So far, it has been documented in OSMF patients as a primary inflammatory reaction (Mucositis)[10]. The etiopathogenesis of OSMF, which is produced by the chewing of areca nut, is depicted in Figure 1.

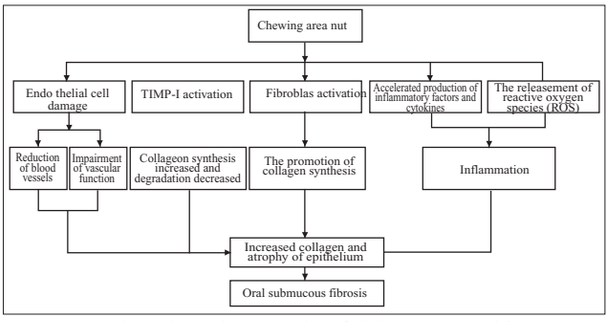

Figure 1 The etiopathogenesis of OSMF caused by chewing areca nut.

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Case Report

A 23-year-old Bengali woman presented to Chattogram International Dental and Hospital's Prosthodontic Department on 16th March 2018 with trouble opening her mouth and a burning feeling when eating for the last year. She was then referred to the Department of Oral and Maxillofacial Surgery for additional examination and care. The history of the current sickness revealed a three-year habit of chewing flavored areca nuts, 1-2 nuts/day. The fact that she is chewing it indicates that she like the flavor. Her parents had the same chewing habit as she did, but they did not suffer from the same condition. When it came to supari or chewing tobacco products, the parents and the rest of the family were fully oblivious of their dangers, believing them to be a natural product that may help with digestive issues. The fact that she is chewing it shows that she enjoys the flavor. Her parents chewed in the same way she did, but they did not have the same condition. The parents and the rest of the family were completely unaware of the dangers of supari or chewing tobacco products, believing them to be a natural product that could help with digestive issues. The inter-incisal opening was only 8 mm wide, which is less than normal. Rubbery and inflexible, the buccal mucosa had a leathery texture when you touched on it. Vertical fibrotic bands could be felt on both sides of the cheek and in the lip, as well as on the inside of the mouth. There were records made of Angle's class I molar relationship on both sides. Routine hematological tests did not show any problems. X-rays were taken of the temporomandibular joints to check for bone problems. As a result of knowing that people often chew on areca nuts, and looking at the clinical signs and symptoms, OSMF was confirmed as a clinical diagnosis, A biopsy was not done because it could cause more fibrous scarring and make the symptoms worse. The patient and her parents were given a lot of information about the dangers of chewing areca nuts during a very intense counseling session. This way, the patient and her family can stop chewing. An oral physiotherapy program that included the use of a jaw stretcher was prescribed for the patient, who was also recommended to take a vitamin and iron supplement. Later, Triamcinolone Acetonide (Trialon,Drug International, Bangladesh) was injected submucosally alongside placental extract (Placentrax) combined with hyaluronic acid into the areas where palpable fibrotic bands were discovered. The technique was done three times with a 15-day break between each repetition. There was a remarkable improvement in the burning sensation of the mouth and mild improvement in mouth opening. The patient had numerous severely decayed teeth that were also affecting her oral health, therefore she was referred to the conservative dentistry and endodontic departments in order to resolve the issue. After three sessions of injection, the patient was no longer there and did not return for follow-up care.

Figure 2 Pale buccal mucosa with loss of elasticity

Figure 3 Fibrous band of lip

Figure 4 FLimited mouth opening, it was 8 mm

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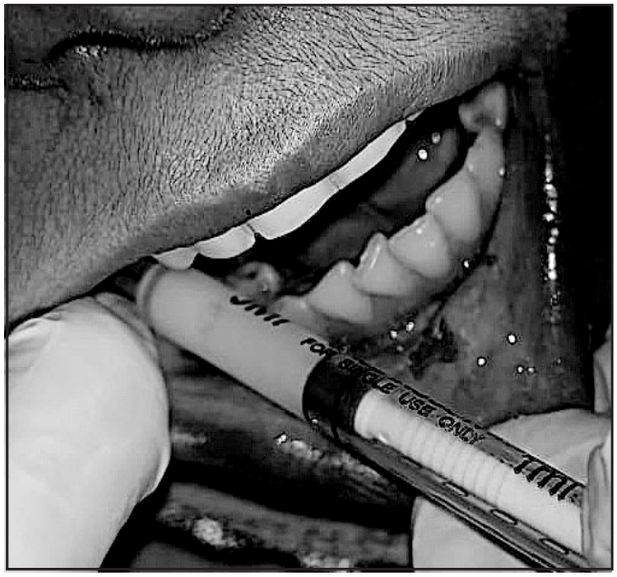

Figure 5 Submucosal injection of Triamcinolone Acetonide

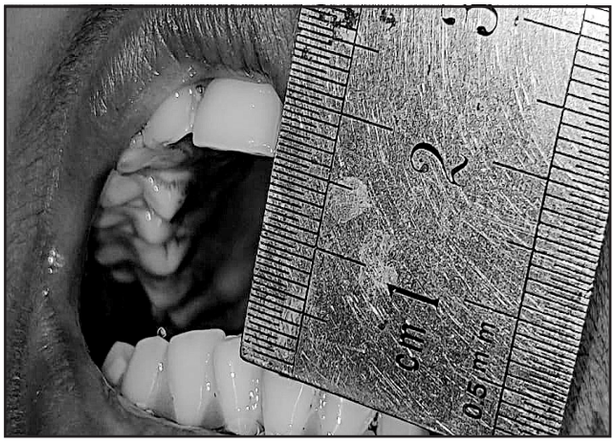

Figure 6 Increase mouth opening after 2 session of submucosal injection of TA

Figure 7 Increase of mouth opening up to 19 mm after three session of TA injection

Discussion

OSMF is linked to significant functional morbidity and an increased risk of cancer[11]. Though its etiology is unknown, some risk factors for this disease include areca nut chewing, chili consumption, genetic processes, immunological processes and nutritional deficiencies[12]. Several factors influence the development of mucosal fibrous band in betel quid, including the amount of areca nut in the betel quid and the frequency and length of chewing[11,12]. This mixture is retained in the buccal mucosa for a long period of time and slowly chewed over a period of time. Smoking marijuana has a comparable impact to smoking tobacco, and it is extremely addictive[13]. This condition was shown to be present only among people who chewed areca nut in one form or another, according to a long-term population-based cohort research conducted in 2013. In this particular instance, the patient had been chewing areca nuts for three years prior to seeking treatment. Buccal mucosa, lips, retromolar regions and the soft palate are the most commonly affected areas by OSMF[14,15]. As a result of fibro-elastic change of the juxta-epithelial layer, it is a chronic disorder marked by mucosal rigidity of varied degrees. As a result, oral opening is severely restricted[16]. Early signs of the disease include a blanching of the buccal mucosa, which gives it a marble-like look; however, later signs include palpable fibrous bands, which cause the mucosa to become pale, thick, and stiff. This results in a restricted mouth, a burning sensation, pain, and dysphagia[17]. Paymaster was the first to describe OSMF's possible precancerous nature, observing the occurrence of squamous cell carcinoma in one-third of his OSMF patients. Subsequent research has found that the incidence of carcinoma in OSMF ranges from 2–30%[18]. This explains why the disease requires immediate attention in order to develop a comprehensive treatment plan to cure it. The treatment of OSMF is dependent on the time of diagnosis and the extent of mucosal involvement. The treatment of OSF requires the cessation of the patient's habits, education about the ill-effects of the disease and close monitoring of the oral mucosa. In severe cases and cases that do not respond to medical treatment, surgical intervention is required[19]. Intralesional injections of steroids, collagenase, hyaluronidase, interferon gamma, and placental extracts are used in medical treatment[20,21]. In order to treat OSF, patients must stop their habits, be educated about the negative implications of the condition, and have their oral mucosa closely monitored. As a last resort, surgical intervention is necessary in circumstances where medical treatment has failed. Placental extract and placental steroids are intralesional injections that are used in medical treatment for conditions such as Crohn's disease or ulcerative colitis. However, in our presented case, we only administer Triamcinolone Acetonide injections in conjunction with hyaluronic acid for the last 15 days, along with a vitamin and iron supplement. Recent research, however, has demonstrated that the combination of salvizanolic acid B and triamcinolone acetonide injections in the treatment of soft palate fibrosis with oral submucous fibrosis is effective[22].

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Conclusion

Oral Submucous Fibrosis (OSF) is a potentially malignant disorder that commonly affects the individuals who have a habit of betel nut quid chewing. OSF may transform into oral malignancy, specifically oral squamous cell carcinoma with a high rate. Early diagnosis and emphasis on patient counseling along with the appropriate treatment can help improve the condition drastically. In our presented case remarkable improvement was observed due to decreasing burning sensation of the mouth and mild improvement in mouth opening. In the situation we've presented, the patient vanished after three injection sessions and did not return for follow-up. If the condition does worsen, he may in the long term need surgical intervention with grafting and there is always the possibility of malignant change and therefore close monitoring of his oral mucosa is essential.

Disclosure

All the authors declared no competing interest.

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