Online ISSN : 2249-4618
Print ISSN : 0975-5888
DOI : 10.17406/GJMRA

Global Journal

of Medical Research: J

Dentistry & Otolaryngology



Real Compulsion of the Hospital Linger

Incidence, Management and Outcome

Highlights

Development of Real Time Facemask

Effect of Different Root Canal Irrigants

Discovering Thoughts, Inventing Future

VOLUME 20 ISSUE 4 VERSION 1.0

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Volume 20 Issue 26 was originally issued as J4

Global Journal of Medical Research: J
Dentistry & Otolaryngology

Volume 20 Issue 26
Originally issued as J4

Global Journal of Medical Research: J
Dentistry & Otolaryngology

Volume 20 Issue 4 (Ver. 1.0)

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Global Journal of Medical Research: J
Dentistry & Otolaryngology
Volume 20 Issue 4 Version 1.0 Year 2020
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

Adenoids with Glue Ear: Incidence, Management and Outcome

By Delwar AHM

Abstract- *Background:* In the 17th and 18th centuries, Santorini and Wilhem Mayer described the adenoids. Enlarged adenoid or adenoids is a common disorder in children, not only compromise the natural pathway of breathing, but it also obstructs the nasopharyngeal opening of Eustachian tubes. As a result, retention of fluid in the middle ear cavity and the development of glue ear or otitis media with effusion (OME). If it happens, the children present with hearing loss, delayed speech and language, poor social behavior, and may with difficulties of balance.

Methods: It is a cohort retrospective study of 251 cases in the Department of Otolaryngology and Head-Neck Surgery, Cumilla Medical College, and Cumilla Medical Centre, Bangladesh, from 01 July 2016 to 31 June 2019.

Results: Incidence of adenoids with glue ear, out of total ENT routine operations was 3.54%, and adenoidectomy-tonsillectomy operations were 29.05%. Of them, the male was 102(40.64%), the female was 149(59.36%), 3-5 years were 83(33.07%), 6-10 years 107(42.63%), and 11-15 years 61(24.30%).

Keywords: *glue ear or otitis media with effusion (OME), adenoids, pure tone audiometry (PTA), impedance audiometry, or tympanometry, otoscopy.*

GJMR-J Classification: *NLMC Code: WV 200*



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Adenoids with Glue Ear: Incidence, Management and Outcome

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Conclusion: Suspected OME cases, though any benefit not found in medical management, some surgeon considering 12 weeks watchful waiting for surgery. Different surgical methods implicated based on severity of OME.

Keywords: glue ear or otitis media with effusion (OME), adenoids, pure tone audiometry (PTA), impedance audiometry, or tympanometry, otoscopy.

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I. Introduction

Adenoid is a lymphoid tissue in the posterior wall and roof of the nasopharynx just behind the nasal orifice or choana. From five months it increases rapidly, most enlargement is seen in 07 years, and after 15 years it regresses.[1] Enlarged adenoid block the nasopharyngeal opening of the Eustachian tube. As a result, accumulation of sterile or non-purulent mucous fluid within the middle ear cavity known as glue ear, OME, secretory otitis media, or serous otitis media. If it is persistent for more than three months is known as chronic OME.[2] Due to blockage of Eustachian tube, absorption of middle ear air causing negative intra-tympanic pressure as a consequence of retraction of tympanic membrane.[3] 80% of children, suffering one episode of OME before 03 years and 40% of them suffers more than three.[4] Acute otitis media due to viral attack may follow bacterial infection causes inflammation of adenoids following to an episode of OME.[5] The Eustachian tube lines by ciliated, pseudostratified columnar respiratory epithelium. The mucosa contains both goblet cells and mucous secreting glands.[6] Any infections due to viral or bacterial resulting in the production of mucous secretion effusion developing OME. Due to repeated infection, the flat cuboidal mucosa replaces by thicker pseudostratified mucous secreting epithelium with the development of cilia. The ciliary lining is less efficient at moving the secretion to the nasopharynx.[7] The latest research suggests that generic inheritance of susceptibility to OME, causing impaired metabolism of oxygen.[8] Composition of the effusion is a glycoprotein, immunoglobulin-A(IgA), lysozyme, interleukins, and other inflammatory cytokine develops rheological adhesiveness and poor transportation, the persistence of effusion needs surgical intervention.[9] Biofilm found in 92% middle ear mucosa undergoes ventilation tube and high grade found in adenoid mucosa.[10] The children with cleft palate have an incidence of OME was 20%.[11] Allergy has conflicted evidence with OME because symptoms of nasal obstruction are more prevalence in adenoid hyperplasia than allergic manifestation.[12] Family history of allergic rhinitis may have a link with OME.[13] Gastro-esophageal reflux is common in infants up to 04 months of age and pepsin first identified in middle ear effusion in 2002.[14] Seasonal variations is closely related to OME that patients of the winter season were more

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than around two times as in the summer.[15] It traditionally imposed that adenoidectomy relief the anatomical obstruction of the Eustachian tube is benefited for the children when the adenoid size is small, but the presence of OME has contributory another factor of adenoid.[16] Recurrent acute and chronic inflammation of adenoid and continuous bacterial loading change of mucosal epithelium into squamous metaplasia and fibrosis, reduced mucociliary clearance of effusion, the contributory factor of the OME.[17] Parental smoking is one of the risk factor of developing OME.[18] If the mother smoked, it is more significant to increase the risk of developing OME or persistence of the disease.[19] An international review of risk factors of OME was increasing number of siblings, smoking, not breastfeeding, low birth weight and poor socioeconomic condition.[20]

This study finds out the incidence, management, and outcome of the adenoids with glue ear and to facilitate the future research activity in the different impacts of glue ear on children's quality of life.

II. Methods and Materials

It is a cohort retrospective study of 251 cases in the two different tertiary care institutions. During three years period, 7099 routine ENT operations performed in which adenoidectomy-tonsillectomy was 864, from that chronic adenoiditis and tonsillitis with glue ear was 251. I followed the QOL (quality of life) measurement concept which modified from the different study groups, the Rutter children behavior questionnaire for teachers, OM8-30, OMQ-14(otitis media questionnaire), including four main profile areas to assess and evaluate the children health status of the ear. Four main profile areas were A. Recurrent AOM, B. Reported hearing difficulties, C. Behaviour and parental QOL and, D. Speech and language. All patients clinically diagnosed as adenoids with glue ear and confirmed by history, examination, and investigations. It includes otoscopy; investigations were X-ray nasopharynx lateral view, Play Audiometry, PTA, Tympanometry, and blood tests were complete blood count and immunoglobulin study. The sensorineural hearing impairment cases excluded from the study. The following data collected about the patients: Age, sex, side, presenting features, otoscopic findings, pre and post-operative (up to 03 months) tympanometry and audiometric findings, radiological gradings of adenoids, treatment, and management. Statistical software SAS used to calculate the data.

III. Results

Incidence of adenoids with glue ear, out of total routine ENT operations was 3.54%, and adenoidectomy-tonsillectomy 29.05% (Chart-1). Of 251, the male was 102(40.64%), and female was 149(59.36%), 03-05 years were 83(33.07%), 06-10 years 107(42.63%), and 11-15 61(24.30%), mean age was 10.80 years whereas lowest one was 03 years, and highest 15(Figure-1). Among them, unilateral OME was 111(44.22%) in which left ear 41(36.94%). Right ear 70(63.06%), bilateral 140(55.78%)(Chart-2), presenting features showed nasal obstruction was 245(97.61%), mouth breathing 231(92.03%), hearing loss 229(91.24%), snoring 213(84.86%), frequent cold attack 199(79.28%), and infrequent earache 117(46.61%)(Figure-2), personal history revealed that villager was 107(42.63%), slum dwellers 105(41.83%), and urban 39(15.54%), smoker parent was 199(79.28%), and non-smoker 52(20.72%)(Figure-3). In otoscopic examination we used 0° Hopkin's laryngeal telescope in cooperative children and traditional otoscope for non-cooperative, exhibited lusterlessly and retracted tympanic membrane was 183(72.91%), color change 51(20.32%), and fluid level and air bubbles 17(6.77%)(Figure-4), radiographic report according to Cohen D et al. grade-2 was 144(57.37%), grade-3 82(32.67%), and grade-4 25(9.96%)(Figure-3), Play audiometry and PTA revealed mild hearing loss(30.49dB) was 181(72.11%), and moderate hearing loss(43.17dB) 70(27.89%). Pre-operative mean mild and moderate hearing loss was 36.83 dB and 43.17 dB, and post-operative (after 03 months) was 19.58 dB and 27.91 dB accordingly. Pre-operative mean hearing was 36.83dB, and post-operative 23.75dB, mean hearing gain 13.08dB (Table-1). Tympanometry showed, pre-operative Type-B was 107(42.63%), and Type-C 144(57.37%). Post-operative (after 03 months) normal Type-A was 231(92.03%), Type-B 07(2.79%), and Type-C 13(5.18%) (Table-2). Treatment provided as per the demand of the disease condition such as adenoidectomy-tonsillectomy for 144(57.37%), adenoidectomy-tonsillectomy with myringotomy, and softly suction of fluid 82(32.67%), and adenoidectomy-tonsillectomy with myringotomy, the suction of fluid and insertion of ventilation tube 25(9.96%)(Figure-4). I used Shepard and Shah's ventilation tube. Regarding follow-up the patient, they came after surgery every week for 03 weeks and after 03 months with audiometry and tympanometry report. Within 03 months, the ventilation tube spontaneously extruded.[21] Among Type-B 7, 4(57.14%) presented with typanosclerosis, and 3(42.86%) with tympanic membrane perforation (Figure-4). Amidst Type-C13, all suffered from allergic manifestation (Figure-4). I was counseling about the disease process with the parents and advised them for long term follow-up with symptomatic medical treatment.

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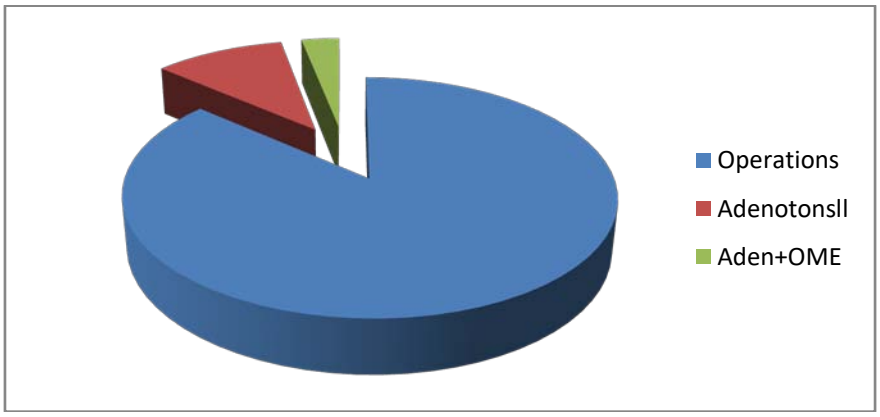


Chart-1: Incidence.n-7099 [Total operation-7099; Aden+OME-251(3.54%): Adenotonsllectomy-864: Aden+OME-251(29.05%)]

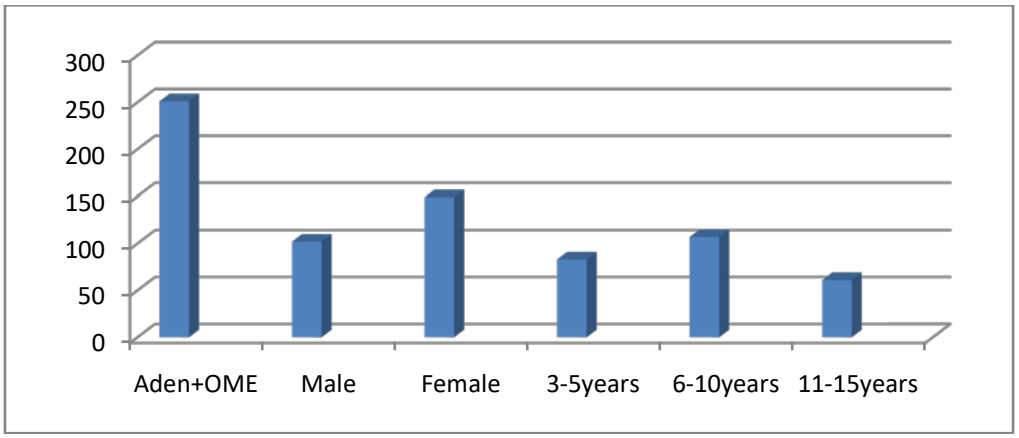


Figure-1: Gender & Age.n-251[Aden+OME-251; Male-102(40.64%): Female-149(59.36%): 3-5years-83(33.07%): 6-10years-107(42.63%): 11-15years-61(24.30%)]

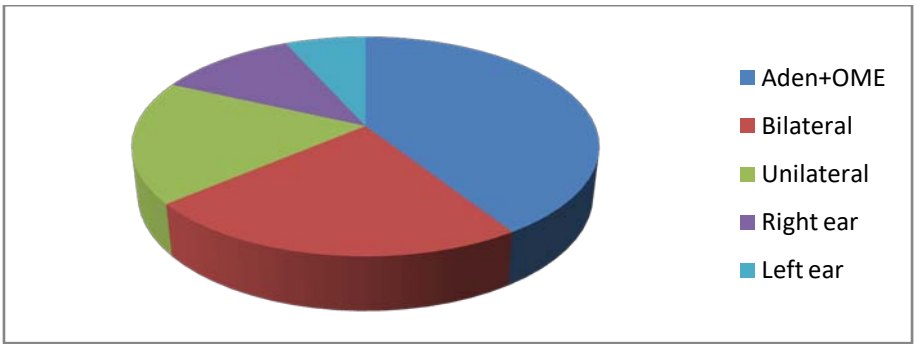


Chart-2: Laterlity.n-251 [Aden+OME-251; Bilateral-140(55.78%): Unilateral-111(44.22%):{n-111;Right ear-70(63.06%): Left ear-41(36.94%)}]

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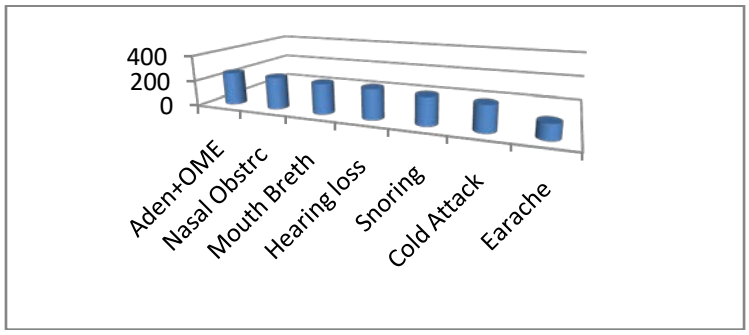


Figure-2: Presenting features. n-251[Aden+OME-251; Nasal Obstruc.-245(97.61%): Mouth breath.-231(92.03%):Hearing loss-229(91.24%):Snoring-213(84.86%):Cold attack-119(79.28%):Earache-117(46.61%)]

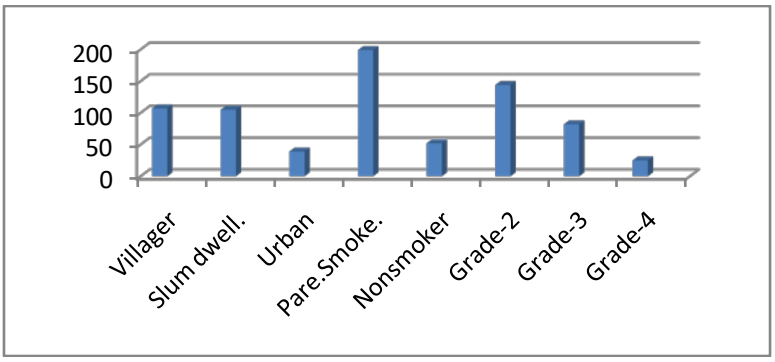


Figure-3: Personal history and radiological finding [n-251; Villager-107(42.63%): Slum dwellers-105(41.83%):Urban-39(15.54%):Parental smoker-199(79.28%):Nonsmoker-52(20.72%):Grade 2-144(57.37%):Grade 3-82(32.67%):Grade 4-25(9.96%)]

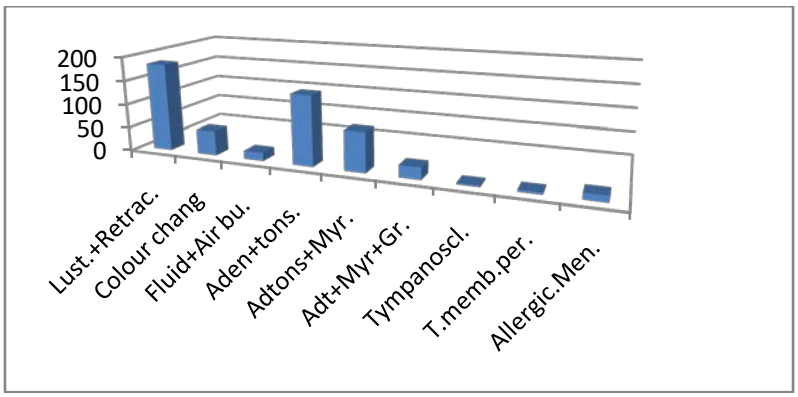


Figure-4: Otoscopic Finding+Surgery+Complications. [n-251; lust.+Retrac.-183(72.91%):Colour-51(20.32%): Fluid+air-17(6.77%): Adenotons.-144(57.37%): Adtons.+Myrin.-82(32.67%): Adt.+Myr.+Grom.-25(9.96%): {n-7(Type-B): Tymscl.-4(57.14%): Perfo.-3(42.86%)}: {n-13(Type-C):Allergic Menif.-13(100%)}]

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Table-1: Play audiometry and PTA finding: pre-operative and Post-operative and Mean Hearing Gain-13.08dB.

Serial No.	Play audiometry and PTA, Types of Hearing loss.	Number of Patient(pre-operative)	Percent--age	Mean hearing(pre-operative)	Mean hearing(post-operative)	No. of patient(post-operative)	Percentage (post-operative)
1.	Normal hearing (0-25dB)				19.58dB	231	92.03%
2.	Mild hearing (26-40dB)	181	72.11%	30.49dB	27.91dB	20	7.97%
3.	Moderate (41-55dB)	70	27.89%	43.17%			
4.	Moderately severe (56-70dB)						
5.	Severe (71-90dB)						
6.	Profound (91-120dB)						
Total		251	100%	Mean hearing-36.83dB	Mean hearing-23.75dB	251	100%

Table-2: Audiometric Finding: Pre-operative and Post-operative

Serial No.	Types of Tympanogram	Pre-Operative: Number of Patient	Percentage	Post-operative: Number of Patient	Percentage
1.	Type-A (Normal Tympanogram)	00		231	92.03%
2.	Type-As(Reduced compliance at ambient Pressure) e.g. Otosclerosis.	00			
3.	Type-Ad (Increased Compliance at ambient Pressure) e.g. Ossicular Disruption.	00			
4,	Type-B(Flat or dome-shaped.) Fluid in Middle Ear.	107	42.63%	07	2.79%
5.	Type-c(Maximum compliance at pressure -200 mm H_2O.) Early stage of OME	144	57.37%	13	5.18%
		251	100%	251	100%

IV. Discussion

Historically, the adenoid associate with upper airway obstruction, as a focus of recurrent infection of the upper and lower respiratory tract, rhinitis, rhino-sinusitis, otitis media, and persistence of OME. The incidence of adenoid with OME in our study was 3.54% in routine operative patients and 29.05% in the adenoidectomy-tonsillectomy patients. Mwaniki KA showed his dissertation in the Medicine department of Nairobi University, Kenya, 67.3% of children with adenoids suffering from OME. In contrast, Nwosu C et al. study displayed incidence of OME was 55.9% in adenoids patient.[22, 23]

Considering gender epidemiology, female 149(59.36%) was more than male 102(40.64%), against Ajayan PV et al. series where the male was 63% and female 37%, Paradise JL reported that there was no any gender prelidection.[24, 25] In Bangladesh perspective female children engaged in household work like cleaning and washing from early childhood causes a frequent attack of cold.

Regarding age, 06-10 years of age was more sufferer 107(42.63%), second-most was 03-05 years 83(33.07%), held up by Dawes JDK and Fujioka M et al. study.[26, 27] Dawes showed majority was in the age of 05-10years whereas Fujioka revealed 04-08 years.

About laterality, bilateral (140) was more than unilateral (111) in which right ear (70) more than left (41), persistence with the report of Silva PA et al. series and memorize that bilateral hearing impairment produce

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more suffering than unilateral and let give them more attention about treatment.[28]

The traditional presenting symptoms of adenoids with glue ear were nasal obstruction 97.61%, mouth breathing 92.03%, hearing loss 91.24%, snoring 213(84.86%), frequent cold attack 79.28%, and infrequent earache 46.61% consistent with Tos M et al. study who described hearing loss and nasal obstruction was above 90%, and other symptoms were above 70%.[29]

Personal history revealed the villager was 42.63%, slum dwellers 41.85%, those were poor, working-class group and urban 15.54% was lower middle-class group supported by Ajayan PV et al. series reported a majority of the patient was poor class.[24] Parental smoker exhibited 79.28% in our research, one of the risk factor for the persistence of glue ear consistent with Alpert H et al. report.[18]

The otoscopic finding was the most important examination procedure to a diagnosis the glue ear. Our current study showed lusterlessly and retracted tympanic membrane was 72.91%, the color changed to amber or yellow to bluish 20.32%, and fluid level and air bubble 6.77% held up by Satish HS et al. series reported 64% retracted tympanic membrane, 16% air bubble but color change 94% wasn't in our favor.[30]

The radiological investigation, X-ray nasopharynx lateral view in open mouth replicated the size of the adenoids described by Cohen D et al. study in which our series, grade-2, was 57.37%, grade-3 32.67%, and grade-4 9.9% supported by Wormald PJ et al. work.[31, 32]

Play audiometry and PTA exhibited the most prime findings of the outcome about the treatment. The pre-operative report in our study, the mild hearing loss of children was 181(72.11%), and moderate 70(27.89%), pre-operative mean hearing thresholds were 36.83dB, persistence with Aman SJ et al. series, they reported 41.56dB whereas Fria TJ displayed 27.5dB.[33, 34] Post-operative, after three months mean hearing was 23.75dB, mean hearing gain 13.08dB held up by Takahashi H et al. research, reported 14.25dB, Aman SJ et al. displayed 16.95dB near our report.[35, 33]

Pre-operative impedance audiometry showed Type-B was 107(42.63%), and Type-C 144(57.37%) near to Orji FT et al. work, reported Type-B was 35% and Type-C 60%.[36] Other studies were against our series, Abd Alhady R et al. displayed Type-B was 84.38%, and Type-C 15.62%, and Aman JS et al. exhibited Type-B was 62.5%, and Type-c 30%.[37, 33] Post-operative after three months, our study presented Type-A(Normal) was 231(92.03%), Type-B 07(2.79%), and Type-c 13(5.18%) which wasn't in our favor, Aman JS et al. study reported Type-A was 70%-, and Type-C, 17.5% whereas Maw AR showed Type-A was 62%.[33, 38]

Regarding treatment, as the patient was children, the parents had over-pessimistic about the disease and are over-optimistic about the result of surgery. They avail of the medical treatment for a prolonged period. After the failure of medical treatment, the parents agreed to take surgical management. In our study, adenoidectomy-tonsillectomy did 144(57.37%) consistence with Sandooja D et al. reported sufficient improvement of OME.[39] Adenoidectomy-tonsillectomy plus myringotomy with soft suction of effusion fluid performed 82(32.67%) held up by Mendel EM et al. series.[40] Adenoidectomy-tonsillectomy plus myringotomy with suction of fluid plus ventilation tube insertion in 25(9.96%) kept up by Gates GA et al. and recommended some cases need triple modalities of surgery.[41]

Post-operative complications like tympanosclerosis, tympanic membrane perforation, and allergic disarrayed children treated accordingly and suggested to maintain long term follow-up.

V. Conclusion

Adenoid with glue ear is a common disease in children. Early detection through a screening process and take the appropriate treatment lowering the catastrophe of the disease process. To maintain the quality of life, normal hearing is essential. Responsible and literate parents, school teacher, are another major factor in takeing care about the disease process, and help to accept the surgical treatment accordingly. Appropriate treatment maintains the children's normal hearing, behavior, speech, language, and intellectual development.

Funding: No funding sources.

Conflict of interest: None declared.

Ethical approval: The study was approved by Institutional Ethics Committee.

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Global Journal of Medical Research: J
Dentistry & Otolaryngology
Volume 20 Issue 4 Version 1.0 Year 2020
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

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By Dr. Meena Vishwanath Kale & Dr. Ninad Subhash Gaikwad

Abstract- *Introduction:* ENT foreign body (FB) account for around 11% of emergencies. Swallowed FB especially fish, mutton bone or chicken bone are commonly seen in adult and elderly while coin in children. In adult, etiology may be considered due to gluttony, poor mastication or age related neuromuscular, decrease in oral tactile sensation. A traumatic FB of neck passed through the esophageal lumen and lodged into intramuscular plane of neck. Radiological investigations helps in localizing migrated FB from lumen. Neck dissection for extraluminal FB removal is the one of the surgical management.

Aim of study: To present extraluminal FB and its management.

Case Report: We had a case of a 60 year old female with complaints of 3 weeks continuous throat pricking sensation. She was treated like gastro-esophageal reflux disease (GERD) but was not getting relief, hence along with radiological investigations we have found a radiopaque extraluminal FB in the right trachea-esophageal groove. FB removal was done without any complications.

Keywords: *esophageal lumen, extraluminal foreign body, GERD, neck dissection, radiopaque.*

GJMR-J Classification: *NLMC Code: WI 250*



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Abstract- Introduction: ENT foreign body (FB) account for around 11% of emergencies. Swallowed FB especially fish, mutton bone or chicken bone are commonly seen in adult and elderly while coin in children. In adult, etiology may be considered due to gluttony, poor mastication or age related neuromuscular, decrease in oral tactile sensation. A traumatic FB of neck passed through the esophageal lumen and lodged into intramuscular plane of neck. Radiological investigations helps in localizing migrated FB from lumen. Neck dissection for extraluminal FB removal is the one of the surgical management.

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Conclusion: Clinical presentation of extraluminal foreign body can be like GERD with suspicious history of FB ingestion. A detailed history with significant radiological investigations helps in diagnosis and management of radiopaque FB.

Keywords: esophageal lumen, extraluminal foreign body, GERD, neck dissection, radiopaque.

I. Introduction

Foreign body in ear, nose and throat are common and around 11% are responsible for ENT emergencies.[1] Ingestion of foreign body can be spontaneous or accidental. F.B. in throat is more common in adults or elderly patients whereas foreign body in nose and ear are more common in children.[2]

Incidence of swallowed FB in children is spontaneous due to their naughtiness while playing, intellectual disabilities, insanity, attention deficit hyperactivity disorder, along with the availability of the objects and absence of watchful caregivers.[3] FB that is found commonly in children are coins; due to the fact that the coins are often handed to younger children and they accidentally swallow because of their tendency to take things into the mouth. Inadequate control of deglutition and shouting or crying while playing or eating.[4]

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In adults, esophageal FB (EFB) are more with fish, mutton or chicken bone. Heavy consumption of alcohol and eating meat like gluttons, especially during festive events, along with poor mastication may be the cause for meat bone/bolus impaction in adults.[4] While elderly, edentulous patients presented more with artificial dentures which can obliterate tactile sensation in the mouth so that bones and other sharp objects are not detected until they have entered the oropharynx.[5] Defective peristalsis due to age-related neuromuscular incoordination and poor masticating habits are the predisposing factors for the cause of impaction of meat bone/bolus in the esophagus [2,4]

Esophageal foreign body can be 1) non-traumatic like coins, marbles, peanuts, beads or 2) traumatic like needles, bone (fish, chicken, mutton) fragments, safety pin, piece of glass etc.

The most common site of impaction is the cricopharyngeal sphincter due to its narrowing. While the other sites of FB impaction are the cervical esophagus and the oropharynx i.e. tonsil, valeculla, base of the tongue.[2]

Clinically patients presenting with doubtful FB ingestion complain of pricking sensation in hypopharynx, dysphagia for solids and odynophagia.

If FB visible in oropharynx it can be easily removed with cold instruments in an OPD setup. While sometimes their diagnosis is made on examination with indirect laryngoscopy, flexible or 70^0 Hopkins rigid endoscope. Radiological investigations like X-ray neck with chest (AP and Lateral view). CT scan are indicated where the object is not found during endoscopic examination and has migrated to unusual and difficult to reach areas.[6] MRI is useful in the evaluation of organic foreign bodies.[6]

Management of FB in throat depends on its location. Most commonly direct laryngoscopy and rigid esophagoscopy is performed. Different modes of intervention for luminal and extraluminal FB of digestive tract are available.

Aim of our study to present a case of extraluminal foreign body with its management by using magnet.

II. Case Report

We had a case of a 60 year old female from Uttar Pradesh without any comorbidity; repeatedly complaining of pricking irritating sensation in throat, no

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dysphagia or odynophagia. General practitioner treated her like a gastro-esophageal reflux disease (GERD) for 3 weeks but she was not getting relief with her symptoms. She came to our tertiary care hospital to have relief of her symptoms. Initially we treated her like GERD with medical line of management. Her 70^0 degree Hopkins endoscopy revealed no evidence of foreign body or pooling of saliva in the pyriform fossa. Persistant pricking sensation made us to dig further into her history. Then she explained that the pricking sensation started while having food in a marriage ceremony. Furthermore we proceeded with X-ray neck antero-posterior and lateral view. This surprisingly showed a radiopaque sharp traumatic FB in right lateral part of the neck with (Fig:1) clinically no evidence of neck injury showing entry point of sharp object. Even with the FB in neck, surprisingly patient did not developed any infection due to continuation of antibiotics.

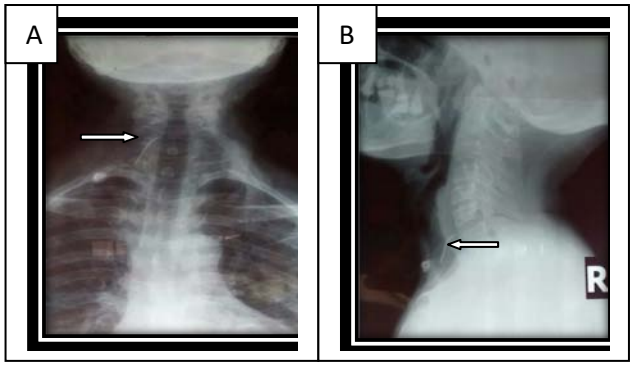


Fig. 1: ⇦ A: Antero-posterior view: Radiopaque wire like FB seen in TE groove

B: lateral view: one end of sharp object pointing towards esophagus

X-ray showed traumatic FB with a pointed end towards esophagus in tracheo-esophageal (TE) groove. Computed tomography was suggestive of extraluminal FB seen in right TE Groove abutting the carotid sheath. For management basis we have done flexible esophagoscopy to see if the tip of traumatic FB was visible. There was no esophageal mucosal damage or blood tinged but only normal healthy mucosa was seen. With assistance of a cardio-vascular-thoracic surgeon the patient was posted for right sided neck exploration, where inspite of a meticulous neck dissection we could not detect the FB. Hence we used high power magnets to pinpoint the foreign body and dissected around its magnetic field. Finally we found a rusted iron wire. Neck closed in layers with capillary drain. No evidence of post-operative complications.

III. Discussion

In our study, a 60 year old adult female had an accidental FB ingestion while eating food in a marriage reception. In some study there is male predominance of FB ingestion may be due to physical or psychological stress.[7] The mean age of male: female ratio is 51.5**:** 50.5 years in adults for ingested foreign body.[2,4] One of the study says in a marriage ceremony due to alcohol consumption and poor mastication leads to frequent FB lodgements in the digestive system[3]. Repeated complaints of GERD or throat pricking should be considered for further investigation specially X-ray neck or endoscopy for probable diagnosis.

In adult, FB lodgement in upper (cervical) esophagus is 2nd most common site after cricopharynx due to its narrow orifice.[4,8] Most common blunt esophageal FB is coin seen in children while chicken, fish or mutton bone FB is seen in adult stated by study of Adhikari P.[9]

We had an extraluminal FB from esophageal lumen into right side intramuscular plane of neck. In X-ray neck, we found a sharp radiopaque FB in right lateral side of neck. As per Nixon GW study, sharp foreign bodies of neck like needle, wire etc. may migrate extraluminally as their position changes with the act of deglutition.[10] We had proceeded with CT Scan of neck to rule out exact location of FB. As per Ray R et al, CT Scan of neck is usually adviced when the object was not found during esophagoscopy and had migrated extraluminally where it is present in unusual and difficult to reach areas.[6] Nowadays with advent technology, during removal of these foreign bodies, pre-operative fluoroscopy (C-arm) helps to detect the exact position of foreign body.[10] After investigations, patient was posted for neck exploration and removal of foreign body with the help of a high power magnet.

Rigid esophageal endoscopy is currently the most commonly used method for removal of esophageal foreign body.[11] Various other modalities available which have been described in the literature, such as dislodgment or removal by a Foley's catheter, advancement with bougie, balloon extraction during fluoroscopy etc. Fluoroscopically controlled foley's catheter can be used to remove the non-opaque, soft, smooth oesophageal foreign bodies like marble or meat bolus.[10] Extraluminal location of metallic radiopaque FB in neck, surgical neck dissection using a magnet is very effective.[8,11] Morbidity rates reported in the literature are lower than 1% [11] and 0.25% in study of Kalliopi A et al[8] and mortality rate is rare. 10–20% ingested FB require non-operative intervention as most of them pass

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harmlessly through gastrointestinal tract and only 1% or less require intervention[12,13].

IV. Conclusion

In case of prolonged symptoms of GERD with suspicious FB ingestion not getting relief with medical management for more than 2 weeks, then proceed with radiological investigations. Extraluminal radiopaque metallic FB are not uncommon but to treat it, meticulous neck dissection with magnet can be consider for management.

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Global Journal of Medical Research: J
Dentistry & Otolaryngology
Volume 20 Issue 4 Version 1.0 Year 2020
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

Nasolabial Cyst: A Sporadic Disease Entity

By Delwar AHM

Abstract- *Background:* The formation of the maxilla is associated with the fusion of different types of embryological elements. If any primitive ectodermal cells buried in the embryonic fusion, there is a formation of a cyst. Nasolabial or nasoalveolar cyst is one of them. It is a rare and non-odontogenic, soft tissue origin occurs beneath the alar nasal.

Methods: It is a cohort retrospective study of 09 cases in the Department of Otolaryngology and Head-Neck Surgery, Cumilla Medical College, and Cumilla Medical Centre, Bangladesh, from 01 July 2016 to 31 June 2019.

Result: Incidence of the nasolabial cyst, out of total routine ENT operations was 0.13%. Of them, the female was 07(77.78%), the male 02(22.22%), 10-30 years were 02(22.22%), 31-50 years 05(55.56%), and 51 years and above 02(22.22%) in which lower age was 20 years, highest 55, mean 40.78, and the standard deviation 6.43. The laterality exhibited only unilateral, in which the right side was 06(66.67%) and left 03(33.33%).

Keywords: *nasolabial, nasoalveolar, cyst, FNAC (fine needle aspiration cytology), OPG (orthopantomogram), CT (computed tomography), MRI (magnetic resonance imaging).*

GJMR-J Classification: *NLMC Code: WE 705*

NASOLABIALCYSTASPORADICDISEASEENTITY

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Conclusion: As a developmental origin, it needs excision of the cyst before the occurrence of any complications.

Keywords: nasolabial, nasoalveolar, cyst, FNAC (fine needle aspiration cytology), OPG (orthopantomogram), CT (computed tomography), MRI (magnetic resonance imaging).

I. Introduction

A cyst may be defined as a closed sac or pouch with a definitive wall that contains fluid, semisolid, or solid. It is an abnormal structure resulting from developmental anomalies, obstruction of duct or parasitic infection. As a jaw cyst, sometimes it is called as nasoalveolar cyst. But it is strictly non-odontogenic and occurs outside the bone. As the alveolar isn't involved, the nasolabial is preferable to the nasoalveolar cyst [1]. It originates from the soft tissue of the maxillofacial region in the lateral half of the nasal floor, anterior to the inferior turbinate [2]. The cyst associated with maxilla, may be separated into a medial and a lateral group in which the nasolabial is in lateral group [3] (Figure-1). They enlarge to splay the nostril and cause of fullness of the upper lip [4]. Zuckerkandl first described the nasolabial cyst in 1882, supported by the Allard RHB in 1982 [5]. From that time, it reported as two theories about the developmental anomalies of the cyst. One kept that it is due to the persistence of embryonic nasolacrimal duct, and the other is embryonic fissured cyst [6] [7]. In 1953, Klestadt WD postulated that the lesion is a fissured cyst, accepted by most of all researchers. It develops from the pitfall of embryonic nasal tissue, which caught in the facial cleft and formed by amalgamating of the maxillary, medial, and lateral nasal process [8]. After that, all scientists classified the maxillary jaw cyst on the basis of Klestadt theory [9]. Due to development from nasal mucosa, they line by columnar (respiratory) epithelium but may show metaplasia to the squamous epithelium in the presence of infection as because of facial cellulitis [10]. The frequency of age was a peak in the fourth and fifth decade [11]. Gender epidemiology shows female preponderance in all studies [12]. In some cases, the patient faces difficulties following catchable of an upper denture and incidentally the cyst diagnosed. Sometime the patient may present with a huge growth with facial deformity [13]. The most cases were unilateral, but a few cases presented with bilateral nasolabial cyst [14]. The cysts are fluctuant, and on bimanual palpation, fluctuation may elicit between the swelling on the floor of the nose and that in the lateral sulcus. The investigation includes confirming the diagnosis of the cyst is radiology, histology, CT, and MRI [15]. Except for the traditional method of sub-labial transoral approach of enucleation of the cyst, some surgeons tried to establish a new trans-nasal approach to endoscopic marsupialization of the nasolabial cyst [16].

The study finds out the relative incidence, presenting feature of the nasolabial cyst, and is discussing the advantages of the traditional and new method of surgical procedures for it.

II. Methods and Materials

It is a cohort retrospective study of 09 cases in the two tertiary care hospitals from 01 July 2016 to 31 June 2019. For three years period, 7099 routine ENT operations performed in which the nasolabial cyst was 09. All patients were clinically diagnosed as a nasolabial cyst, and confirmed by history, examination, and investigations such as FNAC, OPG, and CT scan

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whichever were needed. The following data collected about the patients: Gender, age, laterality, personal history, presenting feature, investigation, treatment, and complications. Statistical software SAS used to calculate all data.

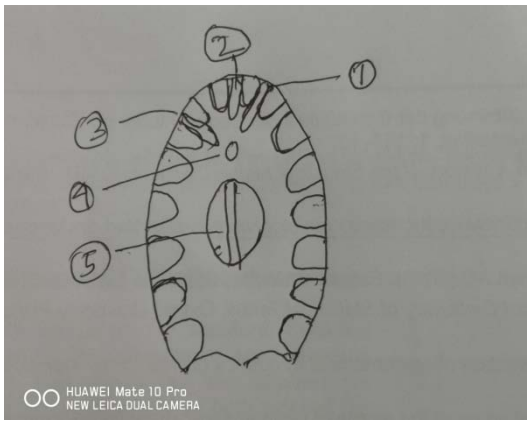


Figure-1: Cyst associated with fusion of Maxilla; 1. Nasolabial or nasoalveolar. 2. Median alveolar. 3. Lateral alveolar. 4. Nasopalatine. 5. Median palatine



Figure-2: Right nasolabial cyst in a female



Figure-3: Right nasolabial cyst in a male



Figure-4: Left nasolabial cyst in a female

III. Results

Incidence of the nasolabial cyst, out of total routine ENT operations, was 0.13% [Chart-1]. Of them, the female was 07(77.78%), the male 02(22.22%) [Figure-5], 10-30 years were 02(22.22%), 31-50 years 05(55.56%), and 51 years and above 02(22.22%) [Figure-5], the lowest age of patient was 20 years, highest 55, mean 47.78, and the standard deviation 6.43. Among them, all cases were unilateral (100%) in which right was 06(66.67%), and left 03(33.33%) [Figure-5]; Personal history exhibited diabetes mellitus was 02(22.22%), and non-diabetic 07(77.78%), hypertensive was 01(11.11%), and non-hypertensive 08(88.89%), betel leaf and nut chewer were 07(77.78%), and non-betel chewer 02(22.22%), the smoker was 03(33.33%), and non-smoker 06(66.67%) [Figure-6]; Presenting features revealed that unilateral facial swelling near the alar nasi was 08(88.89%), feeling of nasal blockage 05(55.56%), and painful facial swelling 01(11.11%) [Figure-6]; Investigations, FNAC, and OPG performed all cases 09(100%), and CT scan 02(22.22%) [Figure-7]; All cases treated surgically, enucleation of the cyst through sub-labial transoral approach under general anesthesia 07(77.78%), and local anesthesia 02(22.22%) [Figure-7]. About local anesthesia, I used a cotton swab soaked with 10-15% lidocaine spray with xylometazoline drop 0.1%, placing in the nasal fossa which shrinkage the turbinate, act as a local anesthetic, and at the same time, prevention of entry of blood to nasopharynx and mouth. I infiltrated Inj. Lignocaine 2% with adrenalin 1:200000 in the sub-labial, lateral nasal wall, and infraorbital area. Regarding follow-up, the patient came every week for three weeks and after three months. Post-operative complications found in 03(33.33%) patients in which 02(22.22%) presented with facial swelling, and 01(11.11%) numbness in upper incisor teeth up to three weeks [Figure-7]. After three months, they didn't show any complaint. The new trans-

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nasal approach to endoscopic marsupialization of the cyst didn't practice in our study.

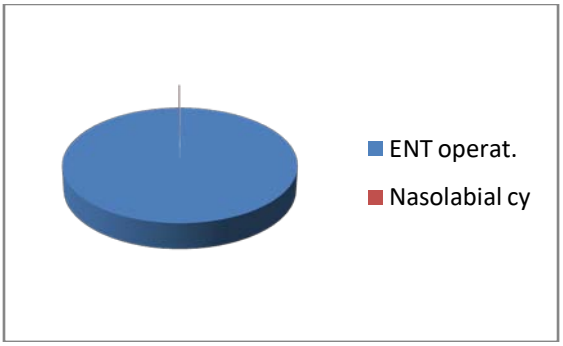


Chart-1: n-7099[ENT operation-7099; Nasolabial cyst-09(0.13%)]

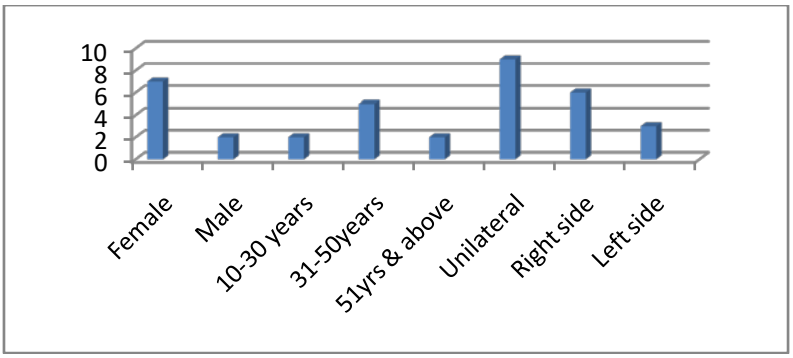


Figure-5: Gender, Age and Side distribution.[n-9; female-7(77.78%): male-2(22.22%):10-30yr-2(22.22%):31-50yr-5(55.56%):51 yr &above-2(22.22%): Right unilat-6(66.67%): left unilat-3(33.33%)]

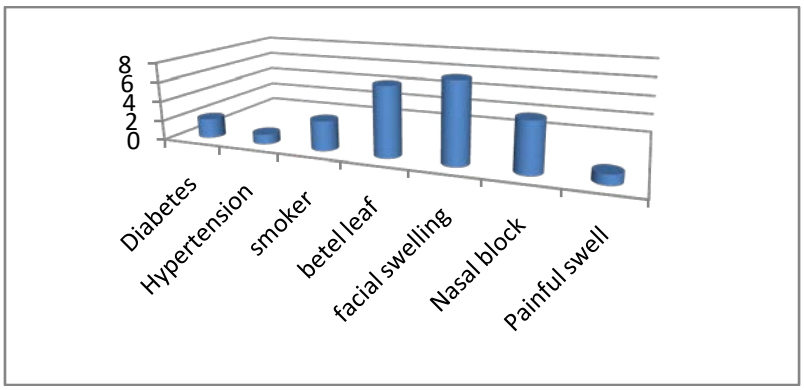


Figure-6: Personal history and Presenting feature. [n-9; Diabetes-2(22.22%): Hypertension-1(11.11%): Smoker-3(33.33%): Betel leaf-7(77.78%): Facial swelling-8(88.89%): Nasal blockage-5(55.56%): Painful facial swelling-1(11.11%)]

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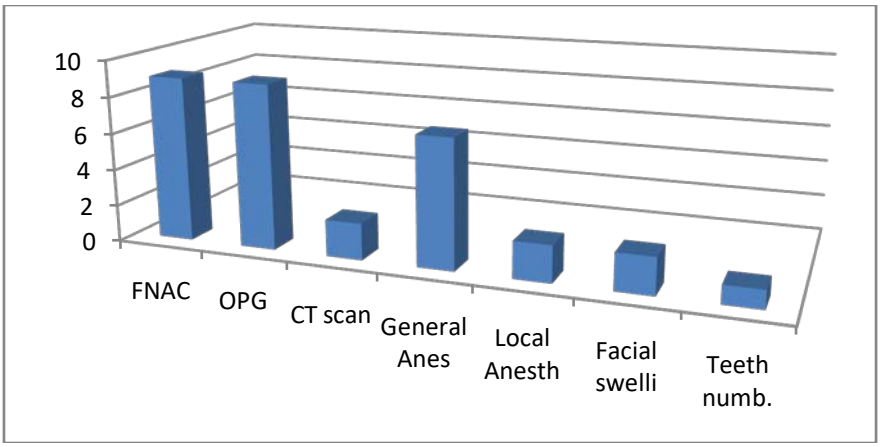


Figure-7: Investigations, Anesthesia and complications. [n-9; fnac-9(100%):opg-9(100%): ct-2(22.22%): general anesthesia-7(77.78%): local anesthesia-2(22.22%): facial swelling-2(22.22%): upper incisor numb.-1(11.11%)

IV. Discussion

The nasolabial cyst is a sporadic and rare lesion. Sher M et al. showed that only 21 examples recorded in the archives of the Department of Oral Pathology of the University of the Witwatersrand over 46 years [1]. Roed-Petersen B reviewed his presentations with only five cases [17]. Many articles were case reports only [18] [19]. All work held up the present series that only nine cases in two tertiary care hospitals for three years.

Considering gender epidemiology, the female was 07(77.78%) more than the male 02(22.22%) kept up my study by all other research. All the University of the Witwatersrand patients has been women [1]. Kuriloff DB, in 1987 reported 19 women and seven men in his study [10]. Vasconcelos RF et al. (1999) recorded that 13 out of 15 patients were women [12].

Regarding age, 31-50 years of age was more sufferer 05(55.56%), other 04, each 02(22.22%) were below 30 years and above 51 years. Sher M reported peak frequency in the fourth and fifth decades supported me series [1] and consistent with Walsh-Waring GP and Graamans K et al. Study [20] [21].

About laterality, bilateral were absent in the present study, right was 06(66.67%), and left 03(33.33%) compatible with Choi et al. reported unilateral case was 18 patients [2]. Roed-Petersen B displayed, among 116 patients, 13 was bilateral presentation against me [17]. Satu M et al. treated 20 patients from 1965 to 2014; only one patient showed bilateral [22].

Personal history revealed, diabetes was 02(22.22%), and hypertension 01(11.11%) in the current study supported by Vinayak KM et al. series exhibited a case report of 73 years [23], Sato M showed a case of 67 years suffered from diabetes and hypertension [22]. No other studies reported about smoking and betel leaf and nut chewer. It is important to know it before surgery and anesthesia. They may be suffered from post-operative and anesthetic complications and need more attention.

The traditional presenting symptoms showed unilateral facial swelling near alar nasal was 08(88.89%) in me report, persistence with Chinellato LEM et al. presented, 100% cases had facial swelling [24]. The feeling of the nasal blockage was 05(55.56%), supported by Vinayak KM and Rao RV study [23] [25]. They exhibited the development of swelling reached the wide dimension causing difficulty in using dentures, breathing obstruction, and facial asymmetry. 01(11.11%) of the patient presented with painful facial swelling, consistent with Sher M et al. observation, commented that an infected cyst is painful and may discharge into the nose [1].

About the investigation, I did FNAC and OPG for 100% cases, supported by Seward GR; reported radiology is usual investigation to distinguish the lesion from odontogenic or non-odontogenic [15]. FNAC is an minimum invasive procedure to know the cellular pattern of the swelling, is it malignant or benign. FNAC reported that there were goblet cells, ciliated cells, basal cells, and flat squamous cells, supported by Sher M et al. [1]. Radiology exhibited the area of the nasolabial cyst, produce radiolucency of the alveolar process above the apices of the incisor teeth. This radiolucency is due to depression of the labial surface of the maxilla due to the nasolabial cyst. CT scan did in 02(22.22%) cases, was above fifty years, supported by Choi et al. revealed the scan shows a well-demarcated, low-density lesion lateral to pyriform fossa [2]. MRI didn't do in any patient of the study, but Tanimoto K et al. Showed that MRI confirmed the lesion was extra-osseous, may have scalloping of the underlying bone [26]. Maximum patients have low income in our Government Hospitals. So always minimum costing was thinking in our mind.

Regarding treatment, it is important to know that nasolabial cysts are extra-osseous but subperiosteal, so I followed the traditional method of sub-labial transoral and enucleation of all cysts, held up by Nixdrop DR and

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Yen HW series [27] [28]. The post-operative complication in my study was 3(33.33%) like facial swelling and numbness, which was return to normal after three months of operation [29].

A new surgical method of trans-nasal approach to endoscopic marsupialization of the nasolabial cyst started a group of surgeons. Su CY in 1999 showed that all but except one in their 16 cases treated successfully [16]. Another surgeon Cho WC in 2008 presented 57 patients in which trans-nasal endoscopic marsupialization did 34, and the sub-labial excision 23 [11]. They experienced post-surgical complications in the sub-labial groups like hematoma, infection, and oroantral fistula supported by Bull TR et al. Series [30]. Post-surgical sequelae included in the sub-labial approach was toothache, swelling, and numbness in contrast to trans-nasal endoscopic marsupialization, one patient feeling an air-bubble like the sensation when she pressed over the previous site of cyst.

V. Conclusion

The nasolabial cyst is an uncommon and sporadic disease. There is a generalized agreement that it is embryological origin than producing symptom after birth it shows symptoms in middle age. Surgery is the option of treatment, may be done by the traditional sub-labial approach or new trans-nasal endoscopic marsupialization. A new approach needs more study to establish as a choice-able technique.

Funding: Nothing any source.

Conflict of interest: No competing interest.

Ethical approval: The study was approved by Institutional Ethics Committee.

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Global Journal of Medical Research: J
Dentistry & Otolaryngology
Volume 20 Issue 4 Version 1.0 Year 2020
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

The Effect of Different Root Canal Irrigants When Activated with Endoactivator and Manual Dynamic Agitation on *Enterococcus Faecalis*- A Comparative in Vitro Evaluation

By Dr. Nikhil Murali, Dr. Rajesh Pillai, Dr. N.O. Varghese, Dr. Afsal Abdul Salim, Dr. B. Jyothilekshmi, Dr. Shemil Sha, Dr. Sandeep Chandran & Dr. Mahesh M

Abstract- Developing a potent irrigant-irrigation activation regimen with maximum desirable properties and minimum adverse effects, also effective against microbial species prevalent in secondary infections, could be a boon to the endodontic fraternity.

Aims: To evaluate whether there is any significant difference in the removal of E.faecalis from root canals by three irrigating solutions- Q-Mix, Aloe Vera, NaOCl when combined with two irrigation protocols-Endoactivator, Manual dynamic agitation.

Settings and Design:

- Tertiary care setting – Department of Conservative Dentistry and Endodontics, PMS College of Dental Science and Research, Trivandrum.
- Biogenix Lab, Poojapura, Trivandrum.
- Jawaharlal Nehru Tropical *Botanical Garden* and Research Institute, Palode.

Keywords: E.faecalis, endo activator, manual dynamic agitation, aloe vera, Q Mix.

GJMR-J Classification: NLMC Code: WU 230



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The Effect of Different Root Canal Irrigants When Activated with Endoactivator and Manual Dynamic Agitation on *Enterococcus Faecalis*- A Comparative in Vitro Evaluation

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- Jawaharlal Nehru Tropical *Botanical Garden* and Research Institute, Palode.

Methods and Material: Forty-two single-rooted, noncarious human premolar teeth having a single canal with similar sizes, and completed apices are selected. Pro Taper rotary files shape the root canals up to an F3 master apical file size. Aloe vera extract is taken and subjected to antimicrobial activity and Minimum inhibitory concentration tests.

To get pure colonies, a pure culture of E.faecalis (American Type Culture Collection[ATCC] 29221) is subcultured in Muller –Hilton Agar and incubated overnight at 37°C. The single colonies are picked up and transferred to 1ml of sterile MH broth and incubated at 37 °C to get the turbidity of 0.5 McFarland standard. The root canals are injected with an inoculum of E.faecalis using a sterile syringe. Sterile paper points are transported to 1 ml PBS in a test tube and vortexed. A BHI agar plate is swabbed with 50 µL of PBS to get individual colonies (colony count in CFU/mL). The specimens are then randomly divided into six groups with test solutions.

Based on the group, the irrigation is done with the appropriate test solution. All teeth are then flushed with 30 ml saline to prevent the carryover of the irrigants.

In each group, specimens will be subjected to CFU counting and then MTT ASSAY, which will determine the % of cell viability.

Statistical analysis used: The comparison of E.faecalis removal between two different irrigating protocols is carried out using an independent t-test. The comparison among the three different irrigating solutions is carried out by one-way ANOVA, and the Post hoc test is made use of for pairwise comparison.

Results: Among the three solutions, Sodium Hypochlorite displayed the best anti-microbial activity followed by Q mix and Aloe vera. Among the two irrigation activation techniques, Endo activator was the best in terms of removing *E. faecalis.* Manual dynamic agitation also showed a considerable amount of reduction in the bacterial count but was associated with operator fatigue.

Keywords: *E.faecalis, endo activator, manual dynamic agitation, aloe vera, Q Mix.*

Key Message: Sodium hypochlorite, in combination with Endo activator, was the most effective in removing *E. faecalis* from infected root canals followed by the combination of Q mix with Endo activator.

I. Introduction

A multitude of studies on humans as well as animals, have enlightened us about the fact that microorganisms play a pivotal role in causing and sustaining pulpal and periapical diseases. The flora that resides in the pulp space is involved in the development of periapical infections in teeth with caries extending into the pulp .1-3 Their removal from the root canal through various shaping methods, irrigation procedures, and, when needed intracanal medicaments, form the rationale of Endodontic treatment.[4] The bacteria, *Enterococcus faecalis* which forms a part of the normal microbial flora of the oral cavity has been associated with asymptomatic, persistent pulpal and periapical infections and failed root canal treatments.[5] Q mix, a root canal irrigant introduced in the market in 2012, is a combination of EDTA, chlorhexidine, and detergent. Using a single solution, which is a mixture of different components, not only saves time and adds simplicity to the procedure but also equips the clinician with beneficial effects of all the individual components.[6] Currently, many researches are being carried out to find herbal alternatives for pulp space disinfectants in Endodontics, owing to their efficiency, safety, and ease of accessibility. [7]

Adopting an appropriate method for activating an irrigating solution is equally important as selecting an ideal irrigant. The Endo Activator System is a sonically-driven system designed to safely activate various

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intracanal reagents and vigorously produce the hydrodynamic phenomenon. [8]

Machine-assisted agitations are effective in debridement. However, each of these methods need special gadgets. In 1980, Match proposed a simple technique for agitation by moving a well-fitted gutta-percha (GP) point inside a prepared root canal, which is now known as Manual Dynamic Agitation.

Studies have shown that gently moving a well-fitting gutta-percha master cone up and down in a short 2- to 3-mm stroke within a prepared canal can produce an effective hydrodynamic effect and significantly improve the displacement and exchange of any given reagent. [9]

Thus, developing a potent irrigant-irrigation activation regimen with maximum desirable properties and minimum adverse effects, that too effective against microbial species prevalent in secondary infections could be a boon to the endodontic fraternity.

II. Subjects and Methods

a) Aloe Vera Extract

Freshly collected healthy, mature leaves of Aloe vera are washed with clean water and longitudinally dissected. Using a sterile knife, the colorless, parenchymatous tissue (aloe gel) is scrapped out carefully, without the green fibers and processed in a blender. Cold percolation method extracts the fresh Aloe vera pulp using 70% ethanol for 72 hours. The extracts are then subjected to filtration using a double-layered muslin cloth. This filtered Aloe vera extract is used in the study.

b) Antibacterial Activity

i. *Agar- Well Diffusion Method*

Petri plates containing 20ml Muller Hinton Agar Medium are seeded with the bacterial culture of *Enterococcus faecalis* (growth of culture adjusted according to McFarland Standard, 0.5%). Wells of approximately 10mm are bored using a well cutter, and different volumes of the sample such as 25µL, 50µL, 100µL are added. Following which, the plates are incubated at 37°C for 24 hours. The diameter of the inhibition zones around the well is measured to assay the antibacterial activity (NCCLS, 1993). Streptomycin acts as a positive control.

c) Determination of Minimal Inhibitory Concentration

Two-fold serial dilution methods helped determine the minimal inhibitory concentration (MIC) with *Enterococcus faecalis* as the indicator organism. The samples added in increasing concentrations of 50, 100, 200, 400, 800, and 1000 µL respectively were incubated overnight at 37˚C. Visual inspection immediately followed by optical density (OD) measurement at 620 nm made using a spectrophotometer measured the growth. At each dilution of the plant extract, growth inhibition for the test wells is determined by the formula:

$$\text{Percentage of inhibition} = (\text{OD of control} - \text{OD of test})/(\text{OD of control}) \times 100\%$$

Forty-two single-rooted, noncarious human mandibular premolar teeth with similar sizes and closed apices are selected. The root surfaces are mechanically debrided from the soft tissues and calculi with a periodontal scaler. Buccolingual and mesiodistal radiographs were taken from the specimens to evaluate their anatomy. Radiographs are taken to verify that the selected teeth are having only a single root canal. Distilled water at 4 °C is used to store the teeth until used. Specimens were then decoronated with a diamond disc using water as a coolant to obtain a standardized root length of 13 mm.

Type II GIC is used to seal the apices of all teeth. Pro Taper rotary files up to an F3 (size 30) master apical file size shaped the root canals, and 2 ml of 3% NaOCl solution is used to irrigate the root canals after each instrument. Subsequently, an autoclave at 121˚C and 15 lbs of pressure, is used to sterilize the samples for 15 minutes.

d) Treatment of Tooth Samples

A pure culture of *E.faecalis* (ATCC 29221) was subcultured in Muller–Hilton Agar and incubated at 37°C overnight to get pure colonies. The single colonies were picked up and transferred to 1ml of sterile MH broth and incubated at 37˚ C to get turbidity of 1.0 McFarland standard.

These colonies of *Enterococcus faecalis* inoculated the sterilized tooth samples. The now infected tooth samples are kept in Brain Heart Infusion broth and incubated for four weeks, with the media being replaced every 48hrs. After the period of incubation, the teeth are treated and categorized accordingly as A, B, C, D, E, and F.

GROUP A-3 ml of 3.0% Sodium hypochlorite for 1 minute using Manual Dynamic Agitation (MDA)

GROUP B-3 ml OF 3.0% Sodium hypochlorite for 1 minute using Endoactivator

GROUP C- 3 ml of Q Mix for 1 minute using MDA

GROUP D-3 ml of Q Mix for 1 minute using Endoactivator

GROUP E- 3 ml of Aloe Vera for 1 minute using MDA

GROUP F-3 ml of Aloe Vera for 1 minute using Endoactivator

The tooth samples were kept in a minimal amount of BHI overnight after treatment.

e) Determination of Colony Forming Units

The scraping from the cavity of each tooth mixed well in 1ml sterile PBS is used to determine the colony-forming units (CFUs) present. BHI agar plates

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swabbed with 10µl from each sample, were kept overnight at 37 ˚C. The control was an untreated tooth. After incubation, the colony-forming units (CFUs) observed were counted, and expressed as CFUs/ml.

f) Mtt Assay

Fifteen mg of MTT (Sigma, M-5655) was reconstituted in 3 ml PBS until completely dissolved and sterilized by filter sterilization.

The cavities of treated teeth samples were rinsed with sterilized PBS and was added with 10µl of reconstituted MTT and then incubated at 37°C in a humidified 5% CO2 incubator for 4 hours. After the removal of the supernatant and the addition of 100µl of MTT Solubilization Solution (DMSO) following the incubation period, and the cavities were mixed gently by pipetting up and down to solubilize the formazan crystals. A microplate reader at a wavelength of 570 nm measured the absorbance values.

The percentage of growth viability was calculated using the formula:

$$\%\ of\ Viability = \frac{\text{Mean OD Samples}}{\text{Mean OD of control group}} \times 100$$

III. Results and Statistical Analysis

a) Determination of Colony Forming Units

Pretreatment 41.2×10^4

Descriptive statistics for CFU

Table 1: Descriptive statistics for CFU based on group

	Group A	Group B	Group C	Group D	Group E	Group F
Mean	6.9	2.8	7.7	4.8	17.0	12.1
SD	1.1	0.3	1.5	1.0	0.6	0.6
Median	6.2	2.9	7.3	4.3	17.0	12.2
Mode	6.2	2.4	5.6	3.9	16.1	11.4
Minimum	5.9	2.4	5.6	3.9	16.1	11.4
Maximum	8.7	3.1	10.0	6.8	18.2	13.1

Table 2: Descriptive statistics for CFU based on solution

	3%NaOCL	Q Mix 2 IN 1	Ethanol extract of Aloe vera
Mean	4.8	6.3	14.5
SD	2.3	2.0	2.6
Median	4.5	6.2	14.6
Mode	6.2	3.9	11.4
Minimum	2.4	3.9	11.4
Maximum	8.7	10.0	18.2

Table 3: Comparison of CFU based on Solution

Solution	Mean	SD	N	F	Sig.	Scheffe Multiple Comparisons		
						Pair	F`	p
3% NaOCl (A)	4.8	2.3	14	71.97**	0.000	A & B	1.3	0.279
Q Mix 2 IN 1 (B)	6.3	2.0	14			A & C	61.7**	0.000
Ethanol extract of Aloe vera (C)	14.5	2.6	14			B & C	45**	0.000

**: - Significant at 0.01 level

Table 4: Descriptive statistics for CFU based on activation

	Manual dynamic agitation	Endoactivator
Mean	10.6	6.5
SD	4.8	4.1
Median	8.2	4.3
Mode	6.2	2.4
Minimum	5.6	2.4
Maximum	18.2	13.1

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Table 5: Comparison of CFU based on activation

Activation	Mean	SD	N	t	p
Manual dynamic agitation	10.6	4.8	21	2.89**	0.006
Endo activator	6.5	4.1	21		

**: - Significant at 0.01 level

b) Determination of % of Cell Viability (Mtt Assay)

Control- Absorbance 0.7992 Viability 100%

Descriptive statistics for % viability

Table 6: Descriptive statistics for % viability based on group

	Group A	Group B	Group C	Group D	Group E	Group F
Mean	48.0	20.5	52.3	30.8	63.5	60.3
SD	4.9	2.3	3.5	5.5	1.4	0.8
Median	48.4	20.1	52.1	30.2	63.2	60.2
Mode	41.8	18.5	48.3	24.8	62.1	59.1
Minimum	41.8	18.5	48.3	24.8	62.1	59.1
Maximum	54.3	25.3	59.1	39.3	65.5	61.4

Table 7: Descriptive statistics for % viability based on solution

	3%NaOCL	Q Mix 2 IN 1	Ethanol extract of Aloe vera
Mean	34.3	41.5	61.9
SD	14.8	12.0	2.0
Median	33.6	43.8	61.8
Mode	18.5	24.8	59.1
Minimum	18.5	24.8	59.1
Maximum	54.3	59.1	65.5

Table 8: Comparison of % viability based on Solution

Solution	Mean	SD	N	F	Sig.	Scheffe Multiple Comparisons		
						Pair	F`	p
3%NaOCl (A)	34.3	14.8	14	23.52**	0.000	A & B	1.5	0.234
Q Mix 2 IN 1 (B)	41.5	12.0	14			A & C	21.9**	0.000
Ethanol extract of Aloe vera (C)	61.9	2.0	14			B & C	11.9**	0.000

**: - Significant at 0.01 level

Table 9: Descriptive statistics for % viability based on activation

	Manual dynamic agitation	Endoactivator
Mean	54.6	37.2
SD	7.5	17.6
Median	53.3	30.2
Mode	41.8	18.5
Minimum	41.8	18.5
Maximum	65.5	61.4

Table 10: Comparison of % viability based on activation

Activation	Mean	SD	N	t	p
Manual dynamic agitation	54.6	7.5	21	4.18**	0.000
Endoactivator	37.2	17.6	21		

**: - Significant at 0.01 level

IV. Discussion

Colony-forming units and viability incidence were the two dependent variables that were used in this study to quantify the amount of reduction of *E.faecalis* from tooth samples after treating with different irrigants and their activation. Results of the study demonstrated that none of the irrigating solutions and their activation

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were able to completely remove *E.faecalis* from tooth samples.

But when different groups were compared, out of the three irrigants, 3% NaOCl was the most effective followed by Q mix and aloe vera in terms of mean reduction in the CFU and percentage of viable organisms. Out of the two activation methods, Endoactivator (EA) showed a greater reduction in both CFU and % viability when compared with Manual Dynamic Agitation (MDA). When the different irrigant-irrigation activation combination were compared the most effective combination was 3%NaOCl with EA(mean value of CFU-2.8×10^4 ,% Viability-20.5%) followed by Q Mix with EA(mean value of CFU-4.8×10^4,% Viability-30.8%), 3%NaOCl with MDA (mean value of CFU-6.9×10^4,% Viability-48%), Q mix with MDA(mean value of CFU-7.7×10^4 ,% Viability-52.3%), Aloe vera with EA(mean value of CFU-12.10×10^4 ,% Viability-60.3%) and Aloe vera with MDA(mean value of CFU-17×10^4 ,% Viability-63.5%) in terms of both CFU and % viability.

The results of the current study are in agreement with most of the previous studies, which evaluated NaOCl and Q Mix as irrigating agents. Aloe Vera being an organic irrigant, requires further investigation to prove its efficacy.

The main reason for choosing *Enterococcus faecalis* in this study despite being only occasionally found in cases of primary endodontic infections is that they are frequently isolated or detected where endodontic therapy has failed. *E.faecalis* can adhere to the root canal walls, accumulate, and form communities organized in biofilm, which helps it resist destruction by enabling the bacteria to become 1000 times more resistant to phagocytosis, antibodies, and antimicrobials than non-biofilm producing organisms. In the current study, root canals were infected for four weeks to ensure the organization and maturation of the biofilm.[10]

One of the effective methods to eradicate *E.faecalis* is the use of various concentrations of sodium hypochlorite. Due to the various disadvantages of sodium hypochlorite like the unpleasant taste, toxicity, and potential weakening of the tooth structure by decreasing the hardness and structural integrity of the dentin within the root canal, finding an effective alternative has become imperative.[11]

In recent years, herbal products are widely investigated as root canal disinfectants in Endodontics because of their efficiency, safety, and accessibility. Bhardwaj et al. assessed the antibacterial activity of Aloe Vera gel as long as 1, 3, and 5 days.[12] Aloe Vera showed good antibacterial activity on the first day of incubation. They noted that Aloe Vera had 75 potentially active constituents such as vitamins, enzymes, minerals, sugars, lignin, saponins, salicylic acids, and amino acids, which were possible reasons for its antimicrobial action.[7] In the present study, agar well diffusion method was used to study the antimicrobial activity of aloe vera against *E faecalis.*

The results of the current study showed that aloe vera had significantly lesser antimicrobial activity against *E.faecalis* when compared with 3% NaOCl and Q mix. Several factors could have contributed to this outcome. The first one is the time of contact of the solution with tooth surface wouldn't have been sufficient for Aloe vera to apply its inhibitory effect against *E.faecalis*. Second, tooth structures themselves might lessen the antibacterial effect of Aloe vera solution. Lawrence et al. stated that microbial toxicity of Aloe Vera is related to the site and number of hydroxyl groups in the phenol groups.[13] Hydroxyl groups are responsible for alkalinity and antibacterial action of calcium hydroxide. However, the dentin buffering action relatively neutralizes its effect. Therefore, this mechanism suppressed the antibacterial activity of Aloe Vera. Third, the gel-like consistency of Aloe Vera could cause a limited flow of the substance through the irregularities of the root canal system.

QMiX is a novel endodontic irrigant for smear layer removal with added antimicrobial agents. It contains EDTA, CHX, and a detergent. QMiX is a clear solution, ready to use with no chair-side mixing. In this current study, NaOCl and Qmix were not used in combination to avoid the formation of even a minute amount of the carcinogenic precipitate. Surface active agent lowers the surface tension of solution and increases their wettability and enables better penetration of an irrigant in the root canal. The potential benefit of bisbiguanide in this mixture is that it prevents the microbial colonization on the dentin surface. Calcium chelating agents can cause cell wall damage in gram-negative bacteria by chelating and removing divalent cations (Mg+2 and Ca+2) from the bacterial cell membranes and increasing its permeability.[14] After analyzing data from the current study, NaOCl had better activity against E.faecalis when compared to Q mix, and thus it would be more beneficial to use Q mix as a final rinse after NaOCl.

In a preliminary study, Gulabivala (2006) has shown that the EndoActivator removes simulated biofilms in extracted teeth. The action of the EndoActivator tip frequently produces a cloud of debris that can be observed within a fluid-filled pulp chamber. The primary function of the EndoActivator is to produce vigorous intra canal fluid agitation through acoustic streaming and cavitation. This hydrodynamic activation serves to improve the penetration, circulation, and flow of irrigant into the more inaccessible regions of the root canal system (Guerisolo[15] et al. 2002).

In the present study, manual dynamic agitation has not performed as effectively as sonic agitation. The reason behind this could be, the energy created by the push-pull motion of the GP point (3.3 Hz) is much lesser than sonic energy of 1-6 kHz, but manual dynamic

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agitation is a simple, cost-effective way of root canal agitation technique, which removes significantly more bacterial biofilm than syringe irrigation in the absence of any gadgets.[16]

According to Ying Liu et al. (2015) and Elakanti et al. (2015), Q mix had superior anti-microbial efficacy against *E.faecalis* when compared with NaOCl, which is in contrast to the results obtained in this current study which showed NaOCl to be much superior. [17,18] This difference could be because of the variation in contact time and quantity of the irrigating solution as well as the difference in the study models used.

At the same time, studies by Ordinola-Zapata r, et al. (2013) and Morgental et al. (2013) have reported inferior anti-biofilm efficacy of Q mix compared to various concentrations of NaOCl with EDTA combinations.

V. Summary and Conclusion

1. Sodium hypochlorite, in combination with Endo activator, was the most effective in removing *E. faecalis* from infected root canals followed by the combination of Q mix with Endo activator.
2. Among the three solutions, Sodium Hypochlorite displayed the best anti-microbial activity followed by Q mix and Aloe vera. Even though Aloe vera showed antimicrobial activity, its performance compared to the other two solutions was below par.
3. Among the two irrigation activation techniques, Endo activator was the best in terms of removing *E. faecalis.* Manual dynamic agitation also showed a considerable amount of reduction in the bacterial count but was associated with operator fatigue.

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Global Journal of Medical Research: J
Dentistry & Otolaryngology
Volume 20 Issue 4 Version 1.0 Year 2020
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

The Development of Real-Time Facemask

By Stephan Chae, Jungwhan Cho & Hwa Sung Chae

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Introduction- The maxilla articulates with nine other bones: the frontal cranial and the ethmoid, as well as the "nasal, zygomatic, lacrimal, inferior nasal concha, palatine, vomer, and the adjacent fused maxilla." It is connected to other bones above through sutures. (Figure 1).

GJMR-J Classification: NLMC Code: WU 113



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The Development of Real-Time Facemask

Stephan Chae [α], Jungwhan Cho [σ] & Hwa Sung Chae [ρ]

I. Introduction

The maxilla articulates with nine other bones: the frontal cranial and the ethmoid, as well as the "nasal, zygomatic, lacrimal, inferior nasal concha, palatine, vomer, and the adjacent fused maxilla." It is connected to other bones above through sutures. (Figure 1).

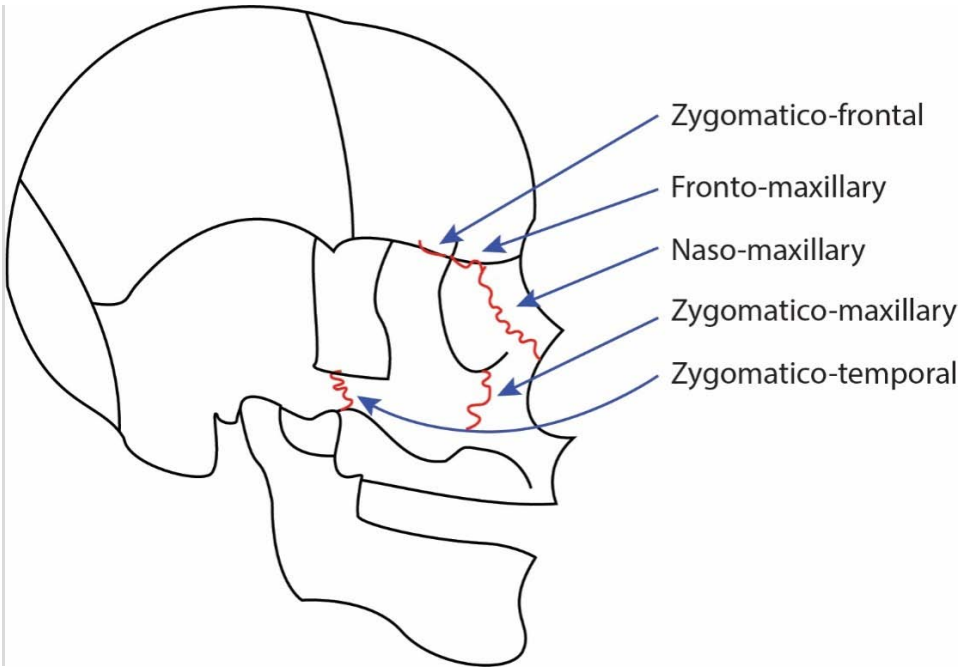


Figure 1: A depiction of circummaxillary sutures

In growing children, the maxilla departs from circummaxillary sutures when face mask treatment is applied(1). Face masks, also called reverse-pull headgear, have been used throughout much of history to move the maxilla both forwards and downwards in patients with midfacial deficiencies (2). Figure 2 depicts the clinical application of a face mask.

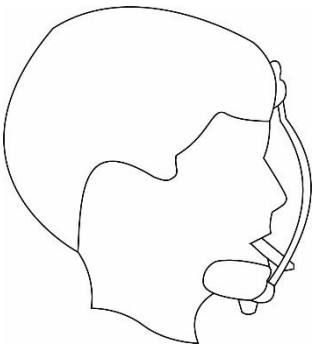


Figure 2: Clinical application of a face mask

The best treatment timing for growing patients is still controversial, and the correlation between cooperation and age is one of the most confounding variables. (3-5)

The recommended wearing time of a face mask is usually longer than 14 hours in a day (6) (7), but this is entirely dependent on the cooperation of the patient. Studies report that received compliance is insufficient (8) (9). A previous study suggested measuring wear time using TheraMon chip technology, which used sensors that collected time and temperature data. It was placed on the forehead of the patient. (10)

However, to our knowledge, no attempt has been made to measure the force applied against the full reverse headgear in real-time. Since the suggested force for face masks lies around 300 to 400 grams, keeping this pressure consistent, especially during sleep, is a challenge. To overcome the complications in this process, we used IoT technology and transferred the collected data onto their phone in real-time to use as an asset. This data could be used to create an entirely

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new system to analyze the data procured by face masks to personalize assistance for each patient.

II. Materials and Method

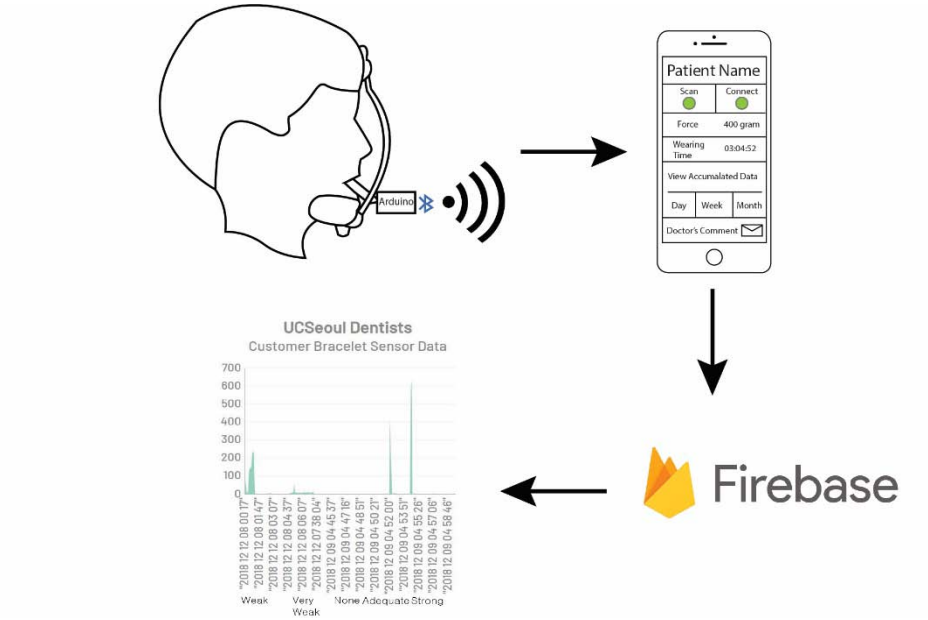


Figure 3: Demonstrates the role of each component and the feature of combination.

1. Load Cell Weight Sensor (AD Module ESU)

This sensor used rubber bands to detect the weight applied to the face mask.

Arduino Force Sensor Circuit

This force sensor converted the code from the sensor into units (grams).

MIT App Inventor

The face mask patient would run an app to connect their phone to this Bluetooth circuit, which was coded (Figure 4) and designed using MIT App Inventor. When a subject presses a 'scan' button, it will send data to the phone. (Figure 5)

Arduino Bluetooth Circuit

This connects the Arduino force sensor to the Bluetooth network, connecting the sensors and the patient's phone. This required coding to detect when the data should be sent, i.e., when the LED was turned on, signifying that the Bluetooth signal was functioning.

Google Firebase

This database sent data from Arduino Bluetooth so that it could be accessed by people other than the patient, making the system functional. (Figure 6)There was also a private cloud generation process necessary to prepare it.Once data is transported from the phone to Google Firebase, the database offers it to both the patient and the orthodontist.

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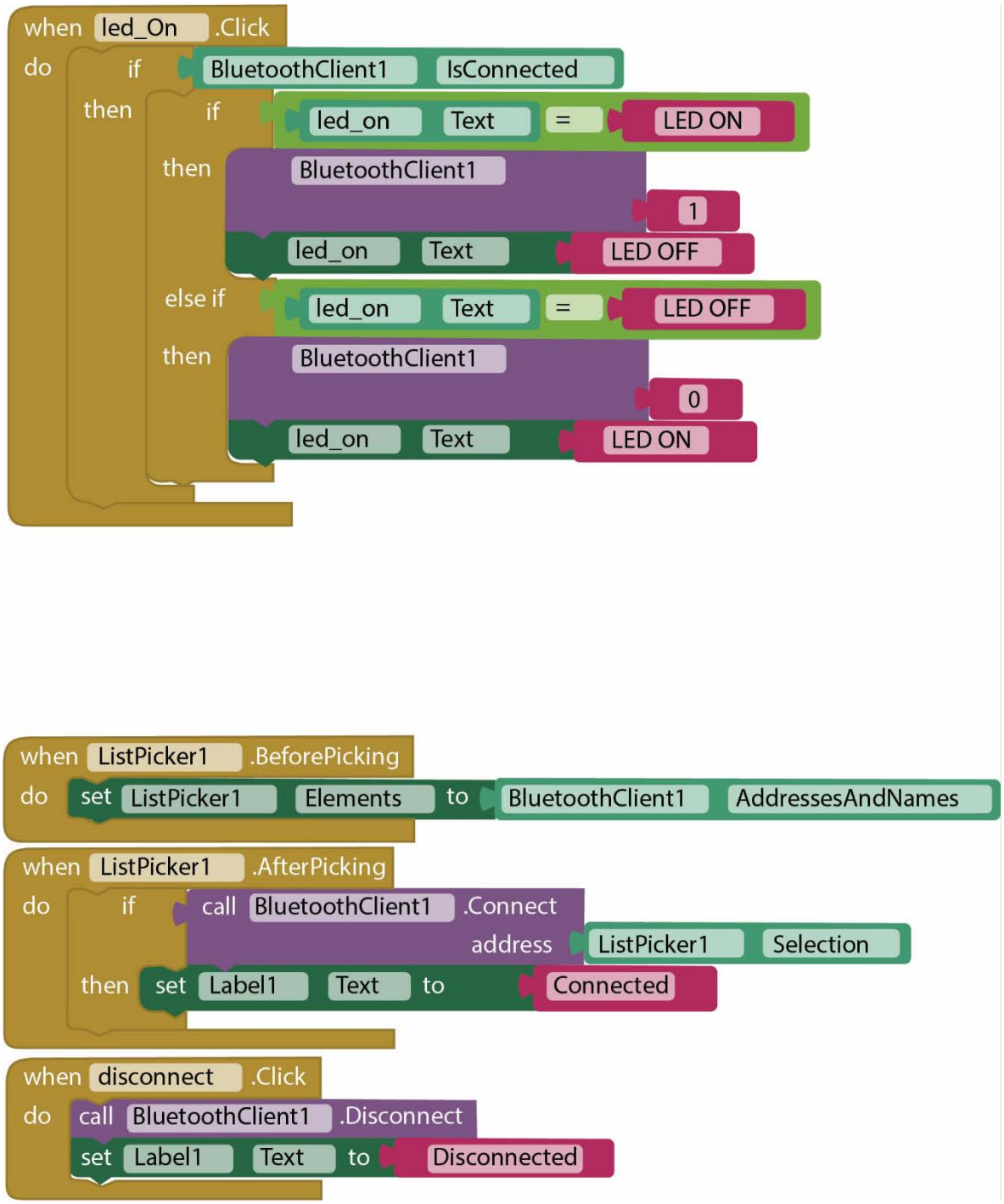


Figure 4: Code used to transfer data from the Arduino to the phone via Bluetooth

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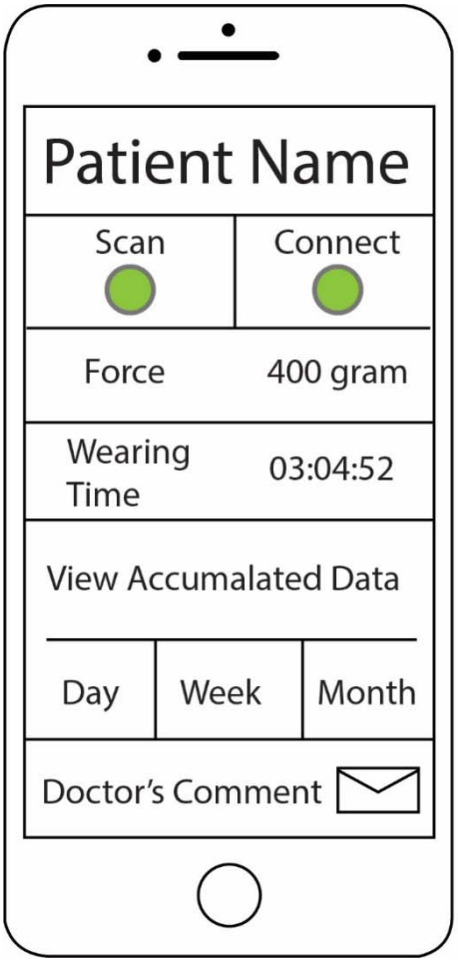
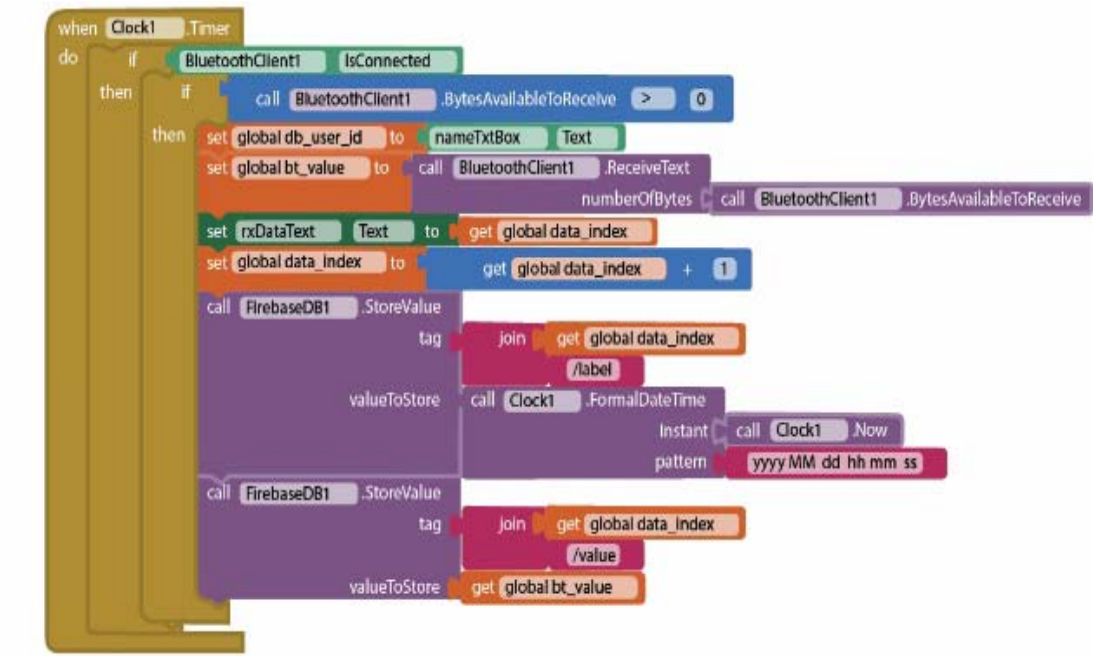


Figure 5: Composition of the app. Displays the current force and the wearing time of the individual



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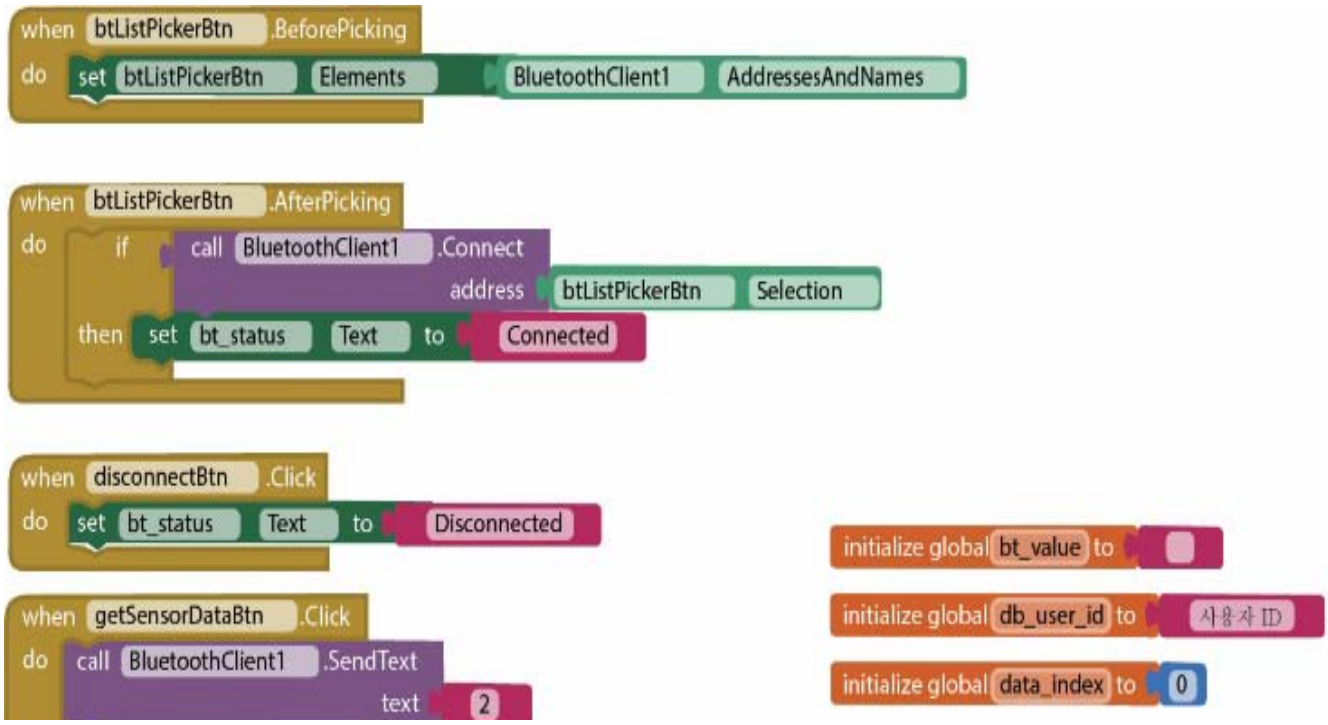


Figure 6: Code used to send data from Arduino to Google Firebase

III. Results

Utilizing face masks and IoT technology, we were able to detect whether and how much weight (0 to 1000 grams) was being applied to a face mask in real-time with an interval of thirty seconds. (Figure 7).

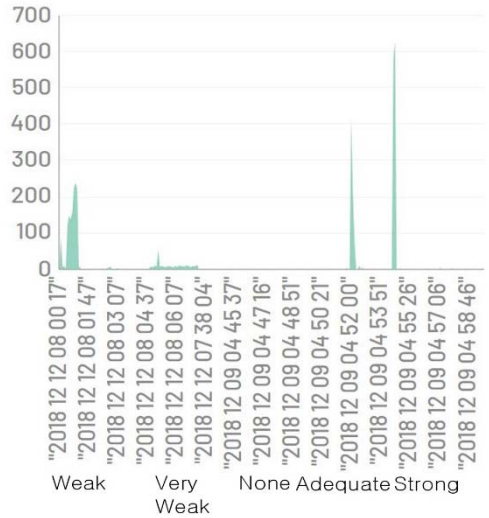


Figure 7: Chart of real-time measured pressure

IV. Discussion

Orthodontists always strive to apply the optimal force to their patient's orthodontic devices. However, due to the amount of patient cooperation necessary to conduct their practice successfully, keeping track of how much force is being applied at home and outside of the clinic seems impossible.

The advent of IoT technology could potentially solve his problems.

It opens comprehensive treatment care for both doctors and patients (Figure 3). When the patients wear the facemask attached to the sensor, Bluetooth will transfer the amount of force to their cell phones. The data is real-time based, and the patient can identify the force level, which is also shown graphically in the background (Figure 4). Further warning messages or beeps will be incorporated when the patients use weak or loosened elastics or insufficient wearing time is noted. Our results were able to detect and digitalize how much weight was being applied, as well as the patient's cooperation. Such data collected will enable far more concise feedback for patients in the future. Besides, the accumulated results will be able to reveal efficient wearing time and force for individual patients, rather than just longer than 12 hours a day. Therefore, doctors can instruct individualized optimum force and wearing time based on scientific evidence with confidence.

V. Conclusion

We suggested an IoT based tractable system for a facemask. This workflow can be widely applicable to any removable appliances in the future. Collected data will provide a comprehensive understanding of optimal force and timing for the treatment.

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Global Journal of Medical Research: J
Dentistry & Otolaryngology
Volume 20 Issue 4 Version 1.0 Year 2020
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

COVID – 19: Control it or it Will Control You

By Dr. CM Marya, Dr. Shilpa Arora, Dr. Ruchi Nagpal, Dr. Sakshi Kataria, Dr. Pratibha Taneja & Dr. Vishal Juneja

Abstract- In 2019, a new virus named severe acute respiratory syndrome coronavirus 2 emerged in Wuhan City of Hubei Province of China causing and exerted a massive toll over the world. By World Health Organization, it was subsequently named COVID – 19 (Corona virus disease). It is considered as a relative of severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS). Within months after its emergence in China, it had affected more than seven lakhs lives and caused more than thirty thousand deaths. The general clinical symptoms associated with COVID – 19 patients include fever, dry cough, generalized body pain and shortness of breath. Its high transmission potential highlighted the need for a coordinated global response to contain such disease threats. Treatment is essentially symptomatic and primary intervention being used is social distancing. Hence special attention and efforts should be implemented to control the current outbreaks. The present review was constructed to elaborate the Corona virus disease and to investigate the most recent trend in India.

Keywords: *COVID -19, Corona virus, SARS-CoV-2, China, Pneumonia.*

GJMR-J Classification: *NLMC Code: WU 113*

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COVID – 19: Control it or it will Control You

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Abstract- In 2019, a new virus named severe acute respiratory syndrome coronavirus 2 emerged in Wuhan City of Hubei Province of China causing and exerted a massive toll over the world. By World Health Organization, it was subsequently named COVID – 19 (Corona virus disease). It is considered as a relative of severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS). Within months after its emergence in China, it had affected more than seven lakhs lives and caused more than thirty thousand deaths. The general clinical symptoms associated with COVID – 19 patients include fever, dry cough, generalized body pain and shortness of breath. Its high transmission potential highlighted the need for a coordinated global response to contain such disease threats. Treatment is essentially symptomatic and primary intervention being used is social distancing. Hence special attention and efforts should be implemented to control the current outbreaks. The present review was constructed to elaborate the Corona virus disease and to investigate the most recent trend in India.

Keywords: COVID -19, Corona virus, SARS-CoV-2, China, Pneumonia.

I. Introduction

The news nowadays is full of reports on coronavirus. Everyone is panicking and scared. In the fall of December 2019, a novel Coronavirus (nCoV) has been identified as a new strain that has not been previously identified in humans, which was first occurred in in Wuhan City of Hubei Province of China as an outbreak of unusual respiratory condition.[1]After this, it is continuously spreading to rest of the world. Because of its new emergence, understanding of transmission patterns, severity, clinical features and risk factors for infection among health professionals as well as general population remains limited and followed by ambiguity in epidemiological, clinical and virological characteristics.[2]

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II. Sars-cov-2

The International Committee on Taxonomy of Viruses (ICTV) announced "Severe Acute Respiratory Syndrome Coronavirus 2" as the name of the new virus. It is genetically associated with the Coronavirus that is responsible for the Severe Acute Respiratory Syndrome (SARS) outbreak in 2003.[3] However, when related; they found both the viruses to be different. Further, on 11th February 2020, the World Health Organization (WHO) announced COVID-19 as the name of this disease and the "COVID-19 virus" as the virus responsible for this disease. As its transmission rate is high, WHO has declared the outbreak of the COVID-19 as a global health emergency on January 30, 2020.

Case definition by WHO

WHO has recently updated the case definitions based on the current information available. Suspect Case is a patient with acute respiratory illness {fever and at least one sign/symptom of respiratory disease (e.g., cough, shortness of breath)} and a history of travel to or residence in a country/area or territory reporting local transmission of COVID-19 disease during the 14 days prior to symptom onset or a patient/Health care worker with any acute respiratory illness and having been in contact with a confirmed COVID-19 case in the last 14 days prior to onset of symptoms or a patient with severe acute respiratory infection {fever and at least one sign/symptom of respiratory disease (e.g., cough, shortness breath)} and requiring hospitalization and with no other aetiology that fully explains the clinical presentation; or a case for whom testing for COVID-19 is inconclusive. Laboratory Confirmed case is a person with laboratory confirmation of COVID-19 infection, irrespective of clinical signs and symptoms.

III. Epidemiology

The epidemic of COVID-19 has broadened from china to growing number of countries. A total of 44 patients with pneumonia of unknown aetiology were reported to WHO till 3 January 2020. During this period, the causative agent of pneumonia was not identified. On January 7, 2020, the Chinese national authority identified new type of virus and reported that this virus is associated with sea food market located in Wuhan city.[4] Two hundred eighty two confirmed cases of COVID – 19 have been reported till 20 January 2020 from China, Thailand, japan and Korea.[5] However, it

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was clear that outbreak is no longer due animal to human transfer and it was evident that 2019-nCoV spreads from human to human.[6] International traffic has been published by WHO on 27 January 2020. On 29January 2020, "The Pandemic Supply Chain Network (PSCN)"has been set up by joint efforts of WHO and World Economic Forum. From Hubei Province, approximately 60.5% of all cases have been reported since the start of the outbreak.[7] COVID – 19 outbreak was declared as pandemic on 11 March 2020, and asked the countries to take immediate actions and magnify response to treat, diagnose and decrease transmission to save people's lives.[8]

A study conducted by *Wang et al* showed that mortality rate of COVID – 19 was 2.84%. While *Wu et al* reported that mortality rate of COVID – 19 was 14% and transmission rate of infection is 0.3.[9,10]

A webinar on "Occupational Health Measures in the Preparedness and Response to COVID19 in the Workplace" has been conducted by WHO and the International Occupational Medicine Society Collaboration (IOMSC) on 23rd March 2020. A joint World Health Organization (WHO)-China fact-finding mission estimated that the epidemic in China peaked between late January and early February 2020, and the rate of new cases decreased substantially by early March.

As of 20th April, 2020, data from WHO showed that there was total of 23,14,621 confirmed cases of COVID-19.

IV. Structure

Coronaviruses are a family of positive single-stranded RNA virus, classified under Nidovirales order. These viruses are enveloped, round in shape and approximately 80 to 120 nanometer in diameter. The virion contains an internal helical RNA-protein nucleocapsid surrounded by an envelope made up of lipids and viral glycoproteins. These glycoproteins are spike protein, membrane protein, and small membrane (Figure 1).[11] The spike protein or "S" is a type I glycoprotein, giving the virus its corona or crown-like morphology in the electron microscope. The coronaviruses attach to the cell surfaces through the spike. The membrane protein or "M" is highly hydrophobic and spans the membrane three times. On the other hand, the small membrane protein or "E" spans the membrane twice.[12]

V. Mode of Transmission

Origin of COVID-19 is zoonotic in nature. People most at risk of infection from the novel coronavirus were those in close contact with animals such as live animal market workers and those who are caring for people infected with the virus such as family members or healthcare workers.[13] The exact dynamics of how the virus is transmitted is yet to be determined. According to the Centre for Disease Control or CDC, COVID-19 is transmitted via droplets and fomites.[14] The main modes of transmission of Coronavirus are person to person, household transmission, from contact with infected surfaces or objects. COVID -19 can be transmitted between people who are in close contact with one another or within about 3-4 feet. The transmission is through the respiratory droplets produced by the infected person when he or she sneezes or coughs, possible inhalation or (into the lungs) of the droplets landing in the oral cavities or noses of people in close proximity.[15,16] Furthermore, as per the statistical records on 20th February 2020, in Shenzhen City, among two thousand eight hundred and forty two identified close contacts, 3% were found to be infected with COVID-19.[17]

Recent reports from the World Health Organization or WHO, human-to-human transmission of the COVID-19 virus is mainly occurring in families, especially in China. As per the WHO, a person might be susceptible to COVID-19 if he or she touches a surface or object containing the virus and then touching their own mouth, nose, or face. The lifespan of COVID – 19 virus outside the body depends on various factors like humidity and temperature of environment. However, it ranges from few hours to seven days like on cardboard upto 1 hour and on plastic upto 4 days.[18]

VI. Clinical Presentation

According to the Centre for Disease Control or CDC, patients above the age of 50 are more prone to attack and who are with other systemic diseases like diabetes, parkinson's disease and cardiovascular diseases are at high risk. As per the World Health Organization (W.H.O.) statistics, the median age of affected people is 51 years with the majority of cases aged between 30–69 years. Statistical data also reveals that 51.1% of the affected population are males.

Symptoms may appear 2 to 14 days after exposure to virus. The range of appearance of first symptom to death is 6-14 days (median- 14 days) depending upon the age and immunity.[19] The initial clinical Features of COVID-19 include decreased white blood cells, fever, fatigue, coughing and sneezing, runny nose, breathing difficulties like shortness of breath, sore throat. Other symptoms include pneumonia, severe acute respiratory syndrome, lungs inflammation and congestion, cardiovascular damage, diarrhoea, impaired renal functions and failure, bilateral ground-glass opacities on chest CT scans and ultimately can lead to death in critical cases. These features have some alikeness with SARS-CoV and MERS-CoV infections. At this stage, need of mechanical ventilators become crucial with quarantine facility.[13,19,20]

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VII. Diagnosis

The prime suspects for COVID-19 include patients with fever and lower respiratory tract symptoms. The geographical distribution and recent contact with the suspected patients should also be taken into consideration. Finally, if suspected with coronavirus, infection control measures should be implemented, and public health officials should be notified.

Diagnosis should be based on clinical and epidemiological factors. The clinical criteria for confirming the diagnosis of the severity of Coronavirus is broadly categorized into the following types: Mild, Moderate, Severe and Critical. In case of mild, the symptoms include fever less than 38 degrees centigrade. Patient with moderate illness may be presented with fever, respiratory symptoms and imaging findings of pneumonia. While in case of severe illness, respiratory distress, oxygen saturation less than 93% at rest are reported. In case of critical condition such as respiratory failure, shock and extra pulmonary organ failure, Intensive care unit is necessary.

Specific diagnosis is made by collection of respiratory material from upper and lower respiratory tract. The upper respiratory tract specimen includes nasopharyngeal or oropharyngeal swab while the lower respiratory specimens include sputum or endotracheal aspirate. Other methods of collection of virus include blood and stool. The specimens are to be collected in sterile containers and must be stored at 2 to 8 degree centigrade. In case of delay, the specimens are frozen at minus 20 degree centigrade and then shipped.

The various laboratory investigations include nucleic acid amplification tests (NAAT), Real Time Reverse Transcription Polymerase Chain Reaction (RT-PCR) for COVID 19 to check for evidence of viral load indicating active infection. Other investigations include serological testing for detecting antibodies, viral sequencing and viral culture.[21, 22, 23]

VIII. Treatment and Preventive Measures

The case fatality rate of the SARS-CoV-2 infected patients was much lower than that of SARS and MERS. No effective pharmaceutical therapy is available for COVID-19 till now. The key preventive measures are to follow good hygiene practices like in case of SARS and MERS. In all health care facilities, standard precautions should always be implemented viz. hand hygiene and the use of personal protective equipment (PPE), prevention of needle-stick or sharps injury, safe waste management, cleaning and disinfection of equipment and cleaning of the environment. There is need to implement appropriate infection prevention and control (IPC) to contain and mitigate transmission even in case of mild illness where hospitalization is not indicated.[24]

However, a number of medicines have been suggested as potential investigational therapies, many of which are now being in clinical trials.[25,26,27]At present, most of the patients with COVID – 19 have been treated symptomatically like antipyretics, empirical antibiotics, antiviral therapy (oseltamivir), RNA synthesis inhibitors and remdesivir. The first case in US was first treated successfully by Remdesivir.[27] Nowadays, chloroquine shown to have anti-viral activity against SARS-CoV-2. Study conducted by Wang et al. (2020) evaluated in vitro five FDA-approved drugs and two broad spectrum antivirals against a clinical isolate of SARS-CoV-2 and concluded that "chloroquine (is) highly effective in the control of 2019-nCoV infection in vitro". More than 15 trials are registered to check the effectiveness of chloroquine in treatment of COVID – 19.[27]

Healthcare workers are at greater risk to COVID-19. Likewise, in the SARS outbreak, out of total affected, 21% of those were healthcare workers. In china, Dr Li Wenliang who tried to warn others about the same has died too. Hence, it is very crucial to protect health workers to safeguard continuity of care. Hence, healthcare professionals should also be screened for COVID – 19.

IX. Indian Scenario

India has reported first case of COVID-19 on 30th January 2020 in Kerala. According to the Ministry of Health & Family Welfare (MoHFW), as of 21st April 2020, COVID-19 - 15,122 active cases, 3259 cured, 603 deaths have been reported.[28]

India has had a brush with three respiratory infections outbreaks in the recent past- SARS, MERS and now COVID - 19. All of these had created panic and chaos. Globally, preventive and control measures are being enforced rapidly. Starting from Wuhan city, they are expanding over the world. A detailed advisory on social distancing measures has been issued to stop or slow down the rate and extent of disease transmission. Detailed advisory has also been issued for health along with consultation with professional associations. Quarantine facilities and preparedness regarding availability of testing kits, personal protective equipment (PPEs), medicines, and adequate isolation wards are continuously evaluated by Ministry of Health and Family Welfare (MoHFW).[28] To assure adequate availability of protective gear for all healthcare workers, all public hospitals have been directed. To slow the spread of the illness and to develop specific pharmaceutical treatment, many efforts are being made.

To provide command and control functions, Strategic Health Operations Centre (SHOC) room has been launched by National Centre for Disease Control (NCDC).[29] The national and state health authorities are constantly reviewing the public health preparedness including surveillance, diagnostics, hospital

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preparedness, infection prevention and control. Honourable PM Narendra Modi made a public appeal to encourage public participation in the response towards COVID-19 by observing national lockdown for 21 days "in order to protect the country, and each of its citizens, a complete ban is being imposed on people from stepping out of their homes." After that he had announced the extension of lockdown till 3rd May to tackle the further spread.

A telephonic survey will also being conducted by government of India and people are requested to participate in this. A call from number 1921 will be coming to ask about prevalence and distribution of COVID – 19 symptoms.

High level Group of Ministers (GoM) is constantly reviewing the status of cases in India and implementing steps taken by the Government of India across states.

X. Conclusion

From the present review, it can be concluded that COVID – 19, being a public health threat, has challenged the economic, medical as well as public health infrastructure. The specific pharmaceutical treatment is currently under evaluation and development. Hence, till then the public should implement the infection control measures.

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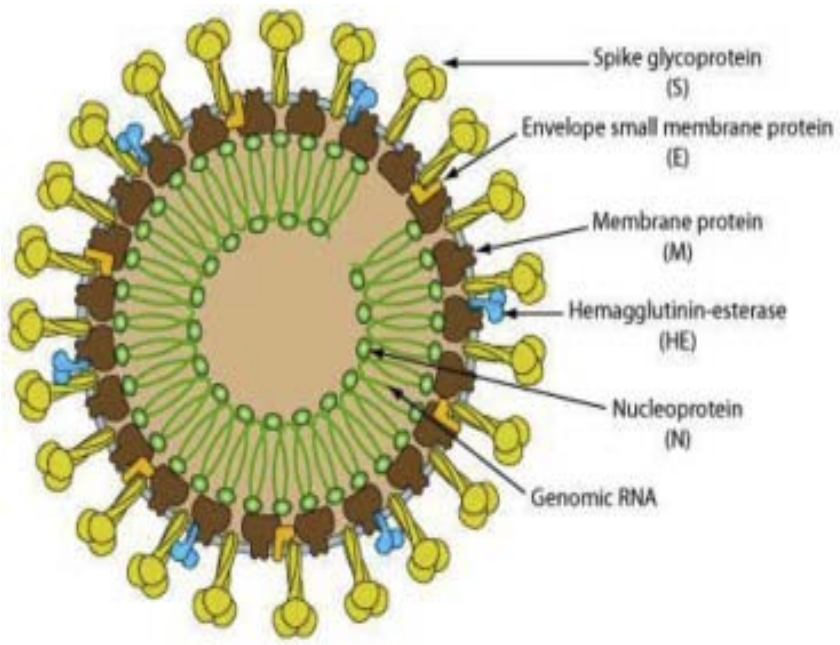


Figure 1: Structure of COVID - 19

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Certificate, LoR and Momento **2** discounted publishing/year **Gradation** of Research **10** research contacts/day **1 GB** Cloud Storage **GJ** Community Access	**Certificate,** LoR and Momento **Unlimited** discounted publishing/year **Gradation** of Research **Unlimited** research contacts/day **5 GB** Cloud Storage **Online Presense** Assistance **GJ** Community Access	**Certificates,** LoRs and Momentos **Unlimited** free publishing/year **Gradation** of Research **Unlimited** research contacts/day **Unlimited** Cloud Storage **Online Presense** Assistance **GJ** Community Access	**GJ** Community Access

Preferred Author Guidelines

We accept the manuscript submissions in any standard (generic) format.

We typeset manuscripts using advanced typesetting tools like Adobe In Design, CorelDraw, TeXnicCenter, and TeXStudio. We usually recommend authors submit their research using any standard format they are comfortable with, and let Global Journals do the rest.

Alternatively, you can download our basic template from https://globaljournals.org/Template

Authors should submit their complete paper/article, including text illustrations, graphics, conclusions, artwork, and tables. Authors who are not able to submit manuscript using the form above can email the manuscript department at submit@globaljournals.org or get in touch with chiefeditor@globaljournals.org if they wish to send the abstract before submission.

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Authors must ensure the information provided during the submission of a paper is authentic. Please go through the following checklist before submitting:

1. Authors must go through the complete author guideline and understand and *agree to Global Journals' ethics and code of conduct,* along with author responsibilities.
2. Authors must accept the privacy policy, terms, and conditions of Global Journals.
3. Ensure corresponding author's email address and postal address are accurate and reachable.
4. Manuscript to be submitted must include keywords, an abstract, a paper title, co-author(s') names and details (email address, name, phone number, and institution), figures and illustrations in vector format including appropriate captions, tables, including titles and footnotes, a conclusion, results, acknowledgments and references.
5. Authors should submit paper in a ZIP archive if any supplementary files are required along with the paper.
6. Proper permissions must be acquired for the use of any copyrighted material.
7. Manuscript submitted *must not have been submitted or published elsewhere* and all authors must be aware of the submission.

Declaration of Conflicts of Interest

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Authors are solely responsible for all the plagiarism that is found. The author must not fabricate, falsify or plagiarize existing research data. The following, if copied, will be considered plagiarism:

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- Writings
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- Printed material
- Graphic representations
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2. Drafting the paper and revising it critically regarding important academic content.
3. Final approval of the version of the paper to be published.

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The corresponding author should mention the name and complete details of all co-authors during submission and in manuscript. We support addition, rearrangement, manipulation, and deletions in authors list till the early view publication of the journal. We expect that corresponding author will notify all co-authors of submission. We follow COPE guidelines for changes in authorship.

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Unless specified in the notification, the Editorial Board's decision on publication of the paper is final and cannot be appealed before making the major change in the manuscript.

Acknowledgments

Contributors to the research other than authors credited should be mentioned in Acknowledgments. The source of funding for the research can be included. Suppliers of resources may be mentioned along with their addresses.

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Preparing your Manuscript

Authors can submit papers and articles in an acceptable file format: MS Word (doc, docx), LaTeX (.tex, .zip or .rar including all of your files), Adobe PDF (.pdf), rich text format (.rtf), simple text document (.txt), Open Document Text (.odt), and Apple Pages (.pages). Our professional layout editors will format the entire paper according to our official guidelines. This is one of the highlights of publishing with Global Journals—authors should not be concerned about the formatting of their paper. Global Journals accepts articles and manuscripts in every major language, be it Spanish, Chinese, Japanese, Portuguese, Russian, French, German, Dutch, Italian, Greek, or any other national language, but the title, subtitle, and abstract should be in English. This will facilitate indexing and the pre-peer review process.

The following is the official style and template developed for publication of a research paper. Authors are not required to follow this style during the submission of the paper. It is just for reference purposes.

Manuscript Style Instruction (Optional)

- Microsoft Word Document Setting Instructions.
- Font type of all text should be Swis721 Lt BT.
- Page size: 8.27" x 11'", left margin: 0.65, right margin: 0.65, bottom margin: 0.75.
- Paper title should be in one column of font size 24.
- Author name in font size of 11 in one column.
- Abstract: font size 9 with the word "Abstract" in bold italics.
- Main text: font size 10 with two justified columns.
- Two columns with equal column width of 3.38 and spacing of 0.2.
- First character must be three lines drop-capped.
- The paragraph before spacing of 1 pt and after of 0 pt.
- Line spacing of 1 pt.
- Large images must be in one column.
- The names of first main headings (Heading 1) must be in Roman font, capital letters, and font size of 10.
- The names of second main headings (Heading 2) must not include numbers and must be in italics with a font size of 10.

Structure and Format of Manuscript

The recommended size of an original research paper is under 15,000 words and review papers under 7,000 words. Research articles should be less than 10,000 words. Research papers are usually longer than review papers. Review papers are reports of significant research (typically less than 7,000 words, including tables, figures, and references)

A research paper must include:

a) A title which should be relevant to the theme of the paper.
b) A summary, known as an abstract (less than 150 words), containing the major results and conclusions.
c) Up to 10 keywords that precisely identify the paper's subject, purpose, and focus.
d) An introduction, giving fundamental background objectives.
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.
f) Results which should be presented concisely by well-designed tables and figures.
g) Suitable statistical data should also be given.
h) All data must have been gathered with attention to numerical detail in the planning stage.

Design has been recognized to be essential to experiments for a considerable time, and the editor has decided that any paper that appears not to have adequate numerical treatments of the data will be returned unrefereed.

i) Discussion should cover implications and consequences and not just recapitulate the results; conclusions should also be summarized.
j) There should be brief acknowledgments.
k) There ought to be references in the conventional format. Global Journals recommends APA format.

Authors should carefully consider the preparation of papers to ensure that they communicate effectively. Papers are much more likely to be accepted if they are carefully designed and laid out, contain few or no errors, are summarizing, and follow instructions. They will also be published with much fewer delays than those that require much technical and editorial correction.

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



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Format Structure

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

All manuscripts submitted to Global Journals should include:

Title

The title page must carry an informative 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) where the work was carried out.

Author details

The full postal address of any related author(s) must be specified.

Abstract

The abstract is the foundation of the research paper. It should be clear and concise and must contain the objective of the paper and inferences drawn. It is advised to not include big mathematical equations or complicated jargon.

Many researchers searching for information online will use search engines such as Google, Yahoo or others. By optimizing your paper for search engines, you will amplify the chance of someone finding it. In turn, this will make it more likely to be viewed and cited in further works. Global Journals has compiled these guidelines to facilitate you to maximize the web-friendliness of the most public part of your paper.

Keywords

A major lynchpin of research work for the writing of research papers is the keyword search, which one will employ to find both library and internet resources. Up to eleven keywords or very brief phrases have to be given to help data retrieval, mining, and indexing.

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

Choice of the main keywords is the first tool of writing a research paper. Research paper writing is an art. Keyword search should be as strategic as possible.

One should start brainstorming lists of potential keywords before even beginning 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 a research paper?” Then consider synonyms for the important words.

It may take the discovery of only one important paper to steer in the right keyword direction because, in most databases, the keywords under which a research paper is abstracted are listed with the paper.

Numerical Methods

Numerical methods used should be transparent and, where appropriate, supported by references.

Abbreviations

Authors must list all the abbreviations used in the paper at the end of the paper or in a separate table before using them.

Formulas and equations

Authors are advised to submit any mathematical equation using either MathJax, KaTeX, or LaTeX, or in a very high-quality image.

Tables, Figures, and Figure Legends

Tables: Tables should be 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. Authors must submit tables in an editable format and not as images. References to these tables (if any) must be mentioned accurately.

Figures

Figures are supposed to be submitted as separate files. Always include a citation in the text for each figure using Arabic numbers, e.g., Fig. 4. Artwork must be submitted online in vector electronic form or by emailing it.

Preparation of Eletronic Figures for Publication

Although low-quality images are sufficient for review purposes, print publication requires high-quality images to prevent the final product being blurred or fuzzy. Submit (possibly by e-mail) EPS (line art) or TIFF (halftone/ photographs) files only. MS PowerPoint and Word Graphics are unsuitable for printed pictures. Avoid using pixel-oriented software. Scans (TIFF only) should have a resolution of at least 350 dpi (halftone) or 700 to 1100 dpi (line drawings). 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.

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Tips for writing a good quality Medical Research Paper

1. Choosing the topic: In most cases, the topic is selected by the interests of the author, but it can also be suggested by the guides. You can have several topics, and then judge which you are most comfortable with. This may be done by asking several questions of yourself, like "Will I be able to carry out a search in this area? Will I find all necessary resources to accomplish the search? Will I be able to find all information in this field area?" If the answer to this type of question is "yes," then you ought to choose that topic. In most cases, you may have to conduct surveys and visit several places. Also, you might have to do a lot of work to find all the rises and falls of the various data on that subject. Sometimes, detailed information plays a vital role, instead of short information. Evaluators are human: The first thing to remember is that evaluators are also human beings. They are not only meant for rejecting a paper. They are here to evaluate your paper. So present your best aspect.

2. Think like evaluators: If you are in confusion or getting demotivated because your paper may not be accepted by the evaluators, then think, and try to evaluate your paper like an evaluator. Try to understand what an evaluator wants in your research paper, and you will automatically have your answer. 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.

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

4. Use of computer is recommended: As you are doing research in the field of medical research then this point is quite obvious. Use right software: Always use good quality software packages. If you are not capable of judging good software, then you can lose the quality of your paper unknowingly. There are various programs available to help you which you can get through the internet.

5. Use the internet for help: An excellent start for your paper is using Google. It is a wondrous search engine, where you can have your doubts resolved. You may also read some answers for the frequent question of how to write your research paper or find a model research paper. You can download books from the internet. If you have all the required books, place importance on reading, selecting, and analyzing the specified information. Then sketch out your research paper. Use big pictures: You may use encyclopedias like Wikipedia to get pictures with the best resolution. At Global Journals, you should strictly follow here.



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

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

8. Make every effort: Make every effort to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in the introduction—what is the need for a particular research paper. Polish your work with good writing skills and always give an evaluator what he wants. Make backups: When you are going to do any important thing like making a research paper, you should always have backup copies of it either on your computer or on paper. This protects you from losing any portion of your important data.

9. Produce good diagrams of your own: Always try to include good charts or diagrams in your paper to improve quality. Using several unnecessary diagrams will degrade the quality of your paper by creating a hodgepodge. So always try to include diagrams which were made by you to improve the readability of your paper. Use of direct quotes: When you do research relevant to literature, history, or current affairs, then use of quotes becomes essential, but if the study is relevant to science, use of quotes is not preferable.

10. Use proper verb tense: Use proper verb tenses in your paper. Use past tense to present those events that have happened. Use present tense to indicate events that are going on. Use future tense to indicate events that will happen in the future. Use of wrong tenses will confuse the evaluator. Avoid sentences that are incomplete.

11. Pick a good study spot: Always try to pick a spot for your research which is quiet. Not every spot is good for studying.

12. Know what you know: Always try to know what you know by making objectives, otherwise you will be confused and unable to achieve your target.

13. Use good grammar: Always use good grammar and words that will have a positive impact on the evaluator; use of good vocabulary does not mean using tough words which the evaluator has to find in a dictionary. Do not fragment sentences. Eliminate one-word sentences. Do not ever use a big word when a smaller one would suffice.

Verbs have to be in agreement with their subjects. In a research paper, do not start sentences with conjunctions or finish them with prepositions. When writing formally, it is advisable to never split an infinitive because someone will (wrongly) complain. Avoid clichés like a disease. Always shun irritating alliteration. Use language which is simple and straightforward. Put together a neat summary.

14. 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 for your topic. You may also maintain your arguments with records.

15. Never start at the last minute: Always allow enough time for research work. Leaving everything to the last minute will degrade your paper and spoil your work.

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

17. Never copy others' work: Never copy others' work and give it your name because if the evaluator has seen it anywhere, you will be in trouble. Take proper rest and food: No matter how many hours you spend on your research activity, if you are not taking care of your health, then all your efforts will have been in vain. For quality research, take proper rest and food.

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

19. Refresh your mind after intervals: Try to give your mind a rest by listening to soft music or sleeping in intervals. This will also improve your memory. Acquire colleagues: Always try to acquire colleagues. No matter how sharp you are, if you acquire colleagues, they can give you ideas which will be helpful to your research.

20. Think technically: Always think technically. If anything happens, search for its reasons, benefits, and demerits. Think and then print: When you go to print your paper, check that tables are not split, headings are not detached from their descriptions, and page sequence is maintained.

21. Adding unnecessary information: Do not add unnecessary information like "I have used MS Excel to draw graphs." Irrelevant and inappropriate material is superfluous. Foreign terminology and phrases are not apropos. One should never take a broad view. Analogy is like feathers on a snake. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Never oversimplify: When adding material to your research paper, never go for oversimplification; this will definitely irritate the evaluator. Be specific. Never use rhythmic redundancies. Contractions shouldn't be used in a research paper. Comparisons are as terrible as clichés. Give up ampersands, abbreviations, and so on. Remove commas that are not necessary. Parenthetical words should be between brackets or commas. Understatement is always the best way to put forward earth-shaking thoughts. Give a detailed literary review.

22. Report concluded results: Use concluded results. From raw data, filter the results, and then conclude your studies based on measurements and observations taken. An appropriate number of decimal places should be used. Parenthetical remarks are prohibited here. Proofread carefully at the final stage. At the end, give an outline to your arguments. Spot perspectives of further study of the subject. Justify your conclusion at the bottom sufficiently, which will probably include examples.

23. Upon 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 for 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 of 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 criteria peer reviewers will use for grading the final paper.

Final points:

One purpose of organizing a research paper is to let people interpret your efforts selectively. The journal requires the following sections, submitted in the order listed, with each section starting on a new page:

The introduction: This will be compiled from reference matter and reflect the design processes or outline of basis that directed you to make a study. As you carry out the process of study, the method and process section will be constructed like that. The results segment will show related statistics in nearly sequential order and direct reviewers to similar intellectual paths throughout the data that you gathered to carry out your study.

The discussion section:

This will provide understanding of the data and projections as to the implications of the results. The use of good quality references throughout the paper will give the effort trustworthiness by representing an alertness to 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 progression.

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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.



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Mistakes to avoid:

- Insertion of a title at the foot of a page with subsequent text on the next page.
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- Submitting a manuscript with pages out of sequence.
- In every section of your document, use standard writing style, including articles ("a" and "the").
- Keep paying attention to the topic of the paper.
- Use paragraphs to split each significant point (excluding the abstract).
- Align the primary line of each section.
- Present your points in sound order.
- Use present tense to report well-accepted matters.
- Use past tense to describe specific results.
- Do not use familiar wording; don't address the reviewer directly. Don't use slang or superlatives.
- Avoid use of extra pictures—include only those figures essential to presenting results.

Title page:

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

Abstract: This summary should be two hundred words or less. It should clearly and briefly explain the key findings reported in the manuscript and must have precise statistics. It should not have acronyms or abbreviations. It should be logical in itself. Do not cite 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 approaches 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. Use comprehensive sentences, and do not sacrifice readability for brevity; you can maintain it succinctly by phrasing sentences so that they provide more than a 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 limit the initial two items to no more than one line each.

Reason for writing the article—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 for this; results of any numerical analysis should be reported. Significant conclusions or questions that emerge from the research.

Approach:

- Single section and succinct.
- An outline of the job done is always written in past tense.
- Concentrate on shortening results—limit background information to a verdict or two.
- Exact spelling, clarity 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 of comprehending and calculating the purpose of your study without having to refer to other works. The basis for the study should be offered. Give the most important references, but avoid making a comprehensive appraisal of the topic. Describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will give no attention to your results. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here.

The following approach can create a valuable beginning:

- Explain the value (significance) of the study.
- Defend the model—why did you employ this particular system or method? What is its compensation? Remark upon its appropriateness from an abstract point of view as well as pointing out sensible reasons for using it.
- Present a justification. State your particular theory(-ies) or aim(s), and describe the logic that led you to choose them.
- Briefly explain the study's tentative purpose and how it meets 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 for every section. If you make the four points listed above, you will need at least four paragraphs. Present surrounding information only when it is necessary to support a situation. The reviewer does not desire to read everything you know about a topic. Shape the theory 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 soundly written procedures segment allows a capable scientist to replicate 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 to give the least amount of information that would permit another capable scientist to replicate 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 section, mention the specific item describing the way, but draw the basic principle while stating the situation. The purpose is to show 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:

Materials may be reported in part of a section or else they may be recognized along with your measures.

Methods:

- Report the method and not the 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—detail how procedures were completed, not how they were performed on a particular day.
- If well-known procedures were used, account for the procedure by name, possibly with a reference, and that's all.

Approach:

It is embarrassing to use vigorous voice when documenting methods without using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result, when writing up the methods, most authors use third person passive voice.

Use standard style in this and 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.



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Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part as 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. Use statistics and tables, if suitable, to present consequences most efficiently.

You must clearly differentiate material which would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matters should not be submitted at all except if requested by the instructor.

Content:

- Sum up your conclusions in text and demonstrate them, if suitable, with figures and tables.
- In the manuscript, explain each of your consequences, and point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation of an exacting study.
- Explain results of control experiments and give 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 manuscript.

What to stay away from:

- Do not discuss or infer your outcome, report surrounding information, or try to explain anything.
- Do not include raw data or intermediate calculations in a research manuscript.
- Do not present similar data more than once.
- A manuscript should complement any figures or tables, not duplicate information.
- Never confuse figures with tables—there is a difference.

Approach:

As always, use past tense when you submit 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 section.

Figures and tables:

If you put figures and tables at the end of some details, make certain that they are visibly distinguished from any attached appendix materials, such as raw facts. Whatever the position, each table must be titled, numbered one after the other, and include a heading. All figures and tables must be divided from the text.

Discussion:

The discussion is expected to be the trickiest segment to write. A lot of papers submitted to the journal are discarded based on problems with the discussion. There is no rule for how long an 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 implications of the study. The purpose here is to offer an understanding of your results and support all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of results should be fully 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 the prospect, and let it drop at that. Make a decision as to whether each premise is supported or 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 an experiment might be personalized to accomplish a new idea.
- Give details of all of your remarks as much as possible, focusing on mechanisms.
- Make a decision as to whether the tentative design sufficiently addressed the theory and whether or not it was correctly restricted. Try to present substitute explanations if they are sensible alternatives.
- One piece of 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 other available information. Present work done by specific persons (including you) in past tense.

Describe generally acknowledged facts and main beliefs in present tense.

The Administration Rules

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ISSN 9755896



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