Online ISSN: 2249-4618
Print ISSN: 0975-5888

Global Journal

of Medical Research: J

Dentistry and Otolaryngology

Cell Cycle Aberration

Denture Cleansing Habits

Highlights

Effect of Curing Protocol

Oral Health-Related Quality

Discovering Thoughts, Inventing Future

Volume 14 Issue 6 Version 1.0

Global Journal of Medical Research: J
Dentistry and Otolaryngology

Global Journal of Medical Research: J
Dentistry and Otolaryngology

Volume 14 Issue 6 (Ver. 1.0)

Open Association of Research Society

Incorporation No.: 0423089
License No.: 42125/022010/1186
Registration No.: 430374
Import-Export Code: 1109007027
Employer Identification Number (EIN):
USA Tax ID: 98-0673427

Global Journals Inc.

*(A Delaware USA Incorporation with "Good Standing"; **Reg. Number: 0423089**)*

Sponsors: Open Association of Research Society
Open Scientific Standards

Publisher's Headquarters office

Global Journals Headquarters
301st Edgewater Place Suite, 100 Edgewater Dr.-Pl,
Wakefield MASSACHUSETTS, Pin: 01880,
United States of America
USA Toll Free: +001-888-839-7392
USA Toll Free Fax: +001-888-839-7392

Offset Typesetting

Global Journals Incorporated
2nd, Lansdowne, Lansdowne Rd., Croydon-Surrey,
Pin: CR9 2ER, United Kingdom

Packaging & Continental Dispatching

Global Journals
E-3130 Sudama Nagar, Near Gopur Square,
Indore, M.P., Pin:452009, India

Find a correspondence nodal officer near you

To find nodal officer of your country, please email us at *local@globaljournals.org*

eContacts

Press Inquiries: *press@globaljournals.org*
Investor Inquiries: *investors@globaljournals.org*
Technical Support: *technology@globaljournals.org*
Media & Releases: *media@globaljournals.org*

Pricing (Including by Air Parcel Charges):

For Authors:
22 USD (B/W) & 50 USD (Color)
Yearly Subscription (Personal & Institutional):
200 USD (B/W) & 250 USD (Color)

Integrated Editorial Board
(Computer Science, Engineering, Medical, Management, Natural Science, Social Science)

Dr. Bart Lambrecht
Director of Research in Accounting and FinanceProfessor of Finance
Lancaster University Management School
BA (Antwerp); MPhil, MA, PhD (Cambridge)

Dr. Carlos García Pont
Associate Professor of Marketing
IESE Business School, University of Navarra
Doctor of Philosophy (Management), Massachusetts Institute of Technology (MIT)
Master in Business Administration, IESE, University of Navarra
Degree in Industrial Engineering, Universitat Politècnica de Catalunya

Dr. Fotini Labropulu
Mathematics - Luther College
University of ReginaPh.D., M.Sc. in Mathematics
B.A. (Honors) in Mathematics
University of Windso

Dr. Lynn Lim
Reader in Business and Marketing
Roehampton University, London
BCom, PGDip, MBA (Distinction), PhD, FHEA

Dr. Mihaly Mezei
ASSOCIATE PROFESSOR
Department of Structural and Chemical Biology, Mount Sinai School of Medical Center
Ph.D., Etvs Lornd University
Postdoctoral Training,
New York University

Dr. Söhnke M. Bartram
Department of Accounting and FinanceLancaster University Management SchoolPh.D. (WHU Koblenz)
MBA/BBA (University of Saarbrücken)

Dr. Miguel Angel Ariño
Professor of Decision Sciences
IESE Business School
Barcelona, Spain (Universidad de Navarra)
CEIBS (China Europe International Business School).
Beijing, Shanghai and Shenzhen
Ph.D. in Mathematics
University of Barcelona
BA in Mathematics (Licenciatura)
University of Barcelona

Philip G. Moscoso
Technology and Operations Management
IESE Business School, University of Navarra
Ph.D in Industrial Engineering and Management, ETH Zurich
M.Sc. in Chemical Engineering, ETH Zurich

Dr. Sanjay Dixit, M.D.
Director, EP Laboratories, Philadelphia VA Medical Center
Cardiovascular Medicine - Cardiac Arrhythmia
Univ of Penn School of Medicine

Dr. Han-Xiang Deng
MD., Ph.D
Associate Professor and Research
Department Division of Neuromuscular Medicine
Davee Department of Neurology and Clinical NeuroscienceNorthwestern University
Feinberg School of Medicine

Dr. Pina C. Sanelli
Associate Professor of Public Health
Weill Cornell Medical College
Associate Attending Radiologist
NewYork-Presbyterian Hospital
MRI, MRA, CT, and CTA
Neuroradiology and Diagnostic Radiology
M.D., State University of New York at Buffalo,School of Medicine and Biomedical Sciences

Dr. Roberto Sanchez
Associate Professor
Department of Structural and Chemical Biology
Mount Sinai School of Medicine
Ph.D., The Rockefeller University

Dr. Wen-Yih Sun
Professor of Earth and Atmospheric SciencesPurdue University Director
National Center for Typhoon and Flooding Research, Taiwan
University Chair Professor
Department of Atmospheric Sciences, National Central University, Chung-Li, TaiwanUniversity Chair Professor
Institute of Environmental Engineering, National Chiao Tung University, Hsin-chu, Taiwan.Ph.D., MS The University of Chicago, Geophysical Sciences
BS National Taiwan University, Atmospheric Sciences
Associate Professor of Radiology

Dr. Michael R. Rudnick
M.D., FACP
Associate Professor of Medicine
Chief, Renal Electrolyte and Hypertension Division (PMC)
Penn Medicine, University of Pennsylvania
Presbyterian Medical Center, Philadelphia
Nephrology and Internal Medicine
Certified by the American Board of Internal Medicine

Dr. Bassey Benjamin Esu
B.Sc. Marketing; MBA Marketing; Ph.D Marketing
Lecturer, Department of Marketing, University of Calabar
Tourism Consultant, Cross River State Tourism Development Department
Co-ordinator , Sustainable Tourism Initiative, Calabar, Nigeria

Dr. Aziz M. Barbar, Ph.D.
IEEE Senior Member
Chairperson, Department of Computer Science
AUST - American University of Science & Technology
Alfred Naccash Avenue – Ashrafieh

Contents of the Issue

Global Journal of Medical Research: J
Dentistry and Otolaryngology
Volume 14 Issue 6 Version 1.0 Year 2014
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

Characteristics of Craniofacial Complex For class II Division 1 Malocclusion in Saudi Subjects with Permanent Dentition

By Azzam Al - Jundi & Hicham Riba
University for Health Sciences, Saudi Arabia

Abstract- European-American norms are still used in the orthodontic treatment of Saudi patients, despite the different ethnic backgrounds of Saudis.

The aims of this study were to evaluate the Cephalometric features of Class II division 1 in Saudi adult patients and to compare these values with those features of normal occlusion by referring to the effect of the gender on these values.

Ninety-four (94) Saudi patients were evaluated Cephalometrically and distributed into two groups where the first group comprised of (45) subjects with normal occlusion. The second group comprised of (49) subjects with Class II division 1.

Wide variations were observed for almost all measurements of Class II division 1. However, a posteriorly positioned mandible and shortness in its dimensions were noticed.

Keywords: class ii division1, cephalometric evaluation, dento skeletal morphology.

GJMR-J Classification: NLMC Code: WU 440

Strictly as per the compliance and regulations of:

Characteristics of Craniofacial Complex For class II Division 1 Malocclusion in Saudi Subjects with Permanent Dentition

Azzam Al – Jundi [α] & Hicham Riba [σ]

Abstract- European-American norms are still used in the orthodontic treatment of Saudi patients, despite the different ethnic backgrounds of Saudis.

The aims of this study were to evaluate the Cephalometric features of Class II division 1 in Saudi adult patients and to compare these values with those features of normal occlusion by referring to the effect of the gender on these values.

Ninety-four (94) Saudi patients were evaluated Cephalometrically and distributed into two groups where the first group comprised of (45) subjects with normal occlusion. The second group comprised of (49) subjects with Class II division 1.

Wide variations were observed for almost all measurements of Class II division 1.However, a posteriorly positioned mandible and shortness in its dimensions were noticed. Patients were found to have vertical growth pattern and posterior rotation of mandible, buccal inclination of upper and lower incisors and an increased cranial base angle were all main characteristics of Class II divisions 1 patients.

The comparison between the two genders revealed that the males have bigger facial dimensions than females, but the angular measurements were similar referring to the resemblance in the craniofacial morphology.

Keywords: class ii division1, cephalometric evaluation, dento skeletal morphology.

I. Introduction

Class II malocclusion is a frequently seen disharmony that has been studied in many different populations [1-4]because excessive overjet is easily recognized, class II division 1 malocclusion is of a greater concern for both patients and parents.

A review of literature shows that class II malocclusion has been evaluated in all three dimensions of space. In general, these studies have compared the craniofacial morphology of patients with class II malocclusion with class I control subjects.

Studies evaluating maxillary and mandibular skeletal and dental positions and vertical components of class II patients have reported conflicting results from both cross-sectional and longitudinal studies. No common results have been found regarding cranial base configuration.

The class II division 1 malocclusion is the most frequent in particular clinics, [5] caused in most times, by a retrognathic mandible [5, 6]

McNamara indicated that retrusion of the mandible is the most commonly occurring factor contributing to class II malocclusion, and the average position of the maxilla was found to be neutral in relation to cranial base structures. [7]

Although many studies have investigated class II malocclusion characteristics, [7, 8, 9, 10], few have studied the characteristic of skeletal II malocclusion in specific ethnic groups. [5, 11, 12].

Therefore, in order to provide more specific information regarding this type of malocclusion in Saudi subjects, this comparative Cephalometric study was undertaken.

The objectives of this comparative Cephalometric study were to:

1. Determine the specific Cephalometric features of class II division 1 malocclusion in adult Saudi subjects that had not been previously submitted to any orthodontic treatment.
2. Compare the changes in the dentofacial structure in untreated class II division 1 malocclusion and normal occlusion class I individuals.
3. Evaluation of the following features of the jaws was made: angular and linear sagittal relation between maxilla and mandible and related to the cranial base; geometric proportion between maxilla and mandible; craniofacial growth pattern and position of maxillary and mandibular incisors, presence of differences between genders.

II. Materials and Methods

Careful selection was made from the files of orthodontics clinics in King Abdul-Aziz Medical City, National Guard Health Affairs, Riyadh, Kingdom of Saudi Arabia, from January 2013 to June 2014.

Forty-nine (49) Saudi individuals having a class II division 1 (23 females and 26 males) aged 18-28 years were evaluated and compared with forty-five (45) Saudi

Author α: BDS, MSD, PhD., College of Dentistry, King Saud bin Abdul-Aziz University for Health Sciences – Riyadh. K.S.A.
e-mails: azjundi@hotmail.com, aljundia@ksau-hs.edu.sa
Author σ: D.D.S, M.S, Diplomat A.B.P.D, College of Dentistry, King Saud bin Abdul-Aziz University for Health Sciences – Riyadh. K.S.A.

individuals having normal occlusion class I pattern (21 females and 24 males) aged 18-28 years.

Selection criteria for class IIdivision1sample were:
ANB angle > 4˚;
Over jet > 4 mm;
Bilateral class II molar in centric occlusion;
Permanent dentition, no missing teeth, (except third molars);
Convex facial profile;
No previous orthodontic treatment;
No cleft lip/palate and/or other craniofacial syndromes
All selected subjects are Saudi descent.

Selection criteria for the class I sample were:
ANB angle ≤ 4˚;
Over jet ≤ 4 mm;
Normal over bite;
Bilateral class I molar and canine in centric occlusion;
Permanent dentition, no missing teeth (except third molars);
Well-aligned maxillary and mandibular arches with less than two mm crowding or spacing;
Class I soft tissue profile;
No previous orthodontics treatment.

a) Determination of sample size

A minimum sample size of 21 per group (total 42) will have 80% power to detect a difference in means of 1^0(Change in the skeletal ANB angle), (Cozza P et al, 2006) [13] assuming that the common standard deviation is 1.25^0 (Sayin & Turkkaharaman, 2005) [14], using a two group t-test with a 0.05 one sided significance.

The radiographic lateral cephalograms used were taken according to the conventional norms.

All cephalograms were taken by the same radiographic apparatus:
planmecapromax 3Ds/3D
Planmecaoy/Asentajankatu6/00800 Helsinki/Finland.

Cephalometric Landmarks were marked and digitized by one author to avoid interobserver variability angular and linear variables were established and measured by: Vistadent™At software (GAC int. Inc. Bohemia, NY)
No cleft lip/palate and/or
other craniofacial syndromes ;
All selected subjects are Saudi descent;
Cephalometric skeletal landmarks used in current study: Fig (1)
N- S - ANS – PNS -A -B -Pog- Me- Ar- Go- Bo -Ao.

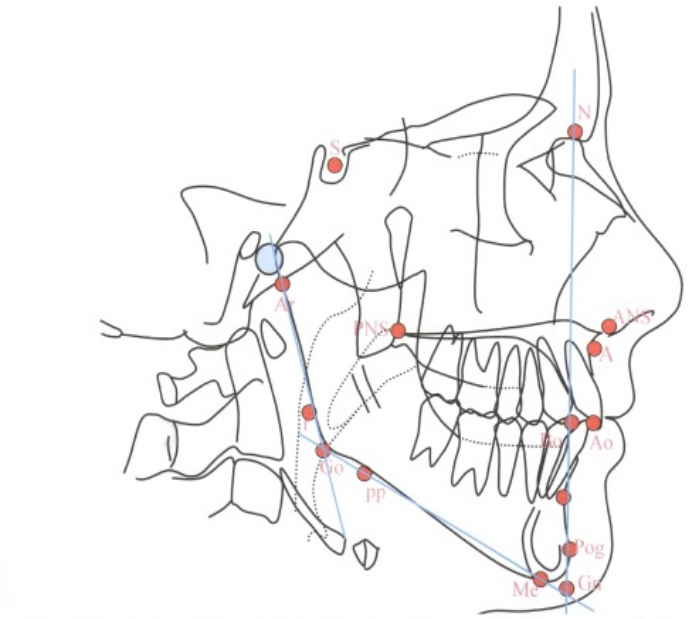


Fig.1 Cephalometric skeletal landmarks used in the current study

Figure 1 : Cephalometric Skeletal Landmarks used in the Current Study

Cephalometric dental and soft tissues landmarks used in the current study:Fig(2)
UI- APUI -LI - APLI- Pog'- Li- LS – Sn - Pn.

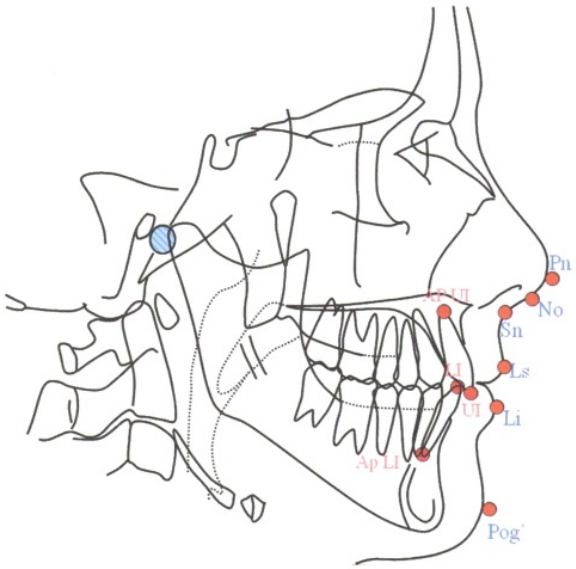


Fig. 2 Cephalometric dental and soft tissue landmarks used in the current study

Figure 2 : Cephalometric Dental and Soft Tissue Landmarks used in the Current Study

The linear measurements used in the current study: (Fig 3)

S-N, S-Ar, Ar-Go, Go-Me, S-Go, S-PNS, PNS-Go, N-Me, S-Gn, ANS-PNS, UI-NA, LINB, pog-NB LI-APog,Ls-ELine, Li-ELine , (B0 –A0) Wits Appraisal.

Fig.3 The linear and angular measurements used in the current study

Figure 3 : The Linear and Angular Measurements used in the Current Study

The angular measurement (degree) used in the study: Fig 3.
SNA – SNB – ANB – SNPog – MM – SN ^ GoMe – SN ^ PP – NSAr– SArGo –ArGoMe – Sum (Bjork) – NSPog (Y)– UI ^ SN – UI ^ SPP –LI ^ GoMe, LI ^ NB-UI ^ LI.

The reference points, planes and angles used in current study were defined according To Bjork, Riolo et al [15, 16]

b) Error Study

Within a two weeks interval from the first measurements, 20 randomly selected radiographs (10 from class II division 1 group and 10 from normal occlusion group) were retraced, redigitized and re-measured by the same author.

The causal error was calculated according to Dahlberg's formula [17]

$$ME = \sqrt{\frac{\Sigma d^2}{2n}}$$

Where **d** is the difference between two registration.

n is the number of duplicate registration and the systematic error with dependent tests, for $P<0.05$

The error of the method of cephalometric measurement ranged between 0.16mm and 0.41mm for linear measurements, and between 0.18 degree and 0.46 degree for angular measurements.

(Allowable inter-and intra-investigator error were 0.5 mm and 0.5 degree)

c) Statistical Analysis

Descriptive statistic was calculated for all measurements in both groups including the mean, standard deviation, and minimum and maximum values for each parameter. [18]

All the statistical analysis were performed by using SPSS-V15 (SPSS Inc., Chicago-ILL).

Anderson-Darling normally tests were performed to check the distribution of data, parametric (two-sample-t-test) or non parametric (Mann-Whitney U test), were used as appropriate to detect significant differences between the two groups with the level significance at 0.05, $p<0.05$

The comparison between genders in class II division 1 used the same statistical test.

Statistically significant values were considered if $p<0.05$

III. Results

Tables (1-4) show descriptive statistics and comparison of cephalometric measurements between two groups.

There was no difference in the mean position of the maxilla-(SNA) between the two groups,
and the class II appeared to be the result of more recessive (SNB) and shorter mandible
(Go-Me).

(These results were also supported by maxillary and mandibular skeletal measurements that were not sella-nasion based).

This was accompanied by an increased mandibular plane angle (Go-Gn/SN) but no increase in anterior facial height. The increased mandibular plane angle appeared to be the result of a reduced ramus height with a reduced posterior facial height in the class II division1 group.

In class II division I patients, the maxillary incisors were buccally inclined (upper incisor-NA) and the mandibular incisors were buccallyinclined and more protrusive (Lower incisor-NB), the overjet was significantly greater in class II division 1 group.

The cranial base angle (NS^Ar) was significantly greater in class II division 1 subjects, and the posterior cranial length (S-Ar) was significantly shorter in class II division 1 group.

The (ANB) angle was significantly greater in class II division 1 subjects.

The Bjork sum (angleNS^Ar, SAr^Go ,ArGo^me)was significantly greater in class II division 1 subjects.

Angle retuded chin is indicated by small (SN^Pog) angle in class II division 1 subjects.

Table 1 : Comparison angular measurements between class II and normal occlusion (in degree)

	Class II, 1			Class I			
Variable	Pts N	Mean	SD	Pts N	Mean	SD	P
NS ^ GoMe	49	33.63	2. 78	45	31.00	3.39	0.00
Ns ^ PP	49	8.01	1.15	45	7.93	1.99	0.18
NSAr	49	125.91	2.91	45	123.95	2.33	0.00
SArGO	49	142.91	2.58	45	141.11	1.70	0.00
ArGoMe	49	133.08	3.45	45	129.72	4.59	0.00
Sum(Bjork)	49	400.01	4.07	45	396.58	5.91	0.00
NSPog	49	69.98	3.22	45	66.20	4.13	0.00
SNA	49	81.66	2.51	45	80.96	3.02	0.22
SNB	49	75.42	3.14	45	78.53	2.81	0.00
ANB	49	6.21	1.94	45	2.57	1.01	0.00
SNPog	49	78.04	2.84	45	82.39	2.57	0.00
NAPog	49	184.93	3.90	45	179.10	4.40	0.00
MM	49	28.57	2.92	45	25.84	3.12	0.00
UI ^ SN	49	109.63	4.58	45	102.49	4.45	0.00
UI ^ Spp	49	67.69	4.23	45	70.10	3.25	0.00

UI ^ NA	49	24.15	2.24	45	22.30	2.60	0.00
LI ^ GoMe	49	97.20	5.60	45	91.60	4.27	0.00
LI ^NB	49	25.20	2.71	45	23.29	2.82	0.00
UI ^ LI	49	131.26	4.31	45	134.64	4.86	0.00

Use Mann-Whitney for comparison between non parametric and two sample student test for parametric distribution data.
Statistically significant values were considered if P<0.05

Table 2 : Comparison linear measurement between class II division 1 and normal occlusion (in mm)

	Class II, division 1			Normal Occlusion			
Variable	No	Mean	SD	No	Mean	SD	P
N-S	49	72.49	2.70	45	73.11	3.82	0.12
S-Ar	49	33.07	2.80	45	36.25	2.82	0.00
Ar-Go	49	50.88	2.69	45	52.34	3.18	0.01
Go-Me	49	73.43	3.00	45	76.83	4.73	0.00
S-Go	49	82.12	2.26	45	86.04	5.53	0.00
S-PNS	49	40.68	1.91	45	41.16	3.59	0.73
PNS-Go	49	41.33	2.05	45	44.15	3.76	0.00
N-Me	49	131.16	2.33	45	125.63	4.70	0.00
S-Gn	49	134.88	3.41	45	132.24	3.51	0.00
N-Go	49	126.62	3.36	45	127.67	4.24	0.18
ANS-PNS	49	53.50	2.49	45	52.89	3.17	0.29
UI-NA	49	5.66	.99	45	4.42	1.43	0.00
LI-NB	49	5.77	.99	45	4.15	1.02	0.00
Pog-NB	49	1.85	.84	45	1.71	.84	0.37
UI-APog	49	4.34	1.10	45	2.76	1.31	0.00
LI-APog	49	3.40	.86	45	1.08	1.26	0.00
Ls-E line	49	2.45	1.20	45	0.20	1.51	0.00
Li-E line	49	- 3.25	.93	45	1.05	1.46	0.00
Wits	49	4.14	1.79	45	1.11	1.48	0.00

Use Mann-Whitney for comparison between non parametric and two sample student test for parametric and two sample student test for parametric distribution data statistically significant values were considered if P<0.05

Table 3 : Study of linear measurements according to sex in class II group(in mm)

Variable	Sex	No	Min	Max	Mean	SD	P
N-S	M	26	67.16	77.25	72.88	2.68	0.04
	F	23	65.81	75.64	70.82	2.58	
S-Ar	M	26	28.68	39.82	33.76	2.93	0.08
	F	23	29.15	37.61	32.30	2.49	
Ar-Go	M	26	46.50	56.62	51.22	2.80	0.34
	F	23	45.83	55.15	50.48	2.57	
Go-Me	M	26	7.35	79.62	74.93	2.84	0.00
	F	23	68.82	76.42	71.74	2.18	
S-Go	M	26	79.56	87.31	83.00	2.44	0.00
	F	23	77.98	84.68	81.12	1.56	
S-PNS	M	26	38.45	45.19	41.15	2.10	0.11
	F	23	37.64	43.66	40.15	1.54	

PNS-GO	M	26	37.46	45.15	41.87	2.15	0.04
	F	23	36.85	44.67	40.71	1.79	
N-Me	M	26	128.68	135.65	132.16	2.01	0.00
	F	23	126.32	135.64	130.02	2.17	
S-Gn	M	26	129.45	141.25	137.04	2.62	0.00
	F	23	128.67	137.25	132.44	2.41	
N-Go	M	26	123.64	137.46	128.68	2.73	0.00
	F	23	119.68	128.69	124.30	2.36	
ANS-PNS	M	26	50.64	60.94	54.51	2.33	0.00
	F	23	48.64	56.16	52.36	2.18	
UI-NA	M	26	2.04	6.84	5.51	1.13	0.25
	F	23	3.65	6.15	5.83	.79	
LI-NB	M	26	2.58	6.64	5.90	1.07	0.62
	F	23	2.98	6.64	5.54	.90	
Pog-NB	M	26	.54	3.61	1.71	.85	0.23
	F	23	.64	3.64	2.00	.83	
UI-A Pog	M	26	2.43	6.68	4.40	1.12	0.67
	F	23	2.64	6.82	4.27	1.11	
LI-A Pog	M	26	1.85	5.05	3.35	.95	0.65
	F	23	2.21	5.06	3.46	.75	
Ls-E line	M	26	2.05	7.15	2.37	1.30	0.63
	F	23	2.65	6.85	2.54	1.10	
Li-E line	M	26	-4.15	2.15	-3.15	1.03	0.78
	F	23	-4.51	1.36	-3.40	.81	

Table 4 : Study of angular measurements according to sex in class II group (in degree)

Variable	Sex	No	Min	Max	Mean	SD	P
NS ^ GoMe	M	26	27.68	38.65	33.73	2.99	0.70
	F	23	26.94	37.16	33.53	2.58	
Ns ^ PP	M	26	6.35	10.05	8.21	1.14	0.29
	F	23	5.65	9.26	7.79	1.15	
NSAr	M	26	120.95	131.61	125.99	2.65	0.85
	F	23	119.95	131.46	125.83	3.24	
SArGO	M	26	138.26	147.16	143.30	2.48	0.92
	F	23	136.26	145.03	142.46	2.68	
ArGoMe	M	26	125.54	138.74	132.92	3.70	0.93
	F	23	128.15	139.25	133.25	3.23	
Bjork Sum	M	26	392.94	411.37	399.97	4.51	0.88
	F	23	396.12	408.06	400.05	3.60	
NSPog	M	26	61.58	75.16	69.25	3.58	0.09
	F	23	66.22	76.13	70.81	2.61	
SNA	M	26	77.82	86.94	81.81	2.50	0.66
	F	23	76.65	87.61	81.49	2.58	
SNB	M	26	71.42	80.90	75.37	2.83	0.77
	F	23	68.35	83.31	75.48	3.53	
ANB	M	26	4.21	10.01	6.43	1.37	0.33
	F	23	.70	11.10	5.97	2.45	

SNPog	M	26	72.46	82.64	77.51	2.72	0.16
	F	23	73.46	85.62	78.64	2.91	
MM	M	26	20.15	33.64	28.09	3.11	0.22
	F	23	23.57	34.76	29.12	2.65	
UI ^ SN	M	26	99.54	115.64	110.89	4.61	0.68
	F	23	100.64	113.64	109.34	4.63	
UI ^ Spp	M	26	60.15	75.16	68.33	4.47	0.26
	F	23	61.35	73.45	66.96	3.90	
UI ^ NA	M	26	19.21	27.24	23.94	2.41	0.20
	F	23	20.40	28.64	24.39	2.07	
LI ^ GoMe	M	26	86.54	106.32	98.18	5.58	0.19
	F	23	84.35	106.35	96.09	5.53	
LI ^ NB	M	26	19.86	29.81	25.36	2.54	0.65
	F	23	18.95	30.61	25.01	2.94	
UI ^ LI	M	26	124.30	140.13	131.18	4.15	0.88
	F	23	122.10	139.52	131.36	4.57	

IV. Discussion

Class II malocclusion has been evaluated in numerous studies. [19, 20, 21].These studies have reported conflicting results about the features of class II malocclusion both in the anteroposterior and vertical dimensions.

Class II malocclusion may results from numerous combination of skeletal and dental components [22]

This was also true for our sample because wide variations were observed for almost all measurements of the class II division 1 patients (Table 1, 2).

Fushima et al [21]reported aretruded and smaller mandible in adult females with class II division 1 malocclusion. In another study of adult patients, Gilmore[23]reported that the mandible was shorter in dental class II division 1 patients. Because our results are consistent with previous studies on adults, we suggest that the majority of class II division 1 patients have a normally positioned maxilla but a smaller and more retruded mandible when compared with class I patients.

Conflicting results of studies regarding anteroposterior positions of maxilla and mandible in growing class II patients may be attributed to the individual differences in skeletal growth rates of these patients.

The sagittal position of the maxilla (SNA) in class II division 1 patients was normally positioned similar to the normal class I group, with a well-positioned maxilla in relation to the cranial base, corroborating previous studies [6, 7, 18, 24, 25]

The sagittal position of the mandible (SNB) presented that it was retracted in relation to the cranial base. The effective length (Go-Me) showed a small sized mandible. These results are in agreement with other studies in the literature.[6, 7, 24, 25, 26, 27] demonstrating that the mandible presents great participation in this type of malocclusion.

These cephalometric results justify the mandibular advancement for correction of the class II malocclusion in great part of the cases [28, 29]

Our results indicated that the class II division 1 patients show an increased mandibular plan angle (NS ^ Go Me) but no increase in anterior facial height (ANS-Me).

The increased mandibular plan appeared to be the result of reduced ramus height. In accordance with our results. Fushima et al[21] also reported backward rotation of the mandible in class II division 1 patients. Bjork and Skieller[30]reported that the intensity of the Condylar growth was strongly correlated with the rotation of the mandible.

Sinclair and Little [31] reported that the degree of vertical mandibular growth was closely correlated with the total amount of condylar growth.

Discrepancy in the posterior face height especially in ramus height may indicate decreased condylar growth in class II division 1 patients. Histological and implant studies [32, 33, 34]have demonstrated that growth in mandibular length occurs primarily at the condyle, the decreased mandibular length found in class II division 1 patient also supports our findings.

The maxillary incisors presented buccal inclination (UI.NA) in class II division 1 subjects. That findings are in consonance with the results of previous studies [6, 7, 18, 35].

The position of maxillary incisors presented protrusion in relation to the cranial base (UI ^ SN) in

class II subjects.This results diverges from studies in the literature [14 ,36,]

The angular measurement for the mandibular incisors (LI-NB) presented statistically significant differences, showing mandibular incisors strongly bucally inclined.

The results for the linear position of mandibular incisors (LI-NB) showed protrusion in relation to their apical base, indicating dento- alveolar compensation for the skeletal discrepancy.

The craniofacial growth pattern presented a vertical tendency in class II division 1 subjects,(Bjork-sum). These finding are uniform to those mentioned in most studies [7, 8, 12], however some authors found contrasting results [9,37]

The cranial base angle (NS^Ar) was significantly greater in class II division 1 subjects. The larger cranial base angle in class II subjects might explain the distal positioning of the mandible.

The sagittal discrepancy of the skeletal base angle (ANB) presented an increase in this angle in class II division 1 subjects when compared to the normal occlusion subjects corresponding with other studies [5,11] Hopkin et al [38] stated that the cranial base configuration was an etiological factor in determining anteroposterior male relationships of the jaws. However a review of the literarure indicated no common results concerning cranial base configurations of class II patients.

Dhopatkar et al [39] has suggested that cranial base morphology was more important in establishment of mal occlusion when there was a significant skeletal discrepancy. This is also acceptable for our study because our class II patient have significantly greater over jet and ANB angle than class I subjects.

V. Conclusion

According to the methodology used, the cephalometric characterizations of Saudi subjects presenting class II division 1 malocclusion were the following:

The maxilla was well positioned in relation to the cranial base and in normal size.

The mandible was smaller in size, posteriorly positioned ((retracted)) and rotated posteriorly when compared with class I subjects.

The geometric proportion between the apical base presented a small mandible and a normal size maxilla.

The craniofacial growth pattern showed a vertical tendency.

The maxillary and mandibular incisors were bucally inclined and protrusively positioned in relation to skeletal base.

Gender comparison revealed that there was statistical difference in linear measurements.

However, there was no difference in angular measurements. This may indicate that males have bigger facial dimensions than females with the resemblance in the geometric proportions and craniofacial morphology.

Reference Références Referencias

1. Ast DB, Carlos JP, Cons DC. Prevalence and Characteristics of malocclusion among senior high school students in up-state New York. AmJ Orthod. 1965;51:437-445.
2. Tang El. The prevalence of malocclusion amongst Hongkong male dental students. Br J Orthod.1994;21:57-63.
3. Silva RG, Kang Ds. Prevalence of malocclusion among Latino adolescents. Am J Orthod Dentofacialorthod. 2001;119:313-315.
4. Lauc T. Orofacial analysis on the Adriatic islands: An epidemiological study of malocclusion on Hvarisland. Eur J Orthod. 2003; 25:273-278.
5. Bishara SE, Jakobsen JR, Vorhies B, Bayati P. Changes in dentofacial structures in untreated Class II division 1 and normal subjects: a Longitudinal study. Angle Orthod. 1997; 67(1):55-66.
6. Carter NE. Dentofacial changes in untreated Class II division 1 students. Br J Orthod. 1987; 14(4):225-34.
7. McnamaraJr JA. Components of Class II malocclusion in children 8-10 years of age. Angle Orthod. 1981;51(3):177-202.
8. Bjork A. Facial growth in man, studied with the aid of metallic implants. ActaOdont Scand.1955; 13:8-34.
9. Moyers RE, Riolo ML, Guire KE, Wainright RL, Bookstein FL. Differential diagnosis of Class II malocclusion part 1. Facial types associated with Class II malocclusions. Am J Orthod. 1980; 78(5):477-94.
10. Sarhan OA, Hashim HA. Dento-skeletal components of Class II malocclusions for children with normal and retruded mandible. J ClinPediat Dent.1994; 18:99-103.
11. Bishara SE. Mandibular changes in persons with untreated and treated Class II division 1 malocclusion. AmJ OrthodDentofacialorthop. 1998; 133(6): 661-73.
12. Phelan T, BuschangPh, Behrents RG, Wintergerts AM, Ceen RF, Hernandez A. Variation in Class II malocclusion: Comparison of Mexican mestizos and American white. Am J OrthodDentofacial Orthop. 2004; 125(4)418-25.
13. Cozza P, BaccettiT, Franchi L, Detoffol L, McNamara J. Mandibukar changes produced by functional appliances in class II malocclusion: A systematic review. AmJ Orthod Dento facial Orhtop.2006 May; 129(5):599-611.
14. Sayino, Turkkaharaman H. Cephalometricevalua-tiuon of non-growing females with skeletal and dental class II division 1 malocclusion. Angle Orthod.2005; 75:656-660.

15. Bjork A. Face in Profil. SvenskTandläkartidskrift. Berlingska Boktryckeriet Lund, 1949.Vol 40.
16. Riolo ML, Moyers RE, McNamara JA, Hunter Ws. An atlas of craniofacial growth: Cephalometirc standards from the University school growth study. Ann Arbor: Centre of human growth and developments, University of Michigan; 1974.
17. Dahlberg G. Statistical methods for medical and biological students. New York: Interscience; 1940.
18. McNamaraJr JA. A method of Cephalometric evaluation. Am J Orthod. 1984; 86(6): 269-300.
19. Feldmann I, Lundstrom F, Pecks. Occlusal changes from adolescence to adulthood in untreated patients with Class II division 1 deep bite malocclusion. Angle Orthod. 1999; 69(1):33-8.
20. Riesmeijer AM, Prahl-Andersen B, Mascarenhas AK, Joo BH, Vig KW. A comparison of craniofacial Class I and Class II growth patterns. AM J Orthod Dentofacial Orhtop. 2004;125:463-471.
21. Fushima K, KitamuraY, Mita H, Sato S, Suzuki Y, Kim YH. Significance of the cant of the posterior occlusal plane in class II division 1 malocclusion. Eur J Orthod.1996 18:27-40.
22. Kim J, Nielsen LI. A Longitudinal study of condylar growth and mandibular rotation in untreated subjects with Class II malocclusion. Angle Orthod. 2002;72:105-11.
23. Gilmore WA. Morphology of the adult mandible in Class II division 1 malocclusion and in excellent occlusion. AngleOrthod. 1950;20:137-146.
24. Ngan PW, Byczeke, Scheick J. Longitudinal evaluation of growth changes in Class II division 1 subjects. SeminOrthod. 1997; 3(4):222-31.
25. Reidel RA. The relation of maxillary structure to cranium in malocclusion and in normal occlusion. Angle Orthod. 1952; 22(3):142-5.
26. Sassouni V. A Classification of skeletal facial types. Am J Orthod. 1969; 55(2):109-23.
27. Sassouni V. The class II syndrome: differential diagnosis and treatment. Angle Orthod. 1070; 40(4):334-41.
28. Johnston JR. Functional appliances: a mortgage on mandibular position. AustOrhtod J. 1996; 14 (3): 154-7.
29. Rudzki-Janson I, Noachtar R. Functional appliance therapy with Bionator SeminOrhtod. 1998;4(1):33-45.
30. Bjork a, Skieller V. Facial development and tooth eruption. An implant study at the age of puberty. Am J Orthod. 1972;62:339-383.
31. Sinclair PM Little RM. Dentofacial maturation of untreated normals. Am J Orthod. 1985; 88:146-156.
32. Bjork A. Variation in the growth pattern of the human mandible: Longitudinal radiographic study by the implant method. J Dent Res. 1963; 42:400-411.
33. Malhews JR, Ware WH. Longitudinal mandibular growth in children with tantanium implants Am J Orthod. 1978; 74:633-655.
34. Enlow DH, Harris DB. A study of postnatal growth of the human mandible. Am J Orthod. 1964; 50:25-50.
35. Rothstein TL. Facial morphology and growth from 10 to 14 years of age in children presenting Class II division 1 malocclusion: a comparative Cephalometric study. Am J Orthod 1971; 60(6) 619-20.
36. Ishiin, Deguchi T, Hunt N.P Craniofacial morphology of Japanese girls with class II division 1 malocclusion. J Orthod. 2001; 28:211-215.
37. Buschang PH, Tanguay R, Tukeweiz J, Demirjan A, La plame. A polynomial approach to craniofacial growth: description and comparison of adolescent males with normal occlusion and those with untreated Class II malocclusion. Am J Orthod DentofacialOrthop. 1986; 90(5):437-42.
38. Hopkin GB, Houston WJB, James GA. The cranial base as an etiological factor in malocclusion. Angle Orhtod. 1968; 38:250-255.
39. Dhopatkar A, Bhatia S, Rock P. An investigation into the relationship between the cranial base angle and maloocusion. Angle Orthod. 2002; 72:456-463.

This page is intentionally left blank

Global Journal of Medical Research: J
Dentistry and Otolaryngology
Volume 14 Issue 6 Version 1.0 Year 2014
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

Effect of Curing Protocol on the Physical Properties of Bulk-Fill Resin Based Composites Using Novel Monomer

By Dr. Hicham Nuaimi

Abstract- Objectives: To evaluate the effect of irradiation time on the Vickers hardness value of two bulk-fill resin-based composites.

Methods: Vickers hardness (HV) of nano-hybrid resin-based composites (RBCs) containing a novel monomer composition based on tricyclodecane– urethane structure (TCD-urethane) [Venus Diamond Bulk Fill, Hearus Kulzer, Germany] compared to conventionally formulated nano-hybrid RBCs [TetricEvo-Ceram Bulk Fill, IvoclarVivadent] for 20 and 40 second using (Elipar S10, 3M ESPE, St. Paul, MN, USA).

Results: The highest hardness value was shown in Bulk Fill 60 sec (HV= 65.15 2.22), while the lowest was observed in Bulk Fill TetricEvo Ceram 40 sec (HV= 61.03 1.63). There is no significant increase in Hardness value during irradiation time for both Bulk Fill Venus Diamond (p=0.456), and Bulk Fill TetricEvo Ceram (p=0.288).

Keywords: *bulk fill resin based composite, novel monomer, vickers hardness value.*

GJMR-J Classification: *NLMC Code: WU 300*

Strictly as per the compliance and regulations of:

Effect of Curing Protocol on the Physical Properties of Bulk-Fill Resin based Composites using Novel Monomer

Dr. Hicham Nuaimi

Abstract- Objectives: To evaluate the effect of irradiation time on the Vickers hardness value of two bulk-fill resin-based composites.

Methods: Vickers hardness (HV) of nano-hybrid resin-based composites (RBCs) containing a novel monomer composition based on tricyclodecane– urethane structure (TCD-urethane) [Venus Diamond Bulk Fill, Hearus Kulzer, Germany] compared to conventionally formulated nano-hybrid RBCs [TetricEvo-Ceram Bulk Fill, IvoclarVivadent] for 20 and 40 second using (Elipar S10, 3M ESPE, St. Paul, MN, USA).

Results: The highest hardness value was shown in Bulk Fill 60 sec (HV= 65.15 2.22), while the lowest was observed in Bulk Fill TetricEvo Ceram 40 sec (HV= 61.03 1.63). There is no significant increase in Hardness value during irradiation time for both Bulk Fill Venus Diamond (p=0.456), and Bulk Fill TetricEvo Ceram (p=0.288).

Conclusion: The mode of polymerization and the light-curing time did not affect on the hardness value of the nanofilled composite resin.

Keywords: bulk fill resin based composite, novel monomer, vickers hardness value.

I. Introduction

Resin-based composite are commonly used in modern dentistry because of their perfect esthetic appearance (tooth colored facade), easy in manipulation and proper mechanical properties. Nanotechnology may be considered as one of the most contemporary advancements in the development of resin-based composites, by increasing filler volume that improved mechanical properties, (1) (2) (3). Additionally, the nano-filler particles provide to show better polishability in compare with conventional resin based composite (4) Durability of resin-based composite entails high mechanical performance, acutely in stress-bearing sites of the posterior tooth that performing high masticatory forces (5).

Researches are not based on improving the inorganic filler components but even more on the development of resin matrix composition by adding novel matrix formulations. Herein, Using of high molecular weight monomers in modern resin based composite suited popular in composite develop-ment(6)(7).

Examples of novel resin matrix contain a high molecular weight monomer derived from a core structure based on tricyclodecane–urethane dimethacrylate composition that is said to dispense without diluents and may thus stop high polymerization shrinkage(7),(8).

Incremental layering techniques are suggested not only to reduce shrinkage but also to confirm an adequate polymerization by applying the resin based composite in multiple layers with 2mm thickness (9).

So that researchers invented a new resin-based composite, the bulk-Fill, was presented in clinics use with one increment may reach to 4 mm thickness for curing as one step, therefore no need to waste time due to layering technique. It is mechanical properties of this new material is still an open question while minimum clinical cases are available. Hardness measurements seem to belong to the most sensitive methods for determining this adequate layer thickness(10).

The purpose of this study was to evaluate the hardness value of Bulk Fill nano resin based composite with novel monomer in contrast to conventional materials using different curing time.

II. Materials and Methods

Thirty-two Bulk Fill resin based composite were investigated in this study, one of them containing novel monomer matrix in compare with conventional composite. The materials were selected from various manufacturers based on differences in their matrix and filler composition (Table 1). Specimens were produced in a Teflon mold of (6 mm *4 mm). The mold was filled in one increment then LED light cured directly using (Elipar S10, 3M ESPE, St. Paul, MN, USA) for 40 and 60 seconds. An amount of eight specimens was produced for each type of composite and curing time.

Author: e-mail: dr.hichamnuaimi@gmail.com

Table 1 : Materials, manufacturer, chemical composition of matrix and filler as well as filler content by weight (w) and volume (v) %

Bulk fill RBCs	Manufacturer	Resin matrix	Filler	Filler (w/v)
TetricEvoCeram	IvoclarVivadent	Bis-GMA, UDMA	Ba–Al–Si-glass, prepolymer filler (monomer, glass filler and ytterbium fluoride), spherical mixed oxide	80/61 (including 17% prepolymers)
Venus® bulk fill	Heraeus Kulzer	UDMA and EBPDMA	Ba–Al–F–Si–glass and SiO_2	65 /38

Hardness value was measured using Vickers hardness test (Nemesis 9000 (INNOVATEST) HaBu, Hauck Pruftechnik GmbH, Hochdorf-assenheim, Germany), three reading was obtained for each sample and the mean of them was represented the mean of hardness value (HV).

Statistical analysis

Results were compared using one- and multiple-way ANOVA and t paired test (α 0 0.05) (SPSS 18.0, Chicago, IL, USA). The results for HV were compared within each different curing time. In the multivariate analysis, the influence of the parameters "material," "curing time," were analyzed.

III. Results

According to limitation of this study, Statistically compared the influence of irradiation time and resin matrix on the mechanical properties of Bulk Fill resin based composite. The highest hardness value was shown in Bulk Fill 60 sec (HV= 65.15 2.22), while the lowest was observed in Bulk Fill TetricEvo Ceram 40 sec (HV= 61.03 1.63) as shown in Fig 1. There is no significant increase in Hardness value during irradiation time for both Bulk Fill Venus Diamond (p=0.456), and Bulk Fill TetricEvo Ceram (p=0.288). as shown in table 2.

Table 2 : illustrate the mean of hardness value (SD) of the groups

Bulk Fill 40s	Bulk Fill 60s	TetricEvo Ceram 40s	TetricEvo Ceram 60s
65.15(2.227)	66.63(2.320)	61.03(1.634)	62.55(2.033)

IV. Discussion

Clinically, researchers confidently assumed to use not more than 2 mm as maximum incremental layer thickness to ensure adequate polymerization for predictable successful fillings. So that new type of resin based composite was used of Bulk Fill resin based composite: Venus Bulk Fill and TetricEvo Ceram Bulk Fill reflected to be used as liner material or as bulk fill materials in Posterior restorations (class I and II).For this, specimens were investigated using a Vickers hardness test (HV). Led cure devise have to checked of it is proper intensity for curing frequency.

Manufacturers were used bisphenol-A- dimethacrylate (Bis-GMA) and only formed the organic matrix out of other dimethacrylates(11). Consequently, resin based composite are assumed to be less viscous because UDMA and TEGDMA that forms more flexible than Bis-GMA(12). Additionally, Bis-GMA is said to be more hydrophilic(13), therefore runs a higher risk of water uptake and degradation than other hydrophobic monomers(14) that used in both resin-based composite which reducing the risk of discoloration (15). It has to be mentioned that using different matrix compositions of the two resin based composite, More over when monomer concentration are increased(16)or diluted(17)may do not improving mechanical properties. Scougall-Vilchis et al. demanded that microhardness largely alters on the inorganic filler particles (size, weight, volume) in addition toorganic matrix (18)so, it can be identified that the measured HV values present the average microhardness of both, fillers and matrix. There is limitation in concentration of dimethacrylates-monomer with lower molecular weight because polymerization might be increase(19).

In the micromechanical tests, Venus Bulk Fillshowed to be non significantly superior to TetricEvo Ceram Bulk Fill resin. The Reasons for that performance might be found in both, organic matrix composition and inorganic fillers. Venus Bulk flow differs from fill in the matrix composition of TetricEvo Ceram as it contains additional EBPDMA and a polymerization modulator(20). In addition of the more flexible side groups with solid core of (TCD - urethane) so that its viscosity can be decreased (21)and with the formation of more homogenous copolymer networks.

Lee et al. found out that viscosity of resin based composite increases when filler volume increases (22)So that Decreasing in viscosity is desirable for

Venus bulk fill (65/38) flow to reach similar levels of flowability, while for TetricEvo Ceram has higher filler content (80/61).In addition increasing filler volume has critical improvement in hardness value, the flexural strength and modulus (23)(24)while in this study it was shown that type of monomer used has affect on the hardness value.

Comparing the results for the hardness value of this study that investigating two different types of Bulk Fill restoration that evaluate resin cure and provide good estimation of the degree of conversion of resin composites,(25), (26).

The depth of cure (DOC) can be affected by some factors relatedto the source of light curing, including the spectral emission (wavelength distribution), light intensity, exposure period, and irradiation distance. Albino et al evaluated the microhardness for nano filled resin-based composite; he showed that there is no significant increase in hardness of resin if they have similar translucency, which is similar to the result of this study. Nicoleta et al showed that irradiation time has less influence on the initial decrease on depth of cure and cure bonding (C–C) double bonds that are direct related to hardness of resin-based composite. Boaro et al. showed that Composite with novel monomer has been shown as one of the materials with the highest results for DOC and low polymerization shrinkage (27).

V. Conclusion

It may be concluded that the mode of polymerization and the light-curing time did not affect the hardness of the nano filled composite resin and that increasing the light-curing time did not improve the hardness of the bottom surface of the composite resin.

References Références Referencias

1. Moszner N, Salz U. New developments of polymeric dental composites. Progress in Polymer Science. 2001; 26: p. 535-576.
2. Mitra S, Wu D, Holmes B. An application of nanotechnology in advanced dental materials. Journal of American Dental Association. 2003; 134: p. 1382-1390.
3. Lohbauer U, Frankenberger R, Kramer N, Petschlt A. Strength and fatigue performance versus filler fraction of different types of direct dental restoratives. J Biomed Mater Res B Appl Biomater 76:114–120.. Journal of Biomedical and Material Research B. 2006; 76: p. 114-120.
4. Endo T, Finger W, Kanehira M, Utterodt A, Komatsu M. Surface texture and roughness of polished nanofill and nanohybrid resin composites. Dent Mater J 29:213–223. Dental Materials. 2010; 29: p. 213-223.
5. Ilie N, Hickel R. Investigations on a methacrylate-based flowable composite based on the SDR technology. Dental Materials. 2011; 27: p. 348-355.
6. Giovannetti A, Goracci C, Vichi A, Chieffi N, Polimeni A, Ferrari M. Post retention using a new resin-based composite with low curing stress. Dental Materials. 2010; 26: p. 27e.
8. Moore B, Platt J, Borges G, Chu T, Katsilieri I. Depth of cure of dental resin composites: ISO 4049 depth and micro- hardness of types of materials and shades. Oper Dent 33:408–412. Journal of Operative Dentistry. 2008; 33: p. 408-412.
7. Leprince J, Leveque P, Nysten B, Gallez B, Devaux J, Leloup G. New insight into the “depth of cure” of dimethacrylate-based dental composites. Dent Mater. doi:10.1016/j.dental.2011.12.004. Dental Materials. 2011; 28(5): p. 512-520.
9. Deliperi S BD. An alternative method to reduce polymerization shrinkage in direct posterior composite restorations. Journal of American Dental Association. 2002; 133: p. 1376-1398.
10. Price R, Berand T, Sedarous M, Andreou P, Loney R. Effect of distance on the power density from two light guides. Journal of Esthetic Dentistry. 2000; 12: p. 320-327.
11. VenusBulkFill_English.pdf. 2010.
12. Sideridou I, Tserki V, Papanastasiou G. Effect of chemical structure on degree of conversion in light-cured dimethacrylate- based dental resins. Biomaterials. 2002; 23: p. 1819-1829.
13. Glenn J. Comments on Dr. Bowen’s presentation. Journal of Dental research. 1979; 58: p. 1504-1506.
14. Ling L, Xu X, Choi G, Billodeaux D, Guo G, Diwan R. Novel F-releasing composite with improved mechanical properties. Journal of Dental Research. 2009; 88: p. 83-88.
15. Asmussen E. Factors affecting the color stability of restorative resins. Acta Odontologica Scandinavica. 1983; 41: p. 11-18.
16. Amirouche-Korichi A, Mouzali M, Watts D. Effects of monomer ratios and highly radiopaque fillers on degree of conversion and shrinkage strain of dental resin composites. Dental Materials. 2009; 25: p. 1411-1418.
18. Scougall-Vilchis R, Hotta Y, Hotta M, Idono T, Yamamoto K. Examination of composite resins with electron microscopy, microhardness tester and energy dispersive X-ray microanalyzer. Dental Materials. 2009; 28: p. 102-112.
17. Ferracane J, Greener E. The effect of resin formulation on the degree of conversion and mechanical properties of dental restorative resins. 1986; 20: p. 121-131.
19. Alvarez-Gayosso C, Barcelo-Santana F, Guerrero-Ibarra J, Saez-Espinola G, Canseco-Martinez M.

Calculation of contraction rates due to shrinkage in light-cured composites. 2004; 20: p. 228-235.

20. Shortall A, Palin W, Burtscher P. Refractive index mismatch and monomer reactivity influence composite curing depth. Journal of dental Research. 2008; 87: p. 84-88.
21. Ellakwa A, Cho N, Lee I. The effect of resin matrix composition on the polymerization shrinkage and rheological properties of experimental dental composites. Dent Mater 23:1229–1235.. Dental Materials. 2007; 23: p. 1229-1235.
22. Lee J, Um C, Lee I. Rheological properties of resin composites according to variations in monomer and filler composition. Dental Materials. 2006; 22: p. 515-526.
23. Kim K, Ong J, Okuno O. The effect of filler loading and morphology on the mechanical properties of contemporary composites. Journal of Prosthotic Dentistry. 2002; 87: p. 642-649.
24. Manhart J, Kunzelmann K, Chen H, Hickel R. Mechanical properties and wear behavior of light-cured packable composite resins. Dental Materials. 2000; 16: p. 33-40.
25. Asmussen E. Restorative resins: hardness and strength vs quantity of remaining double bonds. European Journal of Oral Sciences. 1982; 90(6): p. 484-489.
26. Rueggeberg F, Ergle J, Mettenburg D. Polymerization depths of contemporary light-curing units using micro- hardness. Journal of Esthetic Dentistry. 2000; 12: p. 340-349.
28. Boaro L, Goncalves F, Guimares T, Ferracan J, Versulis A, Braga R. Polymerization stress, shrinkage and elastic modulus of current low-shrinkage restorative composites. Dental Materials. 2010; 26: p. 1144-1150.
27. Albino L, Rodrigues J, Kawano Y, Cassoni A. Knoop microhardness and FT-Raman evaluation of composite resins: influence of opacity and photoactivation source. Braz Oral Res. 2011; 25: 267-73.. Brazialian Journal of Oral research. 2011; 25: p. 267-273.

Global Journal of Medical Research: J
Dentistry and Otolaryngology
Volume 14 Issue 6 Version 1.0 Year 2014
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

The Impact of Aesthetic Orthodontic Treatment Needs on the Oral Health-Related Quality of Life of Dental Students

By Dr. Fatima A. Elmahgoub & Dr. Amal H. Abu Affan

University of Medical Sciences and Technology, Sudan

Abstract- *Background:* More attention is needed in understanding the physical, social, and psychological impact of malocclusion on oral health-related quality of life since it provides more understanding of the demand for orthodontic treatment beyond clinician limits. The aim of this study was to assess the impact of orthodontic treatment needs on the oral health-related quality of life for dental students.

Materials and Methods: A cross-sectional design was used. A random sample of 100 2nd years to 5th year dental students aged 17-23 years from the University of Medical Sciences and Technology in Sudan was obtained, and each subject was assessed for orthodontic treatment need using the Aesthetic Component of the Index of Orthodontic Treatment Needs by taking photographs of the dentition. Each subject was also given an Oral health-related quality to life questionnaire to complete: The Oral Health Impact Profile (OHIP).

Keywords: *malocclusion, quality of life, oral health-related quality of life, oral health impact profile, orthodontic treatment need.*

GJMR-J Classification: *NLMC Code: WU 400, WU 113.7*

Strictly as per the compliance and regulations of:

The Impact of Aesthetic Orthodontic Treatment Needs on the Oral Health-Related Quality of Life of Dental Students

Dr. Fatima A. Elmahgoub [α] & Dr. Amal H. Abu Affan [σ]

Abstract- Background: More attention is needed in understanding the physical, social, and psychological impact of malocclusion on oral health-related quality of life since it provides more understanding of the demand for orthodontic treatment beyond clinician limits. The aim of this study was to assess the impact of orthodontic treatment needs on the oral health-related quality of life for dental students.

Materials and Methods: A cross-sectional design was used. A random sample of 100 2nd years to 5th year dental students aged 17-23 years from the University of Medical Sciences and Technology in Sudan was obtained, and each subject was assessed for orthodontic treatment need using the Aesthetic Component of the Index of Orthodontic Treatment Needs by taking photographs of the dentition. Each subject was also given an Oral health-related quality to life questionnaire to complete: The Oral Health Impact Profile (OHIP)

Results: In general, the oral health- related quality of life was good in this sample. Males generally showed a significantly higher OHIP scores in the handicap domain than females. (P-value: 0.003). Despite the fact that no significant gender differences were observed in the remaining quality of life domains, when the Aesthetic Component of the Index of Orthodontic Treatment Needs (IOTN-AC) was separately evaluated, it was found that males with borderline need for treatment had significantly higher impacts on oral health than females in the same group with regards to functional limitation and psychological discomfort, as well as overall OHIP scores (P= 0.014, 0.05, 0.000 respectively).

Conclusion: Malocclusion does not appear to affect the oral health-related quality of life to a measurable degree.

Keywords: malocclusion, quality of life, oral health-related quality of life, oral health impact profile, orthodontic treatment need.

I. Introduction

The demand for orthodontic treatment has been increasing, which places a load on many global healthcare resources.[1] the development of occlusal indices was done so as to determine the severity of the malocclusion and prioritize treatment. However, occlusal indices define orthodontic treatment need from a clinician's point of view without paying attention to the patient's social needs and desire to improve appearance.

Author α: University of Medical Sciences and Technology, Khartoum, Sudan.

Author σ: Amal H. Abu Affan, Associate Professor, department of Orthodontics, University of Medical Sciences and Technology, Khartoum, Sudan. e-mail: amalabuaffan@yahoo.com

Recently, researchers and clinicians have placed more focus on patients' own perceptions of oral health status and oral health care systems to understand their needs, fulfillment with treatment, and ultimately the perceived overall quality of health systems. [2, 3, 4]

Kelly Ryan Taylor et al found that recent studies with standardized instruments have displayed a link between malocclusion and the oral health related quality of life. [5]

The Aesthetic Component of the Index of Orthodontic Treatment Needs (IOTN-AC) classifies malocclusions based on particular occlusal features which are considered important for aesthetics, in order to identify those in most need for treatment. The aesthetic component (AC), records the aesthetic need for orthodontic treatment using a ten grade standardized ranking scale of coloured photographs showing various levels of dental attractiveness. For IOTN-AC, those with a score of 1-4 are labeled as having no/little treatment needed, 5-7 as borderline treatment needed, and 8-10 as treatment required.[6]

Many instruments have been designed to measure dental outcomes in terms of the impact on quality of life related to oral health. Amongst these, the Oral health impact profile (OHIP) and its shortened version OHIP-14 are broadly used. It was designed to be applied to various oral conditions. The items in both versions of the Oral health impact profile (OHIP) are grouped into 7 domains: functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability, and handicap.[7,8] numerous previous studies reported a significant association between malocclusion and Oral Health Related Quality of Life (OHRQoL) [1, 2, 9-11]

This study aims to answer the following questions: Do various orthodontic treatment needs have an impact on the oral health-related quality of life? Does gender significantly affect the oral health-related quality of life? And is there a difference of OHIP scores between genders in relation to the IOTN?

II. Materials and Methods

This is a Cross-sectional study carried out in the Academy Charity Teaching Hospital (ACTH), University of Medical Sciences and Technology, Faculty of

Dentistry, Khartoum from November 2012 to February 2013.

Permission and approval was obtained from the University of Medical Sciences and Technology (UMST) An informed consent was obtained from each participant in the study. Before taking part in this study, all participants were given a brief explanation about the aim of the study and the methods that will be carried out.

This research included 2nd, 3rd, 4th, and 5th year dental students in the University of Medical Sciences and Technology. 1st years were not included because they were not present in the Academy Charity Teaching Hospital (ACTH) at the time. The following groups of subjects were excluded from the study:

– Students who have had previous orthodontic treatment.
– Students who had active orthodontic treatment.

The sampling technique used was Stratified random sampling.

The desirable sample size was n=100

III. Data Collection Technique

Each batch of UMST students was informed about the aim of the study and all the steps which were required to collect the data in the lecture room. The individuals who have met the inclusion criteria were chosen randomly from registration sheet. Once consent had been obtained, each student was first assessed for orthodontic treatment needs using the aesthetic component of the Index of Orthodontic Treatment Need (IOTN).

The students were examined in the dental clinic. After doing a clinical examination, the subject was asked to bite on their back teeth and a photograph was taken of the dentition. Then, the subject was asked to compare the photo of their teeth with the standard, and grade the dental attractiveness of the anterior teeth. There were 10 grades, grade 1 being the most attractive and 10 being the least. After the subject graded their photo, the need of treatment was attained.

Grade 1-4: No/little treatment need.

Grade 5-7: Borderline treatment need.

Grade 8-10: Definite treatment need.

Secondly, the Oral Health-Related Quality of life was determined by giving each subject a questionnaire to complete with the examiner sitting by the students for explanation of any difficult questions. The questionnaire was the Oral Health Impact Profile (OHIP) which is composed of 49 questions related to oral health. Respondents were asked to indicate on a five-point Likert scale how frequently they experienced each problem within a reference period of 12 months. Response categories for the five-point scale are: "Very often", "Fairly often", "Occasionally", "Hardly ever" and "Never". For three questions that ask about denture-related problems (numbers 9, 18 and 30), a response option was provided for non-wearers of dentures to indicate that these questions do not apply to them. The OHIP scores were then attained.

IV. Data Processing and Analysis

The data was processed and analyzed using computer software programs SPSS (Statistical Package for Social Sciences) version 17

The data analyzed and correlated with those of the Index of orthodontic treatment needs (IOTN) and final results were obtained and presented in tables and figures. The tests which were used during analysis were Chi-squared test, and ANOVA test.

V. Results

Figure 1 shows the gender distribution in the study; the majority of the students were females (78%), while (22%) were males.

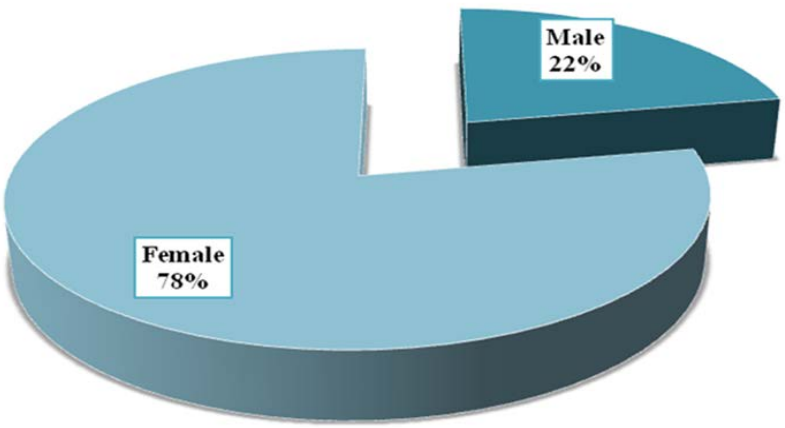


Figure 1: Distribution of the study sample according to (Gender)

Figure 2 portrays the distribution of the study sample according to Index of Orthodontic Treatment Needs (Aesthetic Component). 96% had No/ Slight treatment need with a score ranging from 1-4, while 4% had borderline treatment need with a score ranging from 5-7. None of the population scored 8-10, meaning there was no definitive aesthetic need for treatment among this study sample.

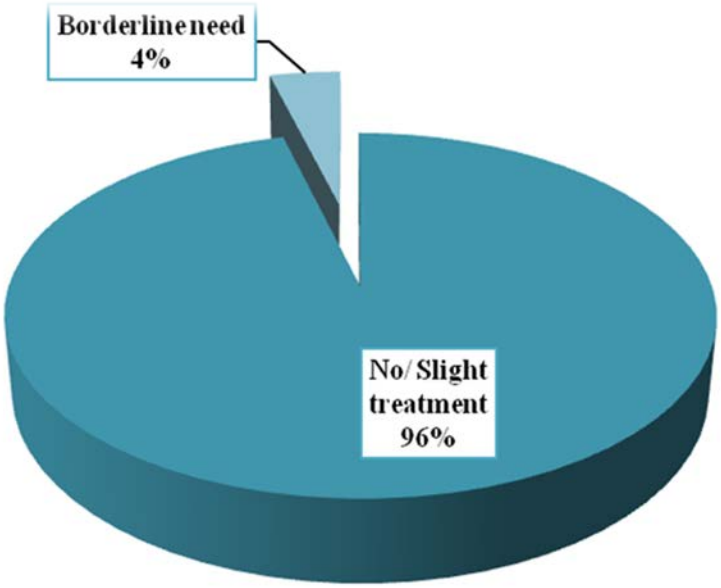


Figure 2 : Distribution of the study sample according to (Index of Orthodontic Treatment Needs (Aesthetic Component) - IOTN (AC))

Figure 3 shows Distribution of the study sample according to Index of Orthodontic Treatment Needs (Aesthetic Component) in relation to gender. It was found that 90.9% of males and 97.4% of females had No/Slight treatment need, while 9.1% of males and 2.6% of females had borderline need for treatment.

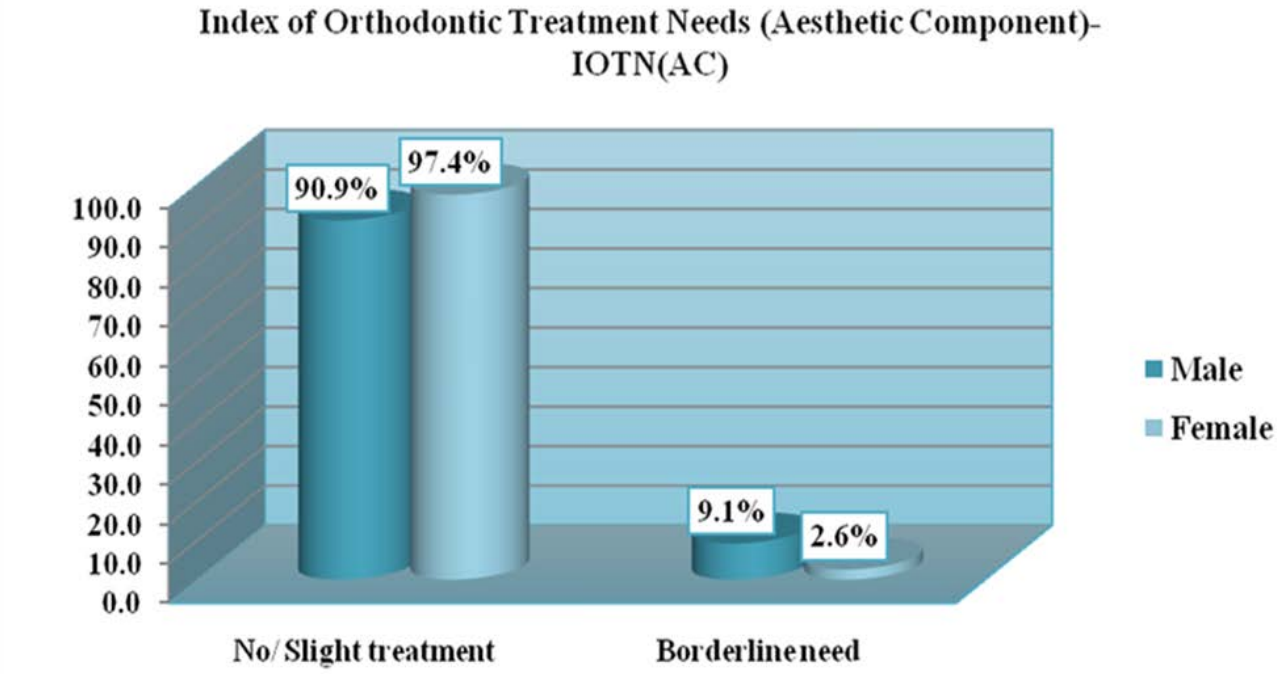


Figure 3 : Distribution of the study sample according to (Index of Orthodontic Treatment Needs (Aesthetic Component) - IOTN (AC)) in relation to gender

In this study sample, the OHIP scores ranged from 0-22.02 in the domains while the overall OHIP scores ranged from 0-95.1 in both genders.

Table (1) shows The Oral health Impact Profile scores (mean ± S.D) in relation with gender; males generally showed a significantly higher OHIP scores in the handicap domain than females. (P-value: 0.003). They also showed higher scores in functional limitation, psychological discomfort, psychological disability, and physical disability than females, however, these were not statistically significant. Females, on the other hand, had more impacts to oral health in terms of physical pain and social disability. These scores, however, were also not statistically significant.

Table 1 : The Oral health Impact Profile scores (mean ± S.D) in relation with gender

		Functional limitation	Physical pain	Psychological discomfort	Physical disability	Psychological disability	Social disability	Handicap	Overall Oral health Impact Profile scores
Gender	Male	8.3 ± 4.2	8.6 ± 5.9	10.0 ± 8.1	5.5 ± 4.8	5.5 ± 9.6	2.2 ± 4.2	6.1 ± 6.5	46.2 ± 26.9
	Female	6.1 ± 3.7	9.8 ± 6.1	7.6 ± 6.8	3.4 ± 3.4	3.1 ± 5.4	2.3 ± 2.5	1.7 ± 3.3	33.5 ± 24.6
	P-Value	0.098	0.544	0.336	0.110	0.281	0.958	0.003	0.144

Table (2) shows The Oral health Impact Profile scores (mean ± S.D) in relation with Index of Orthodontic Treatment Needs (Aesthetic Component) Those with borderline treatment need had statistically significant higher impact on oral health in relation to functional limitation (OHIP score: 11.9 ± 9) than those with no/ slight treatment need (OHIP score: 6.4 ± 3.6) P-value: 0.05 Those with borderline need for treatment

also showed higher impacts on oral health in relation to psychological disability and physical disability, yet these were not statistically significant.

The Oral health Impact Profile scores (mean ± S.D) in relation with Index of Orthodontic Treatment Needs (Aesthetic Component) and gender are shown on Table (3) The males with a borderline need for treatment showed significantly higher scores in functional limitation (P-value: 0.014), psychological discomfort (P-value: 0.05), and overall OHIP scores (P-value: 0.000) than females who also had a borderline need for treatment.

Table 2 : The Oral health Impact Profile scores (mean ± S.D) in relation with Index of Orthodontic Treatment Needs (Aesthetic Component)

		Functional limitation	Physical pain	Psychological discomfort	Physical disability	Psychological disability	Social disability	Handicap	Overall Oral health Impact Profile scores
Index of Orthodontic Treatment Needs (Aesthetic Component)-IOTN(AC)	No/ Slight treatment	6.4 ± 3.6	9.6 ± 6.1	8.0 ± 7.1	3.8 ± 3.9	3.7 ± 6.6	2.4 ± 4.5	2.7 ± 4.6	36.0 ± 25.6
	Borderline need	11.9 ± 9.0	9.5 ± 1.6	12.6 ± 7.1	5.9 ± 2.2	3.1 ± 4.4	0.0 ± 0.0	1.1 ± 1.5	44.0 ± 25.7
	P-Value	0.05	0.982	0.368	0.441	0.905	0.464	0.614	0.667

Table 3 : The Oral health Impact Profile scores (mean ± S.D) in relation with Index of Orthodontic Treatment Needs (Aesthetic Component) and gender

Index of Orthodontic Treatment Needs (Aesthetic Component)-IOTN(AC)		Functional limitation	Physical pain	Psychological discomfort	Physical disability	Psychological disability	Social disability	Handicap	Overall Oral health Impact Profile scores
No/ Slight treatment	Male	7.3 ± 2.8	8.4 ± 6.2	9.2 ± 8.1	5.3 ± 5.0	5.5 ± 10.1	2.4 ± 4.3	6.5 ± 6.7	44.6 ± 27.8
	Female	6.1 ± 3.8	9.9 ± 6.2	7.6 ± 6.9	3.4 ± 3.5	3.2 ± 5.4	2.3 ± 4.6	1.7 ± 3.3	33.7 ± 24.9
	P-Value	0.782	0.637	0.808	0.480	0.317	0.998	0.096	0.216
Borderline need	Male	18.2 ± 0.0	10.6 ± 0.0	17.6 ± 0.0	7.5 ± 0.0	6.2 ± 0.0	0.0 ± 0.0	2.1 ± 0.0	62.2 ± 0.0
	Female	5.5 ± 0.0	8.4 ± 0.0	7.6 ± 0.0	4.4 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	25.8 ± 0.0
	P-Value	0.014	0.491	0.050	0.248				0.000

VI. Discussion

The results of this study showed that the orthodontic treatment needs didn't significantly affect the oral health-related quality of life, which were consistent with the results of Kelly Ryan Taylor et al[5], who carried out a study on 293 children aged 11 to 14 recruited from orthodontic and pediatric dental clinics at the University of Washington and a community health clinic in Seattle, and Vig et al[12] who carried out a longitudinal study involving children/adolescents attending the OSU dental clinics in the United States.

In assessment of the association between Oral Health-Related Quality of Life (OHQoL) and gender, there was found to be a significant difference between gender for the handicap domain of the OHIP only, where males showed higher scores than females (P= 0.003). However, there was no statistically significant difference between genders in the remaining domains of the OHIP, as well as the overall OHIP scores. This corroborated the results of L.A Foster Page et al[11] and Daniela Feu et al[13], while they differed from the results of De Oliveria and Sheiham[9] who found that females had higher impacts on oral health than males.

In the present study, despite the fact that no gender differences were observed in the remaining quality of life domains, when the Aesthetic Component of the Index of Orthodontic Treatment Needs (IOTN-AC) was separately evaluated, it was found that males with borderline need for treatment had significantly higher impacts on oral health than females in the same group with regards to functional limitation and psychological discomfort, as well as overall OHIP scores (P= 0.014, 0.05, 0.000 respectively).

Interestingly, this raises the question, why do males seem to have more negative impacts on certain areas of their oral health than females in this study, and why has this never been reported in another study? And is this truly related to malocclusion only or do other factors play a role?

When we take a look at the domains where males significantly scored higher: Handicap, functional limitation, and psychological discomfort, we find that they included general questions related to oral health. Now, assuming that the questions were answered on a general basis, and not just focusing on malocclusion, which is what should have happened, we can see that there was obviously a great difference in the Handicap domain where males scored (6.1 ± 6.5) and females (1.7 ± 3.3) despite the fact that malocclusion may lead to stale breath, bad appearance, dental problems, and self-consciousness in both genders. One hypothetical response to this is, assuming that it is more common to find males using tobacco products than females, that this may be the cause. Other possible causes are listed later on.

Because the male subjects in this study were students at the faculty, after raising this question, the researcher returned and asked them about their smoking status. It was found that 14 out of the 22 male participants in this study, that is, 63.6% were current smokers. This is a large percentage, and it seems likely to have an effect on the results of this study. However this must be statistically proven before making any conclusions and further research should be done to assess the association between smoking and oral health-related quality of life. This is one of many factors which may have contributed to the impacts on oral health in this study. Other studies controlled confounding factors such as that carried out by L.A Foster Page [11] where the caries index was accounted for using the DMFT score.

However, due to the cross-sectional design of this study, one should not assume that malocclusion doesn't truly have an effect on the oral health-related quality of life.

The studies conducted by Ali and Amin2 and De Oliveria and Sheiham[9] only used the Dental Health Component of the IOTN to assess the effect of malocclusion on the oral health-related quality of life. Because treatment need is not only assessed objectively, and because most orthodontic patients seek their services out of concern for aesthetics rather than health or function, these studies don't truly show the extent of how orthodontic treatment needs affects the oral health-related quality of life. Furthermore, De Oliveria and Sheiham rather focused more on comparing those who had completed orthodontic treatment, with those who were currently under treatment, and those who never had treatment.

This cross-sectional study was the first in Sudan to use these valid instruments: The Oral Health Impact Profile (OHIP), and the Index of Orthodontic Treatment Needs (AC) to investigate the effects of malocclusion on the oral health-related quality of life of dental students. The subjects were randomly selected, giving no room for selection bias. The OHIP was used out of all the other oral health- related quality of life measures because it has been used in many studies[1, 2, 7-9, 13] to assess the relationship between malocclusion and oral health-related quality of life, and it is concerned with not only impairment, but also three functional status dimensions (social, psychological and physical) which represent four of the seven quality of life dimensions[14]

Nevertheless, some limitations should be discussed. The sample size was small due to time and cost factors, and as a result may not have shown a clear association because of the diversity of malocclusions in the population. Therefore, a larger sample may be required to endorse this research.

The subjects were only recruited from UMST, faculty of Dentistry. These were dental students themselves and may have had better access to dental care and more knowledge in the field of dentistry. Thus the results might not be generalizable to the population

of young Sudanese adults requiring orthodontic treatment.

Despite the interviewer's attempt to clarify that the responses of the subjects were confidential, it can't be ruled out that the responses were biased by a desire to give a positive feedback in relation to aesthetics as well as oral health-related quality of life.

VII. Conclusion

Orthodontic treatment needs alone doesn't impact the oral health related quality of life. However, this doesn't necessarily mean that it doesn't play a role in affecting the quality of life related to oral health. Many factors though individually minute, when coupled together can negatively impact an individual's quality of life.

Males generally showed a significantly higher OHIP scores in the handicap domain than females. They also showed higher scores in functional limitation, psychological discomfort, psychological disability, and physical disability than females. Females, on the other hand, had more impacts to oral health in terms of physical pain and social disability.

Reference Références Referencias

1. Zhijian Liua, Colman McGrathb, Urban Ha¨ggc. The impact of malocclusion/ orthodontic treatment need on the quality of life: A systematic review. *Angle Orthodontist* 2009; 79:585-591
2. Ali H. Hassan, Hatem El-Sayed Amin. Association of orthodontic treatment needs and oral health-related quality of life in young adults. *Am J Orthod Dentofacial* 2010; 137:42-7
3. Bedi R, Gulati N, McGrath C. A study of satisfaction with dental services among adults in the United Kingdom. *Br Dent J* 2005; 198:433-7
4. McGrath C, Bedi R. The value and use of ''quality of life'' measures in the primary dental care setting. *Prim Dent Care* 1999; 6: 53-7
5. Kelly Ryan Taylor, Asuman Kiyak, Greg J. Huang, Geoffrey M. Greenlee, Cameron J. Jolley, Gregory J. King. Effects of malocclusion and its treatment on the quality of life of adolescents. *Am J Orthod Dentofacial Orthop* 2009; 136:382-92
6. Peter H. Brook, William C. Shaw. The development of an index of orthodontic treatment priority. *Eur J Orthod*. 1989 Aug; 11(3):309-20.
7. Slade GD, Spencer AJ. Development and evaluation of the Oral Health Impact Profile. *Community Dent Health*.
8. Slade GD. Derivation and validation of a short-form oral health impact.profile. *Community Dent Oral Epidemiol*. 1997 Aug; 25(4):284-90.
9. C. M. de Oliveira, A. Sheiham. Orthodontic treatment and its impact on.oral health-related quality of life in Brazilian adolescents. *J Orthod* 2004; 31:20–27.
10. Ulrich Klages, Aladar Bruckner, Andrej Zentner. Dental aesthetics, self-awareness, and oral health-related quality of life in young adults. *Eur J Orthod* 2004; 26:507-514.
11. L.A. Foster Page, W.M. Thomson, A. Jokovic, D. Locker. Validation of.the Child Perceptions Questionnaire (CPQ11-14) *Journal of Dental .Research* 2005 Jul; 84(7):649-652.
12. Katherine W.L. Vig, Allen Firestone, Wyatt Wood, Misty Lenk. Quality.of Orthodontic Treatment. *Semin Orthod* 2007; 13:81-87
13. Daniela Feu, Branca Heloısa de Oliveira, Marco Antonio de Oliveira Almeida, H. Asuman Kiyak, Jose´ Augusto M. Miguele. Oral health related quality of life and orthodontic treatment seeking. Am *J Orthod Dentofacial Orthop* 2010; 138(2):152-9
14. Gary D. Slade Measuring Oral Health and Quality of Life. North Carolina: Department of dental Ecology; 1997

This page is intentionally left blank

Global Journal of Medical Research: J
Dentistry and Otolaryngology
Volume 14 Issue 6 Version 1.0 Year 2014
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

A Study to Find Anatomic Measurement Correlating to Occlusal Vertical Dimension: Comparison in two Ethnic Groups of Nepal

By Dr. Bishal Babu Basnet, Dr. Raj Kumar Singh & Dr. Prakash Kumar Parajuli

B. P. Koirala Institute of Health Sciences, Nepal

Abstract- Establishment of proper occlusal vertical dimension is the important yet daunting task for successful prosthodontic therapy for function, esthetics and comfort to the edentulous patients. In the current study the relationship of various distances between facial landmarks to the OVD was tested in two ethnic groups of Nepal, viz. Aryans and Mongoloids. The result of this study can be useful in determining proper OVD in the patients who have lost the OVD. The aim of the study was to find the correlation between facial landmarks and OVD.

Materials and methods: The OVD was measured using a Boley gauge from the prominent part of chin and nose. Other facial landmarks were also measured using the calipers in 200 adult volunteers.

Results: The Pearson's product moment correlation coefficient was determined.

Keywords: occlusal vertical dimension, rima oris to pupil distance, eye-ear distance, vertical height of ear.

GJMR-J Classification: NLMC Code: WU 21

Strictly as per the compliance and regulations of:

A Study to Find Anatomic Measurement Correlating to Occlusal Vertical Dimension: Comparison in Two Ethnic Groups of Nepal

Dr. Bishal Babu Basnet [α], Dr. Raj Kumar Singh [σ] & Dr. Prakash Kumar Parajuli [ρ]

Abstract- Establishment of proper occlusal vertical dimension is the important yet daunting task for successful prosthodontic therapy for function, esthetics and comfort to the edentulous patients. In the current study the relationship of various distances between facial landmarks to the OVD was tested in two ethnic groups of Nepal, viz. Aryans and Mongoloids. The result of this study can be useful in determining proper OVD in the patients who have lost the OVD. The aim of the study was to find the correlation between facial landmarks and OVD.

Materials and methods: The OVD was measured using a Boley gauge from the prominent part of chin and nose. Other facial landmarks were also measured using the calipers in 200 adult volunteers.

Results: The Pearson's product moment correlation coefficient was determined. OVD was significantly ($p \leq 0.05$) correlated with rima oris to pupil distance ($r = 0.557$ in whole population, $r = 0.577$ in Aryans and 0.466 in Mongoloids).

Conclusions: The distance between rima oris to pupil distance has higher correlation to OVD than other facial measurements.

Keywords: occlusal vertical dimension, rima oris to pupil distance, eye-ear distance, vertical height of ear.

I. Introduction

Glossary of Prosthodontic Terms[1] defines the occlusal vertical dimension as the distance between two selected points when the occluding members are in contact and rest vertical dimension as the distance between two selected points when mandible is in physiologic rest position. For a successful denture in terms of esthetics and function correct vertical dimension should be determined.[2]

In clinical practice, there exists no universal rule for determining correct vertical dimension at occlusion because of wide range of individual variation.[3] Use of pre-extraction records,[4] maximum biting force,[5] electrymyographic method,[6] and cephalometric radiograph[7] are some of the techniques utilized for determining occlusal vertical dimension. Millet et al.[8] recommended using multiple methods, like physiologic rest position, swallowing, phonetic, esthetics and facial measurements. Distance between soft tissue landmarks of face was significantly correlated to occclusal vertical dimension.[9]

Author α σ ρ: Department of Prosthodontics, B. P. Koirala Institute of Health Sciences, Dharan, Nepal. e-mail: bishal_bpkihs@yahoo.com

The purpose of this study was to evaluate the correlation between facial measurements and occlusal vertical dimension in two ethnic groups of Nepal.

II. Materials and Methods

Two hundred subjects between 19 and 46 years (mean age 25 years) were randomly selected from among the students, staffs, patients and relatives of patients visiting the College of Dental Surgery, B. P. Koirala Institute of Health Sciences. They were divided into two groups according to ethnicity, Aryans and Mongoloids. The inclusion criteria were full set of dentition, straight profile on visual examination, absence of malocclusion, no history of orthodontic and prosthodontic treatment. Each subject was instructed to relax the lips and close mouth in centric relation. The occlusal vertical dimension was measured between most prominent part of chin and nose. Other facial measurements measured were the distance between pupil of eye to corner of mouth (rima oris), distance between outer canthus of one eye to inner canthus of other eye, distance between outer canthus to midpoint of external auditory meatus and vertical height of ear. Independent sample t test was performed to test the difference of means of studied parameters in males and females and in Aryans and Mongoloids. Correlation between these facial measurements and occlusal vertical dimension was studied with Pearson's correlation coefficient (r) at the significance level ≤ 0.05 and 95% confidence interval.

III. Results

The mean occlusal vertical dimension of studied sample was 64.87 ± 5.21 mm. In Aryans, it was mm and in Mongoloids mm. The tables 1-4 show the results of this study. It was found that males have significantly longer dimension of OVD. The difference of means of rima oris to pupil distance, vertical height of ear, distance between outer canthus of one eye to inner canthus of other eye and eye-ear distance between males and females was not statistically significant. As we compared two ethnicities (Table 3), it was found that OVD and rima oris to pupil distance were significantly longer in Mongoloids whereas eye-ear distance was significantly longer in Aryans than Mongoloids.

The correlation between the facial measurements and occlusal vertical dimension was found statistically significant in both ethnicities (Table 4). However, the correlation between rima oris to pupil distance was stronger than the others. It was also noted that correlation between other facial measurements (eye-ear distance, distance between canthi and vertical height of ear) in Mongoloids was relatively weaker. Overall, rima oris to pupil distance was significantly correlated to occlusal vertical dimension (Table 5) with stronger correlation than other facial measurements.

Table 1 : Descriptive statistics of OVD and other facial measurements for total subjects

Character	Number	Minimum	Maximum	Mean	Std. deviation
Age	200	19	46	25	4.78
OVD	200	48	77	64.87	5.21
RO-Pu	200	52.5	72	64.77	4.65
OC-IC	200	55	77	66.99	3.74
E-E	200	53	82	69.32	4.17
EH	200	48.4	71	60.25	3.75

OVD- occlusal vertical dimension, RO-Pu – distance between rima oris to pupil of eye, OC-IC – distance between outer canthus of one eye to inner canthus of other eye, E-E – eye ear distance, EH- vertical height of ear.

Table 2 : Group statistics of OVD and other measurements comparing gender

Parameters	Gender	N	Mean±S.D.	p value	Remarks
OVD	Male	120	65.90±4.31	0.001	Sig.
	Female	80	63.35±6.03		
RO-Pu	Male	120	64.78±4.43	0.437	NS
	Female	80	64.77±4.98		
OC-IC	Male	120	67.27±3.40	0.053	NS
	Female	80	66.57±4.19		
E-E	Male	120	70.33±3.91	0.967	NS
	Female	80	67.83±4.11		
EH	Male	120	60.93±3.75	0.421	NS
	Female	80	59.23±3.55		

p-value significant at ≤0.05 level. Sig.- significant, NS- not significant

Table 3 : Group statistics of OVD and other measurements comparing ethnicity

Parameters	Ethnicity	N	Mean±S.D.	p value	Remarks
OVD	Aryan	100	63.89±6.29	<0.001	Sig.
	Mongoloids	100	65.86±3.61		
RO-Pu	Aryan	100	62.65±4.65	0.003	Sig.
	Mongoloids	100	66.90±3.56		
OC-IC	Aryan	100	66.42±3.95	0.062	NS
	Mongoloids	100	67.56±3.45		
E-E	Aryan	100	70.12±4.81	<0.001	Sig.
	Mongoloids	100	68.54±3.24		
EH	Aryan	100	60.29±3.78	0.200	NS
	Mongoloids	100	60.21±3.75		

p-value significant at ≤0.05 level. Sig.- significant, NS- not significant

Table 4 : Correlation between OVD and other parameters in two ethnic groups

	Aryans			Mongoloids		
Measurements	Pearson's r	p-value	Significance	Pearson's r	p-value	significance
OVD	1			1		
RO-Pu	0.577	<0.001	Sig.	0.466	<0.001	Sig.
OC-IC	0.508	<0.001	Sig.	0.307	0.002	Sig.
E-E	0.498	<0.001	Sig.	0.320	0.001	Sig.
EH	0.471	<0.001	Sig.	0.278	0.005	Sig.

p-value significant at ≤0.05 level. Sig.- significant, NS- not significant

Table 4 : Correlation between OVD and other parameters in studied sample (N=200)

Measurements	Pearson's r	p-value	Significance
OVD	1		
RO-Pu	0.557	<0.001	Sig.
OC-IC	0.499	<0.001	Sig.
E-E	0.395	<0.001	Sig.
EH	0.378	<0.001	Sig.

p-value significant at ≤0.05 level. Sig.- significant, NS- not significant

IV. Discussion

The loss of teeth results in poor appearance of lower third of face. The restoration of correct vertical dimension in those who have lost it should be in harmony with the upper part of face. Prosthodontists have long been seeking for universally accepted method of determining the OVD. There were methods like use of anterior teeth measurements[10], closest speaking space[11], swallowing method[12], patient's neuromuscular perception[13], cephalometric radiographs[14], intra-oral and extra-oral anatomic landmarks[15] and measurement of fingers.[16] All of these methods possess some kinds of disadvantages. The present study gave some idea about facial measurement and their use in determining occlusal vertical dimension.

In present study the occlusal vertical dimension was found 65.90±4.31 mm in male and 63.35±6.03 mm in female. These were found to be longer than the findigs of Ladda et al.[16] (61.4±4.2 mm in male and 56.7±3.0 mm in female) and Kulakarni and Kohli[17] (54 to 59 mm in female and 62 to 65 mm in male). The distance between ANS and Me from cephalometric radiograph in Serbian population, was 67.87±5.67 mm in male and 61.51±5.06 mm in female.[7] Similar measurements were observed in Iraqi adult population reported by Al-Hamadany[18] where occlusal vertical dimension in 75 students was 66.74±6.468 mm. The OVD in males was 68.25±6.134 mm and in females, it was 63.99±6.254 mm. These values are consistent to that of current study.

The correlation was statistically significant and positive with rima oris to pupil of eye (r=0.557), followed by distance between outer canthus of one eye to inner canthus of other eye (r=0.449) and eye-ear distance (r=0.395) and vertical height of ear (r=0.378). This is in contrast with the study done by Delic et al.[19] The correlation of eye-ear distance (r=0.8676) was stronger than pupil to rima oris distance (r=0.4357) in their study. Rima-oris to pupil distance was longer than lower facial height by 3 cm in a study done in Phillipinos by Tina-Olaivar et al.[20]

The limitations of the study were only two ethnic groups were taken into consideration and the findings cannot be extrapolated to other races. Also, the sample size was very small to conclude the findings. The occlusal vertical dimension is not constant and dynamic. Therefore the anthropometric measurement in dentulous subjects can be an adjunct but not accurate for utilizing in edentulous patients. There need to be further investigations to endorse or refute the findings of present study in this part of world as most of studies are found pertaining to developed countries.

V. Summary

Anthropometric measurements of facial landmarks were recorded for 200 subjects (100 Aryans and 100 Mongoloids) and correlation of facial measurements to occlusal vertical dimension was tested. Within the limitations of this study, we can conclude that the facial measurements are significantly correlated to the occlusal vertical dimension. Findings of this study will be helpful guide in determination of occlusal vertical dimension.

References Références Referencias

1. The glossary of prosthodontics terms. J Prosthet Dent. 2005 Jul;94(1).
2. Heartwell CM, Rahn AO. Syllabus of complete dentures. 2nd ed. Philadelphia: Lea & Febiger, 1974;194-6.
3. Hurst WW. Vertical dimension and its correlation with lip length and interocclusal distance. J Am Dent Assoc 1962;64:496-504.
4. Bissau M. Pre-extraction records for complete denture fabrication: a literature review. J Prosthet Dent. 2004 Jan;91(1):55-8.
5. Boos RH. Intermaxillary relation established by biting power. J Am Dent Assoc 1940;27:1192-9.
6. Miljcovic Z, Zeljkovic M, Anojcic M. Comparison of physiologic methods of determination of occlusal vertical dimension in edentulous persons. Vojnosanit Pregl. 2001 Jul-Aug;58(4):381-7.
7. Strajnic L, Stanisic-Sinobad D, Markovic D, Stojanovic L. Cephalometric indicators of the vertical dimension of occlusion. Coll Antropol. 2008;32(2):535-41.
8. Millet C, Leterme A, Jeannin C, Jaudoin P. Vertical dimension in the treatment of edentulous patient. Rev Stomatol Chir Maxillofac. 2010 Nov-Dec.;111(5-6):315-30.
9. Al-Hamdany AK, Kassab NH. Correlation of vertical dimensions of soft tissue facial profiles. Al-Rafidain Dent J. 2010;10(2):243-53.
10. Ekfeldt A, Karlsson S. Influence of lower lip support on recording of vertical dimension in edentulous patients. J Oral Rehabil. 1992;19:313-7.

11. Silverman MM. The speaking method in measuring vertical dimension. J Prosthet Dent. 1953 Mar;3(2):193-9.
12. Shanahan TEJ. Physiologic vertical dimension and centric relation, J Prosthet Dent. 1956;6:741-7.
13. Lytle RB. Vertical relation of occlusion by the patient's neuromuscular perception. J Prosthet Dent. 1964 Jan-Feb;14(1):12-21.
14. Basler FL, Douglas JR, Moulton RS. Cephalometric analysis of the vertical dimension of occlusion. J Prosthet Dent. 1961;11:831-5.
15. Fayz F, Eslami A. Determination of occlusal vertical dimension: a literature review. J Prosthet Dent. 1988 Mar;59(3):321-3.
16. Ladda R, Bhandari AJ, Kasat VO, Angadi GS. A new technique to determine vertical dimension of occlusion from anthropometric measurements of finger. Indian J Dent Res. 2013;24:316-20.
17. Kulkarni N, Kohli M. Estimation and correlation of individual facial height and total body height. J Int Oral Health. 2011 Apr;3(2):37-42.
18. Al-Hamdany AK, Kassab NH. Correlation of vertical dimensions of soft tissue facial profiles. Al-Rafidain Dent J. 2010;10(2):243-53.
19. Delic Z, Simunovic-Soskic M, Perinic-Grzic R, Vukovojac S, Rajic Z, Kuna T. Evaluation of craniometric methods for determination of vertical dimension of occlusion. Coll Antropol. 2000;1(suppl. 24):31-5.
20. Tina-Olaivar EO, Olaivar OK. A comparative study of the upper and lower vertical facial measurements of the Filipinos as it is used in the Willis method for determining the vertical dimension of occlusion. J Philipp Dent Assoc. 1998 Jun-Aug;50(1):44-8.

Photographs

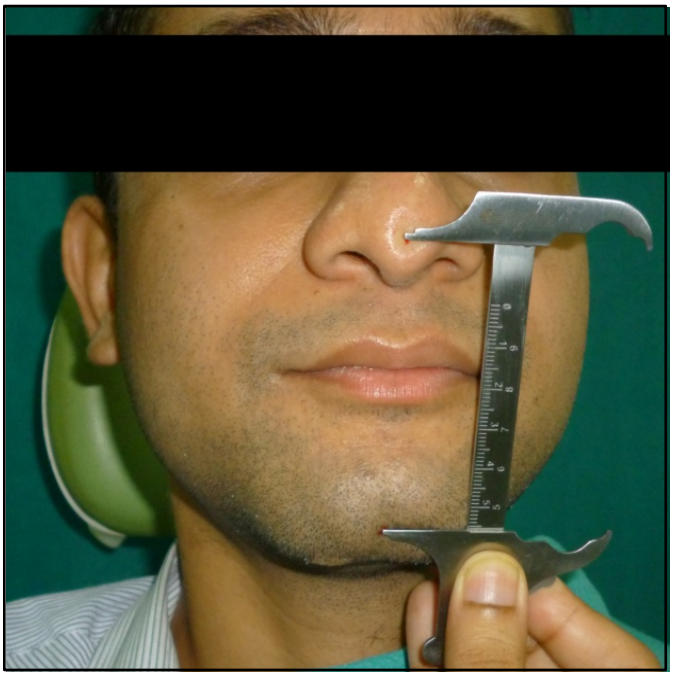


Figure 1 : Measurement of OVD by Boley gauge

Figure 2 : Measurement of distance from rima oris to pupil of eye

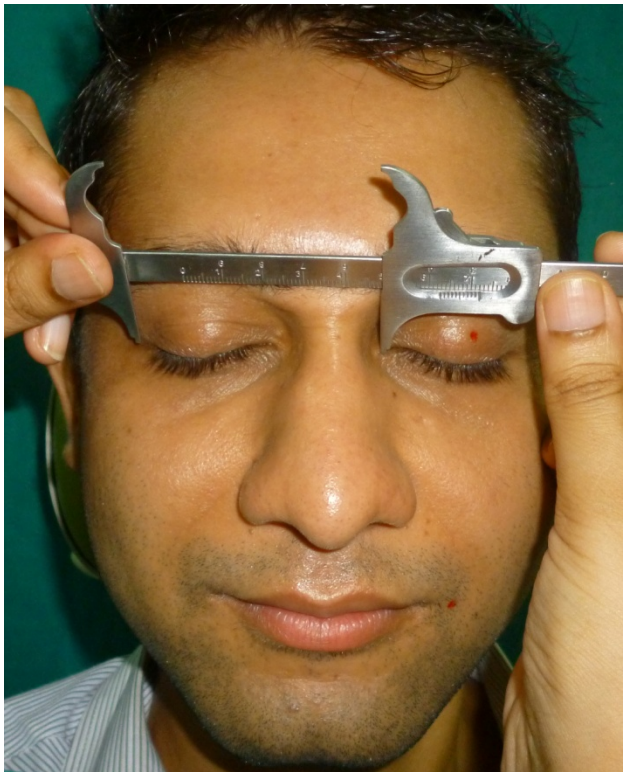


Figure 3 : Measurement of distance from outer canthus of one eye to inner canthus of other eye

Figure 4 : Measurement of eye-ear distance

Figure 5 : Measurement of vertical height of ear

This page is intentionally left blank

Global Journal of Medical Research: J
Dentistry and Otolaryngology
Volume 14 Issue 6 Version 1.0 Year 2014
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

"Cell Cycle Aberration in Ameloblastoma: As Evidenced by an Immunohistochemical Expression of p53 and Survivin"

By Dr. Zulfin Shaikh & Dr. Niranjan K C

SDM College of Dental Sciences and Hospital, India

Abstract- Evasion from apoptosis by aberrations of apoptotic regulatory factors has been found to cause accumulation of neoplastic cells in various tumours. Survivin, an inhibitor of apoptosis protein localizes to the nucleus as well as in the cytoplasm depending on its function such as cell division and inhibiting apoptosis. The regulation of Survivin seems to be linked to p53, a tumour suppressor gene. Though there are studies showing the role of p53 and Survivin in oral carcinogenesis, but the field of odontogenic tumours yet needs to be explored. The aim of this study was to correlate the expression of p53 and Survivin in normal tissues (tooth germ) and Ameloblastoma as well as to assess differential localization of Survivin. Qualitative and quantitative assess- ment of immunexpression of p53 and Survivin (nuclear and cytoplasmic) was evaluated in a total of 35 cases which included 10 tooth germs and 25 Ameloblastoma. The expression levels of p53 and nuclear Survivin were significantly higher in Ameloblastoma quantitatively but there was no significant correlation between p53 and cytoplasmic expression of Survivin.

Keywords: *apoptosis, survivin, p53, ameloblastoma, immunohistochemical expression, tumorigenesis, aberrations, tumour suppressor gene, inhibitor of apoptosis protein, apoptotic regulatory factors.*

GJMR-J Classification: *NLMC Code: WU 20.5*

Strictly as per the compliance and regulations of:

"Cell Cycle Aberration in Ameloblastoma: As Evidenced by an Immunohistochemical Expression of p53 and Survivin"

Apoptosis and Cell Cycle Aberration in Ameloblastoma – Evidenced by Immunohistochemical Study

Dr. Zulfin Shaikh [α] & Dr. Niranjan K C [σ]

Abstract- Evasion from apoptosis by aberrations of apoptotic regulatory factors has been found to cause accumulation of neoplastic cells in various tumours. Survivin, an inhibitor of apoptosis protein localizes to the nucleus as well as in the cytoplasm depending on its function such as cell division and inhibiting apoptosis. The regulation of Survivin seems to be linked to p53, a tumour suppressor gene. Though there are studies showing the role of p53 and Survivin in oral carcinogenesis, but the field of odontogenic tumours yet needs to be explored. The aim of this study was to correlate the expression of p53 and Survivin in normal tissues (tooth germ) and Ameloblastoma as well as to assess differential localization of Survivin. Qualitative and quantitative assessment of immunexpression of p53 and Survivin (nuclear and cytoplasmic) was evaluated in a total of 35 cases which included 10 tooth germs and 25 Ameloblastoma. The expression levels of p53 and nuclear Survivin were significantly higher in Ameloblastoma quantitatively but there was no significant correlation between p53 and cytoplasmic expression of Survivin. There was up-regulation of both p53 and Survivin in Ameloblastoma. This study highlights the nuclear and cytoplasmic expression of Survivin and p53 in tumorigenesis of Ameloblastoma.

Keywords: apoptosis, survivin, p53, ameloblastoma, immunohistochemical expression, tumorigenesis, aberrations, tumour suppressor gene, inhibitor of apoptosis protein, apoptotic regulatory factors.

I. Introduction

Odontogenic tumours comprise a complex group of lesions exhibiting considerable variations in clinical and histological behavior [1]. A series of genetic and molecular alterations appear to promote the development and progression of these tumours [2]. Ameloblastoma is an epithelial odontogenic tumour characterized by a benign but locally invasive behavior, with a high risk of recurrence. Ameloblastoma shows considerable variation with different types such as solid/multicystic, unicystic, peripheral and desmoplastic [3].

Regulation of the cell cycle and control of apoptosis are thought to be intimately linked processes in maintaining homeostasis and developmental morphogenesis [4]. *TP53* is one of the most frequently altered tumour suppressor genes and its gene products play an important role in response to genomic damage by inducing cell cycle arrest and apoptosis [2]. *TP53* encompasses 16-20kb of DNA on human chromosome 17pl3.1 [5].

Apoptosis, also known as programmed cell death or physiological cell death, has diverse roles in development and normal homeostasis as well as in a variety of pathological conditions [6]. Survivin, a member of inhibitor of apoptosis protein family (IAP), has a molecular weight of 16.5kDa and the gene is located on chromosome 17q25 [7]. It is a unique bifunctional protein which suppresses apoptosis by inhibiting caspase-3 and caspase-9 and regulates G2/M phase of the cell cycle by associating with mitotic spindle microtubules. It is highly expressed in embryonic tissues and neoplasm's but is absent in terminally differentiated cells [8]. Several studies have proposed that the sub-cellular distribution of Survivin is regulated by active import into the nucleus and CRM1-mediated export to the cytoplasm [9-11]. Recent studies have suggested that the nuclear pool of Survivin is involved in promoting cell proliferation, whereas the cytoplasmic pool of Survivin controls cell survival [9, 10, 12,13].

Mutation of p53 in tumours causes over expression of Survivin which rescues cells from p53 induced apoptosis [14]. Survivin is highly expressed in most human tumours of the oral cavity, lung, colon, breast, liver, gastrointestinal and prostate [15-21]. The expression of Survivin in odontogenic epithelial cells has already been described [22-24], but to date, no study has investigated the relationship between nuclear and cytoplasmic expression of Survivin in odontogenic tumours. The role of p53 in various tumours has been extensively studied but there are few reports about its association with anti-apoptotic proteins in odontogenic tumours. Therefore, the present study was performed to

Author α: Assistant Professor, Department of Oral and Maxillofacial Pathology and Microbiology, Al-badar Dental College and Hospital, Gulbarga, Karnataka, India. e-mail: dr.zulfin@gmail.com
Author σ: Associate Professor, Department of Oral and Maxillofacial Pathology and Microbiology, SDM College of Dental Sciences and Hospital, Dharwad, Karnataka, India. e-mail: niranjankc29@gmail.com

determine the role of p53 and Survivin, in addition to assess nuclear and cytoplasmic localization of Survivin in Ameloblastoma to gain a better insight into its tumorigenesis.

II. Materials and Methods

Twenty five formalin fixed paraffin embedded tissue blocks with histological diagnosis of Ameloblastoma were retrieved from the archives of the Department of Oral and Maxillofacial Pathology, SDM College of Dental Sciences and Hospital, Dharwad. The study sample being an odontogenic tumour, the control tissue included ten tooth germs taken from the postmortem fetal oral tissues fixed in 10% formalin. All the tooth germs taken were between 20th to 25th weeks of gestation.

The study was approved by the institutional ethics committee. Immunostaining was performed using the super sensitive polymer – Horseradish Peroxidase (HRP) detection system, a biotin free detection system supplied by Biogenex life sciences limited [California, USA]. The paraffin-embedded tissues were cut into four-micrometer thick sections, mounted on amino-propyltriethoxysilane (APES) coated slides, deparaffinized in xylene, rehydrated in alcohol and then treated with 3% hydrogen peroxide for 10 minutes.

The tissue sections were then incubated with primary antibodies against p53 [Mouse monoclonal, Clone DO7, IgG2b immunoglobulin; Biogenex Ltd, USA; diluted at 1:150] and Survivin [Rabbit monoclonal, Clone EP28880Y, IgG immunoglobulin; Biogenex Ltd, USA; diluted at 1:40] as per the instructions given by the manufacturer. Next, the tissue sections were incubated with the secondary antibody and immunoreactivity was visualized with 3, 3-diaminobenzidine solution. Finally, the sections were counterstained with Harri's hematoxylin.

Two independent observers scored all samples in a blinded manner and no interobserver variability was observed. An immunoreactivity scoring system was applied as follows [25]: (i) the staining intensity was graded on a four point scale such as '0' for no staining, '1' for mild staining, '2' for moderate staining and '3' for intense staining, and (ii) the number of positively stained cells with brown colour were counted among 400 tumour cells using an occulometer eye-piece grid at the objective magnification x40. The results were multiplied by 100 and the score was expressed as the percentage of positive cells. Nuclear (A) and cytoplasmic (B) expression of Survivin was assessed separately. The results were subjected to statistical analysis. Mann Whitney U test was performed to determine the significance of p53 and Survivin expression between tooth germ and Ameloblastoma. Wilcoxon Signed Ranks test was used to assess the significance between p53 and Survivin expression in each group. Pearson's correlation test was done to determine the correlation between p53 and Survivin expression in each group. A p-value of <0.05 was considered as statistically significant.

III. Results

The study sample of 25 Ameloblastoma included 12 follicular, 4 plexiform and 9 cases of unicystic subtypes. Out of ten tooth germs five showed hard tissue formation.

a) p53 expression in tooth germ and Ameloblastoma

p53 expression was localized to the nucleus [Figure 1] with predominant intense staining compared to that of tooth germ [Table 1]. Out of ten tooth germs, p53 expression was seen in six tooth germs and was more evident in inner enamel epithelial cells than in stellate reticulum & outer enamel epithelial cells [Figure 1a]. In Ameloblastoma, p53 was expressed in all the tissues. In follicular and plexiform subtypes, p53 expression was seen in peripheral ameloblast-like and few central stellate reticulum-like cells [Figure 1b & 1c] and in unicystic variant, expression was seen in basal and suprabasal cells [Figure 1d]. p53 expression was statistically significant between tooth germ and Ameloblastoma in the number of positive cells but no significance was seen in relation to the staining intensity [Table 2].

Table 1 : Qualitative and quantitative analysis of p53 expression in tooth germ and Ameloblastoma

Group	Total no. of cases	Negative staining	Mild staining	Moderate staining	Intense staining	Average % of positive cells
Tooth germ	10	1	1	6	2	24.89%
Ameloblastoma	25	0	1	9	15	75.97%
Follicular	12	0	1	5	6	79.37%
Plexiform	4	0	0	0	4	81.62%
Unicystic	9	0	0	4	5	68.91%

Table 2 : Pair wise comparison of p53 expression in tooth germ and Ameloblastoma by Mann Whitney U test

	N	Sum of Ranks	Mean Rank	U-value	Z-value	p-value
Qualitative analysis						
Tooth germ	10	123.50	12.35	68.50	-2.296	**0.038**
Ameloblastoma	25	506.50	20.26			
Quantitative analysis						
Tooth germ	10	74.00	7.40	19.00	-3.874	**0.000***
Ameloblastoma	25	556.00	22.24			

**Statistically significant*

b) Survivin expression in tooth germ and Ameloblastoma

Survivin expression was predominantly localized to the cytoplasm **[Figure 2].** The staining intensity was predominantly moderate in Ameloblastoma compared to tooth germ **[Table 3]**. Out of ten tooth germs, Survivin was expressed in five tooth germs with cytoplasmic expression in inner enamel epithelial cells, stellate reticulum & outer enamel epithelial cells with focal nuclear expression in inner enamel epithelial cells **[Figure 2a]**. In follicular and plexiform ameloblastoma, Survivin showed cytoplasmic expression both in peripheral ameloblast-like and central stellate reticulum-like cells with focal nuclear expression in peripheral cells **[Figure 2b & 2c]**. Among unicystic ameloblastoma, cytoplasmic expression of Survivin was seen in basal and suprabasal cells with focal nuclear staining in basal cells **[Figure 2d]**. Similar to p53, Survivin expression was statistically significant between tooth germ and Ameloblastoma but no significance was seen with respect to staining intensity **[Table 4]**.

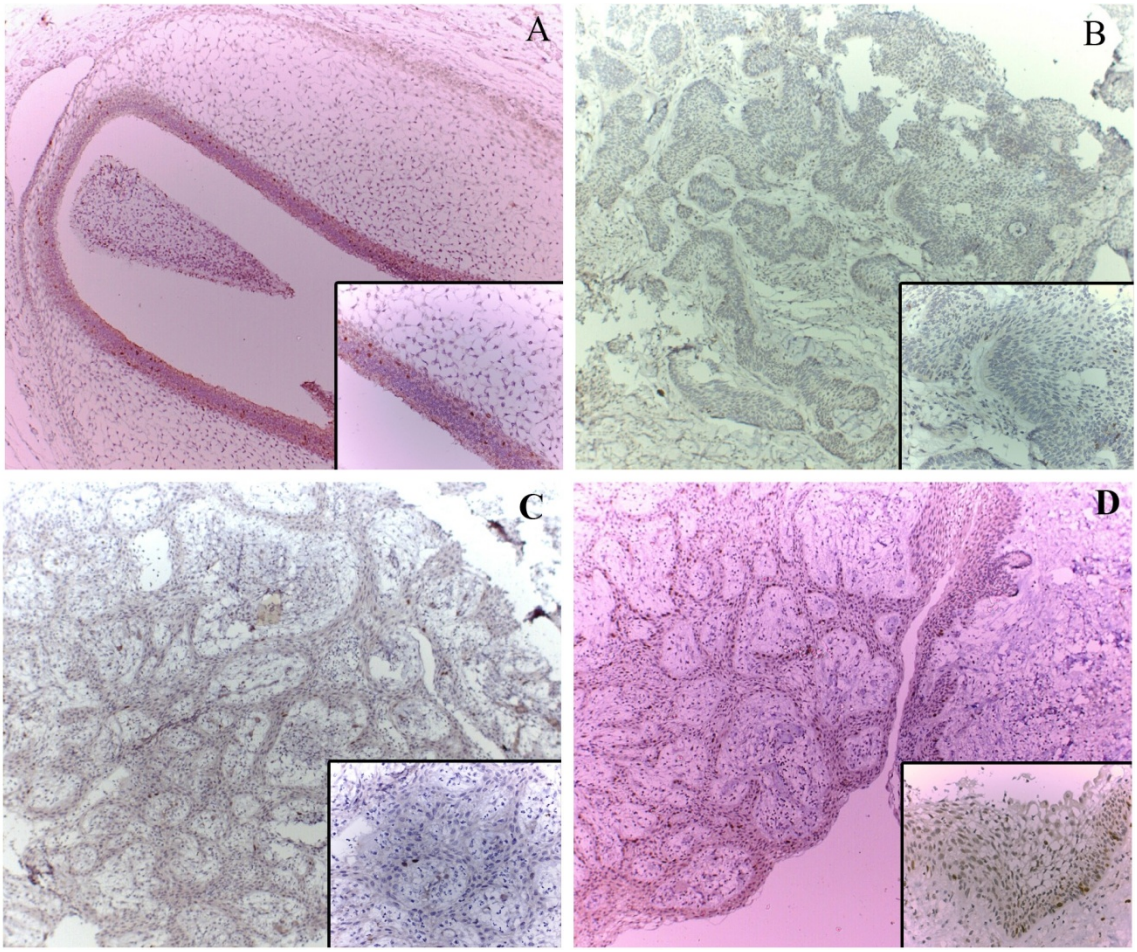


Figure 2 : Expression of Survivin in tooth germ and Ameloblastoma

a) Intense Survivin expression in tooth germ (Original magnification x10). Survivin cytoplasmic expression in inner enamel epithelial cells, stellate reticulum and outer enamel epithelial cells with focal nuclear expression in inner enamel epithelial cells (Inset-Original magnification x40) (Immunostaining: DAB chromogen, Survivin monoclonal antibody).

b) Mild Survivin expression in follicular ameloblastoma (Original magnification x10). Survivin cytoplasmic expression in ameloblast-like cells & stellate reticulum-like cells with focal nuclear expression in peripheral cells (Inset-Original magnification x40) (Immunostaining: DAB chromogen, Survivin monoclonal antibody).

c) Moderate Survivin expression in plexiform ameloblastoma (Original magnification x10). Survivin cytoplasmic expression in peripheral and central neoplastic cells with focal nuclear expression in the peripheral cells (Inset-Original magnification x40) (Immunostaining: DAB chromogen, Survivin monoclonal antibody).

d) Intense Survivin expression in unicystic ameloblastoma showing intraluminal proliferation in plexiform pattern (Original magnification x10). Survivin nuclear and cytoplasmic expression in basal and suprabasal cells (Inset-Original magnification x40) (Immunostaining: DAB chromogen, Survivin monoclonal antibody).

Table 3 : Qualitative and quantitative analysis of Survivin expression in tooth germ and Ameloblastoma

Group	Total no. of cases	Negative staining	Mild staining	Moderate staining	Intense staining	Average % of positive cells
Tooth germ	10	0	4	4	2	29.10%
Ameloblastoma	25	0	6	13	6	78.25%
Follicular	12	0	5	7	0	78.06%
Plexiform	4	0	0	4	0	79.12%
Unicystic	9	0	1	2	6	56.66%

Table 4 : Pair wise comparison of Survivin expression in Tooth germ and Ameloblastoma by Mann Whitney U test

	N	Sum of Ranks	Mean Rank	U-value	Z-value	p-value
Qualitative analysis						
Tooth germ	10	161.00	16.10	106.00	-0.752	**0.506**
Ameloblastoma	25	469.00	18.76			
Quantitative analysis						
Tooth germ	10	73.00	7.30	18.00	-3.913	**0.000***
Ameloblastoma	25	557.00	22.28			

**Statistically significant*

c) p53 and Survivin expression in tooth germ and Ameloblastoma

Four tooth germs showed both p53 and Survivin expression, three showed negative staining for both p53 and Survivin, two tooth germs had only p53 expression and one tooth germ showed only Survivin expression. A positive correlation was found between p53 and Survivin expression in Ameloblastoma **[r=0.251, p=0.226].** We found that p53 and Survivin expression was statistically significant in Ameloblastoma with respect to staining intensity **[Table 5].** Quantitatively, p53 and nuclear Survivin was statistically significant in Ameloblastoma **[p=0.000]** but no significance was seen in p53 and cytoplasmic expression of Survivin in Ameloblastoma **[p=0.330].** Due to focal expression of Survivin in the nucleus of normal and neoplastic cells, a statistical correlation could not be obtained between cytoplasmic and nuclear Survivin.

Table 5 : Analysis of p53 and Survivin expression in tooth germ and Ameloblastoma by Wilcoxon Signed Ranks test

	N	Sum of Ranks	Mean Rank	Z-value	p-value
Qualitative analysis					
Tooth germ	10	28.00	8.00	-0.378	**0.705**
Ameloblastoma	25	171.00	18.2	-2.854	**0.004***
Quantitative analysis					
Tooth germ	10	28.00	8.60	-0.676	**0.499**
Ameloblastoma	25	276.00	24.25	-0.821	**0.411**

**Statistically significant*

IV. Discussion

Various concepts have been proposed which explain the pathogenesis of odontogenic tumours, but what causes odontogenic cells to transform into an odontogenic tumour is yet to be explored [23].

p53, a tumour suppressor gene, acts as a 'molecular policeman' by monitoring the integrity of the genome. If DNA is damaged, p53 accumulates and switches off cell replication to allow extra time for repair mechanisms to act. If the repair fails, p53 triggers cell suicide by apoptosis [26]. Survivin, an inhibitor of

apoptotic protein (IAP) inhibits caspase activation. This has been shown by disruption of Survivin induction pathways leading to increase in apoptosis and decrease in tumour growth. Besides its role as an IAP, Survivin acts as a subunit of the chromosomal passenger complex (CPC) and as a regulator of microtubule dynamics [8, 27]. The CPC also composed of the Aurora-B kinase, Borealin and INCENP corrects attachment errors between chromosomes and the mitotic spindle, regulates the quality-control checkpoint and ensures the correct completion of cytokinesis [10]. The typical chromosomal passenger localization pattern of Survivin can be observed not only in normal but also in tumour cells [27, 28]. LI *et al.* have suggested that nuclear Survivin is involved in the promotion of cell proliferation, whereas cytoplasmic Survivin may help control cell survival [29]. Thus, Survivin exists in two subcellular pools (cytoplasmic and nuclear) in response to its function in the regulation of both cell survival and cell division.

Experiments have revealed that transient expression of wild-type p53 results in marked repression of Survivin at both the mRNA and protein levels [14]. Up-regulation of Survivin and mutation of p53 occurring concomitantly in many human tumours implicates that these two events are related [30, 33]. p53 expression in tooth germs in contrast to previous studies [34,35], can be explained by the fact that p53 activation is not limited to DNA damage; it is also activated in response to myriad stresses like oxidative stress, osmotic shock, heat shock, hypoxia, ribonucleotide depletion and deregulated oncogene expression leading to accumulation of p53 in stressed cells [36]. Absence of p53 staining in other tooth germs correlates with the literature that p53 does not normally accumulate to amounts detectable by immunohistochemical staining because of its short half-life (6-20 minutes) [34, 35, 37].

EL-SISSY NA *et al.* reported faint p53 staining and attributed this to slow tumour growth, expansion and correlated with the benign nature of Ameloblastoma resulting from relatively quiescent tumour cells [34]. Thus, the presence of predominant intense p53 staining in the present study may be suggestive of rapid growth, expansion and locally aggressive behavior of Ameloblastoma [38].

Survivin is chiefly expressed in the undifferentiated proliferating cells like stem cells, basal cells of the oral epithelium, embryonic and fetal tissues but becomes undetectable in most terminally differentiated cells [39]. Absence of Survivin expression in five tooth germs may be due to differentiation of inner enamel epithelial cells into ameloblast because hard tissue formation was evident in these tooth germs.

KUMAMOTO *et al.* suggested that cells neighboring the basement membrane are proliferative cells and those away from the basement membrane are apoptotic [23]. Studies in the literature have described cytoplasmic expression of Survivin to be associated with inhibition of cell death [9-13]. Thus, in the present study predominant cytoplasmic expression of Survivin in the peripheral ameloblast-like cells and stellate reticulum-like cells with focal nuclear expression is suggestive of its role in evading apoptosis rather than in the proliferation of neoplastic cells in Ameloblastoma.

Co-expression of p53 and Survivin in the present study implicates that these two proteins may have a combined role in inhibiting apoptosis, where mutant p53 led to up-regulation of Survivin. But the expression of only p53 or Survivin in few tissues also cannot be ignored. Though possible explanation was obtained through literature review, the significance of clinical and other molecular factors needs to be explored. The present study was done to throw light on nuclear and cytoplasmic expression of Survivin in relation to p53 in Ameloblastoma which would add-up to the existing understanding about its biological behavior and explore new and better therapeutic results. Further molecular studies with large sample size are required to confirm these findings.

V. Acknowledgements

We wish to thank Dr. Kaveri Hallikeri, Professor and Head, SDM College of Dental Sciences and Hospital, Dharwad, Dr. Amsavardani Tayaar @ Padmini. S, Professor, SDM College of Dental Sciences and Hospital, Dharwad and Dr. M V Muddapur, Statistician, SDM College of Dental Sciences and Hospital, Dharwad for their valuable support in the course of the study.

References Références Referencias

1. Kumamoto H. Molecular alterations in the development and progression of odontogenic tumors. *Oral Med Pathol* 2010; **14**: 121-130.
2. Kumamoto H. Molecular pathology of odontogenic tumors. *J Oral Pathol Med* 2006; **35**: 65-74.
3. Philipsen HP. *WHO Classification of Tumors: Pathology and genetics of head and neck tumors*. Lyon:IARC Press, 2005.
4. Li F, Ambrosini G, Chu EY, et al. Control of apoptosis and mitotic spindle checkpoint by survivin. *Nature* 1998; **396**: 580-584.
5. Miller C, Mohandas T, Wolfd D, et al. Human p53 localized to short arm of chromosome 17. *Nature* 1986; **319**: 783-784.
6. Loro LL, Vintermyr OK, Johannessen AC. Apoptosis in normal and diseased oral tissues. *Oral Dis* 2005; **11**: 274-287.
7. Shi Y. Survivin structure: crystal unclear. *Nat Struct Biol* 2000; **7**: 620–623.
8. Altieri DC. The case for survivin as a regulator of microtubule dynamics and cell - death decisions. *Current Opinion in Cell Biology* 2006; **18**: 609-615.
9. Knauer SK, Mann W, Stauber RH. Survivin's dual role: an export's view. *Cell Cycle* 2007; **6**: 518-521.

10. Stauber RH, Mann W, Knauer SK. Nuclear and cytoplasmic survivin: molecular mechanism, prognostic, and therapeutic potential. *Cancer Res* 2007; **67**: 5999-6002.
11. Knauer SK, Krämer OH, Knösel T, et al. Nuclear export is essential for the tumor-promoting activity of survivin. *FASEB J* 2007; **21**: 207-216.
12. Qi G, Tuncel H, Aoki E, et al. Intracellular localization of survivin determines biological behavior in colorectal cancer. *Oncol Rep* 2009; 22: 557-562.
13. Li F, Yang J, Ramnath N, et al. Nuclear or cytoplasmic expression of survivin: What is the significance? *Int J Cancer* 2005; 114(4):509–512.
14. Mirza A, McGuirk M, Hockenberry TN, et al. Human survivin is negatively regulated by wild-type p53 and participates in p53-dependent apoptotic pathway. *Oncogene* 2002; **21**: 2613-2622.
15. L Lo Muzio, G Pannone, S Staibano, et al. Survivin expression in oral squamous cell carcinoma. *Brit J of Canc* 2003; **89**: 2244 – 2248.
16. Chen P, Li J, Ge LP, et al. Prognostic value of survivin, X-linked inhibitor of apoptosis protein and second mitochondria-derived activator of caspases expression in advanced non-small-cell lung cancer patients. *Respirology* 2010; **15**: 501-509.
17. Choi J, Chang H. The expression of MAGE and SSX, and correlation of COX2, VEGF, and survivin in colorectal cancer. *Anticancer Res* 2012; **32**: 559-564.
18. Nassar A, Sexton D, Cotsonis G, et al. Survivin expression in breast carcinoma: correlation with apoptosis and prognosis. *Appl Immunohistochem Mol Morphol* 2008; **16**: 221-226.
19. Kim JY, Chung JY, Lee SG, et al. Nuclear interaction of Smac/DIABLO with Survivin at G2/M arrest prompts docetaxel-induced apoptosis in DU145 prostate cancer cells. *Biochem Biophys Res Commun* 2006; **350**: 949-954.
20. Ito T, Shiraki K, Sugimoto K, et al. Survivin promotes cell proliferation in human hepatocellular carcinoma. *Hepatology* 2000; **31**: 1080-1085.
21. Shintani M, Sangawa A, Yamao N, et al. Immunohistochemical expression of nuclear and cytoplasmic survivin in gastrointestinal carcinoma. *Int J Clin Exp Pathol* 2013; **6**: 2919-2927.
22. deOliveira MG, da Silva Lauxen I, Chaves ACM, et al. Odontogenic Epithelium: Immunolabeling of Ki-67, EGFR and Survivin in Pericoronal Follicles, Dentigerous Cysts and Keratocystic Odontogenic Tumors. *Head and Neck Pathol* 2010; **5**: 1–7.
23. Kumamoto H, Ooya K. Expression of survivin and X chromosome-linked inhibitor of apoptosis protein in ameloblastomas. *Virchows Arch* 2004; **444**: 164–70.
24. Andric M, Dozic B, Popovic B, et al. Survivin expression in odontogenic keratocysts and correlation with cytomegalovirus infection. *Oral Dis* 2010; **16**: 156–159.
25. Barboza CA, Pereira Pinto L, Freitas Rde A, et al. Proliferating cell nuclear antigen (PCNA) and p53 protein expression in ameloblastoma and adenomatoid odontogenic tumor. *Braz Dent J* 2005; **16**: 56-61.
26. Carvalhais JN, de Aguiar, de Araujo VC, et al. P53 and MDM2 expression in odontogenic cysts and tumours. *Oral Dis* 1995; **5**: 218-222.
27. Lens SM, Vader G, Medema RH, et al. The case for Survivin as mitotic regulator. *Curr Opin Cell Biol* 2006; **18**: 616–622.
28. Knauer SK, Bier C, Habtemichael N, et al. The Survivin-Crm1 interaction is essential for chromosomal passenger complex localization and function. *EMBO Rep* 2006; **7**: 1259–1265.
29. Li F. Role of surviving and its splice variants in tumorigenesis. *Br J Cancer* 2005; **92**: 212–216.
30. Parenti A, Leo G, Porzionato A, et al. Expression of survivin, p53 and caspase 3 in Barrett's esophagus carcinogenesis. *Human Pathol* 2006; **37**: 16–22.
31. Adamkov M, Halasova E, Rajcani J, et al. Relation between expression pattern of p53 and survivin in cutaneous basal cell carcinomas. *Med Sci Monit* 2011; **17**: 74-80.
32. Ranade KJ, Nerurkar AV, Phulpagar MD, et al. Expression of Survivin and p53 proteins and their correlation with hormone receptor status in Indian breast cancer patients. *Indian J Med Sci* 2009; **63**: 481-490.
33. Halasova E, Adamkov M, Kavcova E, et al. Expression of anti-apoptotic protein survivin and tumor suppressor p53 protein in patients with pulmonary carcinoma. *Eur J Med Res* 2009; **14**: 97-100.
34. El-Sissy NA. Immunohistochemical detection of p53 protein in ameloblastoma types. *Eas Mediterra Health J* 1999; **5**: 478-489.
35. Al-Salihi KA, Li LY, Azlina A. P53 gene mutation and protein expression in ameloblastomas. *Braz J Oral Sci* 2006; **5**: 1034-1040.
36. Hollstein M, Sidransky D, Vogelstein B, et al. p53 mutations in human cancers. *Science* 1991; **253**: 49–53.
37. Al-Fayad DWS. Immunohistochemical Expression of P53 in Different Types of Ameloblastoma. *Al-Anbar University* 2010; **8**: 66-73.
38. Bai L, Zhu WG. p53: Structure, Function and Therapeutic Applications. *J Cancer Mol* 2006; **2**: 141-153.
39. Altieri DC. Survivin, versatile modulation of cell division and apoptosis in cancer. *Onco* 2003; **22**: 8581–8589.

Figure Legends

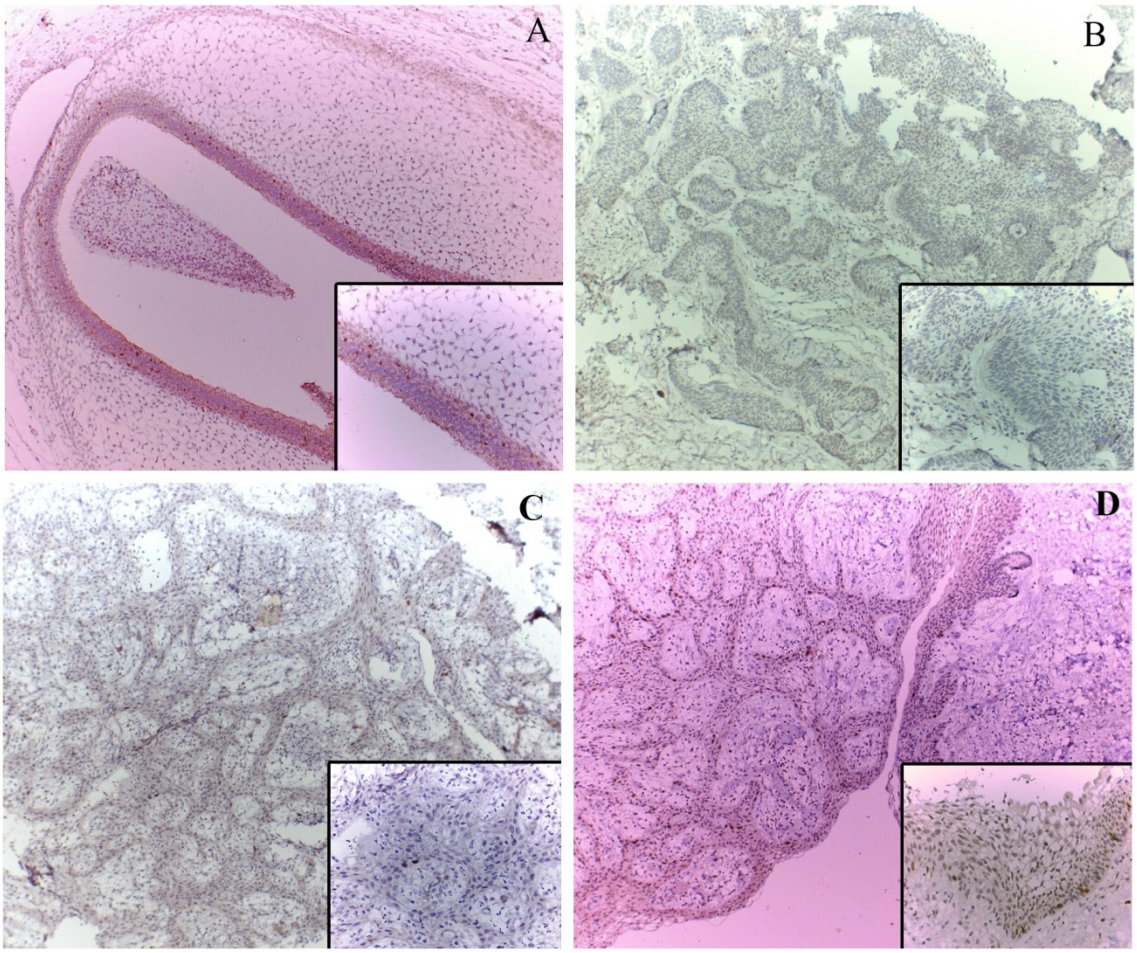


Figure 1 : Expression of p53 in tooth germ and Ameloblastoma

a) Intense p53 expression in tooth germ (Original magnification x10). p 53 nuclear expression in inner enamel epithelial cells (Inset-Original magnification x40) (Immunostaining: DAB chromogen, p53 monoclonal antibody).

b) Intense p53 expression in follicular ameloblastoma (Original magnificationx10). p 53 nuclear expression in ameloblast-like cells and stellate reticulum-like cells (Inset-Original magnificationx40) (Immunostaining: DAB chromogen, p53 monoclonal antibody).

c) Intense p53 expression in plexiform ameloblastoma (Original magnificationx10). P 53 nuclear expression in peripheral and central neoplastic cells (Inset-Original magnificationx40) (Immunostaining: DAB chromogen, p53 monoclonal antibody).

d) Intense p53 expression in unicystic ameloblastoma showing intraluminal proliferation in plexiform pattern (Original magnification x10). P 53 nuclear expression in basal and suprabasal cells (Inset-Original magnificationx40) (Immunostaining: DAB chromogen, p53 monoclonal antibody).

This page is intentionally left blank

Global Journal of Medical Research: J
Dentistry and Otolaryngology
Volume 14 Issue 6 Version 1.0 Year 2014
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

Oral Submucous Fibrosis: A Progressive Debilitating Oral Web Disease

By Abhilash. R. Krishnan & Jayakrishnan
Sri Sankara Dental College, Kerala University, India

Abstract- Amongst the list of pre-malignant conditions, Oral Submucous Fibrosis (OSMF) forms one of the most debilitating diseases of the oral cavity. It is predominantly seen among populations using betel quid, indicating areca nut as the most conspicuous agent in the etiological agents. A clear dose-dependent relationship In relation to both the duration and frequency of chewing areca nut was revealed, although other risk factors such as excessive use of chilies and spices and malnutrition were also put forth. Research in some aspects in the background of progressive fibrosis associated with the disease, has allowed to put light onto the mechanisms involved in the malignant transformation to the most prevalent, potentially malignant oral disorder in south Asia. Reduction in matrix metalloproteinases (MMP's) and increased secretion of tissue inhibitors of MMP's play the most significant role in collagen accumulation whilst fibrogenic cytokines, mainly TGF-b over expression leading to increased production of collagen. There is increasing incidence of the disease and subsequent malignant transformation..

Keywords: areca nut, fibrous bands, betel quid, vesicles, burning sensation, reduced mouth opening, marbled appearance, hyaluronidase.

GJMR-J Classification: NLMC Code: WU 113

Strictly as per the compliance and regulations of:

Oral Submucous Fibrosis: A Progressive Debilitating Oral Web Disease

Abhilash. R. Krishnan [α] & Jayakrishnan [σ]

Abstract- Amongst the list of pre-malignant conditions, Oral Submucous Fibrosis (OSMF) forms one of the most debilitating diseases of the oral cavity. It is predominantly seen among populations using betel quid, indicating areca nut as the most conspicuous agent in the etiological agents. A clear dose-dependent relationship In relation to both the duration and frequency of chewing areca nut was revealed, although other risk factors such as excessive use of chilies and spices and malnutrition were also put forth. Research in some aspects in the background of progressive fibrosis associated with the disease, has allowed to put light onto the mechanisms involved in the malignant transformation to the most prevalent, potentially malignant oral disorder in south Asia. Reduction in matrix metalloproteinases (MMP's) and increased secretion of tissue inhibitors of MMP's play the most significant role in collagen accumulation whilst fibrogenic cytokines, mainly TGF-b over expression leading to increased production of collagen. There is increasing incidence of the disease and subsequent malignant transformation. Hence the article focuses to review the etiology, pathogenesis, clinical features and management of OSMF.

Keywords: areca nut, fibrous bands, betel quid, vesicles, burning sensation, reduced mouth opening, marbled appearance, hyaluronidase.

I. Introduction

On the basis of clinical and histopathological findings, Pindborg defined Oral Submucous Fibrosis as "an insidious chronic disease affecting any part of the oral cavity and sometimes the pharynx. Although occasionally preceded by and or associated with vesicle formation, it is always associated with a juxta epithelial inflammatory reaction followed by a fibro elastic change of the lamina propria with epithelial atrophy leading to stiffness of the oral mucosa and causing trismus and inability to eat".

It is a slow, progressive fibrotic disease causing fibroelastic change and inflammation in the oral mucosa, leading to inability to open the mouth, swallow or speak[1, 2]. This was accredited to the accumulation of inelastic fibrous tissue in the juxta epithelial region of the oral mucosa, along with concomitant muscle degeneration[3]. The most common site to be involved was found to be the buccal mucosa, although other parts of the oral cavity were also found to involve, including the pharynx[4].

These reactions may be the result of direct stimulation from exogenous antigens like Areca alkaloids or changes in the tissue antigenicity that may lead to an autoimmune response.

II. Epidemiology

Most common prevalence was found among the Indians, ranging from 0.2% to 1.2%. A survey revealed an overall prevalence of up to 4% in kerala[5]. Amongst the reported cases 0.5% was found to be in women[6]. The reason for the rapid increase of the disease is reported to be due to an upsurge in the popularity of commercially available areca nut in south asia[7].

III. Etiology and Pathophysiology

The etiology of OSMF is still not fully unwinded. It is considered to be a multifactorial disease. According to Liao, the areca nut in betel quid plays a major role in the pathogenesis of OSMF[8]. There was no significant evidence to relate the habits of smoking or alcohol consumption alone in the pathogenesis of the disease[9, 10]. Arecoline, an active alkaloid found in betel quid, stimulates fibroblasts to increase production of collagen by 150%[11]. Chung-Hung in 2006, studied that arecoline was found to elevate mRNA and protein expression of cystatin C, a non glycosylated basic protein consistently upregulated fibrotic diseases, in a dose dependent manner in persons with OSMF[12].

Yet another hypothesis grips on the fact that, the high copper content of areca nut acts as an initiating factor in OSMF. This was suggested by the fact that, soluble copper levels in oral fluids significantly increases after chewing areca nut for 5-30 minutes[13].

Other factors thought to cause OSMF include iron and vitamin B complex deficiency that derange the repair of inflamed oral mucosa, leading to defective healing and resultant scarring. As a result, the oral mucosa becomes more prone to the effects of areca nut and chilies.

The role of chilies and spices in the list of etiological agents is still a topic of debate among the scientific community. It was shown that the capsaicin in chilies stimulates the widespread palatal fibrosis in rats[14]. However, the incidence of OSMF was lower in Mexico and South America than in India, despite a higher dietary intake of chillies[15].

Author α: Department of Oral Medicine and Radiology, Sri Sankara Dental College, Varkala Trivandrum (dist.), Kerala, India.
e-mail: abhilashkrishnan611@gmail.com
Author σ: Department of Oral Medicine and Radiology, Sri Sankara Dental College, Varkala Trivandrum (dist.), Kerala, India.
e-mail: jayakrisjk@gmail.com

Genetics is believed to play a role in OSMF patients, which leads to immune system changes. People without the betel nut chewing and chilly ingestion were reported to have OSMF[16]. Mutations in APC gene and low expression of wild type TP 53 tumor suppressor gene in affected patients, increased the risk of malignant transformation[17].The increase in CD4 cells with HLA-DR in OSMF tissues suggest that lymphocytes are activated and number of langerhans cells increased. The presence of these immunocompetent cells and with increased CD4 to CD8 ratio in OSMF tissue, suggest an ongoing cellular immune response resulting in imbalance of immune regulation and an alteration in local tissue architecture. These reactions can be from the direct stimulation from exogenous antigens or of changes in tissue antigenicity that leads to an autoimmune response[18]. Increased levels of proinflammatory cytokines and reduced antifibrotic interferon gamma (IFN-gamma) in patients with OSMF were demonstrated[19].

IV. Clinical Features

OSMF was found to be predominant in females[16]. The mean age was 43 years. Burning sensation and discomfort in the oral mucosa during mastication was the most common complaint amongst the reported cases. There is associated depapillation of the tongue (Fig: 1). Progressive changes including difficulty in mastication, reduced salivation, dysphasia, pain in the ears and loss of auditory acuity due to stenosis of the pharyngeal end of Eustachian tubes.

In advanced cases, the jaws become inseparable and totally inelastic and plastic and nutrition can be maintained only by pushing the food into mouth. The buccal mucosa is frequently ulcerated and secondarily infected consequent to ischemia and constant pressure of the mucosa against the buccal aspect of the teeth.

Pindborg provided staging criteria for OSMF[20]. He divided the stages according to the clinical presentation of the disease as:

Stage 1: Stomatitis including erythematous mucosa (Fig: 2), vesicles, mucosal ulcers, Melanotic mucosal pigmentation and mucosal petechiae

Stage 2: fibrosis occurs in ruptured vesicles and ulcers as they heal (Fig: 3), which is the hallmark of this stage

Early lesions demonstrate blanching of oral mucosa and older lesions presents with vertical and circular palpable fibrous bands in the buccal mucosa and around the mouth opening or lips, resulting in mottled, marble like appearance(Fig:4) of the mucosa.

This stage is characterized by reduced mouth opening, stiff and small tongue, fibrotic and depigmented gingiva, shrunken bud like uvula.

Stage 3: speech and hearing deficits may occur as a part of the sequel.

Figure 1

Figure 2

Figure 3

Figure 4

Histological examination reveals severely atrophic epithelium with complete loss of rete ridges. Varying degrees of epithelial atypia may be present. The underlying lamina propria exhibits severe hyalinization, with homogenization of collagen. Cellular elements and blood vessels are greatly reduced[18].

V. Investigations

Clinical presentation of the disease plays an upper hand in the diagnosis phase. Other investigations include complete hemogram, toludine blue test, incisional biopsy and immune fluorescence tests [21].

VI. Management

The earlier the treatment begins, better it is for the patient. The treatment modes depend upon the state of the disease at the time of presentation. If it is detected at a very early stage, cessation of the habit would provide sufficient relief. But moderate to severe stages of OSMF are almost always irreversible. Usually the disease is very resistant to treatment. The proposed treatment regimens aims hinder the progression of the disease process. Submucosal injected steroids and hyaluronidase, placental extracts, oral iron preparations and topical vitamin A and steroids are some the agents that have been used[22]. All of these therapies are usually palliative. Surgical treatment includes simple excision of fibrotic bands, split thickness skin grafting following bilateral temporalis myotomy or coronoidectomy[11]. The use of oral stent as an adjunct to surgery to prevent relapse of the fibrotic bands has also been studied[23]. Other treatment modalities include administration of Antoxid OD for 6-8 weeks, Lycored OD for 6-8 weeks and physiotherapy for improving mouth opening[22].

VII. Malignant Transformation

OSMF is a well recognized potentially malignant disorder of the oral mucosa. Simultaneous occurrence of oral leukoplakia and OSMF is demonstrated to carry a higher risk for malignancy than with OSMF alone which amounts from 4-13%[24].

VIII. Conclusion

The incidence of OSMF is on the rise with the popularity of commercially available betel nut products. It also carries a significant morbidity rate from oral cancer. So it is desirable that OSMF is diagnosed as early as possible. At best, it is palliate the symptoms of OSMF. In palliative care, the patient is the focus of treatment, not the disease. A stepwise approach to OSMF management is advocated, with the level of entry into the treatment algorithm being dictated by the disease severity and response to treatment. Although clinicians strive to achieve lesion resolution and primary outcomes of therapies aims to concentrate on symptom reduction and improvement of quality of life. Intervention studies and public health awareness programme linked with OSMF condition and habits may prove the best way to control disease process at the root level.

IX. Acknowledgements

1. Govind. S.L and Indu Nambiar, House surgeon, Sri Sankara dental college Varkala, Trivandrum (dist.)
2. Anoop. A and Priyanka, House surgeon, Sri Sankara dental college Varkala, Trivandrum (dist.)

References Références Referencias

1. Zain RB, Ikeda N, Gupta PC et al. oral mucosal lesions associated with betel quid, areca nut and tobacco chewing habits: consensus from a workshop held in Kuala Lampur, Malayasia. November 25-27, 1996. J Oral Pathol Med 1999;28:1-4.
2. Rajendran R. oral submucous fibrosis: etiology, pathogenesis and future research. Bull World Health Org 1994;72(6):985-96.
3. Aziz SR (1997) oral submucous fibrosis: an unusual disease. J N J Dental Association 68: 17-19.
4. Paissat DK, oral submucous fibrosis. Int J Oral Surg 1981 (10) 310-312.
5. Pindborg JJ, Mehta FS. Prevalence of oral submucous fibrosis among Indian villagers. Br J Cancer 1968;22:646-54.
6. Shear M, Lemmer J, Dockrat IS. Oral submucous fibrosis in South African Indians: an epidemiological study. S Afr Med Sci 1967; 32: 41-6.
7. Ekanayaka and Titakaratne, J carcinogene Mutagene 2013, S5: oncogenomics of head and neck.
8. Liao PH. Adenamatoid polyposis coli gene mutation and decreased wild type p53 protein expression in oral submucous fibrosis: a preliminary investigation. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. Aug 2001;92(2):202-7.
9. Ariyawardana A, Athukorala AD, Arulanandam A. Effect of betel chewing, tobacco smoking and alcohol consumption on oral submucous fibrosis: A case-control study in Sri Lanka. J Oral Pathol Med. Apr 2006;35(4):197-201.
10. Ranganathan K, Devi MU, Joshua E, et al. Oral submucous fibrosis: A case control study in Chennai, South India. J Oral Pathol Med. May 2004;33(5):274-7.
11. Caniff JP, Harvey W, Harris M. Oral submucous fibrosis: its pathogenesis and management. Br Dentl 1986; 160: 429-34.
12. Chung-Hung T, Shun-Fa Y, Yu-Chao C. The upregulation of cystatin C in oral submucous fibrosis. Oral Oncol. 2006;24:102-6.
13. Trivedy CR, Warnakulasuriya KA, Peters TJ, et al. Raised tissue copper levels in oral submucous fibrosis. J Oral Pathol Med. Jul 2000;29(6):241-8.
14. Sirsat SM, Khanolkar VR. Submucous fibrosis of the palate in diet preconditioned Wistar rats. Induction by local painting of capsaicin--an optical and

electron microscopic study. Arch Pathol. Aug 1960;70:171-9.
15. Pillai R, Balaram P, Reddiar KS. Pathogenesis of oral submucous fibrosis. Relationship to risk factors associated with oral cancer. Cancer. Apr 15 1992;69(8):2011-20.
16. Seedat HA, van Wyk CW. Betel-nut chewing and submucous fibrosis in Durban. S Afr Med J. Dec 3 1988;74(11):568-71.
17. Liao PH, Lee TL, Yang LC, et al. Adenomatous polyposis coli gene mutation and decreased wild-type p53 protein expression in oral submucous fibrosis: a preliminary investigation. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. Aug 2001;92(2):202-7.
18. Haque MF, Harris M, Meghji S, Speight PM. An immunohistochemical study of oral submucous fibrosis. J Oral Pathol Med. 1997;26(2):75-82.
19. Haque MF, Meghji S, Khitab U, Harris M. Oral submucous fibrosis patients have altered levels of cytokine production. J Oral Pathol Med. Mar 2000;29(3):123-8.
20. Pindborg JJ, Mehta FS, Gupta PC, Daftary DK. Prevalence of oral sub mucous fibrosis among 50915 Indian villagers. BrJ Cancer 1968; 22: 646-54.
21. Sabharwal R et al. Oral Submucous Fibrosis-A review. J Adv Med Dent Scie Res 2013; 1(1): 29-37.
22. Borle RM, Borde SR. management of oral submucous fibrosis: a conservative approach. J Oral Maxillofac Surg 1991; 49(8): 788-91.
23. Le PV, Gornitsky et al. Oral Stent as treatment adjunct for oral submucous fibrosis. Oral Surg Med Oral Pathol 1996;81(2): 148-50.
24. Lian IeB 2013. Progression of precancerous lesions to oral cancer: oral oncol 49: 427-430.

Global Journal of Medical Research: J
Dentistry and Otolaryngology
Volume 14 Issue 6 Version 1.0 Year 2014
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

General Anaesthesia in Paediatric Dentistry – An Institutional Experience

By Dr. Saurabh Kumar, Dr. Runki Saran & Dr. Kalyana Chakravarthy Pentapati

Manipal College of Dental Sciences, Manipal University, India

Abstract- *Background:* Dentists who routinely treat children will encounter some patients whose behaviour cannot be managed adequately even with the use of medication and restrains. Young children with lacking cooperative ability having extensive dental caries or children with certain systemic conditions like cerebral palsy who cannot adequately control their own physical movements and mentally handicapped children are some of the cases where pharmacological means of behaviour management for dental treatment is indicated. In such situations dentist can opt for treatment under conscious or deep sedation or a treatment under general anaesthesia.

Objective: The purpose of this paper is to present few case series of children with both systemic condition and severe dental condition that required dental treatment under general anaesthesia.

Conclusion: General anaesthesia can assist in providing quality dental care in such patients who could not be treated otherwise.

Keywords: *general anaesthesia, pediatric dentistry, restorations, prevention.*

GJMR-J Classification: *NLMC Code: WU 105*

General Anaesthesia in Paediatric Dentistry – An Institutional Experience

Dr. Saurabh Kumar [α], Dr. Runki Saran [σ] & Dr. Kalyana Chakravarthy Pentapati [ρ]

Abstract- Background: Dentists who routinely treat children will encounter some patients whose behaviour cannot be managed adequately even with the use of medication and restrains. Young children with lacking cooperative ability having extensive dental caries or children with certain systemic conditions like cerebral palsy who cannot adequately control their own physical movements and mentally handicapped children are some of the cases where pharmacological means of behaviour management for dental treatment is indicated. In such situations dentist can opt for treatment under conscious or deep sedation or a treatment under general anaesthesia.

Objective: The purpose of this paper is to present few case series of children with both systemic condition and severe dental condition that required dental treatment under general anaesthesia.

Conclusion: General anaesthesia can assist in providing quality dental care in such patients who could not be treated otherwise. It should not be used routinely for the convenience of the dental team, but rather should be seen as the last resource for treatment.

Keywords: general anaesthesia, pediatric dentistry, restorations, prevention.

I. Introduction

The administration of local anaesthesia, sedation and general anaesthesia (GA) is an integral part of pediatric dental practice (AAPD, 2004).[1] Young children (under 3 years) with extensive dental caries or children with certain systemic conditions like cerebral palsy who cannot adequately control their own physical movements or mentally handicapped children with whom physical restrain is impossible are few instances which require dental treatment under GA. (Anderson HK et al., 2004; Klaassen MAet al., 2008).[2,3] Recently, extensive caries in younger age group and an inability to accept treatment under local anaesthesia were the main reasons for the use of GA, although a medical problem was the most usual reason in children aged over 9 years. In the study by Cahuana and co-workers (2003)[4], of 1,827 patients aged below 18 requiring general anaesthesia for treatment, 50.4% had a physical or mental disability. Previous studies indicated GA for various reasons like (Vargas Roman Mdel P et al., 2003)[5] patients with physical disabilities with uncontrollable motor deficits making it impossible for them to collaborate; when local anaesthesia is not effective or for reasons of allergy; when there are uncontrollable epileptic crises. Patients with extensive dental treatment needs: when for some reason they must be treated in a single session; extensive orofacial trauma or fractured maxilla, with serious cranio-facial anomalies and the need for extensive dental care. This includes extractions, which are usually multiple, even in patients without other added problems. Patients who do not cooperate for reasons of fear or phobia or incapacity for cooperating due to physical or mental impairment or immaturity (age) or in cases of severe autism and psychosis with uncontrollable behaviour.

Though previous studies have suggested many beneficial effects such as reducing toothache-related behaviours and providing better quality of life, (Versloot J et al., 2006)[6] improvements involving less pain experience, abilities to eat and sleep and positive social impact (Low W et al., 1999)[7]; GA carries a risk for morbidity and mortality and was shown to be emotionally challenging for parents (White H et al., 2003).[8]

Hence the main objective of this report was to discuss few cases of children with both systemic conditions and extensive dental conditions that required dental treatment under GA.

II. Case No. 1

Figure 1

A six year old girl (Figure 1) reported to our clinic with the chief complaint of decayed teeth in the upper and lower, front and back region of the jaw. The child patient was known case of global developmental

Author α: Reader, Department of Pedodontics & Preventive Dentistry, Manipal College of Dental Sciences, Manipal, India.
e-mail: drsaurabh19@yahoo.co.in
Author σ: Lecturer, Faculty of Dentistry, MMMC, Manipal, India.
Author ρ: Reader, Department of Public Heath Dentistry, Manipal College of Dental Sciences, Manipal, India.

delay. On examination primary dentition was present with multiple decayed teeth (Figure 2). On the basis of history and clinical examination she was diagnosed with rampant caries. The treatment plan included oral prophylaxis, restoration of decayed teeth, bifluoride varnish application followed by extractions of grossly decayed teeth. Since the child patient was highly uncooperative with global developmental delay, the dental treatment was planned under chair-side general anaesthesia. After getting the parental consent evaluation by paediatrician, a pre-anaesthetic check-up (PAC) was done before taking up the case under chair side GA. Following the clearance given by paediatrician and anaesthetists, the child patient was admitted one day prior to the procedure. Routine blood and urine tests were performed and nil per oral (NPO) instructions were given. On the day of procedure the chair-side general anaesthesia was given by anaesthetists and the dental treatment was performed. After the finishing treatment, the child patient was shifted to intensive care unit (ICU) where the child was monitored. The following day the child patient was examined. Once satisfied the chid patient was discharged.

Figure 2 : Preoperative

Figure 3 : Extracted teeth

Treatment done under General Anaesthesia

- Oral prophylaxis
- Restoration with respect to 55 53 63 65 75 83 85
- Extraction with respect to- 54 52 51 61 62 64 74 73 72 82 84 (Figure: 3)
- Bifluoride varnish application

III. Case No. 2

Figure 4

A seven year old boy (Figure 4) reported to our clinic with the chief complaint of decayed teeth in the upper and lower, front and back region of the jaw. The child patient was known case of global developmental delay with convulsive disorder. On examination mixed dentition was present with multiple decayed teeth (Figure 5). On the basis of history and clinical examination he was diagnosed with multiple dental caries. The treatment plan included oral prophylaxis, restoration of decayed teeth, Bifluoride varnish application (Figure 6). Since the child patient was highly uncooperative with global developmental delay& seizure disorder, the dental treatment was planned under general anaesthesia. A paediatric evaluation and pre-anaesthetic check-up (PAC) was done before taking up the case under chair side general anesthesia.

Figure 5 : Preoperative

Figure 6 : Postoperative

- Oral prophylaxis
- Pit & fissure sealants with respect to16 26 36 46
- Restoration with respect to 55 65 75 74 84 85
- Bifluoride varnish application

IV. Case No. 3

Figure 7

A three year old girl (Figure: 7) reported to our clinic with the chief complain of decayed teeth in the upper and lower, front and back region of the jaw. Nothing relevant medical history was reported by parents. This was the child's first visit to dental clinics. On examination primary dentition was present with multiple decayed teeth. On the basis of history and clinical examination she was diagnosed with early childhood caries with chronic periapical abscess with respect to 75. The treatment plan included oral prophylaxis, restoration of decayed teeth, pulpectomy with respect to 75, Bifluoride varnish application. Since the child patient was highly uncooperative with lacking cognitive ability, the dental treatment was planned under general anaesthesia. A paediatric evaluation and pre-anaesthetic check-up (PAC) was done before taking up the case under chair side general anesthesia.

Figure 8 : Preoperative

Figure 9 : Post-operative

Treatment done under general anaesthesia

- Oral prophylaxis
- Pit & fissure sealants with respect to 64 65
- Restoration with respect to 51 61 62 73 74 81 84 85
- Pulpectomy with respect to75
- Bifluoride varnish application.

V. Discussion

According to **ADA Anaesthesia guidelines (2007)**[9], patients considered for general anaesthesia must be suitably evaluated prior to the start of any sedative procedure. In healthy or medically stable individuals (ASA I, II) this must consist of at least a review of their current medical history and medication use and NPO status. However, patients with significant medical considerations (e.g., ASA III, IV) may require consultation with their primary care physician or consulting medical specialist. In our cases we followed the same guidelines for a review of their current medical history and medication use and NPO status.

Because many dental patients undergoing deep sedation or general anaesthesia are mentally and/or physically challenged, it is not always possible to have a comprehensive physical examination or appropriate laboratory tests prior to administering care. When these situations occur, the dentist responsible for administering the deep sedation or general anaesthesia should document the reasons preventing the recommended preoperative management. In two of our cases the child was having systemic condition. There examination and evaluation was done after the child was admitted prior to the day of procedure of general anaesthesia.

The dentist should be responsible for sedative/anaesthetic management, adequacy of the facility and staff, diagnosis and treatment of emergencies related to the administration of deep sedation or general anaesthesia and providing the equipment, drugs and protocols for patient rescue.

VI. Conclusion

General anaesthesia (GA) can assist in providing quality dental care in such patients who could not be treated otherwise. General anaesthesia should not be used routinely for the convenience of the dental team, but rather should be seen as the last resource for treatment.

References Références Referencias

1. Guidelines for Monitoring and Management of Pediatric Patients During and After Sedation for Diagnostic and Therapeutic Procedures: An Update. Developed through a collaborative effort between the American Academy of Pediatrics and the AAPD. Available at http://www.aapd.org/media/policies.asp
2. Anderson HK, Drummond BK, Thomson WM. Changes in aspects of children's oral-health-related quality of life following dental treatment under general anesthesia. Int J Paediatr Dent 2004; 14:317-25.
3. Klaassen MA, Veerkamp JS, Hoogstraten J. Dental treatment under general anesthesia: the short-term change in young children's oral-health-related quality of life. Eur Arch Paediatr Dent 2008;9:130-7.
4. Cahuana A, Reverón L, El Halabi L. Odonto-pediatríay anestesiageneral. Revisióncasuística. Arch Odontoestomatol 2003;19:240-4.
5. Vargas Roman Mdel P, Rodriguez Bermudo S, Machuca Portillo G.Dental treatment under general anaesthesia: a useful procedure in the third millennium? Med Oral. 2003;8:129-35.
6. Versloot J, Veerkamp JS, Hoogstraten J. Dental Discomfort Questionnaire for young children following full mouth rehabilitation under general anesthesia: a follow-up report. Eur Arch Paediatr Dent 2006;7:126-9.
7. Low W, Tan S, Schwartz S. The effect of severe caries on the quality of lifein young children. Pediatr Dent 1999;21:325-6.
8. White H, Lee JY, Vann WF Jr. Parental evaluation of quality of life measures following pediatric dental treatment using general anaesthesia. AnesthProg 2003;50:105-10.
9. Guidelines for the Use of Sedation and General Anaesthesia by Dentists: American Dental Association (2012). Available athttp://www.ada.org/~/media/ADA/About%20the%20ADA/Files/anesthesia_use_guidelines.ashx

Global Journal of Medical Research: J
Dentistry and Otolaryngology
Volume 14 Issue 6 Version 1.0 Year 2014
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

A Clinical Survey to Evaluate the Patients and Dentists Perspective on Denture Cleansing Habits in Mumbai and Navi Mumbai

By Mariam Khan, Dr. Omkar Shetty, Dr. Gaurang Mistry & Dr. Mishal De Souza

DY Patil University, School of Dentistry, India

Abstract- This study was performed to evaluate the patients and dentists perspective on denture cleansing habits. Using a prepared questionnnaire a total of 100 patients and 100 practicising dentists living in Mumbai and Navi Mumbai were surveyed, regarding their opinions and views about denture hygiene and cleansing routines. The conclusions drawn from the study, were that most of the denture wearers did not clean their dentures satisfactorily and the dentists did not provide complete information about denture cleanliness to their patients.

Keywords: denture cleansing, denture hygiene, oral health, cleansing agents, mechanical methods, professional cleansing, denture care negligence, denture staining, dental plaque, edentulism.

GJMR-J Classification: NLMC Code: WU 113

Strictly as per the compliance and regulations of:

A Clinical Survey to Evaluate the Patients and Dentists Perspective on Denture Cleansing Habits in Mumbai and Navi Mumbai

Mariam Khan [α], Dr. Omkar Shetty [σ], Dr. Gaurang Mistry [ρ] & Dr. Mishal De Souza [ω]

Abstract- This study was performed to evaluate the patients and dentists perspective on denture cleansing habits. Using a prepared questionnnaire a total of 100 patients and 100 practicising dentists living in Mumbai and Navi Mumbai were surveyed, regarding their opinions and views about denture hygiene and cleansing routines. The conclusions drawn from the study, were that most of the denture wearers did not clean their dentures satisfactorily and the dentists did not provide complete information about denture cleanliness to their patients.

Keywords: denture cleansing, denture hygiene, oral health, cleansing agents, mechanical methods, professional cleansing, denture care negligence, denture staining, dental plaque, edentulism.

I. Introduction

"The first step towards change is awareness." A holistic approach of dental health care, awareness and patient support is critically important to a long term success of the treatment. There is sparse literature on dental health awareness, attitude and oral health care among the adult population in India. Oral health has been neglected for long and the need for dental awareness cannot be overstated.

As it's said "Cleanliness is next to godliness", thus cleansing of dentures is essential for the maintenance of residual oral tissue health. We as dentists can help maintain oral tissue health by providing the information needed about denture cleansing techniques to the patients.

This survey throws light on the denture cleansing habits of the patients and dentist perspective towards training patients to maintain denture hygiene.

Author α: (Intern) Dy Patil University, School of Dentistry Navi Mumbai. e-mail: mariamkhan01041991@gmail.com
Author σ: (Dean and Head of Department Prosthodontics) Dy Patil University, School of Dentistry Navi Mumbai. e-mail: oshetty123@gmail.com
Author ρ: (Professor Prosthodontics) Dy Patil University, School of Dentistry Navi Mumbai. e-mail: gaurang.mistry11@gmail.com
Author ω: (Lecturer) Dy Patil University, School of Dentistry Navi Mumbai. e-mail: mishald@gmail.com

II. Materials and Methods

In this study, a total of 100 patients and 100 practising dentists living in Mumbai and Navi Mumbai were surveyed regarding their opinions and views about denture hygiene and cleansing routine, using a prepared questionnaire. This survey was undertaken from August 15, 2014 to September 15, 2014.

III. Result

In this study, it has been revealed that all the 100 practising dentists advise denture cleansing habits to their patients
(Fig 1).

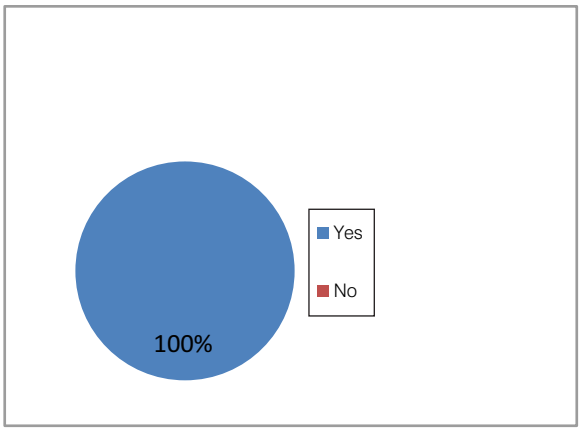


Figure 1 : Do the dentist explain the importance of denture cleansing

47% dentists advise their patients brushing with toothpaste along with denture cleansing agents while the second most preferred method is soaking their dentures into commercial tablets (36%).Brushing with toothpastes and cleansing with soap and water come next at 6% and 11% respectively. (Fig 2).

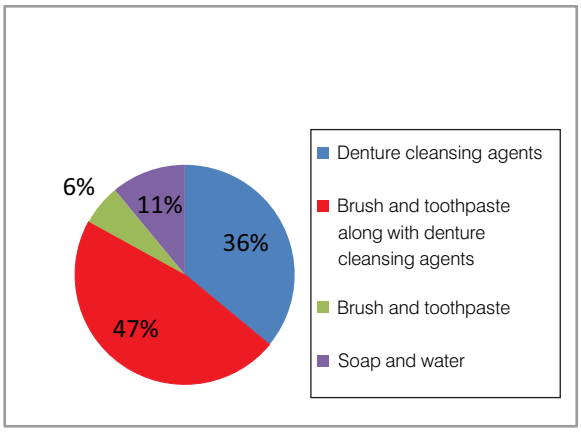


Figure 2 : Methods of denture cleansing advised by the dentists

Denture cleansing agents advised are sodium perborate 80% and alkaline peroxide 16%(Fig 3).

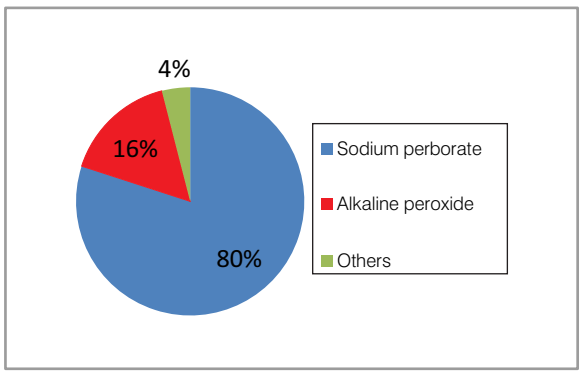


Figure 3 : Denture cleansing agents advised by the dentists

While 70% of the dentists recommend cleansing of the dentures once a day, 20% recommend twice a day and 10% suggest once a day (Fig 4).

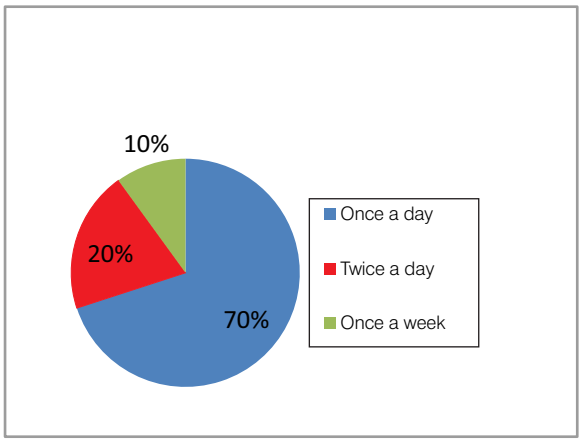


Figure 4 : Dentists recommending cleansing of dentures

98% dentists evaluate dentures for cleansing during recalls, whereas 2% do not recall their patients (Fig 5).

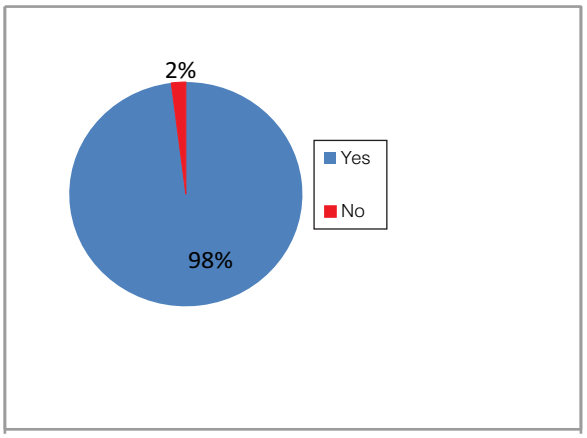


Figure 5 : Denture evaluation during recall visits

Only 44% dentists advise professional cleansing of dentures once a year, 34% twice a year, the rest advice it less frequently (Fig 6).

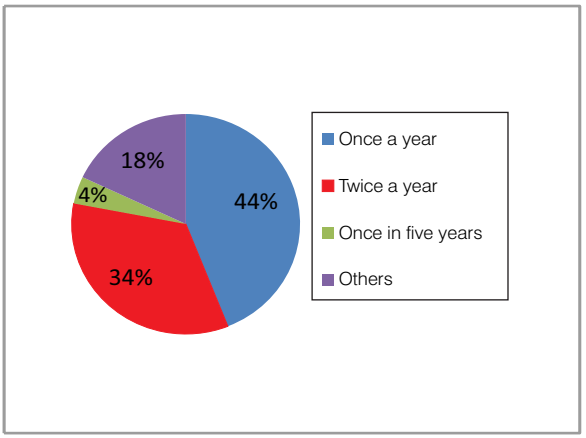


Figure 6 : Professional cleaning of the dentures advised by the dentists

Majority of the dentists 58% instruct patients to clean their dentures after meals, followed by 32% who instruct cleansing after meals as well as before sleeping (Fig 7).

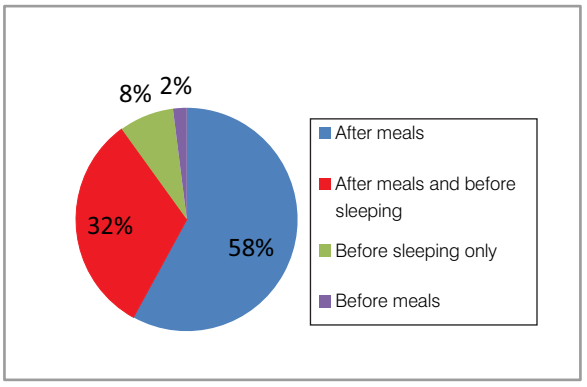


Figure 7 : Dentists recommendations to clean the dentures

34% dentists provide instructs verbally while 21% provide by clinical demonstration. Both verbal and clinical demonstration are provided by 25% dentists. Only 20% provide written instructions (Fig 8).

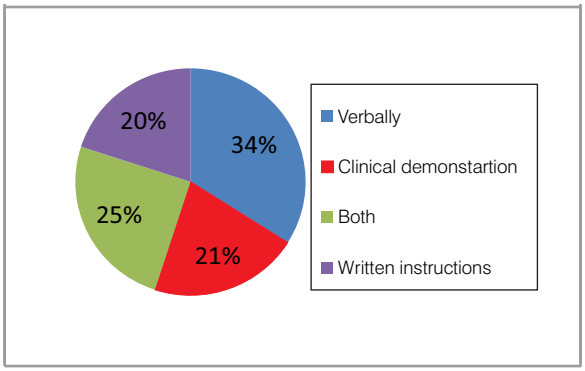


Figure 8 : Mode of providing instructions by the dentists

58% dentists found patient cleansing habits as average, followed by 18% who evaluate them as fair, 14% as unsatisfactory, and only 10% evaluate patient cleansing habits as good (Fig 9).

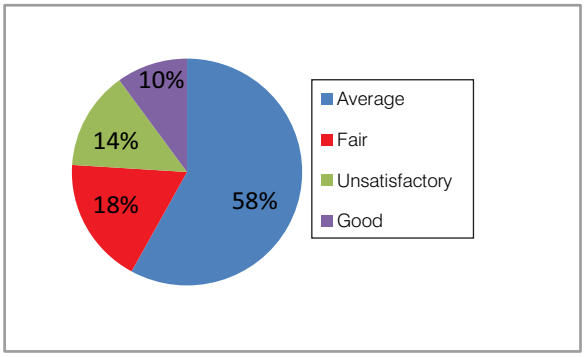


Figure 9 : Evaluation of patients cleansing habits

When the dentists were asked for the reason of negligence of the professional cleaning of the dentures, 33% said patient negligence of professional denture cleansing is due to the cost factor, 29% said it was due to the time factor. 25% was from not wearing the dentures for a day and 13% dentists evaluated the other factors such as patient unawareness and laziness.

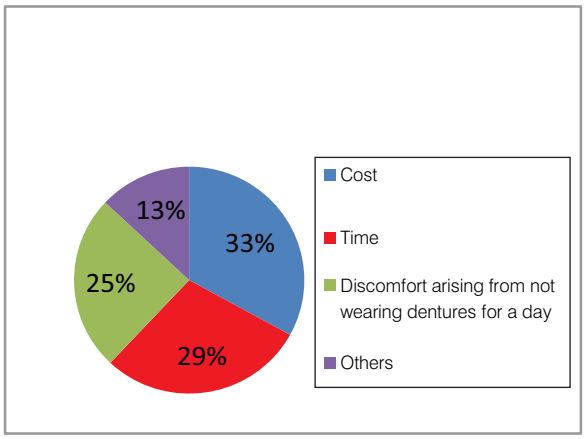


Figure 10 : Negligence for the professional cleansing of dentures according to the dentists

The result of the present survey from the patients perspective indicated that 61% patients did not feel their dentures to be as nice as new, unlike the other 39% (Fig 11). Majority of the patients 92% felt regular cleansing of their dentures are necessary (Fig 12).

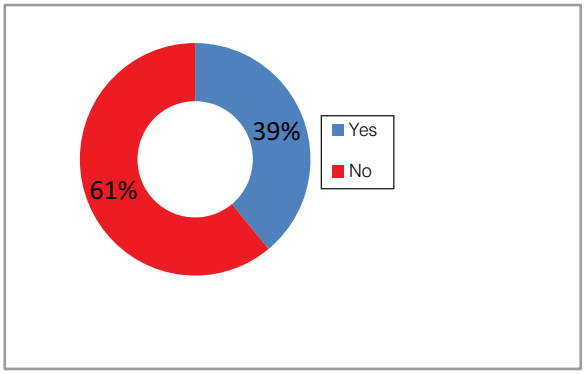


Figure 11 : Do the patients feel their dentures to be as nice as new

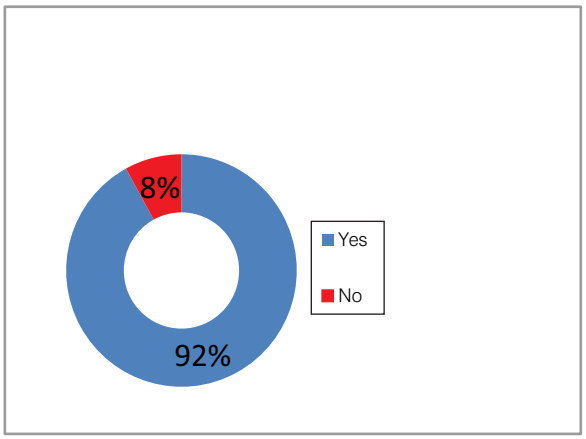


Figure 12 : Do the patients feel regular cleansing of dentures are important

56% patients clean their dentures twice a day followed by 36% who clean it thrice a day and 8% who clean them once a day (Fig 13).

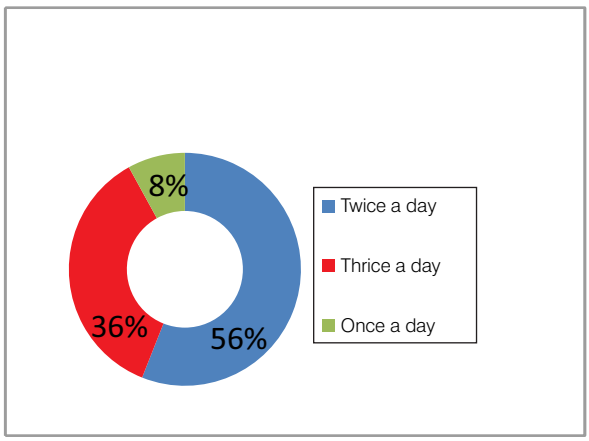


Figure 13 : Frequency of denture cleansing followed by the patients

The most common denture cleansing methods patients use are denture cleansing agents 25%, 35% a brush and toothpaste alone, and a brush and toothpaste along with denture cleansing agent is 25%. Only 15% use soap and water (Fig 14).

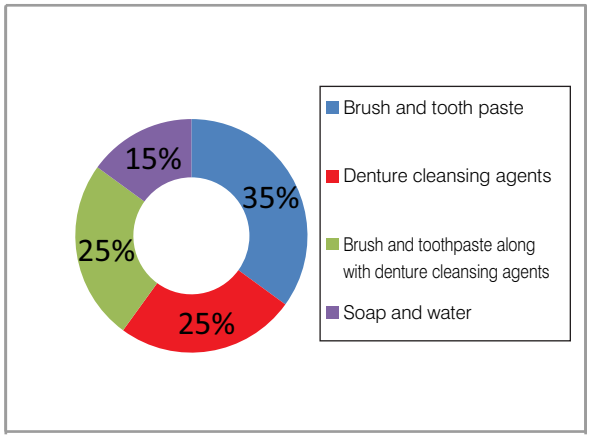


Figure 14 : Methods of denture cleansing followed by the patients

It is suprising to know that 17% patients claim that their dentists do not inform them of how to clean their dentures (Fig 15).

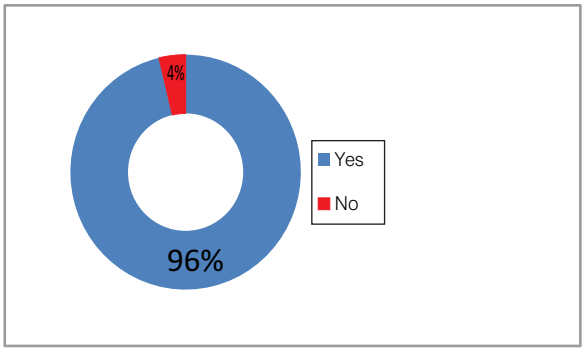


Figure 15 : Were instructions about denture cleansing provided by the dentists

76% of the patients claimed the dentists recommend cleansing of dentures after meals, 15% recommend before sleeping, and 9% recommend before sleeping along with after meals (Fig 16).

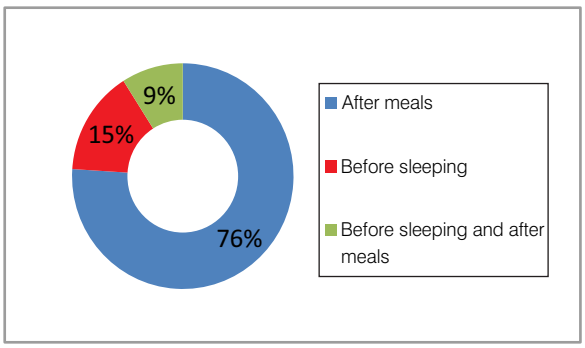


Figure 16 : Dentists advise patients to clean their dentures

According to patients, majority of dentists 54% provide instructions verbal, 23% by clinical demonstration, 12% by both, and 11% by giving written instructions (Fig 17). The most common habits amongst patients leading to staining of dentures is consumption of tea and coffee 76%, 12% take to smoking, 8% beetle nut/ tobacco and remaining 4% pan chewing (Fig 18).

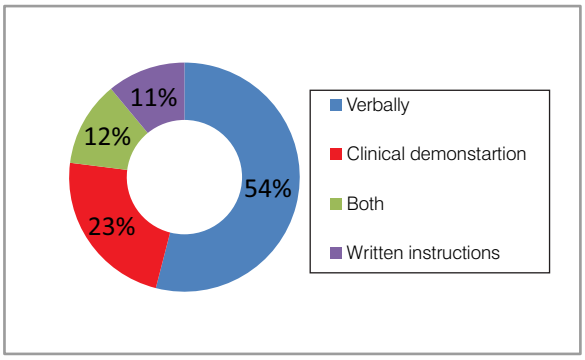


Figure 17 : Mode of providing instructions to the patients

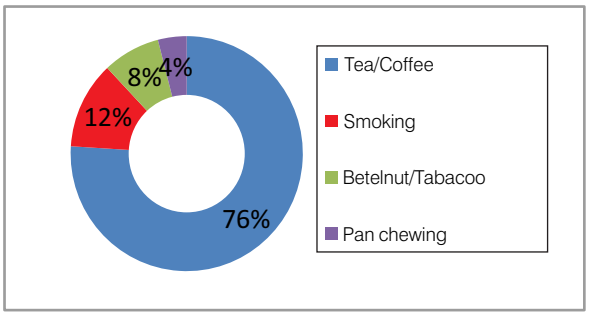


Figure 18 : Habits leading to staining of dentures

61% patients consider stains on dentures as socially unacceptable (Fig 19). 40% patients are unaware of professional cleansing of dentures, 36% neglect professional denture cleansing because of cost, 18% because of discomfort arising from not wearing dentures for a day and 6% due to lack of time (Fig 20).

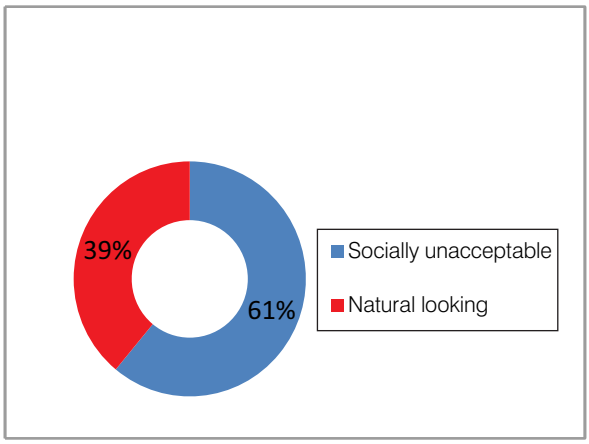


Figure 19 : Patients perspective regarding stains on a denture

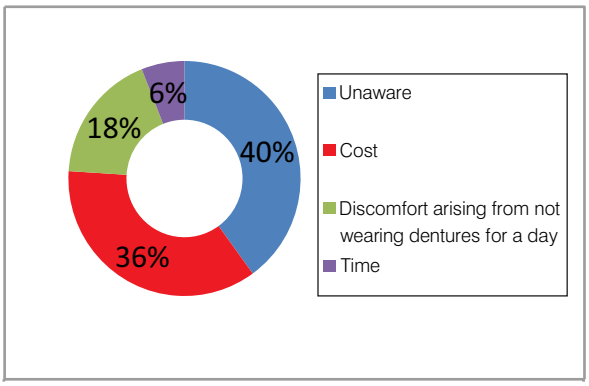


Figure 20 : Negligence for the professional cleaning of dentures by the patients

IV. Discussion

Edentulism is a growing problem in our society. The number of fully and partially edentulous patients is still increasing today. Dentures are an artificial substitute for missing natural teeth and adjacent tissues (1).

Regular cleansing of the denture prosthesis is necessary to increase the longevity of the prosthesis. The present survey is conducted on patients between the age of 35 to 65 years.

We discussed denture cleansing habits with patients as well as dental professionals. We asked both the patients and the dentists as to how often the denture should be cleansed to which majority of the dentists (70%) said once a day, these results agree with those of Nevalainen et al(2) and De Castelucci Barbosa et al(3),and 56% of the patients said twice a day. Keeping in mind, the denture cleansing agent from patient to patient varies, therefore the number of times the patient cleans the denture also varies.

There are various methods to clean a denture, soap and water, brush and toothpaste, brush alone, and denture cleansing agents. Majority of the dentists recommended brushing with toothpaste along with soaking their dentures into denture cleansing tablets, followed by using denture cleansing agents alone, whereas majority patients prefer cleaning their dentures by brushing with a toothpaste (35%). Similar results were obtained in previous studies conducted by Peracini et al(4) and Jegantha et al(5). Brushing with a toothpaste is a mechanical method of denture cleansing, however if done incorrectly it may lead to surface abrasions which will cause undesirable aesthetic and biological result(6,7). Dentrifice has a higher patient compliance because of its simplicity and cost effective characteristics. Mechanical methods of denture cleansing are not effective in completely removing the biological plaque on the surface of the dentures, therefore majority of the dentists (80%) recommend sodium perborate. Oxidizing nature of this chemical has the ability to remove stains as well as the advantage of having an antimicrobial action. Ideally, both mechanical and chemical methods should be used to achieve adequate plaque control. Combination of brushing and soaking methods is recommended by 47% dentists, similar to the studies conducted by Hoad-Reddick et al(8) and Veres et al(9). In addition to the frequency and the nature of denture cleansing, when you clean a denture is equally important. Majority of the dentists and patients said that they should clean their dentures after meals and before sleeping. Daily cleansing of the dentures after meals is necessary to prevent buildup of plaque, food, calculus and stains, which can cause problems with appearance and aesthetics. Lack of denture hygiene is one of the main etiological factors for the inflammation of the oral mucosa according to Abelson.(10) Denture teeth accumulates plaque. When plaque reacts with saliva, it hardens into calculus, therefore professional cleaning machines are available to remove this said calculus. It is extremely important for the dentist to re-call the patients to evaluate the oral hygiene habits, consequently 98% of the dentists re-call the patients for the evaluation of the dentures and maintenance of oral health issues.

V. Conclusion

Within the limits and demography of the survey the following conclusions were drawn:

1) Denture wearers did not clean their dentures satisfactorily.
2) Dentists did not provide complete information about denture cleanliness to their patients.
3) Most of the patients preferred the mechanical method of denture cleansing i.e brushing with toothpaste twice a day.
4) Most of the dentists recommended mechanical and chemical cleansing methods.

Reference Références Referencias

1. Denture Glossary of Prosthodontic Terms.
2. Nevalainen MJ, Oral Mucosa lesions and oral hygiene habits in the home living elderly, J Oral Rehabil, 1997.
3. De Castelucci Barbosa L, Edentulous patient's knowledge of dental hygiene and care of prosthesis, Gerodontology 2008.
4. Peracini et al Behaviors and Hygiene Habits of Complete Denture Wearers. Braz.Dent.J vol 21, 2010.
5. Jeganathan, Denture stomatitis in an elderly edentulluos Asian population. J Oral Rehabil, 1997.
6. Jagger DC, Denture Cleansing- the best approach. Br Dent J, 1995.
7. Dikbas I. Investigation of the cleanliness of dentures in a university hospital, Int J Prosthodont 2006.
8. Hoad-Reddick, Investigations into the cleanliness of dentures in an elderly population. J Prosthet Dent, 1990.

9. Veres EM, A survey of materials and methods employed by denture wearers. J Dent Assoc S Afr, 1985.
10. Abelson D.C. Denture plaque and denture cleansers, Gerodontics 1985.

Global Journals Inc. (US) Guidelines Handbook 2014

www.GlobalJournals.org

FELLOWS

FELLOW OF ASSOCIATION OF RESEARCH SOCIETY IN MEDICAL (FARSM)

Global Journals Incorporate (USA) is accredited by Open Association of Research Society (OARS), U.S.A and in turn, awards "FARSM" title to individuals.The 'FARSM' title is accorded to a selected professional after the approval of the Editor-in-Chief/Editorial Board Members/Dean.

- The "FARSM" is a dignified title which is accorded to a person's name viz. Dr. John E. Hall,Ph.D., FARSS or William Walldroff, M.S., FARSM.

FARSM accrediting is an honor. It authenticates your research activities. After recognition as FARSM, you can add 'FARSM' title with your name as you use this recognition as additional suffix to your status. This will definitely enhance and add more value and repute to your name. You may use it on your professional Counseling Materials such as CV, Resume, and Visiting Card etc.

The following benefits can be availed by you only for next three years from the date of certification:

FARSM designated members are entitled to avail a 40% discount while publishing their research papers (of a single author) with Global Journals Incorporation (USA), if the same is accepted by Editorial Board/Peer Reviewers. If you are a main author or co-author in case of multiple authors, you will be entitled to avail discount of 10%.

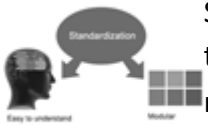
Once FARSM title is accorded, the Fellow is authorized to organize a symposium/seminar/conference on behalf of Global Journal Incorporation (USA). The Fellow can also participate in conference/seminar/symposium organized by another institution as representative of Global Journal. In both the cases, it is mandatory for him to discuss with us and obtain our consent.

You may join as member of the Editorial Board of Global Journals Incorporation (USA) after successful completion of three years as Fellow and as Peer Reviewer. In addition, it is also desirable that you should organize seminar/symposium/conference at least once.

We shall provide you intimation regarding launching of e-version of journal of your stream time to time.This may be utilized in your library for the enrichment of knowledge of your students as well as it can also be helpful for the concerned faculty members.

The FARSM can go through standards of OARS. You can also play vital role if you have any suggestions so that proper amendment can take place to improve the same for the benefit of entire research community.

As FARSM, you will be given a renowned, secure and free professional email addres with 100 GB of space e.g. johnhall@globaljournals.org. This will include Webmail, Spam Assassin, Email Forwarders,Auto-Responders, Email Delivery Route tracing, etc.



The FARSM will be eligible for a free application of standardization of their researches. Standardization of research will be subject to acceptability within stipulated norms as the next step after publishing in a journal. We shall depute a team of specialized research professionals who will render their services for elevating your researches to next higher level, which is worldwide open standardization.

The FARSM member can apply for grading and certification of standards of their educational and Institutional Degrees to Open Association of Research, Society U.S.A. Once you are designated as FARSM, you may send us a scanned copy of all of you credentials. OARS will verify, grade and certify them. This will be based on your academic records, quality of research papers published by you, and some more criteria. After certification of all your credentials by OARS, they will be published on your Fellow Profile link on website https://associationofresearch.org which will be helpful to upgrade the dignity.

The FARSM members can avail the benefits of free research podcasting in Global Research Radio with their research documents. After publishing the work, (including published elsewhere worldwide with proper authorization) you can upload your research paper with your recorded voice or you can utilize chargeable services of our professional RJs to record your paper in their voice on request.

The FARSM member also entitled to get the benefits of free research podcasting of their research documents through video clips. We can also streamline your conference videos and display your slides/ online slides and online research video clips at reasonable charges, on request.

The FARSM is eligible to earn from sales proceeds of his/her researches/reference/review Books or literature, while publishing with Global Journals. The FARSS can decide whether he/she would like to publish his/her research in a closed manner. In this case, whenever readers purchase that individual research paper for reading, maximum 60% of its profit earned as royalty by Global Journals, will be credited to his/her bank account. The entire entitled amount will be credited to his/her bank account exceeding limit of minimum fixed balance. There is no minimum time limit for collection. The FARSM member can decide its price and we can help in making the right decision.

The FARSM member is eligible to join as a paid peer reviewer at Global Journals Incorporation (USA) and can get remuneration of 15% of author fees, taken from the author of a respective paper. After reviewing 5 or more papers you can request to transfer the amount to your bank account.

MEMBER OF ASSOCIATION OF RESEARCH SOCIETY IN MEDICAL (MARSM)

The ' MARSM ' title is accorded to a selected professional after the approval of the Editor-in-Chief / Editorial Board Members/Dean.

The "MARSM" is a dignified ornament which is accorded to a person's name viz. Dr. John E. Hall, Ph.D., MARSM or William Walldroff, M.S., MARSM.

MARSM accrediting is an honor. It authenticates your research activities. Afterbecoming MARSM,you can add 'MARSM' title with your name as you use this recognition as additional suffix to your status. This will definitely enhance and add more value and repute to your name. You may use it on your professional Counseling Materials such as CV, Resume, Visiting Card and Name Plate etc.

The following benefitscan be availed by you only for next three years from the date of certification.

MARSM designated members are entitled to avail a 25% discount while publishing their research papers (of a single author) in Global Journals Inc., if the same is accepted by our Editorial Board and Peer Reviewers. If you are a main author or co-author of a group of authors, you will get discount of 10%.

As MARSM, you willbe given a renowned, secure and free professional email address with 30 GB of space e.g. johnhall@globaljournals.org. This will include Webmail, Spam Assassin, Email Forwarders,Auto-Responders, Email Delivery Route tracing, etc.

We shall provide you intimation regarding launching of e-version of journal of your stream time to time.This may be utilized in your library for the enrichment of knowledge of your students as well as it can also be helpful for the concerned faculty members.

The MARSM member can apply for approval, grading and certification of standards of their educational and Institutional Degrees to Open Association of Research, Society U.S.A.

Once you are designated as MARSM, you may send us a scanned copy of all of your credentials. OARS will verify, grade and certify them. This will be based on your academic records, quality of research papers published by you, and some more criteria.

It is mandatory to read all terms and conditions carefully.

AUXILIARY MEMBERSHIPS

Institutional Fellow of Open Association of Research Society (USA) - OARS (USA)

Global Journals Incorporation (USA) is accredited by Open Association of Research Society, U.S.A (OARS) and in turn, affiliates research institutions as "Institutional Fellow of Open Association of Research Society" (IFOARS).

The "FARSC" is a dignified title which is accorded to a person's name viz. Dr. John E. Hall, Ph.D., FARSC or William Walldroff, M.S., FARSC.

The IFOARS institution is entitled to form a Board comprised of one Chairperson and three to five board members preferably from different streams. The Board will be recognized as "Institutional Board of Open Association of Research Society"-(IBOARS).

The Institute will be entitled to following benefits:

The IBOARS can initially review research papers of their institute and recommend them to publish with respective journal of Global Journals. It can also review the papers of other institutions after obtaining our consent. The second review will be done by peer reviewer of Global Journals Incorporation (USA) The Board is at liberty to appoint a peer reviewer with the approval of chairperson after consulting us.

The author fees of such paper may be waived off up to 40%.

The Global Journals Incorporation (USA) at its discretion can also refer double blind peer reviewed paper at their end to the board for the verification and to get recommendation for final stage of acceptance of publication.

The IBOARS can organize symposium/seminar/conference in their country on behalf of Global Journals Incorporation (USA)-OARS (USA). The terms and conditions can be discussed separately.

The Board can also play vital role by exploring and giving valuable suggestions regarding the Standards of "Open Association of Research Society, U.S.A (OARS)" so that proper amendment can take place for the benefit of entire research community. We shall provide details of particular standard only on receipt of request from the Board.

The board members can also join us as Individual Fellow with 40% discount on total fees applicable to Individual Fellow. They will be entitled to avail all the benefits as declared. Please visit Individual Fellow-sub menu of GlobalJournals.org to have more relevant details.

We shall provide you intimation regarding launching of e-version of journal of your stream time to time. This may be utilized in your library for the enrichment of knowledge of your students as well as it can also be helpful for the concerned faculty members.

After nomination of your institution as "Institutional Fellow" and constantly functioning successfully for one year, we can consider giving recognition to your institute to function as Regional/Zonal office on our behalf.
The board can also take up the additional allied activities for betterment after our consultation.

The following entitlements are applicable to individual Fellows:

Open Association of Research Society, U.S.A (OARS) By-laws states that an individual Fellow may use the designations as applicable, or the corresponding initials. The Credentials of individual Fellow and Associate designations signify that the individual has gained knowledge of the fundamental concepts. One is magnanimous and proficient in an expertise course covering the professional code of conduct, and follows recognized standards of practice.

Open Association of Research Society (US)/ Global Journals Incorporation (USA), as described in Corporate Statements, are educational, research publishing and professional membership organizations. Achieving our individual Fellow or Associate status is based mainly on meeting stated educational research requirements.

Disbursement of 40% Royalty earned through Global Journals : Researcher = 50%, Peer Reviewer = 37.50%, Institution = 12.50% E.g. Out of 40%, the 20% benefit should be passed on to researcher, 15 % benefit towards remuneration should be given to a reviewer and remaining 5% is to be retained by the institution.

We shall provide print version of 12 issues of any three journals [as per your requirement] out of our 38 journals worth $ 2376 USD.

Other:

The individual Fellow and Associate designations accredited by Open Association of Research Society (US) credentials signify guarantees following achievements:

- The professional accredited with Fellow honor, is entitled to various benefits viz. name, fame, honor, regular flow of income, secured bright future, social status etc.

- In addition to above, if one is single author, then entitled to 40% discount on publishing research paper and can get 10%discount if one is co-author or main author among group of authors.
- The Fellow can organize symposium/seminar/conference on behalf of Global Journals Incorporation (USA) and he/she can also attend the same organized by other institutes on behalf of Global Journals.
- The Fellow can become member of Editorial Board Member after completing 3yrs.
- The Fellow can earn 60% of sales proceeds from the sale of reference/review books/literature/publishing of research paper.
- Fellow can also join as paid peer reviewer and earn 15% remuneration of author charges and can also get an opportunity to join as member of the Editorial Board of Global Journals Incorporation (USA)
- • This individual has learned the basic methods of applying those concepts and techniques to common challenging situations. This individual has further demonstrated an in–depth understanding of the application of suitable techniques to a particular area of research practice.

Note :

"

- In future, if the board feels the necessity to change any board member, the same can be done with the consent of the chairperson along with anyone board member without our approval.
- In case, the chairperson needs to be replaced then consent of 2/3rd board members are required and they are also required to jointly pass the resolution copy of which should be sent to us. In such case, it will be compulsory to obtain our approval before replacement.
- In case of "Difference of Opinion [if any]" among the Board members, our decision will be final and binding to everyone.

"

Process of submission of Research Paper

The Area or field of specialization may or may not be of any category as mentioned in 'Scope of Journal' menu of the GlobalJournals.org website. There are 37 Research Journal categorized with Six parental Journals GJCST, GJMR, GJRE, GJMBR, GJSFR, GJHSS. For Authors should prefer the mentioned categories. There are three widely used systems UDC, DDC and LCC. The details are available as 'Knowledge Abstract' at Home page. The major advantage of this coding is that, the research work will be exposed to and shared with all over the world as we are being abstracted and indexed worldwide.

The paper should be in proper format. The format can be downloaded from first page of 'Author Guideline' Menu. The Author is expected to follow the general rules as mentioned in this menu. The paper should be written in MS-Word Format (*.DOC,*.DOCX).

The Author can submit the paper either online or offline. The authors should prefer online submission.Online Submission: There are three ways to submit your paper:

(A) (I) First, register yourself using top right corner of Home page then Login. If you are already registered, then login using your username and password.

(II) Choose corresponding Journal.

(III) Click 'Submit Manuscript'. Fill required information and Upload the paper.

(B) If you are using Internet Explorer, then Direct Submission through Homepage is also available.

(C) If these two are not conveninet , and then email the paper directly to dean@globaljournals.org.

Offline Submission: Author can send the typed form of paper by Post. However, online submission should be preferred.

Preferred Author Guidelines

MANUSCRIPT STYLE INSTRUCTION (Must be strictly followed)

Page Size: 8.27" X 11'"

- Left Margin: 0.65
- Right Margin: 0.65
- Top Margin: 0.75
- Bottom Margin: 0.75
- Font type of all text should be Swis 721 Lt BT.
- Paper Title should be of Font Size 24 with one Column section.
- Author Name in Font Size of 11 with one column as of Title.
- Abstract Font size of 9 Bold, "Abstract" word in Italic Bold.
- Main Text: Font size 10 with justified two columns section
- Two Column with Equal Column with of 3.38 and Gaping of .2
- First Character must be three lines Drop capped.
- Paragraph before Spacing of 1 pt and After of 0 pt.
- Line Spacing of 1 pt
- Large Images must be in One Column
- Numbering of First Main Headings (Heading 1) must be in Roman Letters, Capital Letter, and Font Size of 10.
- Numbering of Second Main Headings (Heading 2) must be in Alphabets, Italic, and Font Size of 10.

You can use your own standard format also.
Author Guidelines:

1. General,

2. Ethical Guidelines,

3. Submission of Manuscripts,

4. Manuscript's Category,

5. Structure and Format of Manuscript,

6. After Acceptance.

1. GENERAL

Before submitting your research paper, one is advised to go through the details as mentioned in following heads. It will be beneficial, while peer reviewer justify your paper for publication.

Scope

The Global Journals Inc. (US) welcome the submission of original paper, review paper, survey article relevant to the all the streams of Philosophy and knowledge. The Global Journals Inc. (US) is parental platform for Global Journal of Computer Science and Technology, Researches in Engineering, Medical Research, Science Frontier Research, Human Social Science, Management, and Business organization. The choice of specific field can be done otherwise as following in Abstracting and Indexing Page on this Website. As the all Global

Journals Inc. (US) are being abstracted and indexed (in process) by most of the reputed organizations. Topics of only narrow interest will not be accepted unless they have wider potential or consequences.

2. ETHICAL GUIDELINES

Authors should follow the ethical guidelines as mentioned below for publication of research paper and research activities.

Papers are accepted on strict understanding that the material in whole or in part has not been, nor is being, considered for publication elsewhere. If the paper once accepted by Global Journals Inc. (US) and Editorial Board, will become the copyright of the Global Journals Inc. (US).

Authorship: The authors and coauthors should have active contribution to conception design, analysis and interpretation of findings. They should critically review the contents and drafting of the paper. All should approve the final version of the paper before submission

The Global Journals Inc. (US) follows the definition of authorship set up by the Global Academy of Research and Development. According to the Global Academy of R&D authorship, criteria must be based on:

1) Substantial contributions to conception and acquisition of data, analysis and interpretation of the findings.

2) Drafting the paper and revising it critically regarding important academic content.

3) Final approval of the version of the paper to be published.

All authors should have been credited according to their appropriate contribution in research activity and preparing paper. Contributors who do not match the criteria as authors may be mentioned under Acknowledgement.

Acknowledgements: Contributors to the research other than authors credited should be mentioned under acknowledgement. The specifications of the source of funding for the research if appropriate can be included. Suppliers of resources may be mentioned along with address.

Appeal of Decision: The Editorial Board's decision on publication of the paper is final and cannot be appealed elsewhere.

Permissions: It is the author's responsibility to have prior permission if all or parts of earlier published illustrations are used in this paper.

Please mention proper reference and appropriate acknowledgements wherever expected.

If all or parts of previously published illustrations are used, permission must be taken from the copyright holder concerned. It is the author's responsibility to take these in writing.

Approval for reproduction/modification of any information (including figures and tables) published elsewhere must be obtained by the authors/copyright holders before submission of the manuscript. Contributors (Authors) are responsible for any copyright fee involved.

3. SUBMISSION OF MANUSCRIPTS

Manuscripts should be uploaded via this online submission page. The online submission is most efficient method for submission of papers, as it enables rapid distribution of manuscripts and consequently speeds up the review procedure. It also enables authors to know the status of their own manuscripts by emailing us. Complete instructions for submitting a paper is available below.

Manuscript submission is a systematic procedure and little preparation is required beyond having all parts of your manuscript in a given format and a computer with an Internet connection and a Web browser. Full help and instructions are provided on-screen. As an author, you will be prompted for login and manuscript details as Field of Paper and then to upload your manuscript file(s) according to the instructions.

To avoid postal delays, all transaction is preferred by e-mail. A finished manuscript submission is confirmed by e-mail immediately and your paper enters the editorial process with no postal delays. When a conclusion is made about the publication of your paper by our Editorial Board, revisions can be submitted online with the same procedure, with an occasion to view and respond to all comments.

Complete support for both authors and co-author is provided.

4. MANUSCRIPT'S CATEGORY

Based on potential and nature, the manuscript can be categorized under the following heads:

Original research paper: Such papers are reports of high-level significant original research work.

Review papers: These are concise, significant but helpful and decisive topics for young researchers.

Research articles: These are handled with small investigation and applications

Research letters: The letters are small and concise comments on previously published matters.

5.STRUCTURE AND FORMAT OF MANUSCRIPT

The recommended size of original research paper is less than seven thousand words, review papers fewer than seven thousands words also.Preparation of research paper or how to write research paper, are major hurdle, while writing manuscript. The research articles and research letters should be fewer than three thousand words, the structure original research paper; sometime review paper should be as follows:

Papers: These are reports of significant research (typically less than 7000 words equivalent, including tables, figures, references), and comprise:

(a)Title should be relevant and commensurate with the theme of the paper.

(b) A brief Summary, "Abstract" (less than 150 words) containing the major results and conclusions.

(c) Up to ten keywords, that precisely identifies the paper's subject, purpose, and focus.

(d) An Introduction, giving necessary background excluding subheadings; objectives must be clearly declared.

(e) Resources and techniques with sufficient complete experimental details (wherever possible by reference) to permit repetition; sources of information must be given and numerical methods must be specified by reference, unless non-standard.

(f) Results should be presented concisely, by well-designed tables and/or figures; the same data may not be used in both; suitable statistical data should be given. All data must be obtained with attention to numerical detail in the planning stage. As reproduced design has been recognized to be important to experiments for a considerable time, the Editor has decided that any paper that appears not to have adequate numerical treatments of the data will be returned un-refereed;

(g) Discussion should cover the implications and consequences, not just recapitulating the results; conclusions should be summarizing.

(h) Brief Acknowledgements.

(i) References in the proper form.

Authors should very cautiously consider the preparation of papers to ensure that they communicate efficiently. Papers are much more likely to be accepted, if they are cautiously designed and laid out, contain few or no errors, are summarizing, and be conventional to the approach and instructions. They will in addition, be published with much less delays than those that require much technical and editorial correction.

The Editorial Board reserves the right to make literary corrections and to make suggestions to improve briefness.

It is vital, that authors take care in submitting a manuscript that is written in simple language and adheres to published guidelines.

Format

Language: The language of publication is UK English. Authors, for whom English is a second language, must have their manuscript efficiently edited by an English-speaking person before submission to make sure that, the English is of high excellence. It is preferable, that manuscripts should be professionally edited.

Standard Usage, Abbreviations, and Units: Spelling and hyphenation should be conventional to The Concise Oxford English Dictionary. Statistics and measurements should at all times be given in figures, e.g. 16 min, except for when the number begins a sentence. When the number does not refer to a unit of measurement it should be spelt in full unless, it is 160 or greater.

Abbreviations supposed to be used carefully. The abbreviated name or expression is supposed to be cited in full at first usage, followed by the conventional abbreviation in parentheses.

Metric SI units are supposed to generally be used excluding where they conflict with current practice or are confusing. For illustration, 1.4 l rather than 1.4 × 10-3 m3, or 4 mm somewhat than 4 × 10-3 m. Chemical formula and solutions must identify the form used, e.g. anhydrous or hydrated, and the concentration must be in clearly defined units. Common species names should be followed by underlines at the first mention. For following use the generic name should be constricted to a single letter, if it is clear.

Structure

All manuscripts submitted to Global Journals Inc. (US), ought to include:

Title: The title page must carry an instructive title that reflects the content, a running title (less than 45 characters together with spaces), names of the authors and co-authors, and the place(s) wherever the work was carried out. The full postal address in addition with the e-mail address of related author must be given. Up to eleven keywords or very brief phrases have to be given to help data retrieval, mining and indexing.

Abstract, used in Original Papers and Reviews:

Optimizing Abstract for Search Engines

Many researchers searching for information online will use search engines such as Google, Yahoo or similar. By optimizing your paper for search engines, you will amplify the chance of someone finding it. This in turn will make it more likely to be viewed and/or cited in a further work. Global Journals Inc. (US) have compiled these guidelines to facilitate you to maximize the web-friendliness of the most public part of your paper.

Key Words

A major linchpin in research work for the writing research paper is the keyword search, which one will employ to find both library and Internet resources.

One must be persistent and creative in using keywords. An effective keyword search requires a strategy and planning a list of possible keywords and phrases to try.

Search engines for most searches, use Boolean searching, which is somewhat different from Internet searches. The Boolean search uses "operators," words (and, or, not, and near) that enable you to expand or narrow your affords. Tips for research paper while preparing research paper are very helpful guideline of research paper.

Choice of key words is first tool of tips to write research paper. Research paper writing is an art.A few tips for deciding as strategically as possible about keyword search:

- One should start brainstorming lists of possible keywords before even begin searching. Think about the most important concepts related to research work. Ask, "What words would a source have to include to be truly valuable in research paper?" Then consider synonyms for the important words.
- It may take the discovery of only one relevant paper to let steer in the right keyword direction because in most databases, the keywords under which a research paper is abstracted are listed with the paper.
- One should avoid outdated words.

Keywords are the key that opens a door to research work sources. Keyword searching is an art in which researcher's skills are bound to improve with experience and time.

Numerical Methods: Numerical methods used should be clear and, where appropriate, supported by references.

Acknowledgements: Please make these as concise as possible.

References

References follow the Harvard scheme of referencing. References in the text should cite the authors' names followed by the time of their publication, unless there are three or more authors when simply the first author's name is quoted followed by et al. unpublished work has to only be cited where necessary, and only in the text. Copies of references in press in other journals have to be supplied with submitted typescripts. It is necessary that all citations and references be carefully checked before submission, as mistakes or omissions will cause delays.

References to information on the World Wide Web can be given, but only if the information is available without charge to readers on an official site. Wikipedia and Similar websites are not allowed where anyone can change the information. Authors will be asked to make available electronic copies of the cited information for inclusion on the Global Journals Inc. (US) homepage at the judgment of the Editorial Board.

The Editorial Board and Global Journals Inc. (US) recommend that, citation of online-published papers and other material should be done via a DOI (digital object identifier). If an author cites anything, which does not have a DOI, they run the risk of the cited material not being noticeable.

The Editorial Board and Global Journals Inc. (US) recommend the use of a tool such as Reference Manager for reference management and formatting.

Tables, Figures and Figure Legends

Tables: Tables should be few in number, cautiously designed, uncrowned, and include only essential data. Each must have an Arabic number, e.g. Table 4, a self-explanatory caption and be on a separate sheet. Vertical lines should not be used.

Figures: Figures are supposed to be submitted as separate files. Always take in a citation in the text for each figure using Arabic numbers, e.g. Fig. 4. Artwork must be submitted online in electronic form by e-mailing them.

Preparation of Electronic Figures for Publication

Even though low quality images are sufficient for review purposes, print publication requires high quality images to prevent the final product being blurred or fuzzy. Submit (or e-mail) EPS (line art) or TIFF (halftone/photographs) files only. MS PowerPoint and Word Graphics are unsuitable for printed pictures. Do not use pixel-oriented software. Scans (TIFF only) should have a resolution of at least 350 dpi (halftone) or 700 to 1100 dpi (line drawings) in relation to the imitation size. Please give the data for figures in black and white or submit a Color Work Agreement Form. EPS files must be saved with fonts embedded (and with a TIFF preview, if possible).

For scanned images, the scanning resolution (at final image size) ought to be as follows to ensure good reproduction: line art: >650 dpi; halftones (including gel photographs) : >350 dpi; figures containing both halftone and line images: >650 dpi.

Color Charges: It is the rule of the Global Journals Inc. (US) for authors to pay the full cost for the reproduction of their color artwork. Hence, please note that, if there is color artwork in your manuscript when it is accepted for publication, we would require you to complete and return a color work agreement form before your paper can be published.

Figure Legends: Self-explanatory legends of all figures should be incorporated separately under the heading 'Legends to Figures'. In the full-text online edition of the journal, figure legends may possibly be truncated in abbreviated links to the full screen version. Therefore, the first 100 characters of any legend should notify the reader, about the key aspects of the figure.

6. AFTER ACCEPTANCE

Upon approval of a paper for publication, the manuscript will be forwarded to the dean, who is responsible for the publication of the Global Journals Inc. (US).

6.1 Proof Corrections

The corresponding author will receive an e-mail alert containing a link to a website or will be attached. A working e-mail address must therefore be provided for the related author.

Acrobat Reader will be required in order to read this file. This software can be downloaded

(Free of charge) from the following website:

www.adobe.com/products/acrobat/readstep2.html. This will facilitate the file to be opened, read on screen, and printed out in order for any corrections to be added. Further instructions will be sent with the proof.

Proofs must be returned to the dean at dean@globaljournals.org within three days of receipt.

As changes to proofs are costly, we inquire that you only correct typesetting errors. All illustrations are retained by the publisher. Please note that the authors are responsible for all statements made in their work, including changes made by the copy editor.

6.2 Early View of Global Journals Inc. (US) (Publication Prior to Print)

The Global Journals Inc. (US) are enclosed by our publishing's Early View service. Early View articles are complete full-text articles sent in advance of their publication. Early View articles are absolute and final. They have been completely reviewed, revised and edited for publication, and the authors' final corrections have been incorporated. Because they are in final form, no changes can be made after sending them. The nature of Early View articles means that they do not yet have volume, issue or page numbers, so Early View articles cannot be cited in the conventional way.

6.3 Author Services

Online production tracking is available for your article through Author Services. Author Services enables authors to track their article - once it has been accepted - through the production process to publication online and in print. Authors can check the status of their articles online and choose to receive automated e-mails at key stages of production. The authors will receive an e-mail with a unique link that enables them to register and have their article automatically added to the system. Please ensure that a complete e-mail address is provided when submitting the manuscript.

6.4 Author Material Archive Policy

Please note that if not specifically requested, publisher will dispose off hardcopy & electronic information submitted, after the two months of publication. If you require the return of any information submitted, please inform the Editorial Board or dean as soon as possible.

6.5 Offprint and Extra Copies

A PDF offprint of the online-published article will be provided free of charge to the related author, and may be distributed according to the Publisher's terms and conditions. Additional paper offprint may be ordered by emailing us at: editor@globaljournals.org .

Before start writing a good quality Computer Science Research Paper, let us first understand what is Computer Science Research Paper? So, Computer Science Research Paper is the paper which is written by professionals or scientists who are associated to Computer Science and Information Technology, or doing research study in these areas. If you are novel to this field then you can consult about this field from your supervisor or guide.

TECHNIQUES FOR WRITING A GOOD QUALITY RESEARCH PAPER:

1. Choosing the topic: In most cases, the topic is searched by the interest of author but it can be also suggested by the guides. You can have several topics and then you can judge that in which topic or subject you are finding yourself most comfortable. This can be done by asking several questions to yourself, like Will I be able to carry our search in this area? Will I find all necessary recourses to accomplish the search? Will I be able to find all information in this field area? If the answer of these types of questions will be "Yes" then you can choose that topic. In most of the cases, you may have to conduct the surveys and have to visit several places because this field is related to Computer Science and Information Technology. Also, you may have to do a lot of work to find all rise and falls regarding the various data of that subject. Sometimes, detailed information plays a vital role, instead of short information.

2. Evaluators are human: First thing to remember that evaluators are also human being. They are not only meant for rejecting a paper. They are here to evaluate your paper. So, present your Best.

3. Think Like Evaluators: If you are in a confusion or getting demotivated that your paper will be accepted by evaluators or not, then think and try to evaluate your paper like an Evaluator. Try to understand that what an evaluator wants in your research paper and automatically you will have your answer.

4. Make blueprints of paper: The outline is the plan or framework that will help you to arrange your thoughts. It will make your paper logical. But remember that all points of your outline must be related to the topic you have chosen.

5. Ask your Guides: If you are having any difficulty in your research, then do not hesitate to share your difficulty to your guide (if you have any). They will surely help you out and resolve your doubts. If you can't clarify what exactly you require for your work then ask the supervisor to help you with the alternative. He might also provide you the list of essential readings.

6. Use of computer is recommended: As you are doing research in the field of Computer Science, then this point is quite obvious.

7. Use right software: Always use good quality software packages. If you are not capable to judge good software then you can lose quality of your paper unknowingly. There are various software programs available to help you, which you can get through Internet.

8. Use the Internet for help: An excellent start for your paper can be by using the Google. It is an excellent search engine, where you can have your doubts resolved. You may also read some answers for the frequent question how to write my research paper or find model research paper. From the internet library you can download books. If you have all required books make important reading selecting and analyzing the specified information. Then put together research paper sketch out.

9. Use and get big pictures: Always use encyclopedias, Wikipedia to get pictures so that you can go into the depth.

10. Bookmarks are useful: When you read any book or magazine, you generally use bookmarks, right! It is a good habit, which helps to not to lose your continuity. You should always use bookmarks while searching on Internet also, which will make your search easier.

11. Revise what you wrote: When you write anything, always read it, summarize it and then finalize it.

12. Make all efforts: Make all efforts to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in introduction, that what is the need of a particular research paper. Polish your work by good skill of writing and always give an evaluator, what he wants.

13. Have backups: When you are going to do any important thing like making research paper, you should always have backup copies of it either in your computer or in paper. This will help you to not to lose any of your important.

14. Produce good diagrams of your own: Always try to include good charts or diagrams in your paper to improve quality. Using several and unnecessary diagrams will degrade the quality of your paper by creating "hotchpotch." So always, try to make and include those diagrams, which are made by your own to improve readability and understandability of your paper.

15. Use of direct quotes: When you do research relevant to literature, history or current affairs then use of quotes become essential but if study is relevant to science then use of quotes is not preferable.

16. Use proper verb tense: Use proper verb tenses in your paper. Use past tense, to present those events that happened. Use present tense to indicate events that are going on. Use future tense to indicate future happening events. Use of improper and wrong tenses will confuse the evaluator. Avoid the sentences that are incomplete.

17. Never use online paper: If you are getting any paper on Internet, then never use it as your research paper because it might be possible that evaluator has already seen it or maybe it is outdated version.

18. Pick a good study spot: To do your research studies always try to pick a spot, which is quiet. Every spot is not for studies. Spot that suits you choose it and proceed further.

19. Know what you know: Always try to know, what you know by making objectives. Else, you will be confused and cannot achieve your target.

20. Use good quality grammar: Always use a good quality grammar and use words that will throw positive impact on evaluator. Use of good quality grammar does not mean to use tough words, that for each word the evaluator has to go through dictionary. Do not start sentence with a conjunction. Do not fragment sentences. Eliminate one-word sentences. Ignore passive voice. Do not ever use a big word when a diminutive one would suffice. Verbs have to be in agreement with their subjects. Prepositions are not expressions to finish sentences with. It is incorrect to ever divide an infinitive. Avoid clichés like the disease. Also, always shun irritating alliteration. Use language that is simple and straight forward. put together a neat summary.

21. Arrangement of information: Each section of the main body should start with an opening sentence and there should be a changeover at the end of the section. Give only valid and powerful arguments to your topic. You may also maintain your arguments with records.

22. Never start in last minute: Always start at right time and give enough time to research work. Leaving everything to the last minute will degrade your paper and spoil your work.

23. Multitasking in research is not good: Doing several things at the same time proves bad habit in case of research activity. Research is an area, where everything has a particular time slot. Divide your research work in parts and do particular part in particular time slot.

24. Never copy others' work: Never copy others' work and give it your name because if evaluator has seen it anywhere you will be in trouble.

25. Take proper rest and food: No matter how many hours you spend for your research activity, if you are not taking care of your health then all your efforts will be in vain. For a quality research, study is must, and this can be done by taking proper rest and food.

26. Go for seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.

27. Refresh your mind after intervals: Try to give rest to your mind by listening to soft music or by sleeping in intervals. This will also improve your memory.

28. Make colleagues: Always try to make colleagues. No matter how sharper or intelligent you are, if you make colleagues you can have several ideas, which will be helpful for your research.

29. Think technically: Always think technically. If anything happens, then search its reasons, its benefits, and demerits.

30. Think and then print: When you will go to print your paper, notice that tables are not be split, headings are not detached from their descriptions, and page sequence is maintained.

31. Adding unnecessary information: Do not add unnecessary information, like, I have used MS Excel to draw graph. Do not add irrelevant and inappropriate material. These all will create superfluous. Foreign terminology and phrases are not apropos. One should NEVER take a broad view. Analogy in script is like feathers on a snake. Not at all use a large word when a very small one would be sufficient. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Amplification is a billion times of inferior quality than sarcasm.

32. Never oversimplify everything: To add material in your research paper, never go for oversimplification. This will definitely irritate the evaluator. Be more or less specific. Also too, by no means, ever use rhythmic redundancies. Contractions aren't essential and shouldn't be there used. Comparisons are as terrible as clichés. Give up ampersands and abbreviations, and so on. Remove commas, that are, not necessary. Parenthetical words however should be together with this in commas. Understatement is all the time the complete best way to put onward earth-shaking thoughts. Give a detailed literary review.

33. Report concluded results: Use concluded results. From raw data, filter the results and then conclude your studies based on measurements and observations taken. Significant figures and appropriate number of decimal places should be used. Parenthetical remarks are prohibitive. Proofread carefully at final stage. In the end give outline to your arguments. Spot out perspectives of further study of this subject. Justify your conclusion by at the bottom of them with sufficient justifications and examples.

34. After conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print to the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects in your research.

Informal Guidelines of Research Paper Writing

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form, which is presented in the guidelines using the template.
- Please note the criterion for grading the final paper by peer-reviewers.

Final Points:

A purpose of organizing a research paper is to let people to interpret your effort selectively. The journal requires the following sections, submitted in the order listed, each section to start on a new page.

The introduction will be compiled from reference matter and will reflect the design processes or outline of basis that direct you to make study. As you will carry out the process of study, the method and process section will be constructed as like that. The result segment will show related statistics in nearly sequential order and will direct the reviewers next to the similar intellectual paths throughout the data that you took to carry out your study. The discussion section will provide understanding of the data and projections as to the implication of the results. The use of good quality references all through the paper will give the effort trustworthiness by representing an alertness of prior workings.

Writing a research paper is not an easy job no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record keeping are the only means to make straightforward the progression.

General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear

· Adhere to recommended page limits

Mistakes to evade

- Insertion a title at the foot of a page with the subsequent text on the next page
- Separating a table/chart or figure - impound each figure/table to a single page
- Submitting a manuscript with pages out of sequence

In every sections of your document

· Use standard writing style including articles ("a", "the," etc.)

· Keep on paying attention on the research topic of the paper

· Use paragraphs to split each significant point (excluding for the abstract)

· Align the primary line of each section

· Present your points in sound order

· Use present tense to report well accepted

· Use past tense to describe specific results

· Shun familiar wording, don't address the reviewer directly, and don't use slang, slang language, or superlatives

· Shun use of extra pictures - include only those figures essential to presenting results

Title Page:

Choose a revealing title. It should be short. It should not have non-standard acronyms or abbreviations. It should not exceed two printed lines. It should include the name(s) and address (es) of all authors.

Abstract:

The summary should be two hundred words or less. It should briefly and clearly explain the key findings reported in the manuscript--must have precise statistics. It should not have abnormal acronyms or abbreviations. It should be logical in itself. Shun citing references at this point.

An abstract is a brief distinct paragraph summary of finished work or work in development. In a minute or less a reviewer can be taught the foundation behind the study, common approach to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Yet, use comprehensive sentences and do not let go readability for briefness. You can maintain it succinct by phrasing sentences so that they provide more than lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study, with the subsequent elements in any summary. Try to maintain the initial two items to no more than one ruling each.

- Reason of the study - theory, overall issue, purpose
- Fundamental goal
- To the point depiction of the research
- Consequences, including definite statistics - if the consequences are quantitative in nature, account quantitative data; results of any numerical analysis should be reported
- Significant conclusions or questions that track from the research(es)

Approach:

- Single section, and succinct
- As a outline of job done, it is always written in past tense
- A conceptual should situate on its own, and not submit to any other part of the paper such as a form or table
- Center on shortening results - bound background information to a verdict or two, if completely necessary
- What you account in an conceptual must be regular with what you reported in the manuscript
- Exact spelling, clearness of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else

Introduction:

The **Introduction** should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable to comprehend and calculate the purpose of your study without having to submit to other works. The basis for the study should be offered. Give most important references but shun difficult to make a comprehensive appraisal of the topic. In the introduction, describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will have no attention in your result. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here. Following approach can create a valuable beginning:

- Explain the value (significance) of the study
- Shield the model - why did you employ this particular system or method? What is its compensation? You strength remark on its appropriateness from a abstract point of vision as well as point out sensible reasons for using it.
- Present a justification. Status your particular theory (es) or aim(s), and describe the logic that led you to choose them.
- Very for a short time explain the tentative propose and how it skilled the declared objectives.

Approach:

- Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done.
- Sort out your thoughts; manufacture one key point with every section. If you make the four points listed above, you will need a least of four paragraphs.

- Present surroundings information only as desirable in order hold up a situation. The reviewer does not desire to read the whole thing you know about a topic.
- Shape the theory/purpose specifically - do not take a broad view.
- As always, give awareness to spelling, simplicity and correctness of sentences and phrases.

Procedures (Methods and Materials):

This part is supposed to be the easiest to carve if you have good skills. A sound written Procedures segment allows a capable scientist to replacement your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt for the least amount of information that would permit another capable scientist to spare your outcome but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section. When a technique is used that has been well described in another object, mention the specific item describing a way but draw the basic principle while stating the situation. The purpose is to text all particular resources and broad procedures, so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step by step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

- Explain materials individually only if the study is so complex that it saves liberty this way.
- Embrace particular materials, and any tools or provisions that are not frequently found in laboratories.
- Do not take in frequently found.
- If use of a definite type of tools.
- Materials may be reported in a part section or else they may be recognized along with your measures.

Methods:

- Report the method (not particulars of each process that engaged the same methodology)
- Describe the method entirely
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures
- Simplify - details how procedures were completed not how they were exclusively performed on a particular day.
- If well known procedures were used, account the procedure by name, possibly with reference, and that's all.

Approach:

- It is embarrassed or not possible to use vigorous voice when documenting methods with no using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result when script up the methods most authors use third person passive voice.
- Use standard style in this and in every other part of the paper - avoid familiar lists, and use full sentences.

What to keep away from

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings - save it for the argument.
- Leave out information that is immaterial to a third party.

Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part a entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Carry on to be to the point, by means of statistics and tables, if suitable, to present consequences most efficiently.You must obviously differentiate material that would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matter should not be submitted at all except requested by the instructor.

Content

- Sum up your conclusion in text and demonstrate them, if suitable, with figures and tables.
- In manuscript, explain each of your consequences, point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation an exacting study.
- Explain results of control experiments and comprise remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or in manuscript form.

What to stay away from

- Do not discuss or infer your outcome, report surroundings information, or try to explain anything.
- Not at all, take in raw data or intermediate calculations in a research manuscript.
- Do not present the similar data more than once.
- Manuscript should complement any figures or tables, not duplicate the identical information.
- Never confuse figures with tables - there is a difference.

Approach

- As forever, use past tense when you submit to your results, and put the whole thing in a reasonable order.
- Put figures and tables, appropriately numbered, in order at the end of the report
- If you desire, you may place your figures and tables properly within the text of your results part.

Figures and tables

- If you put figures and tables at the end of the details, make certain that they are visibly distinguished from any attach appendix materials, such as raw facts
- Despite of position, each figure must be numbered one after the other and complete with subtitle
- In spite of position, each table must be titled, numbered one after the other and complete with heading
- All figure and table must be adequately complete that it could situate on its own, divide from text

Discussion:

The Discussion is expected the trickiest segment to write and describe. A lot of papers submitted for journal are discarded based on problems with the Discussion. There is no head of state for how long a argument should be. Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implication of the study. The purpose here is to offer an understanding of your results and hold up for all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of result should be visibly described. Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved with prospect, and let it drop at that.

- Make a decision if each premise is supported, discarded, or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."
- Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work
- You may propose future guidelines, such as how the experiment might be personalized to accomplish a new idea.
- Give details all of your remarks as much as possible, focus on mechanisms.
- Make a decision if the tentative design sufficiently addressed the theory, and whether or not it was correctly restricted.
- Try to present substitute explanations if sensible alternatives be present.
- One research will not counter an overall question, so maintain the large picture in mind, where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

- When you refer to information, differentiate data generated by your own studies from available information
- Submit to work done by specific persons (including you) in past tense.
- Submit to generally acknowledged facts and main beliefs in present tense.

Please carefully note down following rules and regulation before submitting your Research Paper to Global Journals Inc. (US):

Segment Draft and Final Research Paper: You have to strictly follow the template of research paper. If it is not done your paper may get rejected.

- The **major constraint** is that you must independently make all content, tables, graphs, and facts that are offered in the paper. You must write each part of the paper wholly on your own. The Peer-reviewers need to identify your own perceptive of the concepts in your own terms. NEVER extract straight from any foundation, and never rephrase someone else's analysis.

- Do not give permission to anyone else to "PROOFREAD" your manuscript.

- Methods to avoid Plagiarism is applied by us on every paper, if found guilty, you will be blacklisted by all of our collaborated research groups, your institution will be informed for this and strict legal actions will be taken immediately.)
- To guard yourself and others from possible illegal use please do not permit anyone right to use to your paper and files.

Criterion for Grading a Research Paper (Compilation) by Global Journals Inc. (US)

Please note that following table is only a Grading of "Paper Compilation" and not on "Performed/Stated Research" whose grading solely depends on Individual Assigned Peer Reviewer and Editorial Board Member. These can be available only on request and after decision of Paper. This report will be the property of Global Journals Inc. (US).

Topics	Grades		
	A-B	**C-D**	**E-F**
Abstract	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
Introduction	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

INDEX

save our planet

Global Journal of Medical Research

Visit us on the Web at www.GlobalJournals.org | www.JournalofScience.org
or email us at helpdesk@globaljournals.org

ISSN 9755896