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

Global Journals

of Medical Research: J

Dentistry and Otolaryngology

Fusion and Gemination

Relationship of Oral Hygiene

Highlights

Practices and Dental Caries

Anthropometric Data Collection

Discovering Thoughts, Inventing Future

VOLUME 13 ISSUE 2 VERSION 1.0

Global Journal of Medical Research: J
Dentistry and Otolaryngology

Global Journal of Medical Research: J
Dentistry and Otolaryngology
Volume 13 Issue 2 (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: *investers@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 Volume

Global Journal of Medical research
Dentistry and Otolaryngology
Volume 13 Issue 2 Version 1.0 Year 2013
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4618 & Print ISSN : 0975-5888

Anthropometric Data Collection in the Human Nasal and Oral Cavity

By K. Farahmand & R. Srinivasan

North Dakota State University, United States

*Abstract-*This paper examines new methodologies that may be used for the process of the Anthropometric data collection in the Human Respiratory Tract (HRT). The geometric dimensions of internal human anatomy in the nasal and oral cavity varies among the individuals but has the same structure overall. The volume of the flow differs widely with respect to the dimensions of the nasal and oral cavity. The process of defining a definite geometry is a complex task as the shape or size of the cavity differs widely. Several methods which are published in literature define the geometry by determining its physical characteristics. The existing methodologies focus on the internal portion of the nasal and oral cavity extending up to the trachea and beyond. A methodology is proposed to measure the characteristic dimension of the human nasal and oral cavity at the inlet/outlet points which are classified as internal measurements.

Keywords: *anthropometry, nasal cavity, oral cavity, respirator devices.*

GJMR-J Classification : *NLMC Code: WU 101.5, WV 320*

Strictly as per the compliance and regulations of:

Anthropometric Data Collection in the Human Nasal and Oral Cavity

K. Farahmand [α] & R. Srinivasan [σ]

Abstract- This paper examines new methodologies that may be used for the process of the Anthropometric data collection in the Human Respiratory Tract (HRT). The geometric dimensions of internal human anatomy in the nasal and oral cavity varies among the individuals but has the same structure overall. The volume of the flow differs widely with respect to the dimensions of the nasal and oral cavity. The process of defining a definite geometry is a complex task as the shape or size of the cavity differs widely. Several methods which are published in literature define the geometry by determining its physical characteristics. The existing methodologies focus on the internal portion of the nasal and oral cavity extending up to the trachea and beyond. A methodology is proposed to measure the characteristic dimension of the human nasal and oral cavity at the inlet/outlet points which are classified as internal measurements.

Keywords: anthropometry, nasal cavity, oral cavity, respirator devices.

I. Introduction

Anthropometric data collection is a tool widely used today in design and development of a product. The use of the Anthropometric data during the design stage assists in the optimum use of the product by target population for intended application. National institute for occupational safety and health (NIOSH) conducted an anthropometric study of the facial measurements (NIOSH 2007). The safety of the population using the respirators is addressed by the NIOSH and it is the responsibility of NIOSH to ensure that quality of the respirators is maintained and it fits to the target population. Hence NIOSH conducted an anthropometric survey of sample population depicting the diverse US respirator users. The manufactures also followed the guidelines given by NIOSH. An overview of the airway geometry is needed by many for the purpose of studying the airflow dynamics involved. Figure 1 shows a numerical study of the spray particle deposition in the human nasal cavity and the geometry used. Inthavong et al. (2006) developed simulated conditions with added insertion angle for the drugs into the nasal cavity and the injected particle velocity to capture its flow properties along the nasal cavity. Similar kind of geometry was used by Zhang et al. (2008), Lindemann et al. (2004) and Pless et al. (2004) for performing the numerical simulation.

Authors α σ: Industrial and Manufacturing Engineering Department, North Dakota State University, Fargo, USA.
e-mail: kambiz.farahmand@ndsu.edu.

The volume of intake air first comes in contact with the anterior portion of the nasal cavity and oral cavity (during oronasal breathing). These two regions get first affected by the fluid intake. The geometry of the nasal cross section is very complex and asymmetric in nature. These dimensions are measured using scanning and imaging methods for measuring the cross-section in the middle region consisting of the turbinate's and the posterior region connecting to the Nasopharynx. The Anterior portion can be measured using the available device patented (US6659963) shown in Figure 2. The Oral cavity when compared to the nasal cavity is convenient to measure until the throat region.

Data collections for the anthropometric measurements are usually related to the measurements externally and not internally due to the complexity of the human body. The anthropometric data measured for the external body comprise of number of subjects up to 4000 in number and more. The morphometric studies conducted for the internal body consisted of approximately 100 subjects at the maximum. The reason here is that the internal studies need sophisticated equipments like CT or MRI scans etc whereas the external anthropometric measurements need basic measuring instruments like callipers and measuring tape. The usage of the imaging devices is a complicated procedure and needs to be done by medical providers. The use of these equipments could be complicated, time consuming and cost will be staggering for a large population sample size. The same when performed by the use of the measuring devices for external anthropometric measurements will not be as expensive and complicated as for example the use of imaging devices.

The anthropometric data related to the volume of the nasal and oral cavity has been measured using imaging devices using small sample size. A measuring technique is proposed here in to measure the dimensions of the nasal and oral cavity with help of measuring instrument. The instrument could be used for measuring the inside dimensions of the nasal and oral cavity. This process of collecting anthropometric data for the human nasal (anterior portion) and the oral cavity (mouth portion) will provide the much needed data to help with the treatment of injuries, design of the respirator systems and other respiratory devices.

II. Overview of Current Methodology

A number of approaches are in the literature that study the characteristics related to heat and mass transfer along the HRT, deposition of particles, drug therapy applications and injury analysis. These studies do involve taking measurements of the various portions of the upper (nasal and oral) respiratory tract. The Human body does show a high degree of variation between different Human races around the world. The Anthropometric data collection for the human respiratory tract can be identified in two different categories, first in which the measurements for the internal portion of the HRT are taken into consideration for the analysis of the process of heat transfer characteristics, burn injury and or aerosol deposition taking place and in the second category the facial dimensions are noted down to assist fitting of the respirator device on the human face for full-face piece respirators or half-face piece respirators. The categories when analyzed are from a completely different point of view but when the functionality is taken into account; the facial characteristics and the inlet portion of the nasal and oral cavity are directly related to the effective functioning of the human being using the respirator device. The current methodology of gathering the anthropometric data are limited in both the cases. For the category 1 the inlet dimensions of the HRT are identified using the process of CT scan, MRI and Acoustic Rhinomanometry which is a costly process and can be performed on a limited number of subjects. The use of scale, callipers and tape for the category 2 type has been extensively used. This method has been performed on a number of subjects but it has its limitations as it can measure only the facial dimensions from outside.

III. Literature Review

A geometric model was developed for the human nasal cavity using CT scan images (Liu et al. 2009). This was done in collaboration with a hospital's Otolaryngology department and a subject size of 30 was used in the study. The model created was then compared with that available in the literature and a satisfactory model for the nasal cavity was obtained. The CT scan available was first converted into 2D coronal cross-sectional slices and with this as a reference a new 3D geometry was developed. The model completely focuses on the nasal cavity until the posterior region just above the nasopharynx. The fact that the deposition along the respiratory tract is influenced by the three major factors: physical, physiological and morphological is evident (Cheng et al. 1996). To study the aerosol deposition in the human nasal and oral cavity the authors here measured in vivo nasal cavity dimensions using both MRI and AR. A 3D model was reconstructed for oral cavity and the throat model using casting procedures (Robinson et al. 2009). The authors here implemented the casting method instead of the MRI citing that accurate geometry is not obtained due to the movement of the vocal folds during breathing. Grgic et al. studied the aerosol deposition and flow measurements using a human mouth and throat replica (Grgic et al. 2004). The mouth piece angle and dimension were selected from that available in the literature for straight tubes. The extrathoracic model developed here was generated using the information available from CT scans, MRI Scans and observation of subjects during breathing. The model generated consisted of the mouth, oropharynx, larynx and the trachea. Furthermore a study the inter-subject and intra-subject in realistic mouth-throat geometries including mouth, oropharynx, larynx and trachea was also concluded (Grgic et al. 2004). The models used for these purposes were obtained using MRI scans of seven geometries. The acoustic reflection (AR) was used to study the nasal cavity geometry and dimensions (Hilberg et al. 1989 and Gomes et al. 2008)). These results were compared with the geometry obtained from the CT scans. Terheyden et al. validated the results obtained from the AR using the 3D reconstructed images from the CT scans (Terheyden et al. 2000). Xi et al. The use CT scans of a volunteer to construct the realistic model for the respiratory tract (Xi et al. 2008) considering the variations in the cross-section for various portions of the respiratory tract and the mesh generation along with different mesh types is a complex task . Cheng et al. measured the characteristics of the oral cavity until the trachea (Cheng et al. 1997). These characteristics were then related to the dimensionless parameters to study the ultrafine particulate deposition. Adult-Nasal-Oral-Tracheal head airway cast was used in the study to generate the model. Sampson et al. describe about the optical coherence tomography (OCT) in lieu of the CT or MRI scans. The airway dimensions have been verified against that obtained from X-ray or CT scan. Experiments were also conducted to measure the volume and nasal cross-sectional area at different points along the nasal tract. AR was used for this particular test (Mohebbi et al. 2008). The lateral cephalometric radiographs methodology is also used in determining the airway characteristics (Malkoc et al. 2005). This test provides only the 2D images of the nasopharynx. The CT scans were used to study the nasal cavity characteristics and the airway dynamics respectively and Tang et al. suggests some of the possible simulation techniques depending upon the type of flow (Tang et al. 2004 and Ertbruggen et al. 2005). Summarizing the above used methodologies we can infer that the most widely used methods are namely CT Scans, MRI, AR to determine the size and shape of the human respiratory tract.

The Study conducted by the NIOSH is completely focused on the external face features to

create a good fit of the respirators for the entire US respirator users. The anthropometric survey here consisted of a sample size of 4026 subjects for a total of 18 facial and head dimensions manually. The Anthropometric measurements specified above were from externally/ facial features, measuring the internal dimensions in the nasal and oral cavities can also be considered.

IV. Methodology

The Nasal cavity geometry follows a highly complex and asymmetric shape after a length of about 30 mm from the nasal inlet. The process of capturing the characteristics of this region is challenging task. The first 30 mm length of the Nasal cavity is the anterior portion which first comes in contact with the flow during inlet as shown in Figure 3. Figure 3 shows the imported geometry with mesh constructed for the simulation run. The mesh generation process here is determined by the value of the Reynolds number and the Reynolds number used here is 4130 (See Appendix 1) based on the diameter of the trachea and k-ε turbulence model is used for turbulent flow of low Reynolds number.

During a hazardous situation if hot air is inhaled then degree of burn injury suffered could be very high. The dimensions can be measured if an appropriate measuring device is designed for this particular task. The procedure for using this type of tool which penetrates into anterior portion of the nasal cavity must be performed under medical supervision. Figure 4 shows a measuring device (patent number US6659963) designed to measure the cavity in the anterior portion of the nasal cavity in between the inlet and the nasal turbinate's.

The device consists of three different tubes of varying length and diameter. The tube E has a calibrated scale shown in red colour. The tube B and D are connected by a wire mesh A. The wire mesh A expands or contracts when the tube D is moved in the horizontal direction i.e. inwards or outwards. The outer tube C acts as support for the two sliding tubes within. The portion of the tool that penetrates into anterior portion of the nasal cavity is highlighted in Figure 2. When the portion is inserted into the cavity and the tube is moved horizontally until the wire mesh obstructs the sliding mechanism, the data can be noted down from the calibrated scale. Figure 3 shows the pictorial of the existing measuring device.

The dimensions of the Oral cavity can also be measured internally. A measuring instrument similar to a calliper can be used to measure distance in 2 or 4 or 8 directions. This procedure might not need the degree of medical supervision as in the case of the Nasal cavity measurement but it is advisable to have a guidance of a medical practitioner. Figure 4 shows an arrangement of the instrument designed to measure the oral cavity dimensions. The end portion A is inserted into the mouth while the handle D is manipulated. The ends "A" are placed against the wall of the oral cavity and the displacement of ends "A" is measured from the calibrated scale C. The two handles B pivot about the point F to place the two ends "A" against the wall tissue inside the oral cavity. Point E is free to move along the curvature of the handles "B".

The instrument shown in the Figure 5 could be used to measure the dimensions of the oral cavity as identified in Robinson et al. (2009) as a guideline. The inlet of the oral cavity is the widest and follows a tapering cross-section has it advances horizontally towards the Oropharynx. The outermost width being 30.9 mm and approximately 20 mm in width when measured 54 mm deep within the oral cavity as shown in Figure 6. Figure 7 shows the instrument with measurements from Robinson et al. (2009) used as a reference for design such that the instrument is capable of measuring the widest distance close to the oral cavity inlet and the lowest width which is at a distance of 54 mm from the opening.

V. Discussion

The methodologies used for the purposes of the data collection can be summarized as the use of MRI, CT Scans, AR and use of Casting. This type of data collection usually is used on a small number of subjects. The limiting constraints include cost and subject availability due to the nature of procedures. A simple approach to measure these anthropometric data may lack the sophistication of the scanning and imaging devices like CT scan, MRI and AR but will provide the ability to measure large number subjects leading to more statistically usable data. The usages of the MRI, CT scan and AR have disadvantages of being unsafe from ionizing radiation or high costs of using the equipment and use.

The advantages of using this process of identifying the internal nasal and cavity dimensions can be attributed to the fact that this process can be applied to a large sample group. The cost involved with the use of the scanning and imaging devices will also be eliminated by this process. Exposure to the scanning and imaging devices also has a possibility of causing injury to the human body which can be eliminated by the use of these tools. The drawback of this method would be that the measuring needs to be done by the medical providers as the measuring device is inserted into the human body and not similar to the case in measuring the external anthropometric data. The Anthropometric data obtained here will have the measurements of the nasal cavity at a maximum of 50 mm deep and 54 mm for oral cavity whereas the scanning and imaging devices will assist in measuring within the human body.

A feasible method of measuring the dimensions of the Nasal and Oral cavity needs to be developed. A

measuring instrument similar to a calliper can be used to measure distance and or volume within the cavity. The process of measuring the anthropometric data here first starts with defining the landmarks in the human body, for example the tip of the nasal or oral inlet being one of the landmarks in the data collection process followed by the data analysis.

VI. Conclusion

In this study, an approach of measuring the nasal and oral cavity dimensions is outlined for research purposes. Anthropometric data are needed for the design and development of certain respiratory devices and instruments such as safety masks and goggles, respiratory masks, inhalators, etc. and treatment of the respiratory tract after injury. Various three dimensional heat transfer model of heated airflow through the upper human respiratory tract consisting of nasal, oral, trachea and the first two generations of bronchi are developed based on anthropometric dimensions for the various populations. Using computational fluid dynamics simulation software mesh diagrams of oral and nasal cavities considering various breathing / flow configurations are simulated based on these models. Other research uses include the study of the heat and mass transfer, aerosol deposition and flow characteristics in the upper human respiratory tract using computational fluid mechanics simulation requires access to a two dimensional or three dimensional model for the human respiratory tract.

Depicting an exact model is a complex task since it involves the prolonged use of imaging devices on the human body. Hence a three dimensional geometric representation of the human upper respiratory tract is developed using anthropometric data collected consisting of nasal cavity, oral cavity, nasopharynx, pharynx, oropharynx, trachea and first two generations of the bronchi. The methodology would measure the characteristic dimension of the human nasal and oral cavity at the inlet/outlet points which are classified as internal measurements. The respiratory tract is modeled circular in cross-section and varying diameter for various portions as identified and characterized by the anthropometric data. Based on the dimensions identified, a simplified 3D model representing the human upper respiratory tract is generated.

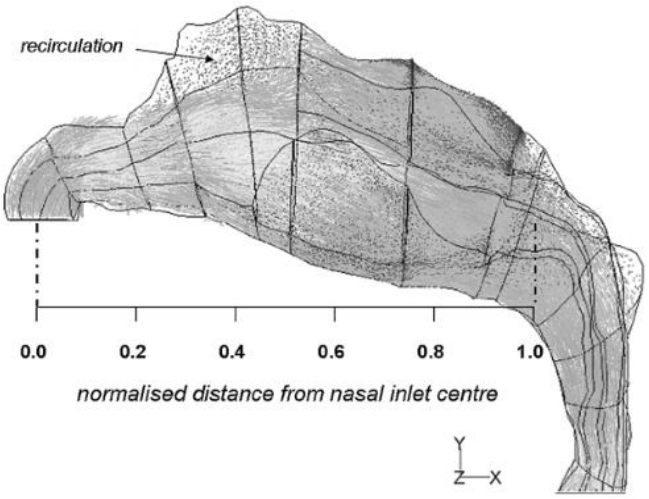


Figure 1 : Nasal cavity geometry used by Inthavong et al.(2006)

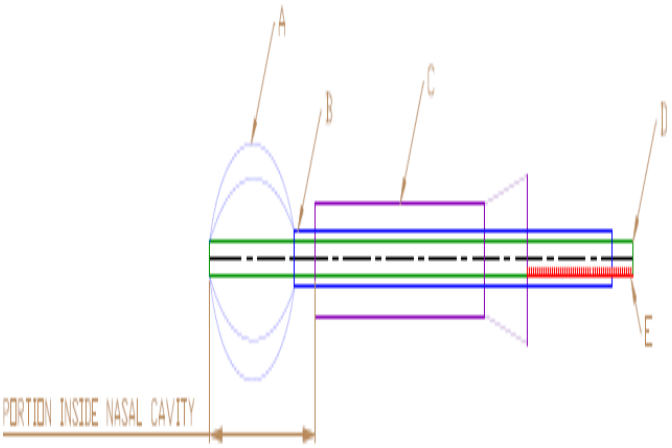


Figure 2 : Tool for Measuring Nasal Cavity Dimension. (Patent number US6659963)

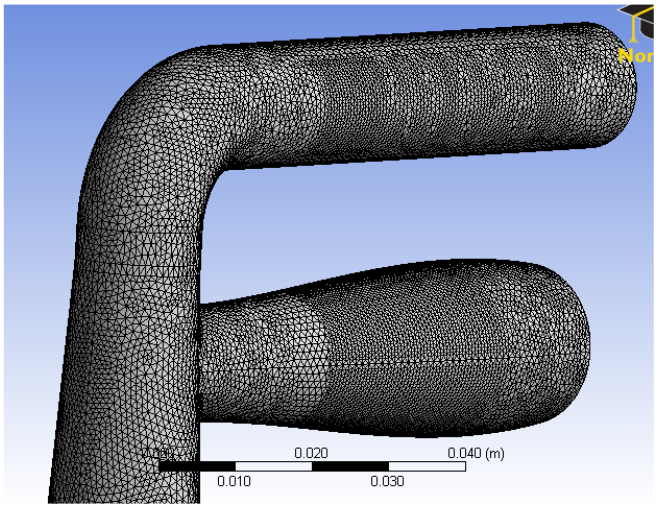


Figure 3 : Mesh generation

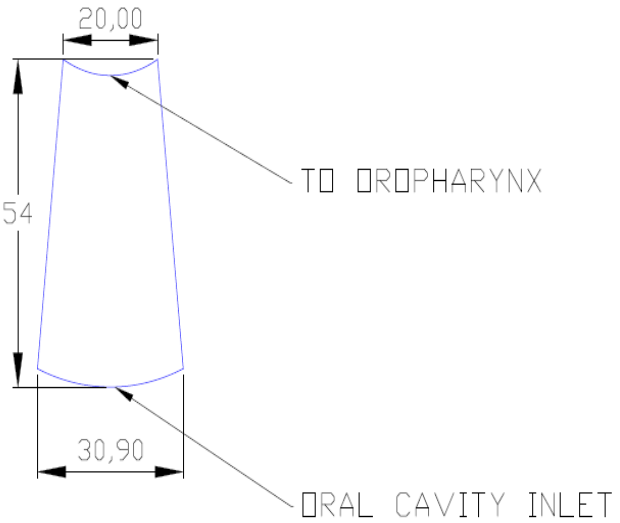


Figure 6 : Top View of Oral Cavity (mm)

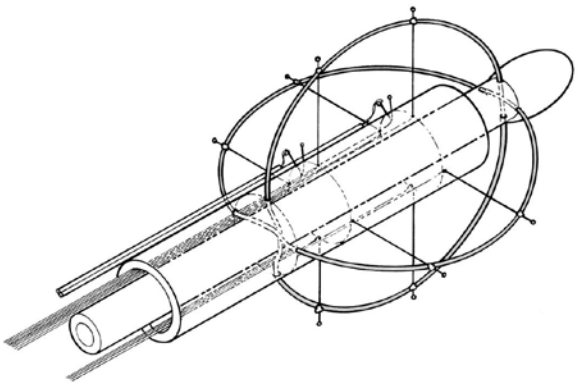


Figure 4 : Pictorial view of the Tool for measuring Nasal Cavity Dimension. (Patent number US6659963)

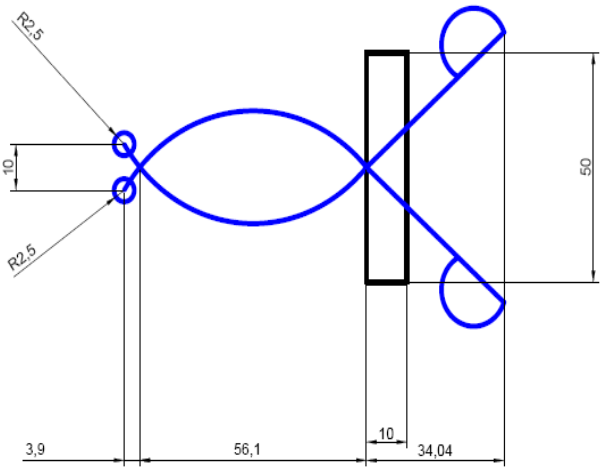


Figure 7 : Oral Cavity Measuring Instrument (All Dimensions in mm)

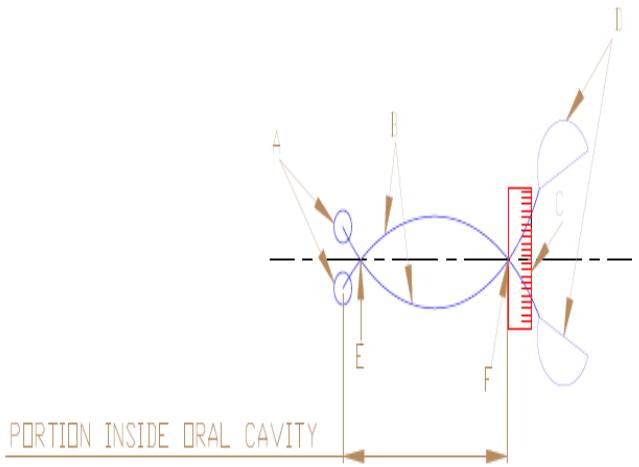


Figure 5 : Tool for measuring Oral Cavity Dimension

References Références Referencias

1. Bubb, H., 2004. Challenges in application of anthropometric measurements. *Theoretical issues in Ergonomical Science*, 5 (2), 154-168.
2. Cheng. K., Cheng. Y., Yeh. H., Guilmette. R.A., Simpson. S.Q., Yang. Y., Swift. D.L., (1996. In VIVO measurement of nasal airway dimensions and ultrafine aerosol deposition in the human nasal and oral airways. *Journal of Aerosol Science*, 27, 785-801.
3. Cheng. K., Cheng. Y., Yeh. H., Swift. D.L., 1997. Measurements of airway dimensions and calculation of mass transfer characteristics of human oral passage. *Transactions of the ASME*, 119, 476-482.

4. Du. L et al., 2008. Head-and-face anthropometric survey of Chinese workers. *Annals of Occupational Hygiene*, 52 (8), 773-782.
5. Erthbruggen. C., Hirsch. C. and Paiva. M., 2005. Anatomically based three dimensional model of airways to simulate flow and particle transport using computational fluid dynamics. *Journal of Applied physiology*, 98, 970-980.
6. Farahmand. K., Srinivasan. R. and Hamidi, M., 2011. CFD Heat Transfer Simulation of the Human Upper Respiratory Tract for Oronasal Breathing Condition. *Journal of Industrial Engineering Computations*.
7. Gomes. A.O.C., Claudia. A., Teixeira. M.S., Henrique. S., Trindade. K., Trindade. I.E.K., 2008. Nasal cavity geometry of healthy adults assessed using acoustic rhinometry. *Rev Bras Otorrinolaringol*, 74 (5), 746-754.
8. Grgic. B., Finlay. W.H., Heenan. A.F., 2004. In vitro intersubject and intrasubject deposition measurements in realistic mouth-throat geometries. *Journal of Aerosol Science*, 35, 1025-1040.

Global Journal of Medical research
Dentistry and Otolaryngology
Volume 13 Issue 2 Version 1.0 Year 2013
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4618 & Print ISSN : 0975-5888

Fusion and Gemination in A Primary Mandibular Anterior Teeth

By Prasanna Kumar Rao, Rohan Mascarenhas , Praveen Jodalli, Vijay Kumar & Darshana Devadig

Yenepoya University, India

*Abstract-*Tooth fusion is one of the rare anomalies of the shape of the tooth. It is due to the union of two separate tooth germs. Tooth fusion and gemination in mandibular primary teeth has very little documentation in Indian population. These conditions requires a minimal intervention approach, preventive procedures, and a long-term follow-up. Here we report a rare case of fusion between left mandibular primary central and lateral incisors and gemination in right primary mandibular lateral incisor in a four year old boy.

Keywords: tooth fusion, double teeth, bilateral fusion, mandibular primary teeth.

GJMR-J Classification : NLMC Code: WU 150

Strictly as per the compliance and regulations of:

Fusion and Gemination in A Primary Mandibular Anterior Teeth

Prasanna Kumar Rao [α], Rohan Mascarenhas [σ], Praveen Jodalli [ρ], Vijay Kumar [ω] & Darshana Devadig [¥]

Abstract - **Tooth fusion is one of the rare anomalies of the shape of the tooth. It is due to the union of two separate tooth germs. Tooth fusion and gemination in mandibular primary teeth has very little documentation in Indian population. These conditions requires a minimal intervention approach, preventive procedures, and a long-term follow-up. Here we report a rare case of fusion between left mandibular primary central and lateral incisors and gemination in right primary mandibular lateral incisor in a four year old boy.**

Keywords: tooth fusion, double teeth, bilateral fusion, mandibular primary teeth.

I. Introduction

One of the most unusual anomalies of shape of the tooth is fusion. It is union of two separated tooth germs. It always confused with germ-ination, which is an attempt of division of a single tooth germ. [1] Clinically it appears as a two separate crowns joining together or a crown of double the size of normal. The presence of deep fissure in fused teeth predisposes them to dental caries and makes them unaesthetic. Radiographically, there are two separate pulp chambers and root canals to a common pulp chamber and root canal system. Different treatment modalities can be implied according to the requirements of the situation. [2] Here we describe an unusual case of fusion between left mandibular primary central and lateral incisors and gemination in right primary mandibular lateral incisor in a four year old boy.

a) Case Report

A medically fit 4 year old boy reported to our dental clinic with chief complaints of decay in theupper right and left posterior teeth. There was no family history of dental anomalies and no consanguinity was reported in the parents. General and extraoral examinations appeared non contr-ibutory.

Intraoral examination revealed that mandibular left side deciduous central lateral incisors were fused together and germination in mandibular right lateral incisor. There was a deep grove on the labial and lingual surface with incisal notching. The periapical radiograph exhibited that the crowns and the roots were fused with complete union of their pulp chambers and root canals in mandibular left central and lateral incisors and right lateral incisor.(Figure 1)

II. Discussion

The terms Joined tooth, Double tooth, Twinning, is used to describe connate tooth and includes both teeth fusion and gemination. [3] Tooth fusion normally due to the union of two separated tooth germs. Depending on the time of union and stages of tooth development it may be complete or incomplete tooth fusion. Sometimes fusion can also seen between normal tooth and supernumerary tooth germ. [4]

In 1979 'Two tooth' rule is introduced to use the term fusion and germination. If the fused tooth are considered as one and the number of teeth in the dental arch is less then the term fusion is considered. If the number of teeth in the dental arch is normal then it is termed as germination or it is a case of fusion between normal and supernumerary tooth. But supernumerary tooth has conical in shape so it shows difference in the two halves of the joined crowns. [3]

Very few cases of bilateral fusion in mandibular primary dentition have been reported from the Indian population in literature. However in Caucasians it is 0.02% and in Japanese population 0.32%. It causes mainly spacing, malocclusion, esthetic and periodontal problems. [5,3,6] Reports of tooth fusion is more in primary dentition (0.5%) when compared to permanent dentition (0.1%). But bilateral tooth fusion in mandibular primary dentition is very rare (0.02%). [7]

The pathogenesis of the tooth fusion is not clear, however trauma, hereditary, environmental factors are considered. There is strong evidence of genetic control of fused teeth as evidenced in family. [8] The deep grove which present on the surface of the fused tooth is the area where bacterial plaque accumulation takes place and which leads to dental caries and periodontal disease. [3] The diagnosis of tooth fusion is mainly depends on history, clinical finding and radiographic findings. [9]Management of twin teeth requires regular and long term follow-ups.

Author α: Associate Professor, Department of Oral Medicine and Radiology, Yenepoya Dental College, Yenepoya University, Mangalore, Karnataka, India. e-mail: drjpkrao@gmail.com
Author σ: Senior Professor, Department of Orthodontics, Yenepoya Dental College, Yenepoya University, Mangalore, Karnataka, India.
Author ρ: Senior Lecturer, Department of Public Health Dentistry, Yenepoya Dental College, Yenepoya University, Mangalore, Karnataka, India.
Author ω: Senior Lecturer, Department Periodontics, Yenepoya Dental College, Yenepoya University, Mangalore, Karnataka, India.
Author ¥: Professor, Department of Conservative Dentistry and Endodontics, A.B Shetty Memorial Institute of Dental Sciences, Nitte University, Mangalore, Karnataka, India.

III. Conclusion

In fusion and germination, deep groove present on the crown may predispose the teeth to develop dental caries or periodontal problems. The treatment of choice depends upon the patients periodontal, esthetic and functional requirements. Usually a multidisciplinary approach may contribute to the success of the treatment.

References Références Referencias

1. Tewari N, Pandey RK. Bilateral fusion in primary mandibular teeth: A report of two cases. J Indian Soc Pedod Prev Dent. 2011;29:50-2.
2. Aguilo L, Gandia JL, Cibrian R, Catala M. Primary double teeth. A retrospective clinical study of their morphological characteristics and associated anomalies. Int J Paediatr Dent 1999;9:175-83.
3. Bharghav M, Chaudhary D, Aggarwal S. Fusion presenting as germination- A Rare Case Report. Oral & Maxillofacial Pathology Journal 2012;3:211-14.
4. Peirera AJ, Fidel RA, Fidel SR. Maxillary Lateral Incisor with Two Root Canals: Fusion or Gemination? Braz Dent J.2000;11: 141-46.
5. Tomizawa M, Shimizu A, Hayashi S, Noda T. Bilateral maxillary fused primary incisors accompanied by succedaneous supernumerary teeth: Report of a case. Int J Paediatr Dent 2002;12:223-27.
6. Sekerci AE, Sisman Y, Yasa Y, Sahman H, Ekizer A. Prevalance of fusion and gemination in permanent teeth in Copadocia region in Turkey. Pakistan Oral & Dental Journal. 2011;31:17-22.
7. Chalakkal P, Thomas AM. Bilateral fusion of mandibular primary teeth. J Indian Soc Pedod Prevent Dent. 2009;27:108-10.
8. Schuur AHB, Van Loveren C. Double teeth: Review of the literature. J Dent Child 2000; 67:313-25.
9. Ghoddusi J, Zarei M, Jafarzadeh H. Endodontic treatment of a supernumarary tooth fused to a mandibular second molar: A Case Report. Journal of oral science. 2006;48:39-41.

Figure 1 : Intraoral periapical radiograph showing fused mandibular left primary central and lateral incisor, Gemination in right primary lateral incisor with single root and root canals.

Global Journal of Medical research
Dentistry and Otolaryngology
Volume 13 Issue 2 Version 1.0 Year 2013
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4618 & Print ISSN : 0975-5888

Relationship of Oral Hygiene Practices and Dental Caries among School Children of Sullia Taluk, Karnataka, South India

By Praveena S, Thippeswamy HM, Nanditha K & Kalyana Chakravarthy P

Manipal University, India

Abstract-Objective: we aimed to evaluate the prevalence of dental caries, treatment needs and oral hygiene practices school going children of Sullia taluk.

Materials and methods: A total of 1800 school children constituted the study sample. Each age group consisted of 600 children. Information on oral hygiene methods was collected. Dental caries was recorded using dft/DMFT as per WHO 1997 guidelines.

Results: The prevalence of dental caries was found to be 33.6% in Sulliataluk. The prevalence of dental caries was found among 5 year old 31.0%, 12 year old 32.8% and 15 year old 37.0% respectively. Prevalence of dental caries among tooth brush using 32.6% and finger users 42.8%. This observation was statistically significant ($P<0.05$). The percentage of caries affected children was low among tooth paste user (30.5%) and those who brush their teeth twice daily (10.6%).

Keywords: *dental caries, treatment need.*

GJMR-J Classification : *NLMC Code: WU 158*

Strictly as per the compliance and regulations of:

Relationship of Oral Hygiene Practices and Dental Caries among School Children of Sullia Taluk, Karnataka, South India

Praveena S [α], Thippeswamy HM [σ], Nanditha K [ρ] & Kalyana Chakravarthy P [ω]

Abstract- Objective: we aimed to evaluate the prevalence of dental caries, treatment needs and oral hygiene practices school going children of Sullia taluk.

Materials and methods: A total of 1800 school children constituted the study sample. Each age group consisted of 600 children. Information on oral hygiene methods was collected. Dental caries was recorded using dft/DMFT as per WHO 1997 guidelines.

Results: The prevalence of dental caries was found to be 33.6% in Sulliataluk. The prevalence of dental caries was found among 5 year old 31.0%, 12 year old 32.8% and 15 year old 37.0% respectively. Prevalence of dental caries among tooth brush using 32.6% and finger users 42.8%. This observation was statistically significant ($P<0.05$). The percentage of caries affected children was low among tooth paste user (30.5%) and those who brush their teeth twice daily (10.6%). The prevalence of dental caries found to be slightly higher among urban (34.2%) and mixed diet group (34.9%) compared to rural (33.3%) and vegetarian group (32.9%). In all the age groups the decayed teeth accounted for the greatest percentage in both deciduous and permanent dentition. The greatest treatment need for study population was one surface restoration.

Conclusion: Prevalence of dental caries for the entire study population was 33.6% and the treatment need among the study population revealed that greatest need was for one surface restoration followed by other treatment.

Keywords: dental caries, treatment need.

I. Introduction

Dental caries is a microbial disease of the calcified tissues of the teeth, characterized by demineralization of the inorganic portion and destruction of the organic substance of the tooth.[1]It is a dynamic process where both demineralization and remineralization occur simultaneously. When the rate of demineralization exceeds the rate of remineralization, then there is frank cavity formation.

Dental caries or tooth decay is both a universal and a lifelong disease. This disease is universal in the sense that the prevalence or percent of the population affected increases with age, ultimately affecting almost the entire population. All of us are at risk for caries as long as we have our natural teeth. Thus it is life long and may occur as early as the first year of life as early childhood, caries continue throughout childhood and young adulthood and continue in adults as root surface caries.

Dental caries is a multifactorial disease in which there is an interplay of three principle factors; host (teeth, saliva etc), microflora and substrate (diet). In addition, a fourth factor, time, must be considered. All the factors must be present and must interact with one another for dental caries to develop. The prevalence and incidence of dental caries in a population is influenced by a number of risk factors such as age, sex, ethnic group, dietary patterns and oral hygiene habits.[2]

Dental caries is the most prevalent disease among children in the global scenario. A review of data from the developed countries in the past 25 years revealed a decreasing trend in the levels of dental caries. This has been reported due to the implementation of preventive strategies against dental caries.[3]The scenario in India is no different from other developing countries. Available literature of 1940 to 1960, the prevalence of dental caries in India showed a varied picture i.e. caries being very high in some areas and low in some areas. In spite of conflicting reports, it has been observed that during 1940 the prevalence of dental caries in India was 55.5%, during 1960 it was reported to be 68%. Several studies undertaken in different parts of the country showed that dental caries has been consistently increasing in its prevalence and severity.[4] Due to lack of baseline data, it is virtually impossible to establish the exact situation regarding prevalence of dental caries in India.

Studies reported in Indianchildren reported varied prevalence of dental caries.[3,4] Hence an attempt was done to assess the prevalence of dental caries, treatment needs and oral hygiene practices among school children of Sulliataluk. It will also help to provide baseline data on prevalence of dental caries among 5, 12 and 15 year old school children of Sullia taluk, Karnataka.

Author α: Reader, Department of Orthodontics and Dentofacial Orthopedics, Yenepoya Dental College, Derlakatte, Mangalore.
Author σ: Reader, Dept of Community Dentistry, JSS Dental College, Mysore.
Author ρ: Reader, Dept of Prosthodontics, JSS Dental College, Mysore.
Author ω: Assistant Professor, Dept of Public Health Dentistry, Manipal College of Dental Sciences, Manipal University, Manipal.
e-mail: drkalyan81@gmail.com

II. Materials and Methods

A cross-sectional study was conducted to evaluate the prevalence of dental caries and treatment needs among 5, 12 and 15 year old school children of Sulliataluk,Dakshina Kannada district, Karnataka.

Public education in Sullia is mostly served by government bodies. From each selected school, 600 children of 5, 12 and 15 year aged children were selected using systematic random sampling.A total of 1800 school children were included in this study. Subjects with mixed dentition and those with acute infections of the oral cavity were excluded from the study.

A specially designed proforma which consisted of two parts was used. The first part had demographic information, which was retrieved from school records and through interviews with the children. Information was also collected on children's oral hygiene practices including regularity of cleaning the teeth, aids and agents used for this purpose and also frequency of brushing. The second part consisted of clinical examination for dental caries and treatment needs as described by WHO (1997) for oral health surveys.[5]Caries was examined under natural day light using mouth mirrors and CPI probes. In children of 5 year age group, dft index was recorded, while for 12 and 15 year age children DMFT was recorded. Intra-examiner reliability was assessed using Kappa coefficient which was 0.90 suggesting an excellent agreement.

III. Statistical Analysis

All the analysis was done using SPSS 14 version (SPSS Inc, Chicago, IL, USA). A p-value of <0.05 was considered statistically significant. Chi-square test was used to compare the proportions between the groups. Student's t test was used to compare the dft/DMFT score between male and females.

IV. Results

A total of 1800 school children constituted the final sample in the study. Each age group consists of 600 children combining both males and females (Table 1). Among 5, 12 and 15 year age group, majority of the children used toothbrush as the method to maintain oral hygiene both in male as well as females. A minor proportion of children also used finger as an aid to maintain oral hygiene. Almost 2/3rd of the children used toothpaste and 1/3rd used tooth powder in 5, 12 and 15 year male and female children. A small proportion of children in 5, 12 and 15 year children used indigenous materials like salt, charcoal and or brick powder as dentifrice (Table 2).

Caries was compared in 5, 12 and 15 year old children with respect to type of oral hygiene aids and dentifrices. In 5 year age group children, there was no significant difference in the caries experience and type of oral hygiene aid ($p=0.272$) or dentifrice used ($p=0.597$). In 12 year age group children, more than 2/3rd of the toothbrush and half of the finger users were caries free ($p=0.006$). Almost 2/3rd of the toothpaste and more than half of the toothpowder users were caries free ($p<0.001$). In 15 year age group children, nearly 2/3rd of the toothbrush and nearly half of the finger users were caries free ($p=0.05$). Almost 2/3rd of the toothpaste and more than half of the toothpowder users were caries free ($p<0.001$) (Table 3).

There was no significant difference in the mean dft score between males and females of 5 year age group ($p=0.452$). In 12 and 15 year age group, there was no significant difference in the mean DMFT score between males and females ($p=0.249$ and $p= 0.742$ respectively) (Table 4)

In 5, 12 and 15 year age group, 2/3rd of the males and females required no specific treatment as assessed by the treatment needs described by WHO in 1997. Preventive care was needed in almost 3-5% of the children while Sealant was required by 4-6.5% children. Major treatment need in all the age groups was one surface filling which was in the range of 17 - 26%.This was followed by the need for 2 or more surface fillings (8 -14%). The need for pulp care was in the range of 7-12%. The least required form of treatment was crown/ veneer/ other care (Table 5).

V. Discussion

The present study showed that majority used tooth brush and tooth paste as the commonly used oral hygiene aids and materials. These findings were similar to the other studies conducted by Retnakumari N (1999)[3], Sarvanan S et al., (2003)[6], Okeigbemen(2004)[7], David et al., (2005)[8].

The prevalence of dental caries in the present study was 32.6% among tooth brush users. This was similar to the findings reported by Misra and Shee (1979)[9] and Sarvananet al., (2003)[6]. This may be attributed to the fact that tooth brush is more effective for removal of plaque from the tooth surface. The low prevalence of dental caries in tooth brush users may be due to the fact that the bristles of a tooth brush could reach and clean those inaccessible areas of oral cavity that might not be accessible to the finger and other materials.

In the present study regarding the use of tooth paste, tooth powder and other materials like salt, charcoal, ash, etc., it was observed that the percentage of caries affected children was high in subjects who used other materials when compared to tooth paste and tooth powder users. The findings was similar to the studies conducted by Kapoor AK et al., (1980)[10], Sarvanan S et al., (2003)[6]. The high prevalence of dental caries who use these indigent oral hygiene aids could

be attributed to the fact that they were applied with finger which might not permit them to clean the inaccessible areas of the oral cavity. It might also be possible that dentifrices deliver active ingredients like fluoride which lead to effective plaque control and prevention of caries.

In the present study the prevalence of dental caries among the study population was 33.6%. The prevalence of caries increased from 5 years to 15 years age group. This finding was similar to the studies conducted by DuttaA (1965)[11], TewariA et al., (1977)[12], Megas et al., (1989)[13], Rodrigues et al., (1998)[14]. This might be attributed to the fact that as age advances,the teeth were exposed to the cariogenic challenges more often. Increased pattern of sugar consumption, availability of sugar products at schools, urbanization, socio-economic circumstances, availability of dental services, dental service utilization are some factors which could have concomitant role in increased prevalence of dental caries.

The mean dft/DMFT was found to be similar in females and males among 5, 12 and 15 year age group. The finding was contrary to the studies conducted by Dutta (1965)[11],Wright et al., (1989)[15], Megaset al.,(1989)[13], David et al., (2005)[8].

In the present study it was observed that needs for different forms of dental treatment were single surface restoration were in utmost need followed by two or more surface restorations. This study goes which in accordance with the study conducted by Mosha HJ et al., (1994)[16], Rodriquesand Damle SG (1998)[14], Sarvanan S et al., (2003)[6], Kulkarniand Deshp-ande(2002)[17].

Our study provided baseline data for dental caries and treatment needs in Sulliaschool children. Within the limits of this study, we could conclude that the dental caries was high in this area. Healthier children are more likely to attend school, and modest improvements in schooling will allow for the continuation of education. Hence, authorities should consider this data and should plan appropriate action strategy to decrease the overall prevalence and unmet treatment need among this target group along with other prevailing general health problems. Oral health promotional activities like use of topical fluoride, teaching and reinforcing appropriate brushing technique and frequency of brushing, demonstrating plaque using disclosing agents, decreasing the availability of sugar/sweetened food in the school premises and promotion of sugar free (tooth-friendly sweets) should be reinforced and recommended. The cultural habit of cleaning teeth at least once a day is an important cultural infrastructure that can be made use for oral health promotion by showing the right way of brushing and cleaning teeth.High literacy rate in this area could be helpful in implementing health education for children and adults (parents and teachers) which might help in modification of risk behavior. Comprehensive school health programs can cause a dramatic "ripple effect", resulting in changes in attitudes, knowledge and behavior. Schools that provide health services and education not only benefit school-aged children, but also the entire community.School children can act as messengers for other out-of-school children and members of their communities to communicate better practices in hygiene and overall health. Incorporating oral health in general health education can be much more useful. Usage of topical fluoride might not be appropriate as the study area comes under endemic fluoride belts of India. Dental schools in the study area could also be used to decrease the overall unmet needs among children along with promotion of oral health.

References Références Referencias

1. Shafer, Hine, Levy. Editors: R. Raajendran, B. Shivapathasundharam and AR Raghu Shafer's Textbook of Oral Pathology. 6th ed. Elsevier; Noida, India: 2005.
2. Harris R, Nicoll AD, Adair PM, Pine CM.Risk factors for dental caries in young children: a systematic review of the literature. Community Dent Health. 2004;21(1 Suppl):71-85.
3. Retnakumari N. Prevalence of dental caries and risk assessment among primary school children of 6-12 years in the Varkala municipal area of Kerala. J Indian SocPedoPrev Dent 1999;17(4):135-142.
4. Dash JK, Sahoo PK, Bhuyan SK, Sahoo SK. Prevalence of dental caries and treatment needs among children of Cuttack (Orissa). J Indian SocPedoPrev Dent 2002;20(4):139-143.
5. WHO 1997. Oral Health surveys. Basic methods. 4th edition Geneva.
6. Sarvanan S, Anuradha KP, Bhaskar DJ. Prevalence of dental caries and treatment needs among school going children of Pondicherry, India. J Indian SocPedoPrev Dent 2003;21(1):1-12.
7. Okeigbemen SA. The prevalence of dental caries among 12 to 15 year old school children in Nigeria. Report of a local survey and campaign. Oral Health Prev Dent 2004;2:27-31.
8. David J, Wang NJ, Astrom AN, Kuriakose S. Dental caries and associated factors in 12 year old school children in Thiruvananthapuram, Kerala, India. Int J Pediatr Dent 2005;15:420-428.
9. Misra FM, Shee BK. Prevalence of dental caries in school going children in an urban area of South Orissa. J Ind Dent Assoc 1979;51:267-270.
10. Kapoor AK, Ray SK, Kaur P, Reddy DCS, Nagchoudhary J. Dental caries and its relationship to materials used for cleaning teeth and frequency of cleaning teeth "Prevalence of Dental caries". JIDA 1980;52:81-83.

11. Duttta A. Study on prevalence of periodontal disease and dental caries amongst the school going children in Calcutta. J All India Dent Assoc 1965;367-384.
12. Tewari, Amrit, Chawla, Harpinder Singh. A study of prevalence of dental caries in an urban area of India. JIDA 1977;49:231-237.
13. Megas BF, Athanassoule TN. Dental caries prevalence in the permanent teeth in Greek school children related to age, sex, urbanization and social status. Community Dent Health 1989;6:131-137.
14. Rodrigues JSL, Damle SG. Prevalence of dental caries and treatment need in 12-15 year old municipal school children of Mumbai. J Indian SocPedoPrev Dent 1998;16(2):31-36.
15. Wright FAC, Deng H, Shi ST. The dental health status of 6 and 12 year old Beijing school children in 1987. Community Dent Health 1989;6:121-130.
16. Mosha HJ, Ngilisho LAF, Nkwera H, Scheutz F, Poulsen S. Oral health status and treatment needs in different age groups in two regions of Tanzania. Community Dent Oral Epidemiol 1994;22:307-310.
17. Kulkarni SS, Deshpande SD. Caries prevalence and treatment needs in 11-15 year old children of Belgaum city. J Indian SocPedoPrev Dent 2002;20(1):12-15.

Table 1

Age group	Male N (%)	Female N (%)
5	298 (49.7)	302 (50.3)
12	304 (50.7)	296 (49.3)
15	301 (50.2)	299 (49.8)
Total	**903 (50.2)**	**897 (49.8)**

Table 2

Age group	Oral hygiene aids	Male N(%)	Female N(%)
5	Tooth brush	251 (84.2)	254 (84.1)
	Finger	47 (15.8)	48 (15.9)
12	Tooth brush	270 (88.8)	273 (92.2)
	Finger	34 (11.2)	23 (7.8)
15	Tooth brush	291 (96.7)	287 (96.0)
	Finger	9 (3.0)	12 (4.0)
	Any other	1 (0.3)	-
5	Tooth paste	192 (64.4)	206 (68.2)
	Tooth powder	99 (33.2)	89 (29.5)
12	Tooth paste	206 (67.8)	214 (72.3)

	Tooth powder	89 (29.3)	79 (26.7)
	Any other	9 (3.0)	3 (1.0)
15	Tooth paste	218 (72.4)	238 (79.6)
	Tooth powder	79 (26.2)	52 (17.4)
	Any other	4 (1.3)	9 (3.0)

Table 3

Age	Method	Caries		p-value	Dentifrice	Caries		p-value
		Experienced	Free			Experienced	Free	
5	Tooth brush	152 (30.1)	353 (69.9)	0.272	Tooth paste	118 (29.6)	280 (70.4)	0.597
	Finger	34 (35.8)	61 (64.2)		Tooth powder	63 (33.5)	125 (66.5)	
	Others	-	-		Others	5 (35.7)	9 (64.3)	
12	Tooth brush	169 (31.1)	374 (68.9)	0.006	Tooth paste	122 (29.0)	298 (71.0)	<0.001
	Finger	28 (49.1)	29 (50.9)		Tooth powder	66 (39.3)	102 (60.7)	
	Others	-	-		Others	9 (75.0)	3 (25.0)	
15	Tooth brush	209 (36.2)	369 (63.8)	0.05	Tooth paste	148 (32.5)	308 (67.5)	<0.001
	Finger	12 (57.1)	9 (42.9)		Tooth powder	64 (48.9)	67 (51.1)	
	Others	1(100)	-		Others	10 (76.9)	3 (23.1)	

Table 4

Age	Sex	N	Mean ± SD dft / DMFT	p-value
5	M	298	0.74 ± 1.66	0.452
	F	302	0.65 ± 1.24	

12	M	304	0.46 ± 0.84	0.249
	F	296	0.54 ± 0.86	
15	M	301	0.68 ± 1.07	0.742
	F	299	0.71 ± 1.16	

Global Journal of Medical research
Dentistry and Otolaryngology
Volume 13 Issue 2 Version 1.0 Year 2013
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4618 & Print ISSN : 0975-5888

Enhancing the smile with botox- Case Report

By Dr. Vivek Amin, Dr. Vishal Amin, Dr. Swathi, Dr. Ali Jabir & Dr. Praveena Shetty

Yenepoya Dental College And Hospital, India

Abstract- *Introduction:* The psychological stress due to gummy smile could be the key reason to seek orthodontic treatment. Botox has shown to be most effective and minimally invasive technique to correct the gummy smile which is caused due to short upper lip. This case report was done to show its clinical changes in the correction of gummy smile.

Methods: Three patients received BTX-A injection and the patients were clinically evaluated one week, two and three weeks post operatively with changes documented in the photographs.

Results: After four weeks, results were definitely observed with a decrease from 8 mm gingival exposure to 3 mm.

Conclusion: The use of Botox isa conservative treatment in patient with short upper lip and gummy smile. However the improvement is temporary and must be repeated every six months to one year.

Keywords: *gummy smile, short upper lip, botox.*

GJMR-J Classification : *NLMC Code: WU 600*

ENHANCINGTHESMILEWITHBOTOX-CASEREPORT

Strictly as per the compliance and regulations of:

Enhancing the smile with botox- Case Report

Dr. Vivek Amin [α], Dr. Vishal Amin [σ], Dr. Swathi [ρ], Dr. Ali Jabir [ω] & Dr. Praveena Shetty [¥]

Abstract- *Introduction:* The psychological stress due to gummy smile could be the key reason to seek orthodontic treatment. Botox has shown to be most effective and minimally invasive technique to correct the gummy smile which is caused due to short upper lip. This case report was done to show its clinical changes in the correction of gummy smile.

Methods: Three patients received BTX-A injection and the patients were clinically evaluated one week, two and three weeks post operatively with changes documented in the photographs.

Results: After four weeks, results were definitely observed with a decrease from 8 mm gingival exposure to 3 mm.

Conclusion: The use of Botox isa conservative treatment in patient with short upper lip and gummy smile. However the improvement is temporary and must be repeated every six months to one year.

Keywords: *gummy smile, short upper lip, botox.*

I. Introduction

Smiling is the most powerful communication and people with attractive smile radiate warmth that draws others to them instantly.Unattractive smile due to short upper lip and excessive gingival exposure can be self-conscious or even psychologically affected and hence could be the main reason to seek orthodontic intervention.

In many instances, orthodontist may fail to correct gummy smilewithout surgical procedures like lefort 1 osteotomy, crown lengthening and myectomy to muscle resection[1].The goal of an orthodontist is to attempt a non-surgical and minimally invasive treatment Three patients between the age group of 17 to 21 years visited the department of orthodontics and dentofacial orthopaedics, Yenepoya University with the chief complaint of excessive gummy smile. On examination one patient had a short upper lip with normal maxilla and other two had short upper lip with vertical maxillary excess, but were not willing for surgery.

At the beginning of the treatment extra-oral smiling photographs were taken.Patients were thenreferred to the Department of Dermatology of the same university and Botox allergic test was done in each individual prior to Botox injection. Botulinum toxin type A (BTX-A) was diluted by adding 4.0ml of 0.9% normal saline solution without preservatives to 100 U of vacuum - dried C botulinum type A neurotoxin complex, according to the manufactures dilution technique. This resulted in a 2.5 U/0.1 ml dose. 1.25U per side was injected in both the right and left levator labii superioris and levator labii superioris alaque nasi muscle (LLS) and an additional 1.25 U per side at the overlap areas of the levator labii superioris and zygomaticus minor muscles (LLS/ZM). Aspiration before BTX-A, injection was done to avoid involuntary deposition of the toxin into the facial arteries (figure1,2). The patients were clinically evaluated 1 week, 2 weeks and 4 weeks post operatively.

II. Results

The results of this clinical trial were analysed both by clinical evaluation of gummy smile and with pre and postoperative photographs. The following measurements (called A,B and C) were recorded: A: RP1 to superior border of upper lip vermilion; B: RP1 to inferior border of upper lip vermilion; and C: inferior border of upper lip vermilion border to junction of the gingiva with maxillary right central incisor crown along its own midline (figure 3).

All patients began to show improvement approximately 15 days after the injections (figure 4 -9). After 4 weeks results were definitely observed with a decrease from 8 mm gingival exposure to 3 mm, which was considered as normal gingival display for an adult during smiling.

III. Discussion

The surgical correction of the short upper lip and gummy smile by gingivectomy was an alternative treatment but they are not routinely used to treat hyper functional upper lip elevator muscle. Lefort I osteotomy with superior impaction is most commonly adopted to treat skeletal vertical maxillary excess and the most common limitation of this procedure is the congestion of nasal air way function[2]. We could avoid extensive surgical procedures and its side effects with the use of Botox.

Author α: M.D.S, Professor Department of Orthodontics and Dentofacial Orthopaedics Yenepoya University Mangalore, 575018 Karnataka, India. e-mail: drvivekamin@gmail.com

Author σ: M.B.B.S, M.D Professor Department of Dermatology Yenepoya University Mangalore, 575018 Karnataka, India. e-mail: drvishalamin@yahoo.com

Author ρ: MDS Reader Department of Endodontics and Conservative Dentistry Yenepoya University Mangalore, 575018 Karnataka, India. e-mail: drswathiamin@gmail.com

Author ω: Department of Orthodontics and Dentofacial Orthopaedics Yenepoya University Mangalore, 575018 Karnataka, India. e-mail: drjabir05@gmail.com

Author ¥: M.D.S Reader Department of Orthodontics and Dentofacial Orthopaedics Yenepoya University Mangalore, 575018 Karnataka, India. e-mail: orthopraveenshetty@gmail.com

Botox injection is an excellent treatment modality in achieving a pleasing smile. A satisfactory result was achieved in all cases and in turn it boosted their self-confidence and social acceptance.

Rubin et al[3]concluded that the levator labii superioris, the zygomaticus minor and superior fibres of buccinators musclesunder the nasolabial fold are responsible for the production of a full smile. Pessa[4] indicated that levator labii superioris alaque nasi was responsible for the formation of medial portion of the fold and minimally responsible for the elevation of upper lip and smile formation and he also found that zygomaticus major and minor are responsible for smiling. The ability of BTX-A to produce muscle paralysis by chemodenervation has been utilized to treat our patient with hyper active upper lips.We achieved a reduction of gingival exposure from 8 mm to 3 mm in all our cases. According to Sarver[5], a slight amount of gingival exposure is acceptable and that contrary to posed smile, an unposed smile is natural in that it expresses authentic human emotion.

IV. Conclusion

It's the time to broaden the horizon of our profession.The use of Botox is effective, minimally invasive, conservative treatment in patient with short upper lip and gummy smile. However the improvement is temporary and must be repeated every six months to one year.

References Références Referencias

1. Sahoo KC et al. Botox in gummy smile- a review. Indian journal of dental sciences 2012;(4)1:51-3.
2. Adarsh S. Indira et al. Botox as an adjunct to orthognathic surgery for a case of sever vertical maxillary excess. J. Maxillofac. Oral Surg 2011;10(3):266-270.
3. Rubin LR. Mishriki Y. Lee G. Anatomy of the naso labial fold: the key stone of the smiling mechanism. Plast Reconstr Surg1989:83:1-10.
4. Pessa JE. Improving the acute nasolabial angle and medial nasolabial fold by levator alae muscle resection. Ann Plast Surg1992:29:23-30.
5. Sarvar DM. The importance of incisor positioning in the esthetic smile: the smile arc. AM J Orthod Dentofacial Orthop 2001:120:98-111.
6. Mario Polo. Botulinum toxin type A in the treatment of excessive gingival display. AM J Orthod Dentofacial Orthop 2005;127:214-218.
7. Chin Yang Tasi et al. Effects on craniofacial growth and development of unilateral botulinum neurotoxin injection into the masseter muscle. AM J Orthod Dentofacial Orthop 2009;135:142.e1-142e6.
8. Mario Polo. Botulinum toxin type A (Botox) for the neuromuscular correction of excessive gingival display on smiling (gummy smile).Am J Orthod Dentofacial Orthop 2008;133:195-203.

Figure and Figure Legend

Figure 1

Figure 2

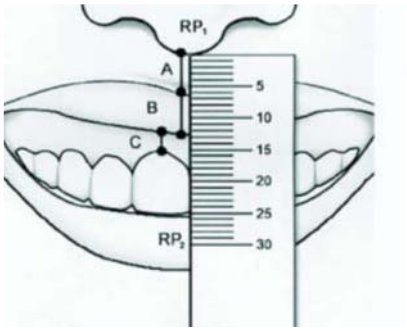


Figure 3

Patients Preand Post Botox Figures

Pre Figure 4

Post Figure 5

This page is intentionally left blank

Global Journal of Medical research
Dentistry and Otolaryngology
Volume 13 Issue 2 Version 1.0 Year 2013
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4618 & Print ISSN : 0975-5888

Is your Tooth Cleaner, Clean...???

By Priyal Matreja, Rajshree Bhandari, Meena Anand, Seema Shetty, Srinivasan Raj Samuel & Betsy S Thomas

Manipal College Of Dental Sciences, Manipal, India

Abstract- Toothbrushes get easily contaminated with different microorganisms originating not only from the oral cavity but also from the surroundings in which they are stored. Contaminated toothbrushes might serve as a possible cause in infection or reinfection especially in patients undergoing periodontal treatment. The purpose of the present study was to evaluate and compare the efficacy of five different disinfectant solutions like hydrogen peroxide (3%), Chlorhexidinegluconate (0.2%), essential oil, Saline (9%) and Cetylpyridinium chloride.Sixty dental graduates were randomly assigned as control and experimental groups and were provided with toothbrushes and the disinfectant solution for routine use twice daily for three days. They were instructed to immerse the toothbrush head in the disinfectant solution for five minutes after brushing and the toothbrush was air dried. Toothbrushes were collected from volunteers after three days of use for microbiological analysis.

Keywords: toothbrush, chlorhexidine, cetylpyridium chloride, essential oil, hydrogen peroxide.

GJMR-J Classification : NLMC Code: WU 600

Strictly as per the compliance and regulations of:

Is your Tooth Cleaner, Clean…???

Priyal Matreja [α], Rajshree Bhandari [σ], Meena Anand [ρ], Seema Shetty [ω], Srinivasan Raj Samuel [¥] & Betsy S Thomas [§]

Abstract- Toothbrushes get easily contaminated with different microorganisms originating not only from the oral cavity but also from the surroundings in which they are stored. Contaminated toothbrushes might serve as a possible cause in infection or reinfection especially in patients undergoing periodontal treatment. The purpose of the present study was to evaluate and compare the efficacy of five different disinfectant solutions like hydrogen peroxide (3%), Chlorhexidinegluconate (0.2%), essential oil, Saline (9%) and Cetylpyridinium chloride.Sixty dental graduates were randomly assigned as control and experimental groups and were provided with toothbrushes and the disinfectant solution for routine use twice daily for three days. They were instructed to immerse the toothbrush head in the disinfectant solution for five minutes after brushing and the toothbrush was air dried. Toothbrushes were collected from volunteers after three days of use for microbiological analysis. 3% Hydrogen peroxide (MD= -2.02, p<0.001), mouthwash containing 0.2% chlorhexidinegluconate (MD= -1.79, P<0.001) and mouthwash containing essential oils (MD=-1.51, P<0.008) gave a significantly lower CFUs score whereas saline and cetylpyridinium chloride mouthwash failed to produce a significant difference in the number of CFUs when compared with that of water. The presents study shows that using 3% H2O2 in 1:1 dilution for disinfecting toothbrush after brushing is the most effective method followed by mouthwashes containing .2% chlorhexidinegluconate and essential oils respectively.

Keywords: toothbrush, chlorhexidine, cetylpyridium chloride, essential oil, hydrogen peroxide.

I. Introduction

Oral hygiene is the practice of keeping the mouth and teeth clean to prevent dental problems like, dental caries, gingivitis, periodontitis and bad breath[1]. Tooth brushing, tongue cleaning, flossing, mouth rinsing with disinfectant mouth washes are some of the methods for maintaining oral hygiene. Tooth brushing is the most effective and commonly used method among them. Along with the brushing methods, disinfection of toothbrush is also equally important for maintenance of health of oral tissues[1].

Toothbrushes often become contaminated with microorganisms which originate not only from oral cavity but also from environment in which they are stored[2,3,4]. Wet environment of bathroom, dispersed aerosols from toilet flushing and contaminated finger contact contribute to toothbrush contamination.

Several families generally store their tooth-brushes in a common container which can lead to cross- infection.There is a possibility of re-infection when the individual uses the contaminated toothbrush. In 1920, Cobb was the first investigator to report the recurrence of infection in mouth in patient using contaminated toothbrush. When patient was advised to soak the toothbrush in alcohol before and after using it patient recovered from disease[5].

Glass and Shapiro[6] observed that changing the toothbrush at short intervals, helped patient achieve elimination of inflammatory disease symptoms, suggestive that toothbrush acted as a reservoir for microorganisms capable of producing diseases. Few studies have also reported chances of bacteremia and other systemic problems due to the use of contaminated toothbrush[7].

There is a need of disinfection of toothbrush, which can be done by methods which acts rapidly, cost-effective, non-toxic and which can be easily implemented. Various methods for toothbrush disin-fection have been listed in literature like immersion in antimicrobial solution, use of anti-bacterial tufted toothbrushes, UV sterilization etc[8]. Based on this, the present study was done to compare the efficiency of different antimicrobial solutions for disinfection of toothbrush.

II. Materials and Methods

The present study was done in Manipal College of Dental Sciences, Manipal. Permission from ethical committees of Manipal College of Dental Sciences and Kasturba Medical College, Manipal were taken. A total of sixty (volunteers) dental graduates aged in the range of 22- 27 years were selected for the study. They were explained verbally about the study and they were provided with subject information sheet to them for delivering complete information regarding the study in a

Authors α σ: B.D.S Manipal College of Dental Sciences, Manipal.
e-mails: priyalmatreja@gmail.com, bhandarirajshree@in.com
Author ρ: Associate Professor, Dept. of Periodontology,Manipal College of Dental Sciences, Manipal. e-mail: drmeenaanand@yahoo.com
Author ω: Lecturer, Dept. of Microbiology,Kasturba Medical College, Manipal. e-mail: seemakshetty@gmail.com
Author ¥: Post Graduate student, Dept. of Public Health Dentistry, Manipal College of Dental Sciences, Manipal.
e-mail: samuelrajsrinivasan@gmail.com
Author §: Professor and Head,Dept. Of Periodontology, Manipal College of Dental Sciences, Manipal.
e-mail: betsythonmas99@gmail.com

language they could easily understand (Kannada or English). Written consent and contact information was collected from the volunteers. It was ensured that the selected volunteers are not taking any antimicrobial substances or antibiotics. Following this a routine dental checkup and oral prophylaxis was performed on the selected volunteers and plaque & gingival scores were brought down to zero.

Five antimicrobial mouth rinses containing different active compounds namely 0.9% saline, 3% hydrogen peroxide, mouthwash 0.2% Chlorhex-idinegl-uconate, essential oils and Cetylpyridinium chloride along with tap water as control were selected to conduct the study.

For purpose of standardization, same brand of toothbrush (Colgate, medium hard) and toothpaste (Colgate) were provided to all the volunteers. Toothbrushes were labeled as T1–T10 (Tap water-control), T11 – T20 (3% Hydrogen peroxide), T21 –T30 (0.9 % Saline), T31- T40 (0.2% Chlorhexidinegluconate), T41 –T50 (essential oils), T51- T60 (Cetylpyridinium chloride).The first group of ten volunteers were asked to brush using the standard modified bass technique for 3 min, twice daily for three days using the toothbrush and toothpaste provided to them. Following which they were instructed to rinse their brushes under tap water for 20 seconds, shake and leave the toothbrush to air dry in bathroom. In the same manner remaining five groups with ten subjects were asked to rinse their brushes under tap water for 20 seconds, shake well and keep the toothbrush in 3% hydrogen peroxide, 0.9% saline, 0.2% Chlorhexidinegluconate, essential oils and cetylpyridinium chloride containing mouthwashes respectively for 10 minutes. The tooth brush head was completely immersed in the disinfectant. A small sterile white bottle was provided to volunteers to put the disinfectant and to immerse brush head in disinfectant. Volunteers belonging to 3% hydrogen peroxide, 0.9% saline, 0.2% Chlorhexidinegluconate , essential oils and cetylpyridinium chloride mouthwashes groups were asked to dip the brush head in 1:1 dilution of the solution respectively. After ten minutes of immersion in disinfectant solution, volunteers were instructed to take out the toothbrush head from it and shake it once to remove the excess disinfectant solution. After this, volunteers were asked to keep their toothbrushes erect with its head facing upwards and left it for drying. Volunteers were given reminders for all the three days to follow the post-brushing instructions with the help of text messages in morning and at night.

Volunteers were asked to return the toothbrush after three days. Toothbrushes were collected from the volunteers, placed in a sterile box and transported within an hour to the laboratory for microbiological analysis.

For the microbiological analysis, back and handle of each toothbrush was disinfected with cotton soaked in 70% isopropyl alcohol (spirit), following which each toothbrush head (pre labeled as T1 to T60) was immersed in separate 10 ml of thioglycolate broth solution bottles and shaken for 2 minutes to transfer the microbial content present on bristle surface to the broth solution.

Each broth solution was subjected to vortexing for 3 minutes, following which 1:10 and 1:100 dilutions were made for each broth solution in small vials using preset standard pipettes. Dilutions were labeled as T1-1:10 and T1-1:100 and same for remaining broth solutions till T60 -1:10 to T60-1: 100. After this, freeze dried blood agar plates were taken and labeled for example as follows, T1 undiluted, T1-1:10 dilution and T1-1:100 dilutions corresponding to each broth solution and its respective dilutions. Same was done for the remaining 59 broth solutions and their dilutions till T60 undiluted, T60-1:10 dilution and T60-1:100 dilutions.

With the help of sterilized end of inoculation loop, sub culturing (spreading) of individual pre labeled blood agar plates was done using 10μl of its corresponding solution. The inoculated plates were then incubated at 37°C for the next 48 hrs. At the end of 48 hrs, blood agar plates were recovered from incubator for microbial counting.

III. Results

Sixty volunteers between the age group of 22 to 27 years (mean age=?) participated in this study. The toothbrushes were labeled and subjected to microbial analysis after twice daily use for three days to determine the total number of CFUs. The mean log CFU and standard deviation after treatment with six different solutions used to disinfect toothbrushes is presented in Table 1. The mean difference in the log CFUs among the six groups was analyzed using ANOVA and they were significantly different ($P< 0.001$). 3 % Hydrogen peroxide (4.24 ± 1.0) produced the lowest number of CFUs among all the six groups followed by mouthwashes containing 0.2 % Chlorhexidinegluconate (4.47 ± 1.7) and essential oils(4.75 ± 1.2) respectively.

Dunnett post hoc analysis was performed among the six respective groups with the group using water as the control is presented in Table 2. 3 % Hydrogen peroxide (MD= -2.02, $p<0.001$), 0.2% chlorhexdinegluconate mouthwash (MD= -1.79, $P<0.001$) and essential oils mouthwash (MD=-1.51, $P<0.008$) gave a significantly lower CFUs score when compared with water as the disinfectant. Saline and cetylpyridinium chloride containing mouthwash failed to produce a significant difference in the number of CFUs when compared with that of water.

IV. Discussion

Overview of the literature suggests that contamination of toothbrush and its role in transmission of oral and systemic disease[7,10,11]. Several studies

Table 1 : Mean and standard deviation of the microbial counts in log CFU for various solutions used for disinfecting tooth brush after brushing

Disinfectant groups	Number of cases	Mean ± SD (Log CFU)[a]	Range (Log CFU)		P value[b]
			Minimum	Maximum	
Water	10	6.27 ± 0.8	4.9	7.6	0.001*
3% H_2O_2	10	4.24 ± 1.0	3.0	4.2	
.9% Saline	10	6.13 ± 0.7	4.8	6.9	
.2% Chlorhexdinegluconate mouthwash	10	4.47 ± 1.7	3.0	6.9	
Essential oils mouthwash	10	4.75 ± 1.2	3.0	7.0	
Cetylpyridinium chloride mouthwash	10	5.48 ± 1.0	3.0	6.8	

(a-log transformed, b- one way ANOVA, *- p value <0.05)

conducted in past used different disinfection techniques like UV radiation[8,9], microwave irradiation[12], boiling water, chemical agents[13] like hydrogen peroxide, cetylpyridinium chloride, chlorhexidine , etc., had shown reduction in microbial count on toothbrush bristles suggesting need for toothbrush disinfection. The present study was undertaken to analyze the disinfection property of five different antimicrobial solutions (saline 0.9%,hydrogen peroxide 3%, 0.2% Chlorhexidinegluconate , essential oils and Cetylpyridinium chloride containing mouthwashes) and tap water as control. Sixty volunteers with average age ranging from 22 to 27 years were randomly assigned one of the six groups with ten subjects in each. Volunteers were asked to brush twice daily for three days and follow the post brushing disinfection instructions given to them. At the end of three days used toothbrushes were collected and sent for microbiological analysis.

Hydrogen peroxide showed maximum reduction in microbial count (MD= -2.02, p<0.001) .This result agrees with the finding of a study done Sogi et al [14].The antimicrobial activity of hydrogen peroxide is based on release of nascent oxygen and its effervescence removes the debris from otherwise in accessible regions[15].

Chlorhexidinegluconate that was used as disinfectant showed next least microbial count (MD= -1.79, P<0.001). Chlorhexidine destroys the integrity of cell membrane, penetrates the cell and precipitates the cytoplasmic proteins leading to bacterial cell destruction. It acts mainly against gram positive organisms, some gram negative bacteria and fungi[16]

Essential oils containing mouthwash (MD=-1.51, P<0.008) showed comparable results with that of chlorhexidinegluconate. Essential oils cause bacterial cell wall destruction, their enzymatic inhibition and extraction of bacterial polysaccharide[17]. Volunteers in group six which used cetylpyridinium chloride containing mouthwash as disinfectant showed reduction in microbial count but much less in comparison with other three groups. A similar result was obtained in previous study conducted by Meier S et al 1996 using cetylpyridinium chloride spray as disinfectant for toothbrushes[18]. It was observed that the brushes of volunteers in group 3 using 0.9% saline and group 1 using tap water showed maximum microbial count on toothbrush bristles suggesting these two as least effective method for toothbrush disinfection. Similar results were also obtained in previous studies[19,20].

The present study used a wide range of disinfectant solutions that are commercially available and compared it with the routine use of tap water for cleaning toothbrush. Results suggest the use of disinfectant to be beneficial in reducing the microbial count. The study design incorporated the use of toothbrush disinfectant twice daily for three days to correlate it with the lifestyle pattern of individuals to obtain effective results. Further qualitative in vivo studies using disinfectant methods that are economical, non-toxic and easy to use can be done.

Table 2 : Post hoc analysis of various disinfecting agents with water as the control

Post hoc comparisons °		Mean Difference	P value	Effectiveness	Confidence interval	
					lower	upper
3% H_2O_2	Control	-2.02	0.001*	H2O2>Water*	-3.22	-0.82
.9% Saline	Control	-0.13	0.99	Saline = Water	-1.33	1.06
.2% Chlorhexid-ineGluconate mouthwash	Control	-1.79	0.001*	Hexidine> water*	-2.99	-0.59
Essential oils mouthwash	Control	-1.51	0.008*	Listerine > Water*	-2.71	-0.32
Cetylpyridinium chloride mouthwash	Control	-0.78	0.30	Colgate Plax = water	-1.98	0.40

* . The mean difference is significant at the 0.05 level, c-Duuunnett test Dunnett test

Figure 1 : Picture showing microbial colonies on red blood agar plates of samples collected from group 1(Tap water),group (.2 % Chlorhexidine gluconate) and group (3% Hydrogen peroxide) respectively

V. Conclusion

The present study shows that use of 3% hydrogen peroxide to disinfect toothbrush is one the most effective methods to decontaminate it followed by using mouthwashes containing 0.2% chlorhex-idinegluconate and essential oils as disinfectants.

References Références Referencias

1. Duarte CA, Marcondes PC, Rayel AT. Transmissibilidade da microbiotabucalemhumanos.
2. repercussãosobre o dente e o periodonto. Rev Period. 1995 Jan; 1(1):211-6.
3. Malmberg E., Birkhed D., Norvenius G., Noren J.G., Dahlen G. : Microorganisms on toothbrushes at day-care centers. ActaOdontolScand 1994; 52:93-98.
4. Taji S.S., Rogers AH. : The microbial contamination of toothbrushes. A pilot study. Aust Dent J 1998; 43:128-30.
5. Verran J., Leahy-Gilmartin AA.: Investigations into the microbial contamination of toothbrushes. Microbios 1996; 85: 231-8.
6. Cobb CM, Toothbrushes as a cause of repeated infections of the mouth. Boston Med Surg J 1920; 183:263-4.
7. Glass RT, Shapiro S. : Oral inflammatory diseases and the toothbrush. J Okla Dent Assoc 1992;82 :30-2.
8. SconyersJR,CrawfordJJ,moriaty JD. Relationship of bacteremia to toothbrushing in patients with periodontitis. J Am Dent Assoc 1973;87:616-22.
9. Glass RT, Jensen hg.The effectiveness of a u-v toothbrush sanitizing device in reducing the number of bacteria ,yeasts and viruses on toothbrushes.JOkla DENT Assoc 1994;84:24-8.
10. BoylanR,LiY,SimeonovaL,SherwinG,KreismannJ,Craig RG et al.Reduction in bacterial contamination of toothbrushes using the Violet ultraviolet light activated toothbrush sanitizer. Am J Dent 2008;21:313-7.
11. Brool I, GoberAE.Persistence of group A beta haemlytic streptococci in toothbrushes and removable orthodontic appliances following treatment of pharyngotonsillitis.ArchOtolaryngol Head Neck Surg 1998;124;993-5.

12. Fischer H.Contaminated toothbrushes and pharyngitis. Arch Otolaryngol Head Neck Surg 1999;125;479.
13. Chibebe J Jr ,Pallos . Evaluation of sterilization of toothbrushes in a microwave oven (in vitro study).Rev Biocienc 2001;7:39-42.
14. Caudry SD,KKlitorinos A ,Chan EC.Contaminated toothbrushes and their disinfection.J Can Dent Assoc 1995;61:511-6.
15. Sogi S. , Subbareddy , Kiran S : Contamination of toothbrush at different time intervals and effectiveness of various disinfecting solutions in reducing the contamination of toothbrush. J Indian Soc.Pedo.Prev Dent. 2002; 20(3):81-85.
16. Navneet G. , Kaur S. : A study of toothbrush contamination at different time intervals and comparative effectiveness of various disinfecting solutions in reducing toothbrush contamination. J Indian Soc.Pedo.Prev Dent. 1996; 14: 10-13.
17. Verran J. , Leahy–Gilmartin AA. : Investigations into the microbial contamination of toothbrushes. Microbios. 1996; 85:231–38.
18. Antimicrobial mouthrinses: overview and update. Mandel, I.D. Journal of the American Dental Association (1939) (1994).
19. Meier S, Collier C, Scaletta MG, Stephens J, Kimbrough R, Kettering JD.An in vitro investigation of the efficacy of CPC for use in toothbrush decontamination. J Dent Hyg 1996;70:161–165.
20. Mehta A., Sequeira PS., Bhat G.: Bacterial Contamination and Decontamination of toothbrushes after use. NYSJ 2007; 20-22.
21. Aznita WH., Fathilah AR: The potential use of chlorhexidine (CHX) and Hexetidine containing mouth rinse in maintaining toothbrush sterility. J.Med.Sci.2006; 6(1):59-62.
22. Dhifaf Mohammad Saleh: Effectiveness of different cleanser solutions on the microbial contamination of toothbrushes. Journal of Kerbala University, Vol. 9 No.3 Scientific. 2011;302-307.
23. Edson Yukio Komiyama; GraziellaNuernberg Back-Britol; Ivan Balducci; CristianeYumi Koga-Ito: Evaluation of alternative methods for the disinfection of toothbrushes. Braz. oral res. vol.24 no.1 São Paulo Jan. /Mar 2010.
24. Sandra Sato, VinícíusPedrazzi, Elza Helena Guimarães Lara, HeitorPanzeri, Rubens Ferreira de Albuquerque, Izabel Yoko Ito:Antimicrobial spray for toothbrush disinfection: An in vivo evaluation.Quintessence internationalVol.
25. Kozai K., Iwai T. , Miura K. : Residual contamination of toothbrushes by microorganisms. J Dent Child. 1989; 56:201–204.
26. Dayoub MB. , Rusilko D., Gross A: Microbial contamination of toothbrushes. J Dent Res. 1977;56:706. 36 no.10 november/december 2005.
27. Mythili R., Sreedhar, Jaya M. : Comparative effectiveness of various disinfecting solutions inpreventing toothbrush contamination. J Indian Soc Periodontal. 1997; 21 (2): 46-47.

Global Journals Inc. (US) Guidelines Handbook 2013

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%.

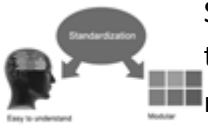
Once FARSM title is accorded, the Fellow is authorized to organize a symposium/seminar/conference on behalf of Global Journal Incorporation (USA). The Fellow can also participate in conference/seminar/symposium organized by another institution as representative of Global Journal. In both the cases, it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

Administration Rules Listed Before Submitting Your Research Paper to Global Journals Inc. (US)

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