ISSN 2305-9664

Journal of Contemporary Dental Sciences

Volume : 06, No : 01 January, 2018

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. 6, No. 1, January, 2018

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:

* No part of the materials published in this journal may be reproduced in a retrieval system or transmitted in any form or by any means electronic, mechanical, photocopying, recording or otherwise without the prior written permission of the publisher. Reprints of any article in the journal will be available from the publisher

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

Editorial

The current issue (Volume 6, Issue 1, January, 2018) of Journal of Contemporary Dental Sciences (JCDS) brings 4 original papers and a case report for its followers.

The article by Asad-Uz-Zaman reported different types of fibro-osseous lesions of the jaws in Bangladeshi patients over a ten year period. Ossifying fibroma and fibrous dysplasia were the most common fibro-osseous lesions of the jaws diagnosed using WHO (2005) criteria. Both lesions showed female predominance.

Antibiotic sensitivity pattern of Salmonella typhi isolated from blood culture of 120 patients were described by RA Khan. The findings of this study indicated Ceftriaxone, Ceftazidime, Ciprofloxacin and Azitrhomycin could be used as first line therapy in enteric fever.

Touhida Murad et al. in their article described the effect of aqueous extract of mango leaves on blood glucose level in Alloxan induced diabetic rats. This was a very interesting read.

Shahnaz Parvin et. al. in their paper reported their clinical experience on pulp therapy performed among 1-12 year old patients in Pediatric OPD of a private dental college over a three years period. Pulpectomy was preferred over other types of primary teeth pulp treatment, while more patients needed apexification compared to apexogenesis in permanent teeth having incomplete apices.

In this issue we also included a case report on walking bleach technique by MAH Sheikh et al.

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. 6, No. 1 January, 2018

Contents

Fibro-osseous lesions of the jaws: A study of 43 Bangladeshi patients

Zaman A U

Abstract

Background: *Fibro-osseous lesions (FOLs) are relatively common entities in the head and neck region. However, ther is no published report on these group of lesions on Bangladesh populations. The pupose of this study was to analyze clinoco-pathological features of these lesions reported in our hospital over a period of 15 Years.* ***Materials and Methods:*** *A total of 43 cases of fibro-osseous lesions of the jaws were collected from the files of the department of Oral Pathology, Sapporo Dental College, Dhaka, Bangladesh during 15years period from 2005 to 2015. The demographic data, radiographic features and histological findings were analyzed.* ***Results:*** *The most common FOL was ossifying fibroma (OF), 28(65%), followed by fibrous dysplasia 13(FD), (30%). There were three cases of osseous dysplasia(OD), (7%). Ossifying fibroma most frequently occured in the 2nd and 4th decades of life and mostly involved the posterior region of mandible. Fibrous dysplasia was mostly seen in the 1st decade of life. The maxilla was involved more than mandible, most common in the posterior region of the maxilla. Both lessions showed slight female predominance. Radiographically, ossifying fibroma mostly was mixed radiolucent-radiopaque. Fibrous dysplasia mostly appeared as radiopaque lesions. Microscopically, OF composed of fibrocellular stroma, where as most of the FD exhibit fibrous stroma, ineterspread with mainly woven bone.* ***Conclusion:*** *Ossifying fibroma (OF) and fibrous dysplasia (FD) are most common fibro-osseous lesion in the region and both lesions showed female predominance.*

Keywords: Fibro-osseous lesions, Ossifying firbroma, Fibrous dysplasia ***(J Cont Dent Sci 2018;6(1):1-4)***

Introduction

Fibro-osseous lesions of the jaws and craniofacial bones are a diverse group of process that are characterized by replacement of normal bone with fibrous tissue that gradually undergoes mineralization.1 The diagnosis of these lesions based on histopathological features alone has considerable limitation. So proper categorization requires a good correlation of the history, clinical findings, radiological characteristics and histological appearances. There are no previously published reports on fibro-osseous jaw lesions in Bangladesh. The aim of this study was to analyze various clinico-pathology and radiological features of these lesions reported in our hospital over the period of 15 years.

1. Prof. Dr. Asad-Uz-Zaman, Professor & Head, Depatment of Oral Pathology and Periodontology, Sapporo Dental College & Hospital, Uttara, Dhaka

Address of Correspondence

Prof. Dr. Asad-Uz-Zaman, Professor & Head, Depatment of Oral Pathology and Periodontology, Sapporo Dental College & Hospital, Uttara, Dhaka, Email: azaman@sdch.edu.bd

Material and Methods

All the cases diagnosed at the Department of Oral Pathology, Sapporo Dental College, Dhaka, Bangladesh as benign fibro-osseous lesions from March 2000 to December 2015 were retrieved according to the criteria of recent World Health Organization Classification (2005) for fibro-osseous lesions. All the cases were primarily diagnosed both clinically and histopathologically. The demographic and clinical information was obtained from each individual patient's file and laboratory registries. Each case was accompanied by radiograph and radiographic features were assessed for radiolucency, radiopacity, margins of the lesion, cortical-plate expansion, involvement of antrum, displacement and resorption of teeth.The 5m-thick haematoxylin and eosin (HE)-stained sections were reviewed under light microscope to confirm the diagnosis of cases subjective to surgical procedures for both diagnostic and treatment purpose. Histologically, parameters such as type of bone, cellularity, presence of cementum-like materials and nature of stroma were assessed.

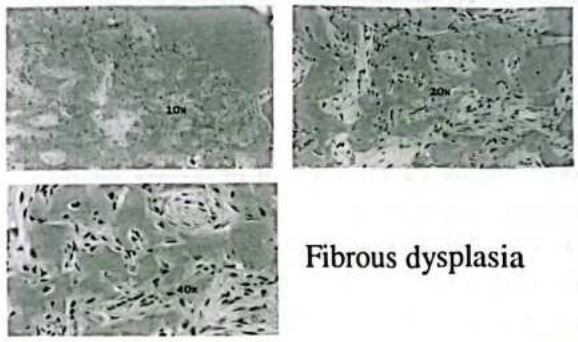
Article received 06/08/2017 : Article accepted 20/11/2017

Results

A total of 43 cases of fibro-osseous lesions were recorded over the period of 15 years. Among these, the most common FOL was ossifying fibroma (OF), (n=28, 65%), followed by fibrous dysplasia (FD) (n=13, 30%). There were two (n=2, 5%) cases of osseous dysplasia (OD). Ossifying fibroma (OF) was most frequently occurred in the 2nd and 4th decades of life and mostly involved the posterior region of the mandible. Fibrous dysplasia was mostly seen in the 1st decade of life. The maxilla was involved more than mandible, most common in the posterior region of the maxilla. Both lesions showed slight female predominance. Radiographically, ossifying fibroma mostly was well- defined mixed radiolicent-radiopaque. Fibrous dysplasia mostly appeared as a defuse radiopaque lesion. Microscopically, OF composed of fibrocellular stroma, whereas most of the FD exhibit stroma, interspread with mainly woven bone.

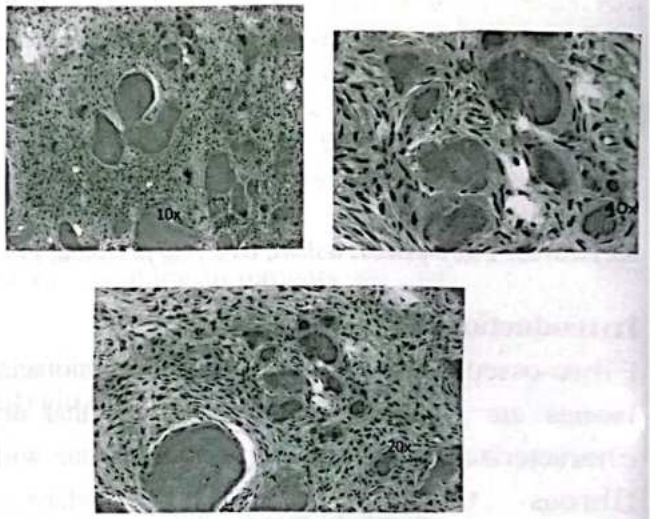
Table 1: Distribution of the demographic, clinical and radiographic features of 43 fibro-osseous lesions.

Parameter	OF (n=28)	FD (n=13)	OD (n=2
Age			
Mean	28.7	20.30	15.5
Range	11-65	8-33	11-20
Gender			
Male	46%	38%	100%
Female	54%	62%	
Site			
Mandible	68%	38%	100%
Anterior	21%	15%	
Posterior	47%	23%	
Maxilla	32%	62%	
Anterior	11%	23%	
Posterior	21%	39%	
Radiography			
Mixed	52%	36%	100%
Radiolucent			
Radiopaque	48%	54%	
Well defined margin	91%		100%
Poorly defined margin	9%		



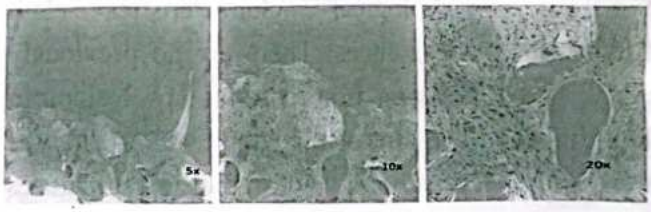
Fibrous dysplasia

Fig.1: Microscopic feature of Fibrous dysplasia(FD) (10x, 20x, 40x enhancement)



Ossifying fibroma

Fig.2: Microscopic feature of Ossifying Fibroma(OF), (10x, 20x, 40x enhancement)



Osseous dysplasia

Fig.3: Microscopic feature of Osseous dysplasia (OD) (10x, 20x, 40x enhancement)

Discussion

Fibro-osseous lesions are a group of lesions characterized by the replacement of normal bone by cellular fibrous tissue containing foci of mineralization that vary in amount and appearance.[2] Langdon et al ., suggested that certain fibro-osseous lesions of the jaws may represent different stages in

the evaluation of a single disease process.[3]
The first case report of fibro-osseous lesions of the jaw was reported in 1947.[4] After that there were only few reports on fibro-osseous lesions of jaws .[5-9]

However, although FOL are comparatively one of the common lesions occurring in Bangladesh, there is no retrospective study reported in the English Language Literature. In the present study we tried to compare the features of between OF and FD, which are the most common lesions reported in this region.

Ossifying fibroma (OF) is a true benign neoplasm of the bone tissue. According to WHO (2005) recent classification of FOL, OF is a well-demarcated lesion composed of fibrocellular tissue and minerilzed material of varying appearance. Juvenile trabecular ossifying fibroma and juvenile psammomatoid ossifying fibroma are two histologic variants of ossifying fibroma.[1]

In this study we followed the recent WHO classification, OF and Central ossifying fibroma (COF) are combined and two cases of osseous dysplasia were reported. In our data, 27 cases were diagnosed as OF and 1 cases as Juvenile ossifying fibroma (JOF). Sudeedra P et al , found that in India the most common type of fibro-osseous lesion of the jaw were ossifying fibroma (75%) , followed by ossous dysplasia (OD), (25%). Ratthapong W et al in Thailand also found ossifying fibroma (50.8%) most common lesions in the jaw followed by FD (42.6%). Alsharif et al. reported from China found OF were the most common FOL (77%) followed by FD (23%).[5,7-8] In contrast, Ogunsalu et al found that in Jamaica the most common types of FOLs of the jaws were FD (51.7%) followed by OF (34.5%).[9] In all these studies FD and OF were the most common FOL of the Jaws and the present study also reflect the same incidence of FOL in the Jaws. In this study, OF were the most common FOL lesion of the jaw followed by FD which is similar with the reports by Sudeedra P et al, Ratthapong W et al., Alsharif et al,[5,8-9] which may be due to same geographic area. In present study, the number of osseous dysplasia (OD) and juvenile trabecular ossifying fibroma was too small to draw any valid conclusion.

According to WHO (2005) fibrous dysplasia is a genetically based sporadic disease of the bone that may affect single or multiple bones monostotic fibrous dysplasia (MFD), Polyostotic fibrous dysplasia (PFD). FD occurring in multiple adjacent craniofacial bones is regarded as monostatic. FD may be part of the McCune-Albright syndrome.

Monostotic FD is six times more common than polyostotic FD (WHO, 2005) In this study, all 13 cases of FD showed a solitary lesion in the jaws, although few of the maxillary lesions extending up to paranasal sinius cause nasal abstruction. FD dysplasia was most commonly seen during the 1st and 2nd decade of life which contrast with the results of Waldron, Regezi and Sudeendra P. [5,10-11] and slightly more common in maxilla than in the mandible.

Both OF and FD showed a female predilection (female: male ratio, 1.15:1 and 1.6:1, respectively), which agrees with the result of Ogunsalu et al (1.5:1 and 1.5:1 respectively).[9] Ossifying fibroma (OF) was most often diagnosed during 2nd and 4th decade which is to some extent concurs with the report by Sudeendra et al and Eversole et al, and showed predilection for the mandible.[5,12] The most common location was the posterior region of the mandible. These finding generally agrees with the reports by Eversol et al and Sudeendra et al.[5,12]

Radiographally, OF mostly appeared as mixed radiolucent-radiopacity and FD mostly showed radiopacity , which agree with the result reported by Waldron.[4]

Histologically, OF is composed of fibrous tissue that very in cellularity and mineralized component consist of woven bone, lamellar bone and cementum-like materials (WHO, 2005). In the present study majority of the cases showed woven bone with cementum-like materials. Fibrous Dysplasia (FD) consists of cellular fibrous tissue with spindle shape cells and immature trabeculae of woven bone with no osteoblastic rimming (WHO, 2005). Mature bone was seen in three cases and stroma was mostly fibrocellular.

Conclusion

OF and FD were the most common fibro-osseous lesions of the jaws diagnosed in Bangladeshi patients over the period of 15 years and both lesions showed female predominance.

References

1. Branes L, Eveson JW, Reichart P, Sidransy D,Lyon France: IARC press; 2005, World Health Organization Classification of Tumors Pathology and Genetics of Head and Neck Tumors; pp.284-27
2. Speight PM, Carlos R, Maxillofacial fibro-osseous lesions, Current Diag Pathol, 2006; 12: 1-10
3. Langdon JD, Rapids AD, Patel MF. Ossifying Fibroma-one disease or six? An analysis of 9 fibro-osseous lesions of the jaws.
4. Waldron CA. Fibro-osseous lesions of the jaws. J Oral Maxillfac Surg. 1993; 51:828-35(PubMed)
5. Prabhu S, Sharanya, Rekha K. Fibro-osseous lesions of the oral and maxilla-facial region: Retrospective analysis for 20 years. J Oral Maxillofac Pathol, 2013, Jan-Apr;17(1)36-40(PubMed)
6. Juliana NSN, Juliana MC, Aguida MMAM, Fabio RP. Benign Fibro-osseous lesions: Clinicopathological features from 1 cases diagnosed in the oral diagnosis setting. Oral Surg Oral Med Oral Pathol Oral Radiol Endod, 2013;115(5): e56-e65.
7. Worawongvasu, R and Songkampol,K. Fibro-osseous lesions of the jaws: an analysis of 122 cases in Thailand. J Oral Pathol Med 2010; 39: 703-708.
8. Alsharif MJ, Sun ZJ, Chen XM, Wang SP, Zhao YF. Benign fibro-osseous lesions of the jaws: A study of 127 Chinise patients and review of the literature. Int J Surg Pathol. 2009:17: 122-34(PubMed).
9. Ogunsalu CO, Lewis A, Doonquah L. Benign fibro-osseous lesions of the jaw bones in Jamica: Analyisis of 32 cases. Oral Dis, 2001;7: 155-62(PubMed).
10. Waldron CA. Fibro-osseous lesions of the jwas. J Oral Maxillfac Surg. 1985; 43:249-62(PubMed).
11. Regezi JA, Odontogenic cyst, odontogenic tumors, fibro-osseous, and giant cell lesions of the jaws. Mod Pathol, 2002: 15: 331-41.
12. Eversol LR, Sabes WR, Rovin S. Fibrous dysplasia: a nosologic problems in the diagnosis of fibro-osseous lesions of the jaws. J Oral Pathol 1972; 1: 189-220.

Antibiotic sensitivity pattern of Salmonella typhi isolated from blood culture

RA Khan[1], MF Karim[2]

Abstract

Introduction: *Typhoid fever is an endemic disease in many developing countries including Bangladesh. A changing antibiotic sensitivity pattern of Salmonella typhi & emergence of resistance has increased to a great concern. The present study was under taken to study the antibiotic sensitivity pattern of Salmonella typhi isolated from blood culture in BSMMU, Dhaka Microbiology Laboratory.* ***Materials & Methods:*** *One hundred twenty patients suspected of having typhoid fever of different age & sex groups visiting Microbiology department for blood culture were included in the study from January 2018 to June 2018.Gram negative non lactose fermenting colonies were subjected to identification & antibiotic sensitivity testing in disc diffusion method according to NCCLS guidelines.* ***Results:*** *Out of 120 blood cultures,30 cases of Salmonella typhi were isolated. Ceftriaxone(93.33%), Ceftazidime(93.33%), Ciprofloxacin(83.33%), Azithromycin(80%), Ampicillin(26.67%), Cotrimoxazole(26.67%), Chloramphenicol(26.67%) & Nalidexic acid(10%) were sensitive.* ***Conclusion:*** *This study indicate that Ceftriaxone,Ceftazidime,Ciprofloxacin & Azithromycin can be used as a first line therapy.*

Key words: Antibiotic sensitivity, Salmonella typhi .

J Cont Dent Sci 2018;6(1):05-08

Introduction

Typhoid fever is an endemic disease in many developing countries especially in the Indian subcontinent including Bangladesh.[1,2] The endemicity in India is quite significant with a morbidity rate of approximately 102 to 2219 per 100000 populations.[3] According to WHO, 16.6 million cases of typhoid fever was diagnosed annually & mortality due to it was approximately 6 lacs per annum.[4] It is characterized by the ingestion of food & water contaminated with human faeces. Individuals recovering from typhoid fever act as a chronic carrier & shed bacteria for months. Antibiotic therapy is the mainstay of managing typhoid fever. In the past decade, resistance of salmonella to multiple drugs, especially to Ampicillin, Chloramphenicol & Cotrimoxazole was on the rise. This resistance pattern had resulted in use of fluoroquinolones & 3rd generation cephalosporins as first line drug.[5,6]

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

2. Dr. Md. Fazlul Karim, Professor & Head. Dept. of Microbiology, Kumudini Women's Medical College, Mirzapur, Tangail.

Address of Correspondence

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

Material & Methods

120 patients suspected having typhoid fever of different age groups & sex visiting microbiology department BSMMU, Dhaka for blood culture were included in the study from January, 2018 to June, 2018. Patient were selected according to clinical features which include fever for more than 7 days, rose spot on the trunk, bradycardia, headache, myalgia etc. were suspected as typhoid fever. Blood samples were taken for culture & sensitivity and WIDAL test from 120 clinically suspected cases of typhoid fever. Trypticase Soya Broth was used as a culture media. Collection of blood, incubation & subculture into Mac Conkey's agar were done as per the standard methods.[7]

Gram's Staining, Motility test, Catalase test, Oxidase test, Sugar fermentation test, IMVIC test (Indole production Methyl red test, Voges-Proskaur test, WIDAL test). Urease test & Triple Sugar Iron (TSI) test were done according to the procedure of Capuccino & Shermau.[8]

Suspected non-lactose fermenting colonies were further processed & confirmed by group & type specific salmonella antisera (Group D factor[9]).

All the isolates of Salmonella typhi were tested for their antimicrobial susceptibility pattern on Muller -Hinton agar media by disc diffusion method against Ampicillin (10 mcg),

Article received 12/06/2017 : Article accepted 16/10/2017

Ciprofloxacin (5 mcg), Cotrimoxazole (25 mcg), Ceftriaxone (30 mcg), Azithromycin (15 mcg), Chloramphenicol (30 mcg), Ceftazidime (30 mcg) & Nalidixic acid (30 mcg). The disc strength & Zone size interpretation was in accordance with the National Committee for Clinical Laboratory Standards (NCCLS).

Interpretation of zone size

Inhibition zones produced by each drug was considered into two susceptibility categories namely sensitive (S) & resistant (R) shown in Table-1 (NCCLS, 1988).

Table-1: Interpretation of zones of inhibition (NCCLS, 1988)

Antibiotics	Disc Patency (mcg/disc)	Diameter of zone of inhibition	
		Resistant (R)	Sensitive (S)
Ampicillin	10	13	17
Chloramphenicol	30	12	18
Cotrimoxazole	25	10	16
Ciprofloxacin	05	15	21
Ceftriaxone	30	13	21
Ceftazidime	30	14	18
Nalidixic acid	30	13	19
Azithromycin	15	13	18

Result

A total of 120 clinically suspected cases of typhoid fever were studied. Study population was from all age groups.Blood culture were done.Of which 30 cultures became Salmonella typhi, 70 cultures were sterile & 20 showed growth of other bacteria (Table-III).

Table-2: Total blood cultures

Culture Status	Total
Sterile	70 (58.33%)
Salmonella	30 (25.00%)
Others	20 (16.67%)
Total Blood Culture	120 (100%)

The patients in which Salmonella typhi were isolated divided into paediatric age group (Upto 15 years) & adult age groups (>15 years). 10 were in paediatric age group & 20 were in adult age group. The highest prevalence rate (66.67%) was found in adult age group.

Table-3: Rate of isolation of Salmonella typhi in relation to age groups

Age Group	Number of Specific cases	Number of isolates
Upto 15 years	40 (33.33%)	10 (25%
Adult age groups (>15 years)	80 (66.67%)	20 (25%
Total	120	30

Table-4: Sex distribution of the patient (n=120)

Sex	Number of patients	Ratio
Male	70	1.4
Female	50	1

The antimicrobial sensitivity pattern of Salmonella typhi against various antibiotics tested was Nalidixic acid (10%), Ampicillin (26.67%), Chloramphenicol (26.67%), Cotrimoxazole (26.67%), Azithromycin (80%), Ciprofloxacin (83.33%), Ceftriaxone (93.33%), Ceftazidime (93.33%).

Table-5: Antimicrobial sensitivity pattern of Salmonella typhi (n=30)

Antimicrobial agent	Susceptibility pattern	Salmonella typhi
Ceftriaxone	S	28 (93.33)
	R	02 (6.67)
Ceftazidime	S	28 (93.33)
	R	02 (6.67)
Ciprofloxacin	S	25 (83.33)
	R	05 (16.67)
Azithromycin	S	24 (80.00)
	R	06 (20.00)
Ampicillin/ Chloramphenicol/ Cotrimoxazole	S	08 (26.67)
	R	22 (73.33)
Nalidixic acid	S	03 (10.00)
	R	27 (90.00)

Figures within parenthesis indicate percentage. S=Sensitive, R=Resistant.

Discussion

Typhoid fever is a major public health problem in Indian subcontinent including Bangladesh involving high morbidity & economic burden.

The 30 isolates of Salmonella typhi were analyzed for sensitivity pattern of current antibiotics. Out of 30 isolates, resistance was found in Nalidixic acid (90%), Ampicillin (73.33%), Chloramphenicol (73.33%) & Cotrimoxazole (73.33%).

In a study conducted by Akter & Hasan et al in 2012 in Bangladesh, resistance to Ampicillin (100%) & to Ciprofloxacin was only 0.27%.[7] No resistance was found to Ceftriaxone. Study by Krishnan et al (2009) showed sensitivity to Chloramphenicol (86%), Ampicillin (84%) & Cotrimoxazole (88%). Highest sensitivity was seen for Ceftriaxone followed by Quinolones.[8]

Bulbul Hasan et al in their study in 2011 showed 100% susceptibility to Ceftriaxone & Ceftazidime with good sensitivity to Ciprofloxacin & Azithromycin.[9]

Singhal et al in their study in 2014 observed that isolates were resistant to Nalidixic acid & 3rd generation Cephalosporin & 84.5% isolates had decreasing Ciprofloxacin susceptibility.[10] Adabwea N.U. et al in 2012 in their study found multi drug resistance pattern in Salmonella typhi isolates with resistance to Ampicillin, Cotrimoxazole.[11]

Our study correlates to some extent with the above studies. Enteric fever is a significant health problem in Bangladesh & is dreaded because of its complication & high incidence of carrier rate if left untreated or because of multidrug resistant strains.

Since decades, recommended treatment of typhoid fever include Ampicillin, Cotrimoxazole or Chloramphenicol. Emerging drug resistance over past 20 years had limited usefulness of these antibiotics.

Presently quinolone, macrolide& 3rd generation cephalosporin antibiotics are preferred for empirical therapy till culture reports are available. Unfortunately sensitivity to quinolone has been steadily declining.A growing rate of resistance to ceftriaxone has also been reported.[12]

Conclusion

Accurate & rapid diagnosis of typhoid fever with appropriate antibiotic therapy can substantially reduce the health care burden in developing countries including Bangladesh.The antimicrobial sensitivity testing showed that the Salmonella typhi are highly sensitivity (>80%) to Ceftriaxone, Ceftazidime, Ciprofloxacin & Azithromycin where as Nalidixic acid, Ampicillin, Cotrimoxazole & Chloramphenicol showed only (<30%) sensitive.

So this study indicate that Ceftriaxone, Ceftazidime, Ciprofloxacin & Azithromycin can be used as a first line therapy. Ampicillin, Cotrimoxazole, Chloramphenicol & Nalidixic acid should be avoided for treatment.

References

1. Rockhill RC, Leshmena M, Moechtor MA, Sutomo A. Detection of Salmonella Ci, D & Vi antigens by co-agglutination in blood culture from patients with salmonella infection.Southeast Asian J trop Med Publ Hlth 1980; 11 : 441-445.
2. Saha SK, Amin, Hanif M, Islam M & Khan WA. Interpretation of the widal test in the diagnosis of typhoid fever in Bangladeshi children.Annals of Tropical Paediatrics 1996;16: 75-78.
3. Mehta PL, Hakim A, Kanath S. The changing faces of salmonellosis J Assoc. physicians India 1992;40:713.
4. White NJ,Party CM.The treatment of typhoid fever current opinion Infect disease 1996 ; 9 :298-302.
5. Kanungo S, Dutta S, Sur D, Epidemiology of typhoid & paratyphoid fever in India J Infect Dev Ctries 2008;2:454-60.
6. Capoor MR, Nair D, Hasan AS, Aggarwal P, Gupta B, Typhoid fever narrowing therapeutic options in India. Southeast J Trop Med Public Health 2006;37:1170-4.
7. Collee JG, Miles RS, Watt B, Tests for the identification of bacteria, In: Collee JG, Fraser AG, Marmion BP, Simmons S, editors. Mackie & Mc Cartney practical medical microbiology, 14th ed., London, Livingstone, 1996;pp.131-49.
8. Cappuccino, Shermann, A laboratory manual, 7th eds., Person Education India. Dorling Kindersley, 2005, P.71-76, 37-89, 189, 193, 151-154, 161-166, 157-158, 175.
9. Krishmann P, Stalin M & Balasubramanian S, Changing trends in antimicrobial resistance of Salmonella enteric serovar typhi & Salmonella enteric serovar Salmonella paratyphi in Chennai. Indian J Pathol Microbial, 2009;52:505-6.
10. L.Singhal, PK. Gupta, P. Kale, V. Gautam, P. Ray. Trends in antimicrobial susceptibility of Salmonella typhi from North India. Indian Journal of Medical Microbiology , 2014,32;2:149-152.
11. N.U. Adabara, B.U. Ezugwa, A. Momojimoh, A Madza, Z. Hashiimu & D Damisa. The prevalence & antibiotic susceptibility pattern of Salmonella typhi among patients. Attending a military hospital in Minna, Nigeria. Adv Prev Med 2012;2012:875419.
12. Cramp JA, Medalla FM, Joyce K.W., Krueger AL, Hockstra RM, Whichard JM, et al. Antimicrobial resistance among invasive non typhoidal Salmonella entarica isolates in the United States. National antimicrobial resistance monitoring system, 1996-2007. Antimicrob Agents Chemother,2011 Mar.55(3);1148-54.

Effect of aqueous extract of Mangifera indica Linn (Mango) leaves on blood glucose level in Alloxan induced diabetic rats

T Murad[1], MI Khan[2], O Yasmeen[3], Z Ahmed[4]

Abstract

Purpose: *The present study has been conceived with the aim to investigate the blood glucose lowering effect of Mangifera indica Linn (mango) leaves in non-diabetes rats and in alloxan induced diabetes rats.* ***Methods:*** *10 to 12 weeks old long Evans Norwegian rats were used in this study. Their fasting blood glucose level was estimated on day 1, day 4, day 22 and day 26 of the experiment. Alloxan has been chosen to induce diabetes mellitus in rats.* ***Results:*** *Administration of aqueous extract of Mangifera indica Linn (mango) leaves in a dose of 400 mg/kg body weight for 21 days in non-diabetes rats produce no significant change in blood glucose level as compared to non-diabetes control group. Whereas, administration of 400 mg/kg body weight aqueous extract of Mangifera indica Linn (mango) leaves in Alloxan induced diabetes rats produce a significant change in blood glucose level as compared to diabetes control group.* ***Conclusion:*** *The observations and results of this study provide information that Mangifera indica Linn (mango) leaves has blood glucose lowering effect in aloxan induced diabetes rats.*

Key words: Diabetes Mellitus, Mangifera indica Linn (mango), Alloxan ***J Cont Dent Sci 2018;6(1):09-14***

Article received 15/04/2017; Article accepted 31/10/2017

Introduction

Diabetes Mellitus is currently one of the most common, costly and burdensome endocrine disorder which is increasing in epidemic proportion throughout the world affecting 6% of the global population. The total number of people with diabetes is projected to rise from 171 million in 2000 to 366 million in 2030.[1] Like many other developing countries the magnitude of diabetes mellitus is increasing in Bangladesh also. In Bangladesh the current prevalence rate of diabetes mellitus (among the people of 20-79 years of age) is 4.8%. It is supposed to rise to 6.1% in 2025.[2]

The increasing prevalence of diabetes mellitus, the emergence of diabetes complications as a cause of early morbidity and mortality and the enormous mounting burden on health care systems make diabetes a priority health concern. But the management of diabetes is still a challenge to the medical community. Current oral anti-diabetic drugs have modest efficacy, limited modes of actions, adverse side effects, decreased efficacy over time, ineffectiveness against some long-term diabetic complications and low cost-effectiveness.[3] Therefore, in recent decades there is renewed attention to the alternative medicines and natural products for discovery and development of novel drugs for diabetes.

Natural product preparations have historically been the major source of pharmaceutical agents. Mangifera indica Linn is a large evergreen tree, long living, 10-45m high with a strong trunk and heavy crown. It is valued for its edible fruit in different parts of the world. It has been an important herb in the Ayurvedic and indigenous medical systems for over 4000 years. According to ayurveda varied medicinal properties are attributed to different parts of mango tree. It is used to cure a range of diseases such as asthma, cough, diarrhea, dysentery, jaundice, pains, malaria and diabetic.

1. Dr. Touhida Murad, MBBS, M.Phil, Assistant Professor, Department of General & Dental Pharmacology, Dhaka Dental College, Dhaka University, Dhaka
2. Professor Dr Md. Ismail Khan, MBBS, M.Phil, Vice Chancellor, Chattagram Medical University
3. Dr. Onayza Yasmeen, MBBS, M.Phil, Assistant Professor, Sir Salimullah Medical College, Dhaka
4. Dr. Zunaid Ahmed, BDS, Ph.D, Associate Professor, Department of General & Dental Pharmacology, Sapporo Dental College, Dhaka University, Dhaka

Address of Correspondence

Dr. Touhida Murad, MBBS, M. Phil. Assistant Professor, Department of General and Dental Pharmacology, Dhaka Dental College, Mirpur-14, Dhaka. Email: ashaprio@yahoo.com
Cell: 01711-809106

This study has been designed to evaluate the anti-diabetic effect of aqueous extract of Mangifera indica Linn (mango) leaves in experimental diabetic rats. 10 to 12 weeks old long Evans Norwegian rats weighing between 150 to 180 gm were used in this study. Rats were maintained under standard conditions and were received standard rat diet. Their fasting blood glucose level was estimated on day 1, day 4, day 22 and day 26 of the experiment. Rats were given Alloxan 150 mg/kg body weight intraperitoneally for induction of diabetes on day 1. Since it is an experimental study there are some limitations. Considering these limitations if we get some positive results definitely it will bring some hopes for further study in future.

Materials and Methods

Place, types and duration of the study

This study has been performed in the department of Pharmacology at Dhaka Medical College, Dhaka. Is an experimental study in animals (rats), conducted in between January 2013 to December 2013.

Instruments and Accessories:

- Conical flask, funnel, filter paper, gloves, sterile gauge
- Electric digital balance-mettler and Toledo, Switzerland
- Glucometer with kit, ryles tube, syringe, sterile blade
- Grinding machine
- Refrigerator
- Rotator vacuum evaporator-buchi lador technique AG, Switzerland

Drugs and Reagents:

- Aqueous extract of Mangifera indica Linn (mango) leaves
- Alloxan

Collection and Authentication of Plant Material

The fresh leaves of Mangifera indica Linn (mango) were collected from a local garden at Savar and was authenticated as Mangifera indica Linn (mango) leaves by Bangladesh National Herbarium, Mirpur, Dhaka. DACB Accession no 39522.

Preparation of Aqueous Extract

The fresh leaves of Mangifera indica Linn (mango) were cleaned and shed dried. The shadow air-dried leaf of Mangifera indica Linn (mango) was grounded into fine powder with auto-mix blender. Then the fine powder was suspended in equal amount of water and stirred intermittently and left overnight. The macerated pulp was then filtered through a coarse sieve and the filtrate was dried at room temperature. This dry mass served as aqueous extract of Mangifera indica Linn (mango). The extract was subsequently concentrated under reduced pressure to get the corresponding residue, evaporated under vacuum evaporator to obtain final deep green semisolid extract. A total of 30 gm extract was found in this way from 1 kg of leaves.

Animals

The experiment was carried out on a total number of 24 healthy, 10-12 weeks aged, long Evans Norwegian rats weighing between 150 to180 gm. The animals were housed in animal house in Dhaka Medical College in clean cages and maintained under standard condition (12 hour Light / 12 hour dark cycle, at 25°C and 30-35% humidity) and fed with standard pellet diet and water ad libitum. The rats were purchased from Bangladesh Centre for Scientific and Industrial Research Lab (BCSIR).

Collection of Blood

Blood was collected from each of the animal following aseptic method. Tail vein was cut at the tip with a sharp sterile blade under local anesthesia.

Determining the effects of aqueous extract of Mangifera indica Linn (mango) leaves on blood glucose level in non-diabetic rats

In this part, the effect of aqueous extract of Mangifera indica Linn (mango) leaves on blood glucoselevel in experimental non-diabetic rats were studied. Total 12 rats were taken. The animals were divided into two groups, each group containing six rats. The groups were labeled as Group –A and Group –B respectively. All the rats were fasted over night before collection of blood. Group –A (Control group): The animals of this group received standard rat diet daily for 21 consecutive days. Their fasting blood glucose level was estimated on day 1 and day 22 of the experiment. Group B: The animals of this group received aqueous extract of Mangifera indica Linn (mango) leaves in a dose of 400 mg/kg of body weight through Ryl's tube along with standard rat diet daily for 21 consecutive days. Their fasting blood glucose level was also estimated on day 1 and day 22 of the experiment. The dose of Mangifera indica Linn (mango) leaves (400 mg/kg of body weight), used in this study was selected in keeping conformity with the dose used in research work by Luca CD and Mohammed A 2012.[4]

Determining the effects of aqueous extract of Mangifera indica Linn (mango) leaves on blood glucose level in Alloxan induced diabetic rats

The experiment was designed to demonstrate the effect of aqueous extract of Mangifera indica Linn (mango) leaves on blood glucose levels in Alloxan induced diabetic rats. The dose and route of administration of alloxan monohydrate was selected from Etuk et al. 2010.[5] This study was comprised of 12 rats divided into 2 groups, each containing 6 rats. Groups were labeled as Group –C and Group –D. All the rats were fasted over night before collection of blood. A drop of blood was collected from each of the animals, in the un-anaesthetized state, by cutting the tail at the tip by 0.1 cm with a sharp sterile blade for estimation of fasting blood glucose level. Group - C: Diabetic control group, rats were given Alloxan 150 mg/kg body weight intraperitoneally for induction of diabetes on day 1. Before giving Alloxan their fasting blood glucose level was estimated. After injection Alloxan the rats were given standard rat diet and their fasting blood glucose level was estimated again on day 4 and day 26 of the experiment. Group - D: Co-treated with Alloxan and Mangifera indica Linn (mango) leaves extract rats were given Alloxan 150 mg/kg body weight intraperitoneally for induction of diabetes on day 1. Before giving Alloxan their fasting blood glucose level was estimated. Three days after Alloxan injection fasting blood glucose was estimated on day 4 of the experiment. Then the rats received aqueous extract of Mangifera indica Linn (mango) leaves 400 mg/kg body weight per day orally along with standard rat diet for 21 days. Fasting blood glucose level was estimated on day 26 of the experiment.

Blood glucose estimation was done by electronic glucometer

Data collection and statistical analysis Collected data were tabulated and statistical analysis was done by appropriate significant test. Unpaired Student's t test was used to compare the results between individual groups of experiment 1 and 2. The results were presented in tables and by bar diagrams. Each bar diagram represents the (Mean±SD) of specific groups of rats. Results were considered to be significant when p values were less than 0.05 ($p<0.05$).

Results

Effect of aqueous extract of Mangifera indica Linn (mango) leaves (AEMIL) on blood glucose level in non-diabetic rats

In, group - A (control group) the blood glucose levels (mean ± SD) were 5.13 ± 0.47 and 5.20 ±

0.42 on day 1 and on day 22. Where as in, group - B the blood glucose levels (mean ± SD) were 5.07on day 1 and on day 22 respectively. The results are shown in Table - I and in Figure -1.

Table-1: Effect of aqueous extract of Mangifera indica Linn (mango) leaves (AEMIL) on blood glucose level in non-diabetic rats.

Group	FBG (mmol/L) on day 1 (Mean ± SD)	FBG (mmol/L) on day 22 (Mean ± SD)
A (n=6)	5.13 ± 0.47	5.20 ± 0.42
B (n=6)	5.07 ± 0.55	5.13 ± 0.56 ns

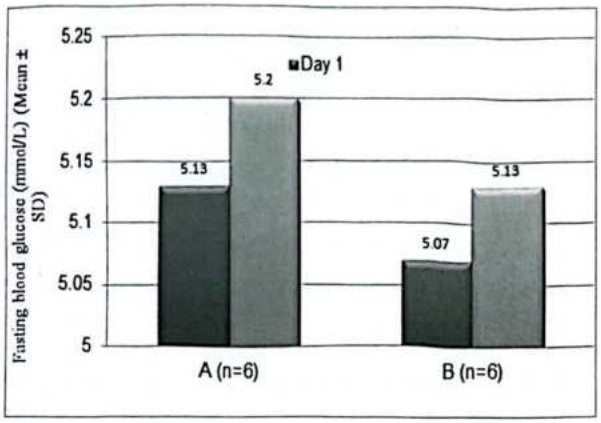


Fig-1: Bar diagram showing fasting blood glucose level (mmol/L) (Mean ± SD) in group A and B rats on day 1 and day 22.

Effect of alloxan on blood glucose level of group -C and group -D rats on day 4:

In, group-C, the blood glucose levels (mean ± SD) were 5.58 ± 0.31 and 15.58 ± 3.37 on day 1 and on day 4. At the same time in, group-D the blood glucose levels (mean ± SD) were 5.66 ± 0.30 and 15.53 ± 3.30 on day 1 and on day 4 respectively. The results are shown in Table -II and in Figure-2.

Table-2. Showing the effect of Alloxan on blood glucose level of group C and D rats on day 4:

Group	FBG (mmol/L) on day 1 (Mean ± SD)	FBG (mmol/L) on day 4 (Mean ± SD)
C (n=6)	5.58 ± 0.31	15.58 ± 3.37
D (n=6)	5.66 ± 0.30	15.53 ± 3.30 ns

Comparison of FBG level on day 4 with control (group-C) was done by unpaired student's 't'- test. ns=not significant

Effect of aqueous extract of Mangifera indica Linn (mango) leaves on blood glucose level in diabetic rats:

In, group-C the blood glucose levels (mean-SD) were 5.58 ± 0.31 and 15.692 ± 2.88 on day 1 and on day 26 respectively. In, group-D the blood glucose levels (mean ± SD) were 5.66 ± 0.30 and 8.00 ± 1.61 on day 1 and on day 26 respectively. The results are shown in Table - 3.

Table-3: Effect of aqueous extract of Mangifera indica Linn (mango) leaves (AEMIL) on blood glucose level in diabetic rats

Group	FBG (mmol/L) on day 1 (Mean ± SD)	FBG (mmol/L) on day 26 (Mean ± SD)
C (n=6)	5.58 ± 0.31	15.69 ± 2.88
D (n=6)	5.66 ± 0.30	8.00 ± 1.61***

Comparison of FBG level on day 26 with control (Group-C) was done by unpaired student's 't'- test. ***=significant at p<0.001

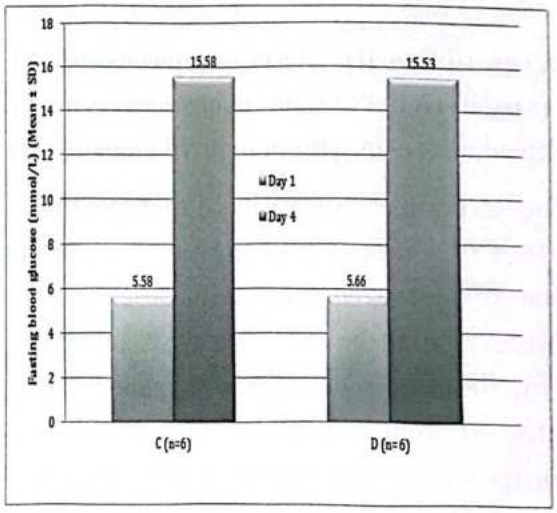


Fig-2: Bar diagram showing fasting blood glucose level (mmol/L) (Mean ± SD) in group C and D rats on day 1 and 4.

Statistical Analysis

Unpaired student's t test was done between group A and group B; results shows p value>0.05 which was not statistically significant.

Unpaired student's t test was done between group C and group D on day 4; results shows p value>0.05 which was not statistically significant.

Unpaired student's t test was done between group C and group D on day 26; results shows p value <0.001 which was statistically significant.

Discussion

For this study 24 healthy rats of Long Evans Norwegian strain, between 10-12 weeks of age of both sexes weighing 150-180 gm were taken. The rats were divided into 4 groups, each containing 6 rats. The experiment was divided into two parts. In experiment 1 the effect of aqueous extract of Mangifera indica Linn (mango) leaves on blood glucose level in non-diabetic rats were studied. Their fasting blood glucose levels were estimated on day 1 and day 22 of the experiment. Experiment 2 was designed to demonstrate the effect of aqueous extract of Mangifera indica Linn (mango) leaves on blood glucose levels in Alloxan induced diabetic rats. All the rats of this experiment received injection Alloxan in a dose of 150 mg/kg body-weight intraperitoneally for induction of diabetes on day 1.The duration of the study was 26 days. The exact mechanism of aqueous extract of Mangifera indica Linn (mango) leaves in reducing blood glucose level is not well understood. Numbers of phytochemical screening was done to identify the phytochemicals present in different parts of Mangifera indica Linn (mango). The aqueous extract of leaves of Mangifera indica Linn (mango) showed the presence of flavonoids, tannins, saponins, cardiac glycosides, resins, sterols and balsam.[4] The hypoglycemic effects produced by leaves extract may be due to the presence of these bioactive constituents; flavonoids, tannins, alkaloids, steroids and trepenoids.Various parts of Mangifera indica Linn (mango) viz. leaves, fruits, stem bark, heartwoods and roots have been reported to yield mangiferin a polyphenolic antioxidant and major bio-active constituent. Mangiferin has been reported in various parts of Mangifera indica Linn (mango): leaves,[6] fruits,[7] stem bark,[8,9] heartwood[10] and roots.[11]

Antidiabetic activity of Mangifera indica Linn (mango) leaves may be due to this mangiferin. The anti-diabetic activity of mangiferin probably due to some extra pancreatic actions.[12] Aderibigbe et al[13] and Bhowmik et al[14] demonstrated that Mangifera indica Linn (mango) water extract may interfere with intestinal absorption of glucose in the gut by various mechanisms when given with a simultaneous glucose load in diabetic rats. Muruganandan et al[15] suggested that both pancreatic and extra pancreatic mechanism might be involved in its antidiabetic effect. The extra pancreatic mechanism could be - i) stimulation of peripheral glucose utilization ii) an enhancement of glycolytic and glycogenic processes and/or iii) a glycemic reduction through inhibition of glucose intake.[16] Basha et al [17] suggested that extract may possess insulin like effects on peripheral tissues by either promoting glucose uptake or metabolism, by inhibiting hepatic gluconeogenesis[18] or absorption of glucose into the muscles and adipose tissues,[19] by the stimulation of a regeneration process and revitalization of the remaining beta cells.[20]

In this study it was observed that aqueous extract of Mangifera indica Linn (mango) leaves has blood glucose lowering effect in Alloxan induced diabetic rats but not in normal rats. The result suggested that the aqueous extract of Mangifera indica Linn (mango) leaves may be used as blood glucose lowering agent in the treatment of diabetes mellitus.

However, to validate this claim and to evaluate the mechanism of action, more studies would be necessary, such as measurement of plasma insulin level, lipid hydroperoxidation level, haemoglobinA1C,

lever glycogen level and free radical in the tissues after treatment with aqueous extract of Mangifera indica Linn (mango) leaves. Despite all this limitations, the interpretation of the results obtained in this study which was made carefully and cautiously are satisfactory and encouraging.

Conclusion

The observations and results of this study provide information that Mangifera indica Linn(mango) leaves has blood glucose lowering effect and rationale for use this as anti-diabetic agent in diabetes mellitus. But the available data regarding the anti-diabetic activity of the detected plant is not sufficient to adequately evaluate or recommend its use. However, further research works are necessary regarding pharmacokinetics, pharmacodynamics, phytochemical screening, lipid hydro-peroxidation level, free radical in the tissues, toxicology and posology to develop and use it as potent and safe anti-diabetic agent in human. Clinical intervention studies are also required to provide evidence for a safe and effective use of the identified plant in the treatment of diabetes.

References

1. Trivedi NA, Mazumder B, Bhatt JD, Hemavathi KG. Effect of shilajit on blood glucose and lipid protile in alloxan-induced diabetic rats. Indian J Pharmacol,2004;30(6);373-376.
2. Nitiyanant W, Tandhanand S, Mathtab H, Zhu XX, Pan CY et.al. The Diabetic-Asia 1998 study --outcomes on control and complications in type-1 and type-2 diabetic patients. Curr Med Res Opin,2002;18(5);317-327.
3. Vats V, Grover JK, Rathi SS. Evaluation of anti-hyperglucemic and hyposlycemic effect of trigonella feonum-graecum linn, Ocimum sanctum Linn and Plerocarpus marsupium linn in normal and alloxanized diabetics= rates. J. Ethnopharmacol 2002; Jan 79(1): 95-100
4. Luka CD, Mohammed A. Evaluation of the antidiabetic property of aqueous extract of Mangifera indica leaf on normal and alloxan-induced diabetic rats. Scholars Research Library 2012; 2 (2): 239 243.
5. Etuk EU, Muhammed BJ. (2010) Evidence based analysis of chemical method of induction of diabetes mellitus in experimental rats. Asian J Exp Biol Sci 2010; 1 (2): 331 336.
6. Desai PD, Ganguly AK, Govindachari TR, Joshi BS, Kamat VN, Manmade AH, Mohamed PA, Nagle SK, Nayak RH, Saksena AK, Sathe SS, Vishwanathan N. Chemical investigation of some Indian plants: Part II. Indian Journal of Chemistry 1966; 4: 457 - 549.
7. El Ansari MA, Reddy KK, Sastry KNS, Nayudamma Y. Dicotyledonae, anacardiaceae polyphenols of Mangifera indica. Phytochemistry 1971; 10: 2239 - 2241.
8. Bhatia VK, Ramanathan JD, Seshadri TR. Constitution of mangiferin. Tetrahedron 1967; 23: 1363 - 1368.
9. El Ansari MA, Rajadurai S, Nayudamma Y. Studies on the polyphenols of Mangifera indica bark. Leather Science 1967; 14: 247 - 251.
10. Ramanathan JD, Seshadri TR. `Constitution of mangiferin`. Current Science 1960; 29: 131 - 132.
11. SK Nigam, CR Mitra. Constituents of mango (Mangifera indica) roots. IndianJournal of Chemistry 1964; 2: 378 - 379.
12. Biwititi P, Musabayane CT, Nhachi CF. Effects of opuntia megacantha on blood glucose and kidney function in streptozotocin diabetic rats. J. Ethno-pharmacol 2000; 69: 247 - 252.
13. Aderibigbe AO, Emudianghe TS, Lawal BA. Antihyperglycemic effect of Mangifera indica in rat. Phytotherapy research 1999; 13 (6): 504 - 507.
14. Amrita Bhowmik, Liakot Ali Khan, Masfida Akhter, Begum Rokeya. Studies on the antidiabetic effects of Mangifera indica stem-barks and leaves on nondiabetic, type 1 and type 2 diabetic model rats. Bangladesh Journal of Pharmacology 2009; 4 (2): 110 - 114.
15. Muruganandan S, Srinivasan K, Gupta S, Gupta PK, Lal J. Effect of mangiferin on hyperglycemia and atherogenicity in streptozotocin diabetic rats. Journal of Ethnopharmacology 2005; 97: 497 - 501.
16. Saxena A, Vikram NK. Role of selected Indian plants in management of type 2 diabetes: a review. J Alt Comple Med. 2004; 10: 369 - 378.
17. Basha PD, Kumar PK, Teja BB, Subbarao M. (2011) Antidiabetic activity on extracts of Mangifera indica in Alloxan monohydrate induced diabetic rats. Drug Invention Today 2011; 1 (1): 165 - 168.
18. Ali L, Khan AKA, Mamun MIR, Mosihuzzaman M, Nahar N, Nur-E-Alam M, Rokeya B. Studies on hypoglycemic effects of fruit pulp, seed and whole plants of Momordica charantia on normal and diabetic model rats. Planta Medica 1993; 59: 408 - 412.
19. Kamanyi. Hypoglycaemic propelties of the aqueous root extract of Marinda lucida. Studies in the mouse. Phytotherap. Res. 1994; 86: 369 371.
20. ERB Shanmugasundaram, G Rajeswari, K Baskaran, BR Rajesh Kumer, K Radha Shanmugusundaram, B Kizar Ahmath. Use of Gymnema sylvestre leaf extract in the control of blood glucose in insulin-dependent diabetes mellitus. Journal of Enthopharmacology 1990; 30 (3): 281 - 294

Pulp therapies for children: A 3-year clinical experience from a Private Dental College Hospital in Dhaka City

S Parvin[1], MAI Khan[2], SL Biswas[3]

Abstract

Introduction: *This report was aimed at reviewing different types of pulp treatment performed at Pediatric OPD (POPD) of Sapporo Dental College and Hospital (SDCH) over a three-year period.* ***Materials and method:*** *A retrospective patient record between the time periods of January 2014 to December 2016 was retrieved from Pediatric OPD logbooks and the Data Bank of Hospital Administrative Office of SDCH. Data on Pulp treatment and final restorative materials for both primary and permanent teeth were analyzed.* ***Results:*** *Over a 3-year period, a total of 15,966 visits were made by both old and new patients at the Paediatric Out-Patient Department (POPD) of SDCH. The age range of the patients was between 1-12 years, with 52.7% male and 47.3% female. Among the visitors, N=2506 pts received pulp therapies of different types that included pulp capping, pulpotomy and pulpectomy for primary teeth. Apexogenesis, apexification and root canal treatment were performed in selected cases of permanent teeth. Pulpectomies were most frequently performed in primary teeth (n= 1505) pts. Mandibular 2nd deciduous molar were most commonly affected teeth that needed pulp therapy. Maxillary permanent Incisors received more apexification or apexogenesis treatment therapy and mandibluar 1st permanent molars received the most number of RCTs. Regarding restoration after pulp therapy, Glass Ionomer Cement (GIC) was the most popular restorative material with 73% teeth restored with this material.* ***Conclusion:*** *Extensive damage to teeth and pulp are leading causes of tooth loss. Appropriate choice of pulp treatment and the use of an effective restorative material could help prevent early loss of both primary and permanent teeth thus ensuring healthful oral environment for children and adolescents.*

Key Words: Pulp Therapy, Pulp capping, Pulpectomy, Pulpotomy, Paediatric OPD, SDCH

J Cont Dent Sci 2018;6(1):15-19

Introduction

The dental pulp is a specialized connective tissue (CT) confined inside rigid walls of mineralized tissue at the center of a tooth. It is comprised of nerves, cells and many blood vessels which work to channel vital nutrients and oxygen.[1] There are several ways in which pulp can be damaged. Tooth decay (dental caries, attrition, erosion, abrasion) and traumatic injury are the most common reasons for painful pulp exposure and inflammation. Depending on the site and severity of the injury, an untreated inflamed pulp either goes through spontaneous remission or follows an acute or chronic pathology leading to pulp necrosis.[2] So a damaged pulp would need pulp therapies ranging from medicating the exposure site to partial or complete extirpation of the pulpal tissues[3]. The primary goal of pulp therapy is to treat, restore and save the affected tooth. An Inflamed and injured pulp is exceptionally painful, so it will quickly become obvious that the child needs to see the pediatric dentist. The goal of modern pediatric dentistry is to bring children into the permanent dentition after natural exfoliation of their primary teeth and to instill a positive attitude toward keeping habit of optimal dental or oral health.

A remarkable number of complications of untreated or poorly treated primary teeth or young immature permanent teeth are still encountered.

1. Dr. Shanaz Parvin, Asst. Professor, Department of Paediatric Dentistry, Sapporo Dental College & Hospital.
2. Dr. Md. Asif Iqbal Khan, Prof. & Head, Department of Paediatric Dentistry, Sapporo Dental College & Hospital.
3. Dr. Spina Luna Biswas, Associate Professor, Department of Oral and Maxillofacial Surgery, Sapporo Dental College & Hospital.

Address of Correspondence

Dr. Shanaz Parvin, Asst. Professor, Department of Paediatric Dentistry, Sapporo Dental College & Hospital.24 Courtbari Road, Sector-8, Uttara, Dhaka-1230. E mail-shanazruby@gmail.com

Article received 10/07/2017; Article Accepted 21/10/2017

This demands exact diagnosis, thorough knowledge of the pulpal condition and application of appropriate therapies for different situations. The following types of pulp therapies are in practice for treatment of primary teeth and young permanent teeth: [3-11]

1. Primary teeth: Pulpotomy, Pulpectomy, Pulp capping
2. Young permanent teeth with open apex: Apexogenesis, Apexification
3. Young permanent teeth with closed Apex: Pulp capping, partial pulpotomy (CVEK pulpotomy) and Root Canal Treatment (RCT)

Primary teeth pulpotomy involves removal of coronal pulp, bleeding control with moist cotton pressure followed by fixation of radicular pulp stump with a tissue fixative agent, most commonly with formoacresol (FC).[5] After tissue fixation a treatment restoration (Temporary filling) is placed for 3-7 days for follow-up visit and a pain-free symptomless tooth is restored with Glass Ionomer or Composite or SS crown.[5, 7]

Pulpectomy procedure involves removal of both coronal and radicular pulp, Chemomechanical preparation of the root canals with H- file and root canal solutions, drying, sealing and filling of the prepared canals with a resorbable paste only.[12] Use of gutta percha (GP) as canal filler is contraindicated in primary teeth because they are non-absorbable and could act as a harmful foreign body. [7,8]

Pulp capping procedures are of two types: Direct and Indirect.[4,11] In indirect-pulp capping deep carious lesions are excavated with extreme caution and calcium hydroxide is placed at the deepest part over remaining dentine. Direct pulp capping is performed in cases of iatrogenic or mechanical pinpoint exposure of coronal pulp or pulp horn. After hemostasis with moist cotton, $Ca(OH)_2$ is directly applied on the exposure site and an IRM is placed over that until next visit. The objective of pulp capping is to induce secondary dentine formation at the region below medicament. Direct pulp capping is more successful in permanent teeth as compared to primary teeth. So in most accidental exposure cases, primary teeth are treated with pulpotomy rather than direct pulp capping.[2,13]

Apexification (in non-vital teeth) and Apexogenesis (in vital teeth) are performed in young permanent teeth with open apex with the goal of promoting apical closure.[11] CVEK pulpotomy is often performed for larger iatrogenic exposure of coronal pulp where the injured portion of the coronal pulp is removed and healing of the remaining coronal pulp is influenced with antibiotic anti-inflammatory medicament. Root canal therapy is performed in permanent teeth with closed apex where the pulp is irreversibly damaged. All the pulp therapies are aimed at preserving the teeth in the dental arch and preventing their early loss leading to disharmony of oro-facial anatomy.

The Department of Pediatric Dentistry of Sapporo Dental College and Hospital, a private dental college situated in Uttara, Dhaka, has a fully operational Out-Patient Department (POPD) for children. The children treated in this department are generally between 1-12 years of age, who present with various oro-dental problems and dental pain. A carious or traumatically exposed tooth is treated at the department according to the merit of pulp involvement with a view to preventing premature loss. Early loss of primary and permanent teeth during mixed dentition period leads to malocclusion in permanent dentition with variable complications. The Pediatric OPD conducts pulp therapies for prevention of premature tooth loss and prevents complications from such losses. This report was aimed at analyzing different types of pulp therapy performed at the Pediatric OPD of Sapporo Dental College over a 3-year period.

Materials and methods

Following approval from the authorities of Sapporo Dental College and Hospital, patient records for the time period of January 2014 to December 2016 were recalled. Data was retrieved from Department of Pediatric Dentistry OPD logbooks (POPD) and Hospital Administrative office Records. Data for pulp therapy and post-therapy restorative material were recorded for both deciduous and permanent teeth. Patients, their age ranging between 1-12 years, were divided into 3 age groups: 1-3 years, 4-7 years, and 8-12 years. Commonly involved jaw and teeth were enlisted for comparison. Collected data were then entered in Microsoft Office excel spreadsheet and results were analyzed.

Results

Table-1. Distribution of Patients According to gender and number of visit at Paediatric OPD During 2014-2016

Year	Male N (%)	Female N (%)	Total N(%)
2016	3041 (19.04%)	2380 (14.9%)	5421 (33.95%)
2015	2620 (16.4%)	2518 (15.8%)	5138 (32.18%)
2014	2753 (17.24%)	2654 (16.62%)	5407 (33.18%)
Total	8414 (52.7%)	7552 (47.3%)	15966 (100%)

Table 1 showed total no. of old and new patients from both genders who visited pediatric OPD of SDCH from January 2014 to December 2016. There were 15966 visits during the above mentioned period and with more male patients 8414 (52.7 %) as compared to female patients 7532 (47.3%)

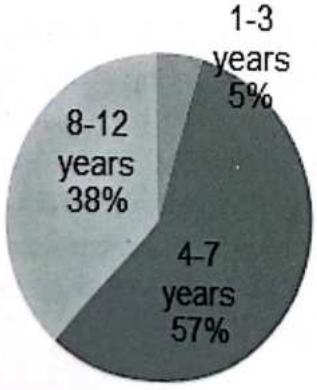


Fig.1 described the age group of patients who received treatment at SDCH Paediatric OPD. Majority of patients represent 4-7 years age group (57%), while 38% patients belonged to 8-12 years of age. Only 5% of the patients came from 1-3 years age group

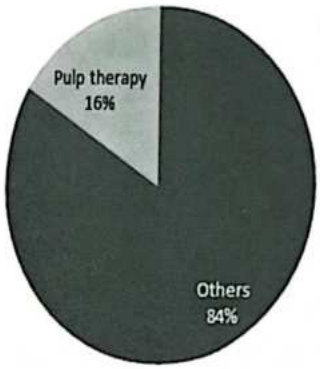


Fig 2. Distribution of Patients according to pulp therapy treatment provided at POPD

Figure 2 showed that 16% of the visitors at Pediatric OPD received different pulp treatment during 2014- 2016.

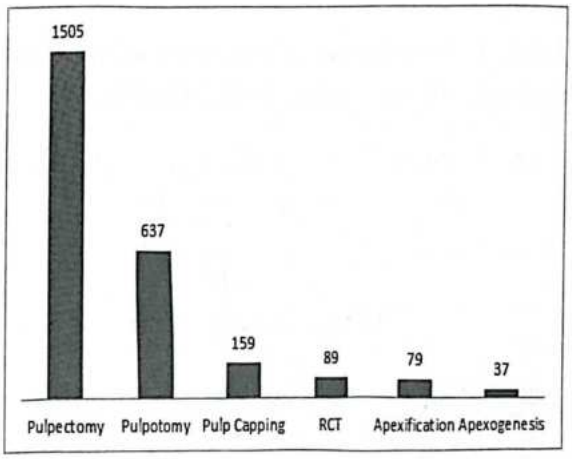


Fig 3. Frequency distribution of Different Pulp Therapies

Figure 3 showed that pulpectomy (n=1505) was preferred over pulpoptomy (n=637) or pulp capping (n=159) in primary teeth. For permanent teeth with open apex, apexification (n=79) was more frequently performed than apexogenesis (n=37). Eighty- nine (n=89) young permanent teeth with closed apex received root canal treatment (RCT).

Table 2: Distribution of Primary teeth treated with Pulp Therapy during 2014-2016 (N=2301)

Tooth selected	Maxillary teeth			Mandibular teeth			Total no. of primary teeth No. (%)
	Right No. (%)	Left No.(%)	Total No.(%)	Right No. (%)	Left No.(%)	Total No.(%)	
Incisor Canine	4 (0.2) 3(0.1)	2(0.1) 2(0.1)	6(0.3) 5(0.2)	0(0) 3(0.1)	0(0) 1(0.1)	0(0) 4(0.1)	6(0.3) 9(0.4)
1st Molar	282(12.3)	252(11)	534(23.2)	275(12)	299(13)	574(25)	1108(48.1)
2nd Molar	147(6.3)	146(6.3)	293(17.7)	431(18.7)	454(19.7)	885(38.5)	1178(51.2)
Grand Total	436(18.9)	402(17.5)	838(36.4)	709(30.8)	754(32.7)	1463(63.6)	2301(100)

Table 2 showed during 2014-2016, a total of 2301 pulp therapies were performed on primary teeth. More pulp therapies were carried out in mandibular teeth (63.4%) in comparison to maxillary teeth (36.4%). In mandible, 2nd molars received more pulp therapies (n=885), while in maxilla, 1st molars (n= 534) needed more pulpal treatment.

Table-3: Distribution of Permanent teeth treated with Pulp Therapy during 2014-2016 (N=205)

Tooth	Maxillary teeth			Mandibular teeth			Total no. of permanent teeth No. (%)
	Right No. (%)	Left No. (%)	Total No. (%)	Right No. (%)	Left No. (%)	Total No. (%)	
Incisor Canine	28(13.7) 0(0.0)	32(15.6) 0(0.0)	60(29.3) 0(0.0)	0(0.0) 0(0.0)	0(0.0) 0(0.0)	0(0.0) 0(0.0))	60(29.3) 0(0.0)
Premolar s	5(2.4)	1(0.5)	6(2.9)	1(0.5)	1(0.5)	2(1)	8(4)
1st Permanent molar	25(12.2)	21(10.2)	46(23.4)	48(23.4)	43(21)	91(44.4)	137(66.7)
2nd Permanent Molar	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)
Grand Total	58(28.3)	54(26.3)	112(54.6)	49(23.9)	44(21.5)	93(45.4)	205(100)

Table 3 showed during 2014-2016, a total of 205 pulp therapies were performed on permanent teeth. More pulp therapies were carried out in maxillary teeth (54.6%) in comparison to mandibular teeth (45.4%). Sixty (n=60) maxillary incisor teeth received pulp therapy compared to none (n=0) in mandible. Mandibular 1st permanent molars received more pulp therapies (n=137) compared to maxillary 1st molar (n=46). Permanent canines or 2nd molars did not need any pulp treatment.

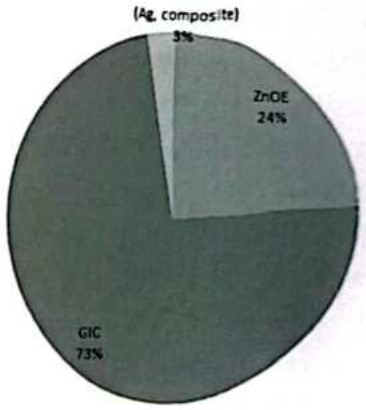


Fig 4. Restorative Material used after pulp therapy

Fig.4 showed that 73% of teeth after pulp therapy were restored by Glass Ionomer restorative cement. Twenty four (24%) percent of the patients had received Zinc Oxide cement (ZnO) as final restoration while the remaining 3% were given composite or Ag-amalgam as final restoration.

Discussion

The reported data show that in 3 years period from January 2014 to December 2016, total 15966 patients visited in pediatric OPD of Sapporo Dental College and Hospital. Commonly affected gender group was male (52.7%) as compared to female (47.3%). The 4-7 years age group patient in their early mixed dentition period dominated the recipients of pulp treatment (57%). Of all the patients who received treatment at POPD of SDCH, 16% patients were treated by different types of pulp therapies according to the level of pulp damage.

Pulpectomy was a popular choice over Pulpotomy in Primary teeth. Pulp capping was performed in both primary and permanent teeth. Non-vital young permanent teeth were treated by Apexification (n=79). Thirty-seven (n=37) traumatic cases of anterior teeth with vital pulp were successfully treated by the procedure of apexogenesis.

During the 3-year period, 89 cases of root canal treatment (RCT) were also completed with success.

In comparison, a greater number of primary 2nd molars had to be treated by pulp therapy than first molars. Mandibular primary molars needed more pulp therapy. The anterior primary teeth rarely needed pulp treatment.

Permanent maxillary incisors were the common recipients of Apexification or apexogenesis therapy. Root canal treatment (RCT) was performed on some of the teeth following root apex closure in apexification/genesis. Some infected young permanent teeth with closed apex were directly given RC therapy.

Glass Ionomer (GIC) restorative cement was the final restorative material of choice after pulp therapy in primary teeth (73%). Twenty-four percent (24%) of the patients treated by ZnOE cement as Intermediate restoration material (IRM) after pulp therapy did not return for final restoration. Permanent teeth were treated by GIC, Composite or Silver-amalgam after completion of RCTs.

Conclusion

Extensive damage to teeth and pulp are leading causes of tooth loss. Appropriate choice of pulp treatment and the use of an effective restorative material could help prevent early loss of both primary and permanent teeth thus ensuring healthful oral environment for children and adolescents. Regular clinical and radiographic review following pulp therapy is strongly recommended.

References

1. Fuks AB, Benjamin P. Current concepts in Pulp Therapy for Primary & young permanent teeth. Paediatric Endodontics. Springer international publishing Switzerland, 2016; 23-36.
2. Curzon MEJ, Roberts JF, Kennedy DB, pulp therapy. Kennedy s Paediatric Dentistry. Wright (1996), 4th Edition; 143-194.
3. Pulp therapy for primary molars. UK national clinical guidelines in paediatric Dentistry: 2006 BSPD & IAPD, International Journal of Paediatric Dentistry 16 (suppl.-1): 15-23.
4. Al- Zayer MA, Straffon LH, Feigal RJ, Welch KB. Indirect pulp treatment of primary posterior teeth: a retrospective study. Paediatric Dentistry 2003; 25:19-36.
5. Havale R, Anegundi RT, Indushekar K, Sudha P. Clinical & radiographic evaluation of pulpotomies in primary molars with formocresol, glutaraldehyde & ferric sulphate. Oral health Dental management, 2013; 12(1) 24-31.
6. Holan G, Eidelman E, Fuks AB, Long term evaluation of pulpotomy in primary molars using MTA or FC. Paediatric Dentistry. 2005; 27(2): 129-36.
7. Reddy VV, Fernandes. Clinical & radiological evaluation of zinc oxide-eugenol and Maisto s paste as obturating materials in infected primary teeth- 9 months study. J Indian society of pedodontics & preventive dentistry 1996; 14:39-44.
8. Ozalp N, Saroglu I, Sonmez H. Evaluation of various root canal filling materials in primary molar pulpectomies: an in vivo study. J dentistry 2005; 18: 347-50.
9. Dean JA, Mack RB, Fulkerson BT, Sanders BJ. Comparison of electrosurgical & Formocresol pulpotomy procedures on children. International journal of Paediatric Dentistry 2002; 12:177-182.
10. Guelmann M, Bookmyer KL, Villalta P, Garcia-Godoy F. Microleakage of restorative techniques for pulpotomised primary molars. ASDC Journal of Dentistry for Children 2004; 71:209-211.
11. American Academy of Paediatric Dentistry Guideline on pulp therapy for primary & young permanent teeth (revised) 2004.http:// www. aapd.org/media/policies.asp
12. Holan G, Fuks AB, A comparison of pulpectomies using ZOE and KRI paste in primary molars: a retrospective study. Paediatric Dentistry 1993; 15: 403-407.
13. Fuks AB. Current concepts in vital primary pulp therapy. Eur J paediatric Dentistry 2002; 3: 115-20.

Walking Bleach Technique- A Non Invasive Treatment Option of Managing Endodontically Treated tooth: A Case Report

MAH Sheikh[1], MD Khatun[2], TB Badsha[3], MA Khatun[4]

Abstract

Tooth discoloration has a multifactorial etiology and specially anterior teeth are of great aesthetic concerns. In this case report, the patient presented with the complaint of discoloration in his maxillary anterior teeth. He had a history of trauma on that area 15 years back and the tooth was discoloured gradually. It was endodontically treated few months back. The tooth was examined clinico-radiographically- it was asymptomatic, discolored, incisaly fractured and endodontically treated. A diagnosis of traumatic discoloration of maxillary right central incisor was made. Considering the above conditions, non-vital bleaching using walking bleach technique with sodium perborate and 30% hydrogen peroxide was planned and performed successfully. After 6 months follow up, the prognosis was good with no reversal of tooth discoloration.

Key Words:Discoloration, Non-vital tooth, Walking bleach technique, Sodium perborate, Hydrogen peroxide.

J Cont Dent Sci 2018;6(1):20-23

Introduction

Discolouration of teeth could be a result of an aetiological factor (trauma) or the endodontic procedure itself. A haemorrhage in the pulp chamber may result from either a blow, death of the pulp or a failure in controlling the bleeding during endodontic therapy. The penetration of blood into the dentinal tubules, followed by haemolysis of the red cells, which results in the release of haemoglobin and its breakdown products, produces a yellowish brown discolouration.[1,2] Dental restorative materials, including root filling materials and some root canal medicaments may also contribute to the discoloration process.[3,4] There are a number of non-vital bleaching techniques available, which include thermo-catalytic, walking and in-office bleaching techniques by using different commercial bleaching agents such as hydrogen peroxide, sodium perborate and carbamide peroxide.[5] The present case report describes management of endodontically treated traumatized discolored tooth using walking bleach technique.

1. Lt Col Dr. Md Abdul Hannan Sheikh, FCPS, MCPS, D. Conservative, BDS. Classified Specialist & Head, Dept of Conservative Dentistry & Endodontics, Military Dental Centre Dhaka, Dhaka Cantt.
2. Dr. Mst. Dilruba Khatun, BDS, FCPS. Spl in Conservative Dentistry & Endodontics, Dhaka.
3. Dr. Taib Bin Badsha, BDS, MPH. Private Practitioner.
4. Dr. Mst. Amina Khatun, BDS, FCPS Trainee, BSMMU, Dhaka.

Address of Correspondence

Lt Col Dr. Md Abdul Hannan Sheikh, FCPS, MCPS, D. Conservative, BDS. Classified Specialist & Head, Dept of Conservative Dentistry & Endodontics, Military Dental Centre Dhaka, Dhaka Cantt. E mail-drhannan65@gmail.com.

Case Report

A 30 years old male patient reported to the Department of Conservative Dentistry and Endodontics with the complaints of discoloration and unaesthetic appearance of his upper front tooth. He had a history of trauma on that area 15 years back and the tooth was discoloured gradually. It was endodontically treated few months back. The tooth was examined clinico-radiographically- it was asymptomatic, discolored, incisaly fractured and endodontically treated. A diagnosis of traumatic discoloration of maxillary right central incisor was made. Considering the above conditions, non-vital bleaching using walking bleach technique was planned.

The consent of the patient was taken. After proper mouth preparation and isolation with cotton roll- the old restoration was removed and the access cavity was cleaned. The gutta percha filling was removed to a level of 2-3 mm below the cemento-enamel junction.

A layer of glass ionomer cement was placed on top of the gutta-percha filling to prevent percolation of bleaching agent into the cervical and apical region. A mixture of sodium perborate and 30% hydrogen peroxide was placed inside the cavity and condensed with a wet cotton pellet. A piece of dry cotton was placed over this mixture and the access cavity was sealed with glass ionomer cement. The patient was recalled once in every seven days for changing the bleaching agent. After three subsequent visits, there was a drastic change in the tooth colour with satisfactory results. The access cavity and the fractured incisal edge were restored with Giomer (BEAUTIFIL II). The patient will be evaluated regularly to check the occurrence of cervical root resorption and color stability.

Discussion

Discoloration of the tooth is one of the most frequent reasons why a patient seeks dental care. The dental practitioner is provided with a variety of post endodontic treatment options which range from invasive methods like full veneer crowns to least invasive and aesthetic procedures like bleaching. Treatment with a veneer or crown is considered as invasive and expensive methods that required unnecessary destruction of sound tooth structure. Laboratory process is technique sensitive too. On the other hand, non-vital bleaching has some major advantages. These include non-invasive procedure, economical, require no special equipment and ultimately the patient s natural tooth structure is preserved.[6]

Walking bleach technique is the most popular option for bleaching non-vital teeth. It involves the placement of a mixture of sodium perborate and water into the pulp chamber that is sealed off between the patient s visits to the clinician.[7] The method is afterwards modified and water is replaced by 30-35% hydrogen peroxide to improve the whitening effect.[8,9] Because of its low molecular weight, hydrogen peroxide diffuses easily through the organic matrix of the enamel and dentin. It is very unstable and acts as a strong oxidizing agent through the formation of free radicals, reactive oxygen molecules and hydrogen peroxide anions. These reactive molecules can attack the long-chained, dark colored chromophore molecules and break them into smaller, light colored and more diffusible molecule.[10,11]

In this case, walking bleach technique was performed using sodium perborate and 30% hydrogen peroxide. The procedure is simple to perform, consumes the least time, relatively inexpensive and requires no special equipment.[12]

The other bleaching options for non-vital teeth involve the thermo-catalytic technique and in-office external bleaching technique using high concentrated hydrogen peroxide and carbamide peroxide gel. It is not advisable to use the thermo-catalytic method with heating of a 30% hydrogen peroxide solution, as this procedure increases the risk of cervical root resorption which is a serious complication.[13-15]

The clinical situation must be carefully assessed before the bleaching treatment is considered. The quality and the type of the root canal filling that has been employed are of primary importance things. Proper apical sealing is necessary to prevent percolation of the bleaching agents into the periodontal tissues. The most important parameter in non-vital bleaching is the placement of a barrier to prevent the resorption of the tooth which has a poor prognosis.[16-18] A layer of approximately 2-3 mm barrier should be placed coronal to the canal gutta percha. Several barrier materials have been proposed in the literature. They range from materials like cavit to modified zinc oxide eugenol (IRM), glass ionomer cement,

and recently MTA. In this case, glass ionomer cement (type II) was used as barrier material.[19,20]

There is a limitation of evidence based literature that shows the prognosis of bleached non-vital teeth. Holmstrup et al and Brown both reported a success rate of 75% or more after one to five years.[21,22] Brown reported that trauma or necrosis induced discoloration can be successfully bleached in about 95% of cases, compared with lower percentages for teeth discolored as a result of medicaments or restorations.[22] Previous studies have reported that stained teeth in young patients are easier to bleach than discoloration in older patients, presumably because the wide open dentinal tubules in young teeth enable a better diffusion of the bleaching agent.[23,24]

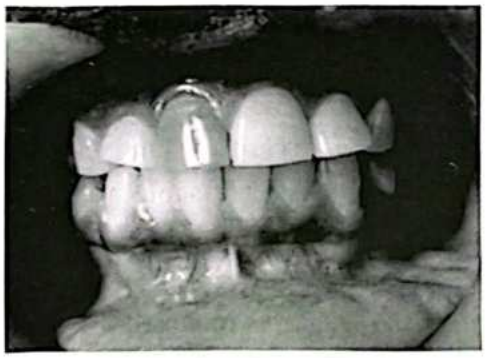


Fig-1: Initial Photograph

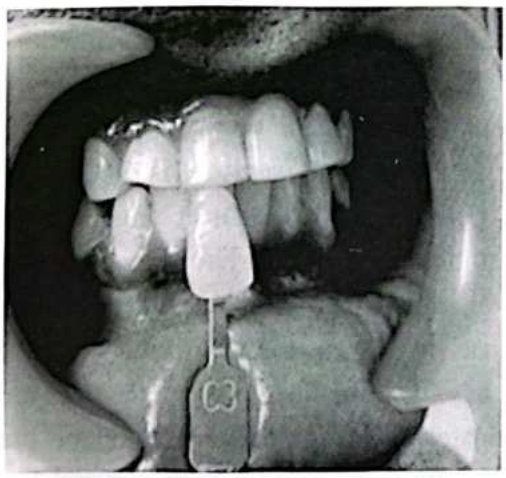


Fig-2:1st Visit

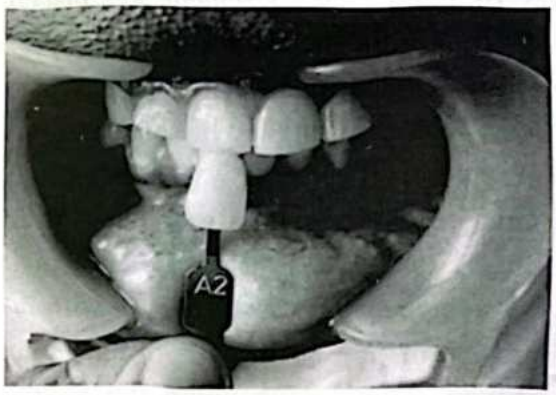
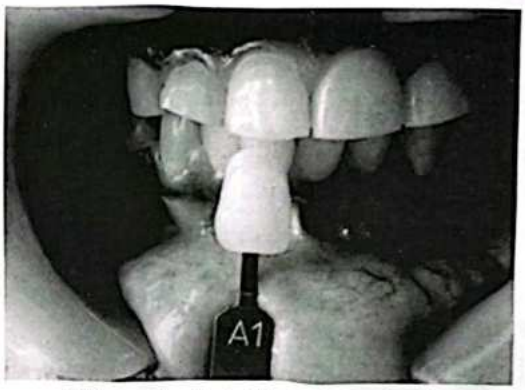


Fig-3: 2nd Visit



Fig–4: 3rd Visit (Desired Aesthetic)

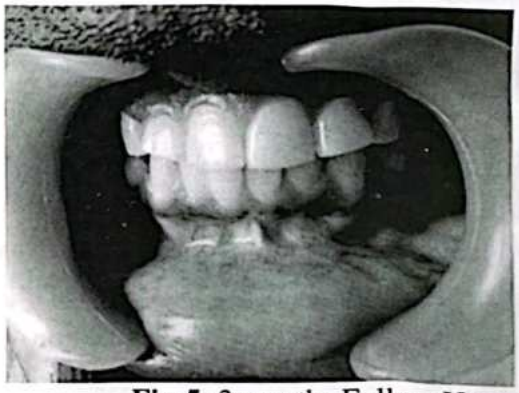


Fig-5: 3 months Follow Up

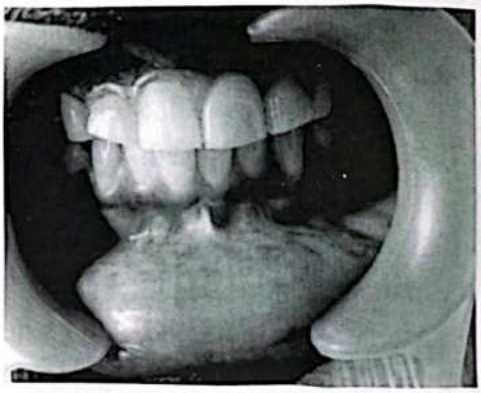


Fig-6: 6 Months Follow Up

Conclusion

It can be concluded that walking bleach technique is simple, safe, conservative and effective procedure for esthetic restoration of discolored endodontically treated teeth provided that clinician had an accurate diagnosis, proper selection of bleaching materials, placement technique and an understanding of the biologic interaction with soft and hard oral tissues.

References

1. Ingle J, Bakland: Endodontics, ed 5th. Philadelphia, Lea and Febiger, 1976.
2. Cohen SC, Bums RC. Pathway of Pulp. St Luies, C.V. Mosby Co, 1980.
3. Abbott PV. Aesthetic considerations in endodontics: internal bleaching. Pract Periodontics Aesthet Dent 1997; 9:833-840.
4. Attin T, Paque F. Review of the current status of tooth whitening with the walking bleach technique. Int Endod J 2003; 36:313-29.
5. Plotino G, Buono L, Grande NM, Pameijer CH, Somma F. Nonvital tooth bleaching: A review of the literature and clinical procedures. J Endod 2008; 34:394-407.
6. Neelakantan P, Jagannathan N. Non Vital Bleaching A Non Invasive Post Endodontic treatment option. Journal of Clinical and Diagnostic Research 2012; 6:527-529.
7. Spasser HF. A simple bleaching technique by using sodium perborate. NY State Dent J 1961; 27:332-34.
8. Nutting EB, Poe GS. A new combination of bleaching teeth. J So Calif Dent Assoc 1963; 289-91.
9. Lambrianidis T, Kapalas A, Mainis M. Effect of calcium hydroxide as a supplementary barrier in the radicular penetration of hydrogen peroxide during intra-coronal bleaching in virto. Int Endod J 2002; 35:985-90.
10. Bowles W. H, Thompson L. R. Vital bleaching: the effects of heat and hydrogen peroxide on pulpal enzymes. J Endod, 1986; 12:108-12.
11. Bowles W. H, Ugwuneri Z. Pulp chamber penetration by hydrogen peroxide following vital bleaching procedures. J Endod 1987; 13:375-7.
12. Nagaveni N.B, Satish T.S. Management of tooth discoloration in non-vital endodontically treated tooth - A report of 6 year follow-up. J Clin Exp Dent 2011;3(2): 180-3.
13. Rotstein I. In vitro determination and quantification of 30% hydrogen peroxide penetration through dentin and cementum during bleaching. Oral Surg Med Oral Pathol. 1991; 72:602-6.
14. Trope M. Cervical root resorption. J Am Dent Assoc 1997; 128:56-9.
15. Madison S, Walton R. Cervical root resorption following bleaching of endodontically treated teeth. J Endod 1990; 16:570-74.
16. Fisher NL, Radford JR. Internal bleaching of discolored teeth. Dent Update 1990; 110-14.
17. Wray A, Welbury R. Treatment of the intrinsic discoloration in the permanent anterior teeth in children and adolescents. Int J Padiatr Dent 2001; 11-309-31.
18. Nutting EB, Poe GS. Chemical bleaching of discolored, endodontically treated teeth. Dent Clin North Am 1967; 655-62.
19. Tselnik M, Baumgartner J. Bacterial leakage with MTA or RMGI which used as a coronal barrier. J endod 2004; 30:782-84.
20. Nusair KM, Hammad HM. Intracoronal sealing comparison of MTA and GI. Quintessence Int 2005; 36:539-45.
21. Holmstrup G, Palm AM, Lambjerg-Hansen H. Bleaching of discolored root-filled teeth. Endod Dent Traumatol. 1988; 4: 197-201.
22. Brown G. Factors influencing successful bleaching of the discolored root-filled tooth. Oral Surg Oral Med Oral Pathol. 1965; 20: 238-44.
23. Abou-Rass M. The elimination of tetracycline discoloration by intentional endodontics and internal bleaching. J Endod. 1982; 8: 101-6.
24. Niederman R, Ferguson M, Urdaneta R, Badovinac R, Christie D, Tantraphol M, et al. Evidence based esthetic dentistry. J Esthet Dent. 1998; 10: 229-34.