ISSN 2305-9664

Journal of Contemporary Dental Sciences

Volume : 07, No : 01 January, 2019

Contents

An Official Publication of Sapporo Dental College, Dhaka, Bangladesh
Recognized by Bangladesh Medical & Dental Council (BM&DC)

ISSN 2305-9664

Journal of Contemporary Dental Sciences (JCDS)

Recognized by Bangladesh Medical and Dental Council (BM&DC)

Vol. 7, No. 1, January, 2019

An Official Publication of Sapporo Dental College Uttara, Dhaka

Address

Sapporo Dental College & Hospital

Plot # 24, Court Bari Road, Sector # 08, Uttara Model Town
Dhaka-1230, Cell : 01678026854, 01678026855, 01678026858
E-mail : sdch@bol-online.com, Web : www.sdch.edu.bd

Graphics Idea : Maruf Hussain, SDCH

Publication of Sapporo Dental College and Printed at
IDEA Printers, Katabon, Dhaka. 02-9662116
E-mail : ideaprinters@yahoo.com

Journal Committee

Instruction to Contributors

* Journal of Contemporary Dental Sciences is the official publication of Sapporo Dental College. The Journal is published twice a year in the month of January and July.
* The Journal Publishes original articles, case reports and review articles related to Dental/Medical science. The style of the papers should be in the modified Vancouver style (Ref. New England Journal Medicine 1997; 336:309-15).
* Papers should be submitted to the Chief Editor, Journal of Contemporary Dental Sciences, Sapporo Dental College, 24, Courtbari Road, Sector 8, Uttara, Dhaka.

General Instruction

* Type manuscripts double spaced including references, figures with legends, and tables on one side of A4 page only. Leave 1-inch margin on all sides with number in every page beginning with the abstract page and including texts, tables, references and figures.
* Cite each reference in numerical order and list in the references section.
* Use SI units of measure.
* Assemble manuscripts in this order: (1) Title page with author information (2) Acknowledgements (3) Abstract page, (4) Text, (5) References, (6) Tables, (7) figures with legends.
* As a general rule, the articles should not exceed 10-12 pages. Over-length manuscripts should not be accepted for publication.
* Submit two copies of the manuscript accompanied by a soft copy preferably CD in MS Word.

Title page with author information (1st page but do not number)

Text page must include:

* Full title of the article not exceeding 50 characters with three to five key words for use as indexing terms and a running title for use on the top of text pages.
* Authors' names, highest academic degree, affiliations, and complete address for correspondence including fax number, telephone number and e-mail address
* Authors should reveal all the conflicts of interest on this page

The acknowledgments page (second page but do not number)

* List all the sources of funding for the research, plus substantive contributions of individuals (Note: If the article is published, this section will be printed at the end of the text)

Abstract page (First numbered page)

* Do not cite references in the abstract. Be concise (250 words maximum)
* Limit use of acronyms and abbreviations. Abbreviations must be defined at the first mention.
* The abstract should cover background and purpose (description and rationale for study); Methods (brief description of methods); results (presentation of significant results); and Conclusion (succinct statement of data interpretation) preferably under separate headings.

The Text

The following are typical main headings:

Introduction, Material and Methods, Results, Discussion and Conclusion

* **Introduction:** Summarize the rationale for the study with pertinent references. The purpose(s) of the study should be clearly cited.
* **Materials and Methods:** Identify type of study and describe study subjects and methods used. Provide methods of statistical analysis. Cite references for standard study and statistical methods. Describe new or modified methods. Identify apparatus (with name and address of the manufacturer) used. Generic names of drugs must be given. Manuscripts that describe studies on humans must indicate that the study was approved by institutional Ethical Committee and the subjects gave informed consent. Add statistical analysis.
* **Results:** Present only important results/ observation in logical sequence in the text, tables or illustrations with relevant statistics
* **Discussion:** Emphasis new and important results and the conclusion that follows including implications and limitations. Relate observations to other relevant studies.

* **References:** Accuracy of reference data is the author's responsibility. Verify all entries against original sources, especially journal titles, inclusive page numbers, publication dates. All authors must be listed if less than six. List only first three and add et. al. if more than six. Personal communications, unpublished observations, and submitted manuscripts must be cited in the text as "({name/s}, unpublished data, year)". Abstracts may be cited only if they are the sole source and must be identified in the references as "Abstract". "In press" citations must have been accepted for publication and add the name of the journal or book including publisher. Use Vancouver style, for example:

1. World Health Organization: WHO recommendations: Obesity: Preventing and Managing the Global Epidemic. Geneva, World Health Org., 2000 (Tech. Rep. Ser. No. 894)
2. Rashid M. Food and Nutrition. In Rashid KM, Rahman M, Haider S eds. Textbook of Community Medicine and Public Health. 4th edn. RHM Publishers 2004; 126-140
3. Sayeed MA, Hussain MZ, Banu A, Rumi MAK, Azad AK. Prevalence of diabetes in a suburban population of Bangladesh Diab Res Clin Prac 1997; 34: 149-155
4. Jarett RJ. Insulin and hypertension (Letter). Lancet 1987; 2: 748- 749
5. Banerji MA, Faridi N, Atulri R, Chiken Rl, Lebovitz HE. Body composition, visceral fat, leptin and insulin resistance in Asian Indian men. J Clin Endocrinol Metab 1999; 84: 137-144 (Abstract)
6. Anwar AKMN & Fariduddin KM, Innovation and re-orientation in medical education and research: Challenges for Ibrahim Medical College. Ibrahim Med. Coll. J. 2007;1(1): 1-2 (Editorial)

Tables

* Each table must be typed on a separate sheet and double spaced. The table number should be Arabic, followed by a brief informative title. Place explanatory matter in footnotes. For footnotes use symbol in this sequence: *, **, etc.

Figures

* Line drawings, photomicrographs, colour prints and halftones should be camera ready, good quality glossy prints. Submit only originals of laser prints, not photocopies. A set of original figures must be submitted. Indicate figure number, short figure title on top of figure lightly in pencil. Any abbreviations or symbols used in the figure must be defined in the figure or figure legend. Keep an original set for your records.

Editing:

* All submitted manuscripts are subject to scrutiny by the Chief Editor or any member of the editorial board. Manuscripts containing materials without sufficient scientific value and of no priority issue, or not fulfilling the requirements for publication may be rejected or may be sent back to the author/s for resubmission with necessary modifications to suit one of the submission categories of the journal. Manuscripts fulfilling the requirements and found suitable for publications are sent for peer review. Submissions found suitable buy the reviewer, may need revision/modifications before being finally accepted. Editorial board finally decides upon the publish ability of the revised manuscript. Proof of an accepted manuscript may be sent to the author/s and should be corrected and returned to the editorial board within one week. No addition to the manuscript at this stage should be accepted. All accepted manuscripts are edited according to the Journal's rule.

Communication Information:

* Communication information for all correspondence is always printed in the title page of the journal. Any additional information or any other inquiry relating to submission of the article the Chief Editor or the Journal office may be contacted.

Copyright:

Journal of Contemporary Dental Sciences
Official Publication of Sapporo Dental College, Uttara, Dhaka

Editorial

A Happy New Year to all our readers and contributors.

The end of a year provides an opportunity to reflect on the events of the previous 12 months. Similarly, the start of a new year is the time for predictions and resolutions, allowing creators to readjust to producing the necessary material on time.

One might think "If everything is predetermined, why bother doing anything?" However, that is not the proper thinking. Instead, it expresses relentless continuation. Furthermore, it suggests that whatever happens, it would be positive and exciting, presenting thought-provoking opportunities and possible future routes.

Therefore, this is crucially important for us as individuals and professionals to adapt and move forward with evolving situations. Let's always be sure that something will happen. Be also sure too that we can influence it if we choose.

The current issue (Volume 7, Issue 1, January 2019) of the Journal of Contemporary Dental Sciences brings 3 Original Articles and 2 Case Report for its readers. We sincerely hope that the presented articles will be well-accepted by our readers.

Professor (Dr.) Asad-Uz-Zaman, BDS, DDS, PhD
Professor and Head, Department of Oral Pathology and Periodontology
Sapporo Dental College & Hospital
Chief Editor, Journal of Contemporary Dental Sciences.
Mailing Address: Plot-24, Courtbari Road, Sector-8, Uttara Model town,
Dhaka -1230, Bangladesh, Email: sdch@bol-online.com

Journal of Contemporary Dental Sciences (JCDS)
An Official Publication of Sapporo Dental College, Uttara, Dhaka

Vol. 7, No. 1 January, 2019

Contents

Consanguinity and Associated Congenital Anomalies- A Cross-Sectional study on 82 patients

ATMS Islam[1], M Ahmed[2]

Abstract

Consanguinity has been associated with congenital anomalies. The present cross-sectional study analyzed the association between consanguinity and different types of congenital anomalies other than orofacial cleft. Here, we surveyed 82 patients who visited the Outpatient Departments of Dhaka Dental College Hospital and Shaheed Suhrawardi Medical College Hospital between January 2013 and December 2014 for cleft lip and palate treatment. Twenty-four patients presented with various associated congenital anomalies other than cleft lip and palate. The mean age of the patient was 5.6 years and the 3 - 6 years group was the largest. Males (48) were higher in number than females (34). Thirteen patients had a history of consanguinity. According to types of consanguineous marriage, 8 were first cousins, and 5 were other than 1st cousins. Our results suggest that consanguinity incurrences underlying genetic risk factors, particularly in the offspring of first cousins.

Key Words: Consanguinity, Consanguineous marriages, congenital anomalies, premarital counselling, Public health education

(J Cont Dent Sci 2019;7(1): 1-4)

Article Received : 23/03/2018 Article Accepted : 29/10/20218

Introduction

Consanguineous marriages have been practised since the early existence of modern humans.[1,2] Still, consanguinity is seen worldwide in several communities with variable rates, particularly in the Muslim world.[3-5] Consanguinity describes unions between couples with at least one common ancestor. It is also loosely termed inbreeding.[2,6-8] Consanguineous marriage may be among first cousins, one-and-a-half cousins, double first cousins, second cousins and remote relatives.[2,5,9] The offspring of consanguineous unions, especially in the first cousin, may be at increased risk of genetic disorders because of the expression of autosomal recessive gene mutations inherited from a common ancestor.[6,10,11] The closer the biological relationship between parents, the greater the probability their offspring will inherit identical copies of one or more detrimental recessive genes. On average, their progeny will be homozygous as they will receive identical gene copies from each parent.[9,12,13]

Consanguinity is prevalent in many countries, especially among Muslims.[2,14,15] In Muslim societies, there is a strong preference for consanguineous unions, most frequently between first cousins. Marriage outside the family is perceived as a risky and disruptive option.[2,15,16] The primary reasons for a preference for consanguineous marriages in such communities with high consanguinity rates include better stability of the marital relationship, ease of finding out a suitable spouse, improved relationships with in-laws, cost-effective, getting better care for in older age, above all maintaining the lineage solidarity of the family.[15,17,18] Although less frequent, consanguineous marriages are also seen in North America, many parts of Europe, Australia, and traditionally in many tribal populations worldwide.[19,20] Consanguinity without knowing the risk of genetic consequences causes an increase in mortality and malformation rate in the family. Comparison between genetic diseases with different modes of inheritance showed that recessive and multifactorial disorders had the highest values in consanguinity.[11,12]

1. Dr ATM Saiful Islam, Associate Professor of Oral & Maxillofacial Surgery, Dhaka Dental College & Hospital, Dhaka, Bangladesh.
2. Professor Mohiuddin Ahmed, Professor of Oral & Maxillofacial Surgery , Sapporo Dental College & Hospital, Dhaka, Bangladesh

Address of Correspondence

Dr ATM Saiful Islam, Associate Professor of Oral & Maxillofacial Surgery, Dhaka Dental College & Hospital, Dhaka, Bangladesh.

Bangladesh is a country of about 170 million people and runs a lower-middle-income economy. It has limited resources, and the inadequacy of health education and awareness among most of the population is still a concern. Over 90% of Bangladesh's population is Muslim, leading to a semi-conservative social structure favouring consanguineous marriages. However, little information on the country's prevalence, extent, and clinical implications of consanguineous marriages is available. This study aimed to determine the association between consanguineous marriage and congenital anomalies.

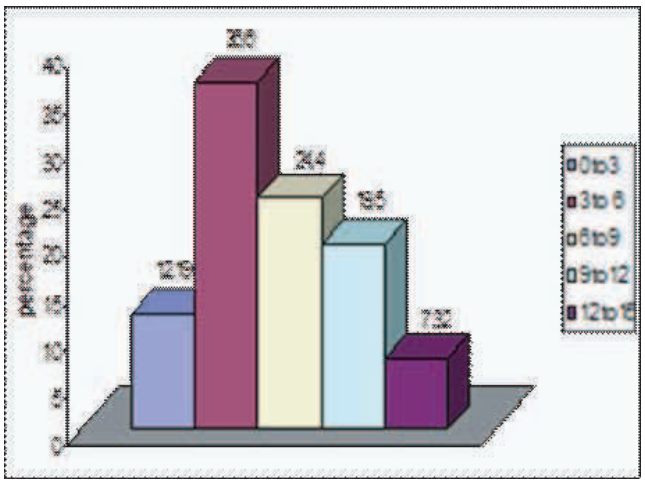


Fig 1: Age distribution of the patients (N = 82).

Materials and Methods

Eighty-two cases were selected from patients visiting with cleft lip and palate and who sought treatment in the Oral & Maxillofacial Surgery Department of Dhaka Dental College Hospital and Shaheed Suhrawardi Hospital, Dhaka, from January 2013 to December 2014. This study was conducted after achieving informed consent from the patients and the Ethical Clearance certificates from the hospital authorities. A standardized structured data collection instrument was used to record the demographics, patient complaints, and the mother's personal history. In addition, the patient's complaints of associated congenital anomalies, speech difficulties, middle ear infection, hearing loss, genetic disorders like Down's syndrome, congenital heart diseases (CHD), repeated respiratory tract infection, syndactyl, polydactyl etc., were examined thoroughly. In addition, echocardiograms were done to confirm CHD.

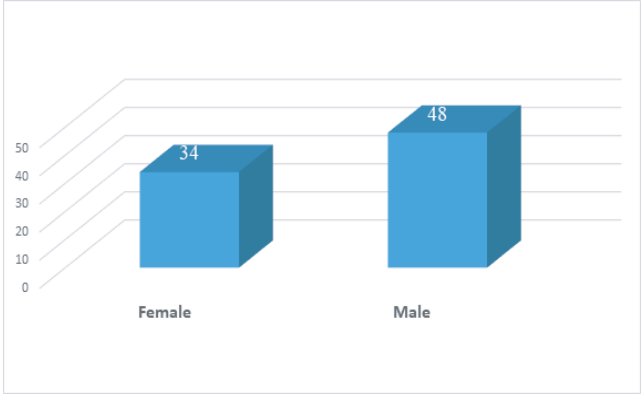
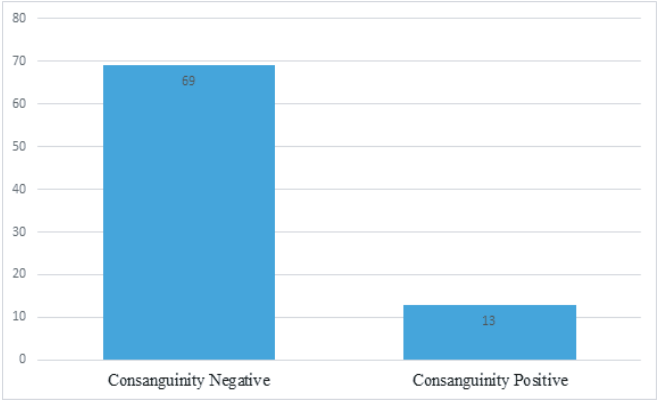


Fig 2: Sex distribution of the patients (N = 82).



negative patients (N = 82).

Results

The participants' age, sex, consanguinity history and associated congenital anomalies are shown in Fig 1, Fig 2, Fig 3, and Table 1, respectively.

Table 1. Congenital anomalies in patients with positive parental consanguinity

Patients having positive parental consanguinity	Name of associated congenital anomalies	Number (percentage) of patients
13	CHD	7 (53.8)
	CHD with Down's syndrome	3 (23.1)
	Down's syndrome	1 (7.7)
	Syndactyl	1 (7.7)
	Polydactyl	1 (7.7)
CHD: Congenital Heart Disease		

Table 2. Distribution of associated congenital anomalies among various types of consanguinity

Name of associated congenital anomaly	Types of consanguineous marriage		Total number of patients
	First Cousin (N=8)	Other than First cousin (N=5)	
CHD	5	2	7
CHD + Down's syndrome	2	1	3
Down's syndrome	Nil	1	1
Syndactyl	1	Nil	1
Polydactyl	Nil	1	1
Total	8	5	13
CHD: Congenital Heart Disease			

Table 3. Congenital anomalies in the total sample

Total patients	Associated congenital anomaly	Number (%) of positive patients
82	CHD	12 (14.6)
	CHD with Down's syndrome	03 (3.7)
	Down's syndrome	02 (2.4)
	Syndactyl	05 (6.1)
	Polydactyl	02 (2.4)
	Total	24 (29.3)
CHD: Congenital Heart Disease		

In our study, the mean age of the patients was 5.6 years, and the highest number of patients were in the 3 - 6 years group (Fig 1). Of the total 82 patients (Fig 2), males (48) were higher in number compared to females (34). In addition, 13 patients out of 82 had a history of consanguinity (Fig 3). The congenital anomalies of consanguinity-positive patients are listed in Table 1.

Out of 13 consanguinity-positive patients, according to types of consanguineous marriage, 8 were first cousins, and 5 were other than 1st cousins (Table 2). In addition, of 82 patients, 24 were presented with various associated congenital anomalies other than cleft lip and palate (Table 3).

Discussion

This study analyzed the association between congenital anomalies and consanguineous marriage. In developed nations, such patients are identified early. Therefore, prompt and appropriate counselling and treatment are provided at an optimum time to achieve the best outcome[4,6,21] The age of the patients in our study ranged from 1 - 15 years. Only 12.2% (n = 10) were below 3 years, and 87.8% (n = 72) were above 3 years. This indicates that social awareness in our population is still lacking. In this study, males outnumbered females, and the ratio was found to be 1.4: 1. The exact cause of the high incidence of facial clefts and associated congenital anomalies in males could not be ascertained..[7] Family history (Genetic factors) has a significant role in congenital anomalies.[7,8] It has been seen in our study that 13 patients (15.85%) have a positive family history. Generally, people blame the mother for her baby, those born with congenital disabilities and believe in superstition.[4] However, this has no scientific basis. Consanguinity might have a decisive role in this deformity. Recessive genetic disorders increase the dormant mutant gene effect on the affected siblings.[4,9,10]

The present study revealed 13 patients whose parents have a history of consanguinity. They all suffered from different types of associated congenital anomalies, either single or multiple, along with cleft lip and palate. Many previous studies revealed high incidences of associated congenital anomalies with consanguinity.[9,21] Some patients suffered from nasal voice, speech problems and middle ear infections primarily due to their orofacial cleft. Consanguinity is a remote possibility there; hence not shown in the results.

The present study also suggests that the risk for associated congenital anomalies, including orofacial cleft, is higher in consanguineous unions in the studied population, principally at first-cousin and closer. So trends of consanguineous marriage in our society should be considered in empiric risk estimates in genetic counselling. And preconception and premarital counselling on consanguinity should be part of primary health care, particularly in highly consanguineous populations.

Consanguineous unions have been associated with increased susceptibility to various forms of inherited disease, which suggests that couples may have deleterious lethal genes inherited from a common ancestor. When transmitted to their offspring, they can lead to prenatal, neonatal and child morbidity or mortality. The present study was conducted on 82 patients to evaluate the presence or absence of associated congenital anomalies in the patient having orofacial cleft with the consanguineous marriage of their parents. However, for more precise risk estimates and a better understanding of the underlying disease factors to establish this outcome, further long-term study with a larger population is needed.

References

1. Lin CH, Lo LJ, Wang ML, Chen YR, Noordhoff MS. Major hematological diseases associated with cleft lip and palate. Cleft Palate Craniofac J 2000; 37: 512-515
2. Leite IC, Paumgartten FJ, Koifman S. Chemical exposure during pregnancy and oral clefts in newborns. Cad Saude Publica 2002; 18: 17-31.
3. Bittles AH and Black ML. Consanguinity, human evolution, and complex diseases. PNAS 2010; 107: 1779-1786
4. Sarwar H. Cleft Palate in Children: Surgery and outcome 1998. Bangladesh Institute of Child Health; Dhaka Shishu Hospital, Dhaka.
5. McKinstry RE. Cleft Palate Dentistry. 1st edn. ABI Professional Publication 1998; 139-142
6. Hardin-Jones M, Chapman KL, Schulte J. The Impact of Cleft Type on Early Vocal Development in Babies with Cleft Palate. Cleft Palate Craniofac J 2003; 40: 453-459
7. Alwan A, Modell B. Community control of genetic and congenital disorders. EMRO Technical Publication Series 24: WHO Regional Office for the Eastern Mediterranean Region, Egypt. 1997
8. Cawson RA, Odell EW. Essentials of Oral Pathology and Oral Medicine. 7th edn. Churchill Livingstone 2002; 32-33
9. Shafi T, Khan MR, Atiq M. Congenital heart disease and associated malformations in children with cleft lip and palate in Pakistan. Br J Plast Surg 2003; 56: 106-109
10. Bittles AH. Commentary: the background and outcomes of the first-cousin marriage controversy in Great Britain. Int J Epidemiol 2009; 38: 1453–1458
11. Bennett R, Motulsky A, Bittles A, et al. Genetic counselling and screening of consanguineous couples and their offspring: recommendations of the National Society of Genetic Counselors. J Genet Couns 2002; 11: 97–119
12. Bishop M, Metcalfe S, Gaff C. The missing element: consanguinity as a component of genetic risk assessment. Genet Med 2008; 10: 612–620
13. Elahi MM, Jackson IT, Elahi O et al. Epidemiology of cleft lip and palate in Pakistan. Plast-Reconstruction-Surg 2004; 113: 1548-1555
14. Bittles A. Consanguinity and its relevance to clinical genetics. Clin Genet 2001; 60: 89–98
15. Grech V, Lia A, Mifsud A. Congenital heart disease in a patient with microform cleft lip. Cleft-Palate Craniofacial-J 2000; 37: 596-597
16. Rasul CH, Hossain MA, Rahman MS. Congenital Anomalies in the Newborn. J. Bangladesh Coll. Phys. Surg 1998; 16: 11-12
17. Cotran, Kumar, Robbins. Pathologicbasis of disease. 4th ed. Philadelphia: WB Saunders Company 1999; 154-155
18. Falik-Zaccai TC, Kfir N, Frenkel P, Cohen C, Tanus M, Mandel H, Shihab S, Morkos S, Aaref S, Summar ML, Khayat M. Population screening in a Druze community: the challenge and the reward. Genet. Med 2008; 10: 903–909
19. Jones MH, Chapman KLJ. The impact of cleft type on early vocal development in babies with cleft palate. Cleft Palate Craniofac J 2003; 40: 453-459
20. World Health Organization. Community genetics services: report of a WHO consultation on community genetics in low- and middle-income countries publications. 2010
21. Arvier JF, Molla MR, Ftzpatrick B, Shaheed SMI, Lanza K. Trans-RA, Odell EW. Essential antral temporalies transfer for the repair of the cleft-palates. Aust. Dent. J. 1997; 42: 307-314

A comparative study of widal test and typhidot in rapid diagnosis of typhoid fever

RA Khan[1], MF Karim[2], KH Pasha[3]

Abstract

Typhoid fever is a major public health problem in Asia pacific region. It is endemic in India subcontinent including Bangladesh. Conventional methods for its diagnosis are blood culture and widal test. Typhidot is a new rapid serological test which now commercially available and reliable in diagnosis of typhoid fever. Typhidot test is an immunodot ELISA which detects antibodies to a specific 50 KDa outer membrane protein specific for Salmonella typhi within an hour. The aim of the present study was to evaluate the utility of typhidot test in rapid diagnosis of typhoid fever in term of sensitivity and specificity. In comparison to the gold standard test i.e. blood culture, sensitivity & specificity of widal test (66.67% and 83.33%) and of typhidot test (93.75% & 96.30%) respectively.

Key Words: Typhidot,blood culture,widal test,Salmonella typhi. ***(J Cont Dent Sci 2019;7(1): 5-8)***

Introduction

Typhoid fever caused by Salmonella typhi is one of the most common infectious diseases and endemic in India subcontinent.[1] It is a life threatening systemic infection and a major public health problem occurring more frequently in developing countries where overcrowding, poor hygiene and sanitation were prevalent.[2,3] Typhoid fever is a major cause of morbidity and mortality globally, causing an estimated 16.6 million new infections and 600000 death each year.[4] The annual incidence of typhoid fever has been reported as more than 13 million cases in Asia, causing more than 6 lakhs death worldwide annually.[5] Therefore, it's rapid, accurate diagnosis is imperative to initiate proper management and to prevent unnecessary use of antibiotics and to control the disease. Blood culture is the gold standard test for the diagnosis of typhoid fever but it may not be always available or may not be done properly in many laboratories. Widespread and indiscriminate use of antibiotics also make the isolation of the causative organism difficult from blood.[6] On the other hand, Widal test, a serological test is readily available and inexpensive which has been in use in all clinical settings for many years. But doubts have been raised regarding its validity as the titres of diagnostic significance of this test differ in different geographical areas in different population and in the presence of other febrile illness. Currently another serological test by the name of Typhidot test' is commercially available for the diagnosis of typhoid fever. This has been reported as a fast, reliable and easy to perform serodiagnostic test with higher sensitivity and specificity than widal test. Studies from other countries of Asia and India have found it to be of practical alternative to widal test in the diagnosis of typhoid fever. Therefore the present study was undertaken to determine the utility of this test in rapid diagnosis of typhoid fever.

Materials & Methods

This Comparitive study was conducted in the department of Microbiology and Immunology, Kumudini Women's Medical College, Mirzapur, Tangail from October, 2017 to April, 2018.The study group included 80 clinically suspected typhoid fever cases of all age groups as well as both sexes who presented to OPD (Out Patient Department), Kumudini Womens Medical College hospital, Mirzapur, Tangail where as

1. Dr. Rafiul Alam Khan, Associate Professor. Dept. of Microbiology, Kumudini Women's Medical College, Mirzapur, Tangail.
2. Prof. Dr. Md. Fazlul Karim, Professor & Head. Dept. of Microbiology, Kumudini Women's Medical College, Mirzapur, Tangail.
3. Dr. Khalid Hasan Pasha, Lecturer, Dept. of Oral and Maxillofacial Surgery, Sapporo Dental College & Hospital.

Address of Correspondence

Dr. Rafiul Alam Khan, Associate Professor. Dept. of Microbiology, Kumudini Women's Medical College, Mirzapur, Tangail.

Article Received : 25/08/2018 Article Accepted : 20/11/2018

febrile patients with alternative diagnosis were excluded from the study. Detailed clinical evaluation as well as routine investigations like CBC, smear for malarial parasite, urine, stool microscopy, urine culture were done in all cases. Blood samples were collected from all the patients included in the study. 10 ml of blood from adult patients and 5 ml from under 12 years were inoculated into the blood culture media (BHI broth) and inoculated at 37°C. Subculture were done on every alternate day till the 7th day.

The growth of Salmonella typhi was identified as per standard protocol and confirmed by agglutination with Salmonella polyvalent 'O','O9'&'H':'d' antisera.[8] The widal test was performed by slide agglutination method and it was considered positive when "O" titre of equal to or more than 1:160 was observed.[9]

Typhidot is a rapid, qualitative dot ELISA test kit which detects IgM & IgG Abs against a specific 50 KD outer membrane protein (OMP) of Salmonella typhi which is impregnated on nitrocellulose strips.The test was done as per manufacturer's kit instructions (Typhidot, Malaysian Biodiagnostic Research SDN BHD; Kualalampur, Malaysia). Results of blood culture, widal test and typhidot test were compared in all patients for their sensitivity and specificity.

Results:

80 blood samples were evaluated for typhoid fever by blood culture, widal test and typhidot. Out of the 80 patients 12(15%) were positive by blood culture. Widal test were positive in 20(25%) patients which included 8 in blood culture positive patients and 4 in blood culture negative patients. These 4 patients who were negative on blood culture but were positive by widal test. Typhidot were positive in 26(32.5%) patients. Out of the 26(32.5%) typhidot positive cases 10 were positive by blood culture and 2 were negative by blood culture. These 2 patients who were negative on blood culture but positive by typhidot and were also positive by widal test. Thus in comparison to the gold standard test i.e. blood culture, sensitivity and specificity of widal test (66.67% & 83.33%) and of typhidot test (93.75% & 96.30%) respectively.

Table I: Results of blood culture,widal test & typhidot test

Results	Blood culture	Widal test	Typhidot test
Positive	12(15%)	20(25%)	26(32.5%)
Negative	68(85%)	60(75%)	26(32.5%)
Total	80(100%)	80(100%)	80(100%)

Table II: Comparison of widal test with blood culture

Blood culture	Widal Test	
	Positive	Negative
Positive 12 (15)	8 (66.67)	4 (33.33)
Negative 68 (85)	12 (17.65)	56 (82.35)
Total 80 (100)	20 (25)	60 (75)

Parenthesis indicate percentage

Table III: Comparison of typhidot with blood culture

Blood culture	Typhidot Test	
	Positive	Negative
Positive 12 (15)	10 (83.33)	2 (16.67)
Negative 68 (85)	16 (23.53)	52 (76.47)
Total 80(100)	26 (32.50)	54 (67.50)

Parenthesis indicate percentage

Table IV: Validity of widal test & typhidot test as a diagnostic tool in comparison with blood culture.

Parameter	Widal test	Typhidot test
Sensitivity	66.67%	83.33 %
Specificity	93.75%	96.33 %

Discussion

Typhoid fever is a systemic illness with a significant morbidity and mortality in developing countries.

Poor sanitation, overcrowding, low standard of living, lack of medical facilities and indiscriminate use of antibiotics lead to endemicity of typhoid fever and multiresistant strains of Salmonella typhi in developing countries.[10,11] Blood culture has remained the gold standard test in diagnosis of typhoid fever. However it is well recognized that facilities for blood culture are not readily available everywhere. Moreover, it is time consuming, expensive and the number of cultures showing positive result is also small.

In our study blood culture positivity among clinically suspected typhoid cases was in 12(15%) cases. Culture positivity in other studies has quoted sensitivity ranging from 08% - 43%.[5] Widal test has been used for over a century in developing countries but its diagnostic utility has been limited due to low sensitivity and specificity.[2] Decreased sensitivity is due to the long latent period after which the test may become positive. Decreased specificity is due to prior infection, vaccination with TAB vaccine, cross reaction with other Gram negative infections. Thus the test had sensitivity of 66.67% and specificity of 75%. Similar result has been reported in other studies from endemic areas.[12,13,14]

In a study by Maha et al.[14] the sensitivity and specificity of widal test were 81% and 71% respectively. Study done by Rahman et al.[15] also reported, the sensitivity and specificity of widal test as 81% and 71% respectively. The interpretation of widal test remain problematic to this day, with a greater number of articles reporting different cut-offs. The test has lost some popularity in recent years as technical skill are required for its performance, interpretation, different sensitivity and specificity rates that are obtained even in same region.[16]

In a developing country like Bangladesh, the widal test has been used extensively in the serodiagnosis of typhoid fever. However, Latif AO et al,[17] reviewed the significance of widal agglutination test and concluded that its use should not be encouraged in endemic areas. Ideally, in the widal test, a fourfold rise of the antibody titre in paired sera is considered as diagnostic of typhoid fever. However, paired sera are often difficult to obtain.

Typhidot is a new, inexpensive and reliable serodiagnostic test recently available commercially. Typhidot test is based on detection of antibodies which appear in detectable titres as early as the first week of illness.It showed sensitivity of 83.33% and specificity of 96.30% in blood culture proved cases. This is in accordance with study done by Sherwal et al.[2] and Narayan et al.[12] In this study the typhidot test showed higher agreement with blood culture (92.8%) than widal test (53.5%).This was also detected by Anusha et al.[18] as agreement of typhidot with blood culture has been calculated as(88%).

A similar study carried out in the southern part of India reported typhidot of having a sensitivity of (100%) and a specificity of (80%) and was recommended for its utility in conjunction with widal test for an early diagnosis of typhoid fever.[19]

Conclusion

Typhidot test is a highly sensitive and specific test for diagnosis of typhoid fever. It is a rapid, easy to perform, more reliable test for typhoid fever as compared to widal test and can be useful in early institution of therapy. However,a larger prospective study is required to evaluate the proper usefulness of this test in countries endemic to typhoid fever.

References

1. Dutta S,Sur D,Manna B,Sen B,Deb AK,Deen JL,et al. Evaluation of new generation serological tests for the diagnosis of typhoid fever:data from a community bases surveillance in Calcutta, India. Diagn Microbial Infect Dist 2006:56(4):359-65.
2. Sherwal BL, Dhamija RK, Radhawa VS, Jais M, Kaintura A, Kumar M.A comparative study of typhidot & widal test in patients of typhoid fever. J Indian Acad clin Med 2004;5:244-46.
3. Agarwal PK, Gogia A, Gupta RK, Typhoid fever. J Ind Academy Clin Med 2004;5(1):60-4.
4. Olsen SJ, Bruckler S, Bibb W, Thi My Thanh N, Mytrinh T, Thi Minh N et al. Evaluation of rapid diagnostic test for typhoid fever. S clin Microbial 2004;4C:1885-89.
5. Ivanoff B, Levine MM, Lambert PH. Vaccination against typhoid fever, present status. Bull WHO 1994;72(6):957-71.
6. Gilmann RH, Terminel M, Levine MM, Hemandez-Menodozep, Hornick Rb. Relative efficacy of blood, urine, rectal swab, bone marrow & rose spot culture for recovery of Salmonella typhi in typhoid fever. Lancet 1957;1:1211-13.

7. Alam MN,Haq SA,Das KK,Majid MN,Siddique RV,Hasan Z et al. Multi drug resistant enteric fever in Bangladesh. Bangladesh J Med 1992;3:38-41.

8. Koneman EW,Allen SD,Janda WM,Schreckenberger PC,Winn WC.Colour Atlas & Text book of diagnostic Microbiology,5th edition,Newyork,Lippincott:1997.

9. Old DC.Salmonella infection.In:Collee JG,Fraster AG,Marmion BP,Simonsa,eds.Mackie&Mc.Cartney practical Medical Microbiology,14th edn. Newyork,Churchil Livingstone;1996:385-402.

10. Brown JC,Shanahar PM,Jesudason MV et al.Mutations responsible for reduced susceptibility to 4-quinilones in clinical isolates of multiresistant Salmonella typhi in India.J Antimicrobial chemother 1996;37:891-900.

11. Therifall ward LR,Skinner JA,Smith HR,Lacy S.Ciprofloxacin resistant Salmonella typhi &treatment failure.Lancet 1999;353:1770-82.

12. Narayanappa D,Sripathi R,Kumar JK,Rajani HS.Comparative study of typhidot&widal test in the diagnosis of typhoid fever.Indian pediatr 2009;47:331-33.

13. Khoharo HK.A comparative study of the typhidot&widal test in blood culture positive cases of typhoid fever.Trop Doc 2011;4:136-38.

14. Maha S Hamd. Safaa Abdel-Rahman,Abdel-Mageed Mostafa, Safaa-Abd-EI Hameed. Evaluation of Enterocheck WBR test in the diagnosis of typhoid fever among Egyptians adults. Egyptian J Med Microbial 2014;23:47-52.

15. Rahman M, Siddique AK, Tam FCH, Sharmin S,Rashid H Iqbal A.Rapid detection of early typhoid fever in endemic community children by the Tubex 09-antibody test. Diag Microbial Infect Dis 2007;58:275-81.

16. Wain J,Hosoglu S.The laboratory diagnosis of enteric fever.J Infect Developing countries 2008;2(6):421-25.

17. Latif AO,King AL.The widal agglutination test-100 years later:Still plagued by controversy. Postgraduate Med J 2000;76:80-84.

18. Anusha R,Ganesh R,Lalitha J.Comparison of a rapid co0mmertial test. Enterocheck WBR, with automated blood culture for diagnosis of typhoid fever.Ann Trop Paediatri 2011;31(3):231-34.

19. Jesudasson M,Esther E,Mathai E.Typhidot test to detect IgG&IgM antibodies in typhoid fever 2002.Indian J Med Res 2002;116:70-72.

The pattern of hypodontia among the patients attended in the Orthodontics Department of Bangabandhu Sheikh Mujib Medical University

MAS Khan [1], MM Uddin [2], I Mafruha[3], A Ashfaquzzaman[4], FA Mufti[5], NA Najia[6], HA Rahman[7], GS Hasan[8], R Ghosh[9], SK Nath[10]

Abstract

Background: *Hypodontia is the congenital absence of one or more teeth and is a dental disability that affects a patient's function and aesthetics. The study was conducted to explore the pattern of hypodontia among the patients who attended the Orthodontics Department of Bangabandhu Sheikh Mujib Medical University, Dhaka.* ***Methods:*** *A cross-sectional study was performed among 102 hypodontic patients (44.1% male and 55.9% female, mean age =18.98 ± 5.18 years) in the Orthodontics Department of Bangabandhu Sheikh Mujib Medical University. Data were collected from hospital records through a purposive sampling technique, in between August 2015 to February 2016.* ***Result:*** *The rate of hypodontia among the orthodontic patients was 10.02%. The highest incidence (39.3%) of hypondontia was observed among 13-15 years old patients. Females were predominant than males. More than 62.75% of patients had Angle's class I type of malocclusion. The highest frequencey of missing tooth was found in maxillary lateral incisor (60.78%) followed by mandibular second premolor (45.1%).* ***Conclusion:*** *The Frequency of hypodontia among female patients is higher than in male patients. As it was a single-center study so this study needs to expand to the whole country to understand the current status of hypodontia among patients in the orthodontics department.*

Key Words: Hypodontia, Orthodontic, Bangabandhu Sheikh Mujib Medical University. ***(J Cont Dent Sci 2019;7(1):9-14)***

Artical Received: 19.07.2018; Article Acepted: 21.11.2018

Introduction

Hypodontia is one of the major dental anomalies which cause malocclusion by disturbing normal dental development.[1] Developmental dental anomalies such as hypodontia and microdontia are not uncommon in many populations, but little is known about their underlying causes.[2] Hypodontia is the condition of naturally having fewer than regular number of teeth.[3] It is a multi-factorial dental irregularity[4] and is considered as one of the most commonly encountered oral variations. Hypodontia explains the developmental absence of one or more teeth, either in primary or permanent dentition.[5] The most common missing teeth are the permanent upper lateral incisors and, in some families, even the deciduous lateral incisors are missing.[6] This means that the majority of cases have a genetic basis although it is occasionally caused by environmental factors, followed by missing of the mandibular second premolar. The majority number of previous studies dealing with Caucasian populations have revealed that the most commonly congenitally missing tooth is the mandibular second premolar, followed by either the maxillary lateral incisor[4] or the maxillary second premolar.[7,8] Many studies have found that the teeth of patients with congenitally missing teeth have smaller mesiodistal dimensions than the normal population. But to our knowledge, only a few studies have compared the mesiodistal and labiolingual dimensions of the teeth of hypodontic patients.[9,10] The prevalence of hypodontia varies from 2.63% to 11.2%, depending on race.[11,12]

1. Dr. Md. Abdus Sobur Khan, Assistant Professor (Orthodontics), Shaheed Tajuddin Ahmad Medical College, Gazipur.
2. Dr. MD. Moin Uddin, Assistant Professor & Head, Dept. of Orthodontics, Rangpur Medical College, Dental Unit
3. Dr. Ishrat Mafruha, Assistant Professor (Orthodontics), Dhaka Community Medical College, Dental Unit
4. Dr. Ahmed Ashfaquzzaman Assistant Professor (Orthodontics), Sir Salimullah Medical College, Dental Unit
5. Dr. Firoz Ali Muftim Medical Officer, Dept. of Orthodontics, BSMMU
6. Dr. Najnin Ara Najia, MPH student, Bangladesh University of Professional
7. Dr. Hassan Abeedur Rahman. Assistant Professor (Orthodontics), North East Medical College, Dental Unit, Sylhet
8. Dr. Ranjit Ghosh. Assistant Professor, Dept. of Orthodontics, BSMMU
9. Professor Dr. Gazi Shamim Hasan, Chairman, Dept. of Orthodontics, BSMMU
10. Dr. Sujan Kanti Nath. Assistant Professor, Dental Public Health. Sapporo Dental College & Hospital

Address of Correspondence

Dr. Sujan Kanti Nath. , Assistant Professor, Dental Public Health. , Sapporo Dental College & Hospital. Phone: +88-01711317563, Mail-knsujan@yahoo.com, Orcid ID: https://orcid.org/0000-0003-1175-1101

Mild hypodontia (absence of one to five teeth) is relatively common, but severe hypodontia (oligodontia, the absence of six or more teeth) is rare. The previous meta-analysis has shown high variation in the prevalence of hypodontia between populations, which differs significantly between males and females. In the majority of the examined studies, females were more often affected by hypodontia than males, and the highest prevalence was found in the Chinese population (7.7% in women and 6.1% in men). In contrast to this trend, the lowest prevalence rate of 2.2% was found in Saudi Arabian women.[12,13] In Bangladesh, a study was conducted at the Department of Orthodontics, BSMMU revealed that the hypodontia prevalence among orthodontically treated was 9.54%. [14] The etiology of hypodontia and oligodontia is unclear.[15] It might be the result of either environmental or genetic factors, or a combination of these.[10,16] There is considerable evidence suggesting that genes play a fundamental role in the etiology of tooth agenesis[17] conducted a study on children with tooth agenesis and reported that more than 50% of siblings and relatives also presented with hypodontia, a high prevalence compared to the expected prevalence in the general population. A study of twins demonstrated a high percentage of concordance for agenesis between homozygotic twins, whereas pairs of heterozygotic twins presented discordance for this dental anomaly.[18] A variation in the worldwide incidence of hypodontia and a variation in the tooth most frequently involved has been reported in previous studies.[18] Studies of large segments of populations from different locations show great variability in the incidence of hypodontia. The incidence of missing permanent teeth, excluding third molars, was 3.4% in Swiss Children,[19] 4.4% in American Children[20], 4.6% in Israeli Children,[21] 6.1% in Swedish Children,[17] 8% in Finnish Children[22] and 9.6% in Austrian Children.[23] Orthodontic treatment can facilitate any restorative treatment, sometimes even eliminating the need for it.[24] Orthodontic treatment for patients with congenitally missing teeth is a challenge to effective treatment planning. Thinking of major alternatives, space closer or space opening for prosthetic replacement, the implant.[25] Early evaluation of the number of missing teeth and consideration of the size of spaces and the number of teeth remaining should aid the orthodontist in planning and managing the treatment.[26] The present study was conducted to explore the pattern of hypodontia among the patients who attended in orthodontics department of BSMMU.

Materials and methods

Study design and population

A Cross-sectional descriptive type of study was conducted from August 2015 to February 2016. The study population comprised dental patients who received treatment at the Department of Orthodontics in Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka. The inclusion criteria of the participants were included (a) Aged 13 years or above with permanent dentition (b) All patients having any missing permanent tooth except the third molar, (c) Patients who gave written consent, and exclusion criteria included (a) Any doubt about the history of the missing tooth or teeth (like Extraction or Avulsion), (b) Patients with cleft lip and palate, (c) Syndromic patients.

Study area

The study was done among the dental patient in the Department of Orthodontics, at BSMMU. It is one of the Medical Universities in Bangladesh situated at Shahbagh Dhaka. Doctors are acquired post-graduation degrees from this University, after completing their Bachelor of Medicine and Bachelor of Surgery degrees from different public or private medical and dental colleges. It was established in 1965. The study place was selected purposively depending on the availability of the sample and according to the convenience of the researcher.

Sample size determination

The sample size was calculated using the following formula:

One sample proportion: (Observed value = 0.03, Hypothesized value: 0.08)

$$\frac{[u\sqrt{\{\pi(1-\pi)\}} + v\sqrt{\{\pi_o(1-\pi_o)\}}]^2}{(\pi-\pi_o)^2}$$

π= 0.03 (Observed value)

πo= 0.08 (maximum expected)

u = 0.842

v = 1.96

According to this formula, the minimum required sample size calculated for this study was 192. However, 102 hypodontia patients were selected purposively as a sample from the patient's hospital record at orthodontics department of BSMMU.

Sampling technique

The respondents were selected by the purposive sampling technique.

Data collection technique

Data were collected from hospital records of the Department of Orthodontics of BSMMU. Hospital records which included the study model, patient's record file, and radiographs (Orthopantomograms -OPG) were the source of information to diagnose the hypodontia.

Data management

All data were compiled and edited meticulously. The data were screened and checked for any missing values and discrepancies. All omissions and inconsistencies were corrected and removed methodically.

Statistical Analysis

Computer-based statistical analyses were carried out with appropriate techniques and systems. All data were recorded systematically in performed data collection form (questionnaire) and quantitative data were expressed as mean and standard deviation and qualitative data were expressed as frequency distribution and percentage. Statistical analysis was performed using the Statistical Packages for Social Sciences (SPSS) version 22. The summarized data was interpreted accordingly and was then presented in the form of tables.

Ethical Consideration

Before the commencement of this study, the research protocol was reviewed and approved by the ethical committee (Local Ethical Committee, Institutional review board) of BSMMU (Ref. No.-BSMMU/2015/1298). As this study is relevant to previous hospital records, it is considered to study models, orthopantomograms, and patient record files. So, there is no physical risk for the participants throughout the study period. All participants will be provided a case number to maintain their confidentiality. Informed consent was taken from each patient. The procedure was helpful for both the physicians and the patients in making a rational approach to the case management.

Results

Distribution of patients according to hypodontia

A total of 1017 patients were found in hospital records. Among them, 102 hypodontic patients were selected and 89.98% (n = 898) of the non-hypodontia patient were not included for this study (Table 1).

Table 1: Distribution of patients according to hypodontia

Hypodontia	Frequency (n)	Percentage (%)
Yes	102	10.02
No	898	89.98
Total	1017	100.0

Distribution of patients' age and sex

A total of 102 hypodontia patients included in this study, with a mean (±SD) age of 18.98 (±5.18) years. Among them maximum patients 39.3% (n = 40) were within 13-15 years, both 23.5% (n =24)

were within 16-20 and 21-25 years and 13.7% (n = 14) were within >25 years age group. Hypodontia female patients 55.9% (n = 57) is higher than male hypodontia patients 44.1% (n = 45) (Table 2).

Table 2: Distribution of patients age and sex

Variable	Category	Overall N =102	Percentage (%)
		Frequency (n)	
Age (Years)	13- 15	40	39.3
	16 - 20	24	23.5
	21 - 25	24	23.5
	>25	14	13.7
Sex	Male	45	44.1
	Female	57	55.9

Distribution of patients according to the type of malocclusion and missing tooth

The distribution of patients according to the type of malocclusion and missing the tooth were presented in Table 3.

Table 3: Distribution of patients according to the type of malocclusion and missing of tooth

Variable	Category	Overall N =102	Percentage (%)
		Frequency (n)	
Malocclusion type	Angle's Class -I	64	62.75
	Angle's Class -II	27	26.47
	Angle's Class -III	11	10.78
Missing tooth	Maxillary lateral incisor	62	60.78
	Maxillary second premolar	10	9.80
	Maxillary first premolar	8	7.84
	Mandibular central incisor	6	5.88
	Mandibular lateral incisor	2	1.96
	Mandibular second premolar	46	45.10

From this table, we found that a higher proportion of 62.75% (n = 64) of patients was in Angel's class-I and a lower proportion of 10.78% (n = 11) of patients were in Angel's class-III type of malocclusion. The majority number of hypodontia patients missing a tooth of maxillary lateral incisor was 60.78% (n = 62) and mandibular second premolar 45.1% (n = 46) and a minority number of hypodontia patients missing a tooth of 1.96% (n = 2).

Discussion

The present study showed the frequency of hypodontia and the pattern of hypodontia among the patients who attended the Orthodontics Department at BSMMU. This study found that the frequency of hypodontia was 10.02%. This finding is consistent with other studies which were conducted in the Orthodontics Department at BSMMU and the prevalence of hypodontia among orthodontically treated was 9.54%.[14] A study conducted in India was found 10.4% hypodontia in the pre-treatment records of orthodontic patients at a rural dental OPD in Western Maharashtra, India[27]. Hypodontia (10.0%) is the most common developmental dental anomaly in Iranian orthodontic patients.[28] A study found 10.9% hypodontia among different malocclusion patients.[29] The frequency of hypodontia which was found in the study is almost similar to the above studies. Although the study entitled as "Prevalence and distribution of dental anomalies in pretreatment orthodontic Thai patients" were found 26.1% hypodontia in the pre-treatment records of Thai orthodontic patients at the Faculty of Dentistry, Khon Kaen University.[30] The age category of hypodontia patients in this study is like another prior study.[30] In this study, the female was more predominant than the male. The female-male ratio was 1.26:1. This result is compared to the following studies. Gomes et al. (2009) found female predominance in their retrospective study in Bras□lia, Brazil. The study of prevalence of dental anomalies in Iranian orthodontic patients also found obvious female predominance in an area of Iran.[28] Male was 5.05% and female was 5.79%.[31]

Regarding the hypodontia patient in this study, the maximum number of patients was Angle□s class I and Angle's class II. This agrees with other prior studies.[27,30] Our study found that the maximum number of patients who had missing teeth of maxillary lateral incisor was 60.78%, mandibular second premolar 45.1%, maxillary second premolar 9.8%, maxillary first premolar 7.84%, mandibular central incisor 5.88% and mandibular lateral incisor 1.96%. The maxillary lateral incisor was the most frequently missing tooth, followed by the mandibular second premolar[32] which is similar to this study. Maxillary lateral incisor (27.95%), mandibular second premolar (21.51%), and maxillary first premolar (12.9%) were

respectively the most frequently absent teeth.[33] Maxillary lateral incisors were most frequently missing teeth (37%) followed in decreasing order by mandibular second premolars (8%)[28]. The most commonly congenitally missing tooth is the mandibular second premolar, followed by either the maxillary lateral incisor[4,17] or the maxillary second premolar.[7,8] However, this result is inconsistent with this study.

Conclusion

Our study showed the current status of hypodontia patients in the Orthodontics Department at BSMMU. The frequency of hypodontia patients in this study is 10.02%, female is more predominant than males, Angle's class I malocclusion is the most common Angle's class III is the least prevalent malocclusion and the maxillary lateral incisor is the most frequently missing tooth, followed by the mandibular second premolar. Finally, it was a single-center study, so this study needs to expand to the whole country to understand the current status of hypodontia among patients in the orthodontics department.

Limitations

The present study has several limitations which need to be taken into consideration while interpreting the findings. First, it was a single-center study so generalization could not be done about the hypodontia patient in the whole country of Bangladesh. Second, because of the cross-sectional nature of the study, no conclusions can be drawn regarding causality. Future studies need to overcome such limitations by employing longitudinal designs with larger and more representative samples.

Acknowledgments

The authors would like to thank the Department of Orthodontics, BSMMU and all the participants of the study for their cooperation, without whom this work would have never been accomplished.

Conflict of interest

The authors have no conflicts of interest to declare.

References

1. Wisth PJ, Thunold K, B'e OE. Frequency of hypodontia in relation to tooth size and dental arch width. Acta Odontol Scand. 1974;32(3):201-6.
2. Militi D, Militi A, Cutrupi MC, Portelli M, Rigoli L, Matarese G, et al. Genetic basis of non syndromic hypodontia: a DNA investigation performed on three couples of monozygotic twins about PAX9 mutation. Eur J Paediatr Dent. 2011;12(1):21-4.
3. Arte S, Pirinen S. Hypodontia [Online] INSERM Available: https://www. orpha. net/data/patho. GB/uk-hypodontia pdf. 2004;
4. Ingervall B. Prevalence of dental and occlusal anomalies in Swedish conscripts. Acta Odontol Scand. 1974;32(2):83-92.
5. Salama FS, Abdel-Megid FY. Hypodontia of primary and permanent teeth in a sample of Saudi children. Egypt Dent J. 1994;40(1):625-32.
6. Lavelle CLB, Moore WJ. The incidence of agenesis and polygenesis in the primate dentition. Am J Phys Anthropol. 1973;38(3):671-9.
7. Hunstadbraten K. Hypodontia in the permanent dentition. ASDC J Dent Child. 1973;40:115-7.
8. Nordgarden H, Jensen JL, Storhaug K. Reported prevalence of congenitally missing teeth in two Norwegian counties. Community Dent Health. 2002;19(4):258-61.
9. Schalk-Van der Weide Y, Steen WH, Bosman F. Distribution of missing teeth and tooth morphology in patients with oligodontia. ASDC J Dent Child. 1992;59(2):133-40.
10. Schalk-Van der Weide Y, Steen WHA, Beemer FA, Bosman F. Reductions in size and left-right asymmetry of teeth in human oligodontia. Arch Oral Biol. 1994;39(11):935-9.
11. Sisman Y, Uysal T, Gelgor IE. Hypodontia. Does the prevalence and distribution pattern differ in orthodontic patients? Eur J Dent. 2007;1(03):167-73.
12. Polder BJ, Van't Hof MA, Van der Linden FPGM, Kuijpers-Jagtman AM. A meta-analysis of the prevalence of dental agenesis of permanent teeth. Community Dent Oral Epidemiol. 2004;32(3):217-26.
13. Mattheeuws N, Dermaut L, Martens G. Has hypodontia increased in Caucasians during the 20th century? A meta-analysis. Eur J Orthod. 2004;26(1):99-103.
14. Nahar L, Jha D, Hassan GS. Prevalence of Impacted Teeth among the Orthodontic Patient in Bangabandhu Sheikh Mujib Medical University. Bangladesh J Orthod Dentofac Orthop. 2015;24-6.
15. Schalk-van der Weide Y, Beemer FA, Faber JA, Bosman F. Symptomatology of patients with oligodontia. J Oral Rehabil. 1994 May;21(3):247-61.
16. Cobourne MT. Familial human hypodontia'is it all in the genes? Br Dent J. 2007;203(4):203-8.

17. Grahn'n H. Hypodontia in the permanent dentition: a clinical and genetic investigation. Odontol Rev. 1956;7(3):1–100.
18. Muller TP, Hill IN, Petersen AC, Blayney JR. A survey of congenitally missing permanent teeth. J Am Dent Assoc. 1970;81(1):101-7.
19. Dolder AA. A statistical survey of deficient dentition. Dent Rec. 1936;57:58.
20. Brown RV. The pattern and frequency of congenital absence of teeth. Iowa State Dent J. 1957;43:60-1.
21. Eidelman E, Chosack A, Rosenzweig KA. Hypodontia: prevalence amongst Jewish populations of different origin. Am J Phys Anthropol. 1973;39(1):129-33.
22. Ranta R, Tulensalo T. Symmetry and combinations of hypodontia in non-cleft and cleft palate children. Eur J Oral Sci. 1988;96(1):1-8.
23. Graber LW. Congenital absence of teeth: a review with emphasis on inheritance patterns. J Am Dent Assoc. 1978;96(2):266-75.
24. Fekonja A. Hypodontia in orthodontically treated children. Eur J Orthod. 2005;27(5):457-60.
25. Carter NE, Gillgrass TJ, Hobson RS, Jepson N, Eechan JGM, Nohl FS, et al. The interdisciplinary management of hypodontia: orthodontics. Br Dent J. 2003 Apr;194(7):361-6.
26. Rosa M, Zachrisson BU. Integrating esthetic dentistry and space closure in patients with missing maxillary lateral incisors. J Clin Orthod. 2001;35(4):221-38.
27. Vibhute AH, Vibhute NA, Daule R. Prevalence of dental anomalies in pretreatment orthodontic patients in Western Maharashtra, India: An epidemiological study. J Orthod Res. 2013;1(2):66.
28. Sogra Y, Mahdjoube GM, Elham K, Shohre TM. Prevalence of dental anomalies in Iranian orthodontic patients. J Dent Oral Hyg. 2012;4(2):16-20.
29. Dwijendra KS, Parikh V, George SS, Kukkunuru GT, Chowdary GN. Association of dental anomalies with different types of malocclusions in pretreatment orthodontic patients. J Int oral Heal JIOH. 2015;7(6):61.
30. Kositbowornchai S. Prevalence and distribution of dental anomalies in pretreatment orthodontic Thai patients. 2011;
31. Altug-Atac AT, Erdem D. Prevalence and distribution of dental anomalies in orthodontic patients. Am J Orthod Dentofac Orthop. 2007;131(4):510-4.
32. Gomes RR, da Fonseca JAC, Paula LM, Faber J, Acevedo AC. Prevalence of hypodontia in orthodontic patients in Brasilia, Brazil. Eur J Orthod [Internet]. 2010 Jun 1;32(3):302-6. Available from: https://doi.org/10.1093/ejo/cjp107
33. Hedayati Z, Dashlibrun YN. The prevalence and distribution pattern of hypodontia among orthodontic patients in Southern Iran. Eur J Dent. 2013;7(S 01):S078-82.

Apexification with MTA: 38 Months Follow-up of a Case

AA Mahmud[1], S Shila [2], MS Mahmud [3], N Islam[4], AMG Muktadir [5], UK Sarkar [6], AFMA Chowdhury [7]

Abstract

Dental trauma is common in school children with immature permanent teeth. When the pulp becomes nonvital in such a tooth, apexification is done to induce an apical closure. Calcium hydroxide paste is the most popular material employed to generate the apical hard tissue barrier. However, calcium hydroxide requires substantial time and multiple visits. In the presented case, the placement of an apical MTA plug allowed obturation of the root canal without waiting for the apical barrier formation. After 38 months, the tooth showed every sign of success.

Key Words: Dental trauma, Apexification, MTA, Hertwig's epithelial root sheath, Epithelial cell rests of Malassez

(J Cont Dent Sci 2019;7(1):15-19)

Artical Received: 03/02/2018 Article Acepte: 10/08/2018

Introduction

Traumatic injuries to immature permanent maxillary incisors are prevalent among school children.[1] Traumatic interference leads to the arrest of root development in such teeth. The resultant wide canals with thin, fragile walls and open apices create challenging clinical situations.[2] In these conditions, induction of root formation (apexogenesis) or root end closure (apexification) have been advocated as treatment options.[3]

The decision for apexogenesis or apexification relies on clinical and radiological features. For example, a patient reporting within 24 hours of traumatic pulp exposure requires apexogenesis. In contrast, a patient reporting later with definite signs of pulp non-vitality requires apexification.

The apexification procedure includes the chemomechanical debridement of the root canal followed by the placement of an intracanal medicament to assist or stimulate apical healing and the formation of a horizontal apical barrier at the apical end of the root canal to facilitate the subsequent obturation of the canal without voids and excess material in the periapical tissue.[4]

Hertwig's epithelial root sheath is significant in developing the apical barrier.[5] It can survive periapical inflammation and continue root development when the inflammatory process is eliminated.[6] Most commonly, calcium hydroxide is used in apexification.[7] It assists in apical closure by stimulating epithelial root sheath cells. However, calcium Hydroxide apexification involves a long period requiring multiple interventions and higher chances of re-infection because of the temporary seal.[8,9] Therefore, several studies have used Mineral Trioxide Aggregate (MTA) for one-visit apexification in anterior teeth,[10-13] taking advantage of MTA's remarkable biocompatibility, antibacterial property, sealing ability, and potential for regeneration of periradicular tissues. The present article reports the apexification procedure and follow-ups of a maxillary lateral incisor with MTA.[14-24]

Case report

A healthy 11-year-old girl was referred to the Conservative Dentistry & Endodontics Department, Sapporo Dental College & Hospital, to manage

1. Abdullah Al Mahmud, Assistant Professor of Conservative Dentistry & Endodontics, Sapporo Dental College & Hospital, Dhaka Bangladesh
2. Shirin Shila , Lecturer of Conservative Dentistry & Endodontics, Sapporo Dental College & Hospital, Dhaka Bangladesh
3. Md. Sony Mahmud, Lecturer of Conservative Dentistry & Endodontics, Sapporo Dental College & Hospital, Dhaka Bangladesh
4. Najmul Islam, Lecturer of Conservative Dentistry & Endodontics, Sapporo Dental College & Hospital, Dhaka Bangladesh
5. A M Golam Muktadir, Lecturer of Conservative Dentistry & Endodontics, Sapporo Dental College & Hospital, Dhaka Bangladesh
6. Uttam Kumar Sarkar, Lecturer of Conservative Dentistry & Endodontics, Sapporo Dental College & Hospital, Dhaka Bangladesh
7. Abu Faem Mohammad Almas Chowdhury, Associate Professor and Head of Conservative Dentistry & Endodontics, Sapporo Dental College & Hospital, Dhaka Bangladesh

Address of Correspondence

Abu Faem Mohammad Almas Chowdhury, Associate Professor and Head of Conservative Dentistry & Endodontics, Sapporo Dental College & Hospital, Dhaka Bangladesh

Mobile: +88-01911305792, E-mail: chowdhuryafma@gmail.com

traumatic maxillary incisors (teeth 11, 21, and 22). Tooth 21 and 22 had become nonvital and infected following an injury resulting from an accidental fall from height 6 months back. Pain on percussion of 21 and 22 and fractured crowns of 11 and 21 (Fig. 1-A) were positive clinical findings during the initial clinical examination. Radiographic examination revealed periapical radiolucency (2-3 mm) associated with teeth 21 and 22 (Fig. 2-A). In addition, tooth 22 presented a relatively short root with an open apex. Tooth 11 did not show any sign of periapical radiolucency. The shorter root and the open apex of 22 indicated a hindrance in root formation owing to apical inflammation.

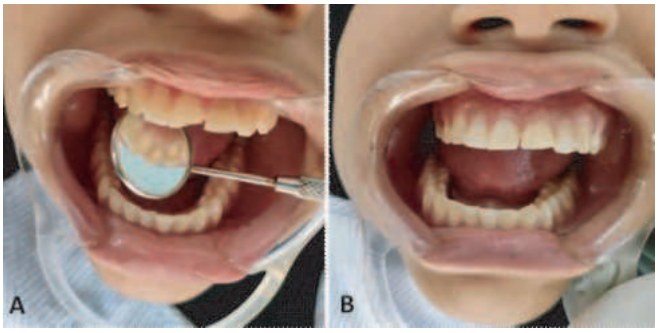


Fig 1. Images taken before and after the final restoration of the broken down crown.

A, Before light cure resin composite restoration of upper right central incisor; B, After restoration.

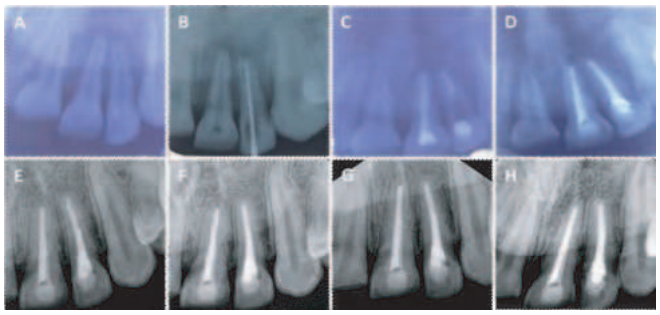


Fig 2. Apexification procedure using MTA, obturation with GP, and follow-ups.

A, Preoperative radiograph; B, Working length determining radiograph; C, Placement of MTA plug; D, Obturation with GP; E, Follow-up after 6 months; F, Follow-up after 12 months; G, Follow-up after 24 months; H, Follow-up after 38 months.

Table 1. Materials used for apexification

Material	Name/Manufacturer
Normal Saline	Normal/The ACME Laboratories Ltd, Dhaka, Bangladesh.
Sodium Hypochlorite Solution	Irrisol/HAI Laboratories, Dhaka, Bangladesh.
Paper Point	Absorbent Paper Points/DiaDent, Korea.
Calcium Hydroxide Powder	Calcium Hydroxide/Deepti Dental Products, Ratnagiri, India.
Zinc Oxide Cement	Caviton/GC Corporation, Tokyo, Japan.
Mineral Trioxide Aggregate	ProRoot MTA/Dentsply India Pvt. Ltd, India.
Calcium Hydroxide Sealer	Sealapex/SybronEndo, Glendora, USA.
Gutta Percha Points	Gutta-percha Points/DiaDent, Korea.
Light Cure Composite Resin	Solare/GC Corporation, Tokyo, Japan.

The patient and her parents were explained the treatment procedures, which included composite resin restoration of 11, root canal treatment of 21, and apexification of 22 with MTA apical plugs. Should such an approach for 22 fail, a surgical endodontic procedure would have been needed. The patient and her parents agreed with the treatment plan. Therefore, informed consent was obtained before initiation of the treatment procedures. The present article will report the treatment procedure and follow-ups of tooth 22.

At this initial appointment, access to root canal 22 was established, and a thin non-purulent discharge from the canal was noticed. Cotton roles and high volume evacuation was employed for isolation. The canal was gently irrigated with normal saline (Normal, The ACME Laboratories Ltd, Dhaka, Bangladesh). A cotton pellet was placed within the pulp chamber, and the cavity was kept open. The patient was discharged with the advice of warm saline gurgling over the next 48 hours.

A 3rd generation of Cephalosporin (Cefixime 400 mg, 12 hourly for 7 days) was also prescribed to aid in periradicular microbial control. The materials used for apexification are shown in Table 1.

On the next visit, the working length was determined to be 18 mm (Fig. 2-B), 2 mm short of the radiographic apex. The canal was then instrumented to an apical size of 80 with Hedstrom files (H- Files, SybronEndo, Glendora, USA) and irrigated with 1.0% sodium hypochlorite solution (Irrisol, HAI Laboratories, Dhaka, Bangladesh) and normal saline alternately. After drying with the sterile paper points (Absorbent Paper Points, DiaDent, Korea), the canal was medicated with pure calcium hydroxide (Calcium Hydroxide, Deepti Dental Products, Ratnagiri, India) mixed into a paste form with normal saline. Finally, the access cavity was filled with zinc oxide (Caviton, GC Corporation, Tokyo, Japan).

The patient was recalled after 11 days, and the treated tooth was found to be asymptomatic. The access cavity was reopened, copious irrigation was done with 2.5% NaOCl solution using a side vented needle and finally irrigated with normal saline. The root canal was dried with sterile paper points. Next, MTA powder was mixed with distilled water (ProRoot MTA, Dentsply India Pvt. Ltd, India) and plugged into the apical third of the root canal with an MTA carrier. This procedure was repeated several times until the thickness of the MTA reached 5 mm. The position and length of the plug were confirmed by radiograph (Fig. 2-C). Then, a moist paper point (size 80, adjusted to the remaining canal length) was placed over the plug. Finally, the cavity was filled with zinc oxide, and the patient was requested to visit after 48 hours.

On the next visit, the patient presented with a comfortable tooth. Therefore, the root canal was obturated with gutta-percha (Gutta-percha Points, DiaDent, Korea) as filler and calcium hydroxide as a sealer (Sealapex, SybronEndo, Glendora, USA) by lateral condensation technique (Fig. 2-D). Finally, the access cavity was filled with composite resin (Solare, GC Corporation, Tokyo, Japan).

The tooth was found asymptomatic during the follow-up visit after 6 months (Fig. 2-E). The radiograph showed complete periapical healing and root formation.

Follow-up visits after 12 months (Fig. 2-F), 24 months (Fig. 2-G), and 38 months (Fig. 2-H) revealed similar clinical and radiological findings. During follow-up visits, the patient and her parents were counselled about the importance of oral hygiene maintenance.

Discussion

This case resulted in successful apexification despite a lengthy history of trauma. Since the root formation was incomplete during the trauma, Hertwig's epithelial root sheath and (or) its remnants, the cell rests of Malassez, may have contributed to the apical closure. Although these cells decrease in number with age, they can undergo cell division.[25] So, as long as a periodontal ligament is present anywhere on the root, the formation of a hard tissue barrier is a reality.

The ability of calcium hydroxide to induce a hard tissue barrier by stimulating cellular activity in epithelial root sheath is accepted, and its osteogenic potential has been known for some time.[26] It also accelerates the natural healing functions in the periapical tissues.[27]The favourable consequences of its use can be attributed to its anti-inflammatory, acid neutralizing, alkaline phosphatase activating, and antibacterial action. It is also less toxic, bactericidal, biocompatible, and has tissue dissolving properties.[28,29]

However, calcium hydroxide has inherent disadvantages such as variability in treatment time, the unpredictability of apical closure, difficulty in patient follow-up, failure in controlling infection, recurrence of infection, cervical fracture, and increased risk of root fracture.[30-32] MTA has superior biocompatibility, and it is less cytotoxic. The presence of calcium and phosphate ions in MTA results in the attraction of blastic cells. It promotes a favourable environment for cementum

deposition.[33,34] Moreover, Felippe et al. demonstrated that MTA results in complete apical barrier formation compared to Calcium hydroxide.[35] Our radiographic images obtained after six months, one year, two years and three years of treatment agree with their report.

It has been reported that calcium hydroxide when used as an intracanal medicament between visits, promotes healing by efficiently eliminating bacteria which survived after biomechanical preparation of the canal.[29,36] Granulation tissue often grows into the apical area of a wide-open root canal. It is sometimes difficult to remove with instruments. However, it necrotizes when calcium hydroxide is packed into the canal as intracanal medicament. It can be rinsed out of the canal at the subsequent visit with sodium hypochlorite.[3] Therefore, in the presented case, calcium hydroxide dressing was given to disinfect the canal, followed by the application of MTA.

The thickness of the MTA plug directly affects its hardness, sealing ability, and displacement when used as an apical barrier. For example, a 5 mm plug is significantly more robust and leakage-resistant than a 2 mm plug.[37] Also, a 4 mm plug is significantly more resistant to displacement than a 1 mm plug.[38] Therefore, following the previous reports, we used a 5 mm plug. Aminoshariae and coresearchers reported that the hand method of placement and condensation of MTA resulted in better adaptation with fewer voids than the ultrasonic method.[39] Accordingly, MTA placement and condensation were done manually in the presented case.

The time required for apical barrier formation may be as long as twenty months using calcium hydroxide. Age and extent of periradicular inflammation may affect the time needed to form an apical barrier.[40] In the presented case, MTA achieved apical closure in around 6 months. A comparative study on young permanent incisors showed that MTA needs reduced treatment time and better sealing ability. Being biocompatible and stronger provides an opportunity for immediate obturation.[41] In the presented case, MTA achieved apical closure in around 6 months. Nonetheless, MTA is much more expensive and challenging to work with during placement in a root canal due to its naturally sandy consistency when hydrated.[42]

Conclusion

MTA has proven its ability in apical healing and stop formation within a short period in the presented case. The placement of an MTA plug also allowed obturation of the root canal without waiting for the apical barrier formation. Clinical and radiological follow-ups until 38 months of treatment showed remarkable results.

Acknowledgements

The authors ackn owledge the technical support provided by Dr Arefin Alam for this research.

References

1. Navabazam A, Farahani SS. Prevalence of traumatic injuries to maxillary permanent teeth in 9- to 14-year-old school children in Yazd, Iran. Dent Traumatol 2010; 26: 154-77
2. Kumar V, Zameer M, Prasad V, Mahantesh T. Boon of MTA Apexification in Young Permanent Posterior Teeth. Case Rep Dent 2014; 2014: 1-5
3. Chowdhury AFMA, Alam A, Sarkar UK, Mahmud AA, Habiba U, Rabby MAI. Apexification with calcium hydroxide: 27 months follow up of a case. Med. Today 2013; 25: 42-45
4. Parashos P. Apexification: Case report. Aust. Dent. J 1997; 42: 43-46
5. Feiglin B. Differences in apex formation during apexification with calcium hydroxide paste. Endod Dent Traumatol 1985; 1: 195-199
6. Heithersay GS. Stimulation of root formation in incompletely developed pulpless teeth. Oral Surg Oral Med Oral Pathol 1970; 29: 620-630
7. Vijayran M, Chaudhary S, Manuja N, Kulkarni AU. Mineral trioxide aggregate (MTA) apexification: a novel approach for traumatised young immature permanent teeth. BMJ Case Rep 2013; 2013: 1-4

8. Schmitt D, Bogen G. Multifaceted use of ProRoot MTA root canal repair material. Pediatr Dent 2001; 23: 326-330
9. Andreasen JO, Farik B, Munksgaard BC. Long term calcium hydroxide as a root canal dressing can increase the risk of root canal fracture. Dent Traumatol 2002; 18: 134-137
10. Pace R, Giuliani V, Nieri M, Di Nasso L, Pagavino G. Mineral trioxide aggregate as apical plug in teeth with necrotic pulp and immature apices: a 10-year case series. J Endod 2014; 40: 1250-1254
11. Mente J, Hage N, Pfefferle T et al. Mineral trioxide aggregate apical plugs in teeth with open apical foramina: a retrospective analysis of treatment outcome. J Endod 2009; 35: 1354-1358
12. Simon S, Rilliard F, Berdal A, Machtou P. The use of mineral trioxide aggregate in one-visit apexification treatment: a prospective study. Int Endod J 2007; 40: 186-197
13. Holden DT, Schwartz SA, Kirkpatrick TC, Schindler WG. Clinical Outcomes of Artificial Root-end Barriers with Mineral Trioxide Aggregate in Teeth with Immature Apices. J Endod 2008; 34: 812-817
14. Torabinejad M, Hong CU, Lee SJ, Monsef M, Pitt Ford TR. Investigation of mineral trioxide aggregate for root-end filling in dogs. J Endod 1995; 21: 603-608
15. Koh ET, Torabinejad M, Pitt Ford TR, Brady K, McDonald F. Mineral trioxide aggregate stimulates a biological response in human osteoblasts. J Biomed Mater Res 1997; 37: 432-439
16. Al-Hezaimi K, Al-Hamdan K, Naghshbandi J, Oglesby S, Simon JHS, Rotstein I. Effect of white-colored mineral trioxide aggregate in different concentrations on Candida albicans in vitro. J Endod 2005; 31: 684-686
17. Al-Hezaimi K, Naghshbandi J, Oglesby S, Simon JHS, Rotstein I. Comparison of antifungal activity of white-colored and gray-colored mineral trioxide aggregate (MTA) at similar concentrations against Candida albicans. J Endod 2006; 32: 365-367
18. Eldeniz AU, Hadimli HH, Ataoglu H, Ørstavik D. Antibacterial effect of selected root-end filling materials. J Endod 2006; 32: 345-349
19. Sipert CR, Hussne RP, Nishiyama CK, Torres SA. In vitro antimicrobial activity of Fill Canal, Sealapex, Mineral Trioxide Aggregate, Portland cement and EndoRez. Int Endod J 2005; 38: 539-543
20. De Leimburg ML, Angeretti A, Ceruti P, Lendini M, Pasqualini D, Berutti E. MTA obturation of pulpless teeth with open apices: bacterial leakage as detected by polymerase chain reaction assay. J Endod 2004; 30: 883-886
21. Fischer EJ, Arens DE, Miller CH. Bacterial leakage of mineral trioxide aggregate as compared with zinc-free amalgam, intermediate restorative material, and super-EBA as a root-end filling material. J Endod 1998; 24: 176-179
22. Torabinejad M, Hong CU, Pitt Ford TR, Kariyawasam SP. Tissue reaction to implanted super-EBA and mineral trioxide aggregate in the mandible of guinea pigs: a preliminary report. J Endod 1995; 21: 569-571
23. Shabahang S, Torabinejad M, Boyne PP, Abedi H, Mc Millan P. Apexification of immature dog teeth using osteogenic protein-calcium hydroxide, and mineral trioxide aggregate in dogs. J Endod 1997; 23: 265
24. Baek SH, Plenk Jr. H, Kim S. Periapical tissue responses and cementum regeneration with amalgam, super EBA, and MTA as root-end filling materials. J Endod 2005; 31: 444-449
25. Andreassen JO, Borum MK, Andreassen FM. Replantation of 400 avulsed permanent incisors. Endod Dent Traumatol 1992; 8: 45-55
26. Mitchell DF, Shankwalker GB. Osteogenic potential of calcium hydroxide and other materials in soft tissue and bone wounds. J Dent Res 1958; 37: 1157-1163
27. Binnie WH, Mitchell DF. Induced calcification in the subdermal tissues of the rat. J Dent Res 1973; 52: 1087
28. Bystrom A, Claeson R, Sundqvist G. Antibacterial effect of camphorated paramonochlorophenol, camphorated phenol and calcium hydroxide in the treatment of infected root canals. Endod Dent Traumatol 1985; 1: 170-175
29. Sj-gren U, Figdor D, Sp-ngberg L, Sundqvist G. The antimicrobial effect of calcium hydroxide as a short-term intracanal dressing. Int Endod J 1991; 24: 119-125
30. Maroto M, Barber'a E, Planells, Vera V. Treatment of a nonvital immature incisor with mineral trioxide aggregate (MTA). Dent Traumatol 2003; 19: 165-169
31. Shabahang S, Torabinejad M, Boyne PP, Abedi H, McMillan P. A comparative study of root-end induction using osteogenic protein-1, calcium hydroxide, and mineral trioxide aggregate in dogs. J Endod 1999; 25: 1-5
32. Andreassen JO, Farik B, Munksgaard EC. Long-term calcium hydroxide as a root canal dressing may increase the risk of root fracture. Dent Traumatol 2002; 18: 134137
33. Weldon Jr. JK, Pashley DH, Loushine RJ, Weller RN, Kimbrough WF. Sealing ability of mineral trioxide aggregate and super-EBA when used as furcation repair materials: a longitudinal study. J Endod 2002; 28: 467-470
34. De-Deus G, Petruccelli V, Gurgel-Filho E, Coutinho-Filho T. MTA versus Portland cement as repair material for furcal perforations: a laboratory study using a polymicrobial leakage model. Int Endod J 2006; 39; 293-298
35. Felippe WT, Felippe MCS, Rocha MJC. The effect of mineral trioxide aggregate on the apexification and periapical healing of teeth with incomplete root formation. Int Endod J 2006; 39: 2-9
36. Estrela C, Estrela CRDA, Hollanda ACB, Decurcio DDA, P'ecora D. Influence of iodoform on antimicrobial potential of calcium hydroxide. J. Appl. Oral Sci 2006; 14: 33-37
37. Matt GD, Thorpe JR, Strother JM, McClanahan SB. Comparative study of white and gray Mineral Trioxide Aggregate (MTA) simulating a one- or two-step apical barrier technique. J Endod 2004; 30: 876-879
38. Hachmeister DR, Schindler WG, Walker III WA, Thomas DD. The sealing ability and retention characteristics of mineral trioxide aggregate in a model of apexification. J Endod 2002; 28: 386-390
39. Aminoshariae A, Hartwell GR, Moon PC. Placement of mineral trioxide aggregate using two different techniques. J Endod 2003; 29: 679-682
40. Huang GT. Apexification: the beginning of its end. Int Endod J. 2009; 42: 855-66
41. Damle SG, Bhattal H, Loomba A. Apexification of anterior teeth. J Clin Pediatr Dent 2012; 36: 263-268
42. Glickman GN, Koch KA. 21st-century endodontics. J Am Dent Assoc 2000; 131: 39-46

Skeletal and dental changes in Class ll division 1 malocclusion using a two-phase approach – a case report

MM Gani[1], MM Hasan[2], PP Dhar[3], SN Rita[4]

Abstract

An 11-year-old female patient reported in good health with the complaints of protrusion of upper front teeth and unpleasant look. Extra oral examination showed convex facial profile with posterior divergence of the face due to retrognathic mandible. She had increased overjet, deep bite. Lips were potentially competent. Intraoral examination revealed erupting upper canine, showed maxillary anterior segment proclined, 10-mm overjet, and 5-mm overbite. After the diagnosis of severe Angle Class II division 1 malocclusion, an upper removable appliance with anterior bite plan to correct the Class II relationships and multiloop edgewise arch wires were used for leveling alignment and finishing. Follow-up examinations revealed an improved facial profile, normal overjet and overbite, and good intercuspation. The patient was satisfied with her post treatment occlusion, smile, and facial appearance. This result suggests that functional removable orthodontic appliance in combination with the multiloop edgewise archwire technique is an effective option for correcting Class II malocclusions.

Key Words: . Class II Div. 1 malocclusion, Skeletal malocclusion, Soft tissue change, Mandibular advancement

(J Cont Dent Sci 2019;7(1):20-24)

Artical Received: 19.07.2018; Article Acepted: 21.11.2018

Introduction

Among the various types of malocclusion found in human populations, class II division 1 is one of the most common. According to Dr. James McNamara, mandibular retrusion is the most common feature of class II division 1 malocclusion in growing children.[1] According to Angle, a Class II malocclusion is characterized by the distal occlusion of the mandibular first molar in relation to the maxillary first molar.[2] The marked overjet also increases the patient's susceptibility to dental trauma. Additionally, the unaesthetic facial appearance often has psychosocial consequences.[3] The optimal time for treatment of patients with Class II malocclusions therapy should be initiated at the beginning of cervical vertebrae maturation stage CS3 to maximize the treatment effects.[4] Growth modification can be carried out to correct the skeletal class II malocclusion at early permanent dentition.[5] Orthodontic treatment planning depends on several factors, including the nature of the malocclusion, patient characteristics, and family history. [6]

In skeletal class II, where active growth is completed, underlying skeletal discrepancy can be camouflaged by orthodontic tooth movement with extraction.[7] The use of a single phase treatment only commences in the permanent dentition with fixed appliance treatment.[8] The perfect treatment timing of Class II malocclusions appears to be during or shortly after the start of the pubertal growth spurt.[9] Functional appliances serve as a potentially successful treatment modality with a retrusive mandible.[10]

1. Dr. Mohammad Mahfuzul Gani BDS, FCPS, Assistant Professor, Dept of Orthodontics, Sapporo Dental College and Hospital,
2. Dr. Muhammad Mahdee Hasan BDS, FCPS, Assistant Professor, Dept of Orthodontics, Sapporo Dental College and Hospital,
3. Dr. Partha Pratim Dhar BDS, Senior Lecturer, Dept of Orthodontics, Sapporo Dental College and Hospital,
4. Prof. Dr. Sufia Nasrin Rita BDS, FCPS, Prof. and Head, Dept of Orthodontics, Sapporo Dental College and Hospital.

Address of Correspondence

Dr. Mohammad Mahfuzul Gani BDS, FCPS, Assistant Professor, Dept of Orthodontics, Sapporo Dental College and Hospital. Email:mahfuzgani1979@gmail.com

Figure 1. Pretreatment facial and intraoral photographs

Diagnosis and Etiology

A Bangladeshi girl aged 11 years presented with a chief complaint of protrusive teeth. She had a convex facial profile, deep bite, lack of passive lip seal. Intraoral examination revealed maxillary diastemas, slight crowding of the mandibular incisors, overjet of 10 mm, and overbite of 5 mm

Radiographic findings

The radiographic analysis of the patient's initial orthopantomogram (Figure: 3) showed an early stage of permanent dentition with all teeth present except third molars with no other abnormalities. Figures: 2(a), show the pre-treatment cephalogram, revealed a Class II skeletal relationship. It showed a moderate skeletal ANB difference of 5. The maxilla was normal relative to the cranial base with an SNA at 81. The mandible was retrognathic with an SNB value of 76. The maxillary incisors were proclined.

Diagnosis

Soft tissue

The patient presented mesocephalic with a convex profile, posterior divergence, obtuse nasolabial angle and a Class II lip relationship.

Skeletal:

Skeletal class II jaw relationship (ANB 50) with retrognathic mandible (SNB 760) with average growth pattern.

Dental:

Angle Class II Division 1 with maxillary incisors proclined. An overbite of 5mm and an Overjet of 10mm.

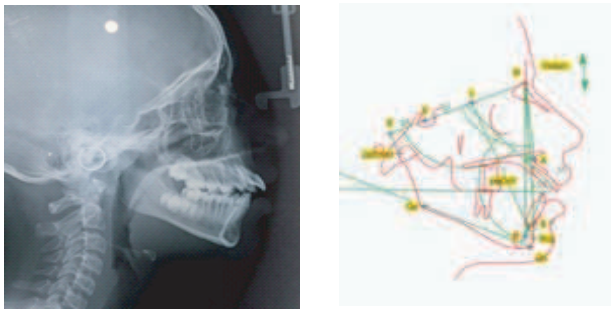


Figure 2. Pretreatment cephalometric radiographs and tracing.

Figure 3: Pretreatment panoramic radiograph

Treatment Objectives

The objectives of first phase were to reduce the skeletal class II pattern, to improve the facial appearance, reduce overbite and mandibular advancement to reduce overjet. The second phase objective was to correct the maxillary dental protrusion, settle the teeth in their new positions, ensure good interdigitation, and achieve a stable occlusion.

Figure 4. Pretreatment facial

any residual crowding and to improve interdigitation and settling in the new Class I position. Retention Removable Hawley's maxillary and mandibular retainers.

Treatment Progress

First phase of treatment was done by upper removable inclined anterior bite plan made by self-cure acrylic resin with Adams claps on both first molar and both first premolar. Patients was instructed to wear the appliance whole day and night including during eating. The appliance was continuing for eight months up to the complete eruption of all premolars and canine.

Second phase of treatment was initiated by banding the maxillary and mandibular first molars and bonding with standard edge wise edgewise brackets (0.018 - 0.028-inch slot). Leveling was performed with 0.014-inch ss MEAW, 0.016-inch ss MEAW, 0.014-inch CuNiTi, 0.016-inch CuNiTi, 0.016 ss archwires. The MEAWs were maintained for 2 months to avoid possible relapse of the Class II relationship. During leveling, in addition to the 0.014-inch ss archwire, a lace back ligature was tied from molar to canine to reduce canine proctraction. Treatment was finished with 0.017x0.025ss wire. After 24 months of active treatment, a Hawley plate were used in the maxillary and mandibular arches.

Results

The post-treatment photographs (Figure 6) revealed an improved soft tissue facial profile along with lip incompetency. The intraoral photographs exhibited bilateral Class I molar and canine relationships and an occlusion with a normal overjet and overbite. Good intercuspation, proximal contacts, and root parallelism were achieved (Figure 8). The cephalometric (Figure 7) analysis demonstrates favorable forward growth of the mandible. There was a reduction of the skeletal class II with a 2 decrease in the ANB angle through forward growth of the mandible. The post-treatment value of SNB at 79 indicates the advancement of mandible. At the end of treatment (Figure 6), the patient had pleasing soft tissue profile and well-settled dentition. Comparison of pre-treatment and post-treatment cephalometric values is given in. Total treatment time was 24 months. The final lateral cephalogram demonstrated proper inclination of the maxillary incisors (Figure 7). The mandibular incisors were facially inclined and the upper lip projection was reduced.

The patient was satisfied with her dental and facial appearance.

Facial photographs (Fig. 6): The post treatment facial photographs showed a reduction of the labial protrusion and stable facial balance as well as a pleasing smile. Close examination demonstrated an improvement in the nasolabial angle. The frontal and smile photographs demonstrated the elimination of the lower lip strain.

Figure 9. Superimposition of pre and post treatment cephalogram

Radiographic examination: The post treatment panoramic radiograph (Fig. 8) revealed root parallelism and no root resorption. The ANB angle was decreased to 2. SN-GoGn was 35 after treatment it was 30. Pretreatment SND was 74 and post treatment SND was 76. Pretreatment S-L was 32mm and post treatment was 40mm. This three issue revealed that mandible grows forward direction. The cephalometric tracing (Fig.7) illustrated incisor inclination correction on upper jaw because pretreatment Mx1-NA was 37 which improved to 20 and Interincisal angle improved to 130 from 115.

Superimposition (Fig 9): Pretreatment-post treatment superimposition tracings confirmed that the mandibular grows forward and upwards direction. Lower first molar also moves forward and establishing Angles class 1 occlusion. Intrerincisal angle improved. Soft tissue profile improved and lower lip moves forward and upwards which makes the lip competent.

Segmental superimposition (Figure 10): Dental Maxilla showed the upward and backward repositioning of the maxillary incisors. Mandible showed forward advancement. Soft tissue profile improved aesthetically and lower lip touching the upper lip which makes the lip competent. Upper lip drape downwards.

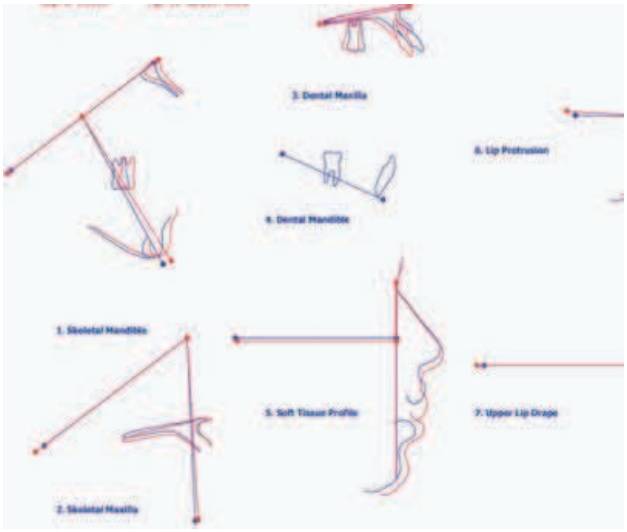


Figure 10. Superimposition of pre and post treatment cephalogram

Discussion

General considerations and principles of management: Majority of Class II division 1 shows a distal relationship of the mandible to the maxilla.[16] Upper anterior bite plan causes increase of mandibular dentoalveolar height and mesial or anterior movement of the lower buccal segments, which is produced by normal mandibular growth.[17] Functional appliances make use of dentoalveolar movement, altered soft tissue environment and the greater growth potential of the mandible to successfully decrease the overjet in growing patients.[18]

Conclusion:

1. For children with moderate to severe class II division 1 malocclusion problems, anterior bite plan and fixed appliance is a successful approach. 2. Mild mandibular retrognathism can be successfully treated by anterior bite plan at growing age. 3. A successful two-phase approach in Class II Division 1 cases has the potential to prevent the removal of bicuspids to treat the malocclusion. 4. The success of this case would not have been possible without the compliance of the patient in the first phase of treatment.

Reference:

1. McNamara J. Component of Class II malocclusion in children 8-10 years of age. Angle Orthod 1981;51:177-202.
2. Angle EH. Classification of malocclusion. Dental Cosmos. 1899;41:248264.
3. Jenny J, Cons NC. Comparing and contrasting two orthodontic indices, the Index of Orthodontic Treatment need and the Dental Aesthetic Index. Am J Orthod Dentofacial Orthop. 1996;110:410-416.
4. Sufia Nasrin Rita, S. M. Anwar Sadat. 'Growth Modification in Class II Malocclusion: A Review'. Updat Dent. Coll .j 2014;4(2):23-26
5. Y Pachori, M Navlani, T Gaur, S Bhatnagar. Treatment of skeletal class II division 1 malocclusion with mandibular deficiency using myofunctional appliances in growing individuals. Journal of indian society of Pedodontics and preventive dentistry. 2012;30(1):56-65
6. Dolce C, Mansour DA, McGorray SP, Wheeler TT. Intrarater agreement about the etiology of Class II malocclusion and treatment approach. Am J Orthod Dentofacial Orthop. 2012;141:17-23
7. Tulloch JF, Phillips C, Proffit WR. Benefit of early Class II treatment: Progress report of a two-phase randomized clinical trial. Am J Orthod Dentofacial Orthop 1998;113:62-72.
8. Gianelly AA. One-phase versus two-phase treatment. American Journal of Orthodontics and Dentofacial Orthopedics 1995; 108 (5): 556-559.
9. Baccetti T, Franchi L, Toth LR. Treatment timing for Twin-Block therapy. American Journal of Orthodontics and Dentofacial Orthopedics 2000; 118: 159-170.
10. Pachori Y, Navlani M, Gaur T, Bhatnagar S. Treatment of skeletal class II division 1 malocclusion with mandibular deficiency using Functional appliances in growing individuals. Journal of Indian Society of Pedodontics and Preventive Dentistry 2012; 30(1): 56- 65.
11. Johan Christian Julyan and Marius Coetsee. Class II Division 1 treatment using a two-phase approach a case report. International Dentistry African Edition; 8(5): 44-68.

12. Kim YH. Tratamiento de maloclusiones severas mediante la tcnica de alambre Edgewise Multiloop (Multiloop Edgewise Arch-Wire, MEAW) Ortodoncia Cl□nica. 2004;7:22-34.
13. Ghafari J, Shofur FS, Jacobsson-Hunt U, Markowitz DL, Laster LL. Headgear vs functional regulator in the early treatment of Class II, division 1 malocclusion: A randomized clinical trial. Am J Orthod Dentofacial Orthop 1998; 113(1):51-61.
14. Tulloch JF, Phillips C, Proffit WR. Outcomes in a 2-phase randomized clinical trial of early Class II treatment. Am J Orthod Dentofacial Orthop 2004;125(6):657-67.
15. Keeling SD, Wheeler TT, King GJ, et al. Anteroposterior skeletal and dental changes after early Class II treatment with bionators and headgear. Am J Orthod Dentofacial Orthop 1998;113(1):40-50.
16. American Academy of Pediatric Dentistry. Policy on the ethical responsibilities in the oral health care management of infants, children, adolescents, and individuals with special health care needs. Pediatr Dent 2018;40(special issue):142-3.
17. S.I Bhalajhi. Orthodontics The Art and Science. Fifth edition. 2012;5:425-426.
18. DiBiase AT, Cobourne MT, Lee RT. The use of functional appliances in contemporary orthodontic practice. British Dental Journal 2015; 218(3): 123-128

Published by :

Sapporo Dental College & Hospital

Plot # 24, Court Bari Road, Sector # 08, Uttara Model Town

Dhaka-1230, Cell : 01678026854, 01678026855, 01678026858

E-mail : sdch@bol-online.com, Web : www.sapporodentalcollege.com.bd