EDITORIAL BOARD MEMBERS

The JKDA is published quarterly.

Letters to the Editor can be submitted to Editor-In-Chief at linawagaiyu@gmail.com

Subscription address:

JKDA P.O. Box 20059-00200, Nairobi. E-mail: journal@kda.or.ke.

website: www.kda.or.ke

Published by:

Kenya Dental Association, Professional Center 1st Floor , Parliament Road, Nairobi

Editorial: Infection prevention and control measures in dental health care today

The earliest report on antisepsis in dentistry stems back to 1876 when a London dentist Barrett A.W 1876 [1] described the prevention and termination of the sequalae of pulp putrefaction. Since then, diagnosis, nomenclature and management of oral infections have advanced considerably. Parallel to this has been the development of infection control and protection measures to minimise health care-associated infections among patients and occupational exposures among the dental care team. Furthermore, associated with dental treatment are particles, splatter and bioaerosols that pose a risk for cross-infection for dental professionals.

Oral health practice has an inherent risk of infectious diseases transmission[2] such as Tuberculosis, Human Immunodeficiency Virus/ Acquired Immune Deficiency Syndrome, Hepatitis B and C, and the novel Severe Air Respiratory Syndrome Corona virus [2] (SARS CoV-2). The latter is the latest hazard facing dental health care workers (DHCWs) whose transmission is via inhalation of virus-infested aerosols and droplets[3]. Dental settings have embraced pragmatic infection control solutions to control the transmission of SARS CoV-2. Auspiciously however, over the years dental schools and professional health agencies have advocated that universal precautions be applied to all patients, as their potential infectivity may not be known[4,5].

Current infection control practices comprise of effective varied measures that include administrative, engineering, and work practice controls that should be adhered to, to assure a safe working environment for the dental health care workers (DHCWs) and their patients. The administrative measure consists of controls that apply to all persons accessing the dental clinic such as the measuring of all persons' temperature at the entrance of the practice, patient triaging, patient to wait outside the clinic until their appointed time and to only allow limited personnel in the operatory area. Additionally, the supply of respiratory protective equipment

(RPE) comprising of efficacious face masks. Further the dental facility should maintain a heightened vigilance and ensure hand sanitization, clinic air flow is not obstructed, surface and floor disinfection and adequate water supply[6].

Engineering controls include measures of isolating DHCWs from the hazardous SARS CoV-2 and other potential pathogens borne in blood and saliva. Managing airflow in the dental clinic during and after Aerosol generating procedures (AGPs). Preferably operating under negative air pressure, and where this is not applicable, sufficient ventilation with or without enhanced active ventilation to create a draught in the room. Executing procedures that do not require direct contact like scheduling and consultations should be done remotely. Use of physical barriers at the front desk and ensuring maintenance of safe distance in the waiting rooms[7].

With regard to work practice controls, efforts should be made to shield the respiratory tract which is the main portal of entry of the virus[8]. This is attained via use of respiratory protective devices (filtering half masks: Filtering face piece (FFP-2)/ N95/ KN95) filter particles significantly more effectively and have a better fit and less leakage compared to regular medical face masks (type IIR, fluid resistant) 9. The reusable half-face piece elastomeric respirators are also recommended for protection against SARS CoV-2. Personal Protective Equipment to protect the patient as well as fellow DHCWs against the micro-organisms exhaled by the user. Nonetheless there is paucity of data on the efficacy of masks in dentistry concerning virus protection6. To guard against entry of pathogens through the mucous membrane of the eyes, googles or face shields are recommended. Moreover, face shields protect the mask and exposed skin from splashes and aerosols during AGPs.

No touch behaviour approach should be practiced, use of splash-proof long-sleeved apron over standard protective clothing will protect DHCWs from fomite transmission. White coats which have been regarded as standard wear have been reported to harbor microorganisms more in the chest area than the pockets among dentists and dental students. Although intact skin is a barrier to the virus, it can serve as a vector for the virus hence meticulous hand hygiene should be strictly observed in the dental clinc[10].

Kenya should adapt the current infection control and prevention guidelines necessitated by the new SARS CoV-2 and embed it into the existing National Infection Prevention and Control Guidelines (NIP-

CG) for Health Care Services in Kenya 2010. In addition, make the adoption and implementation of the NIP-CG compulsory to all health care facilities and provide proper PPE to all DHCWs prioritising resource constraint institutions.

Dr Bernina K. Kisumbi BDS (Nbi), Mphil (UK), FICD

Biomaterials specialist

1. Barrett A W. Decomposition of the dental pulp the cause of periodontitis. Transactions of the Odontological Society of Great Britain 1876; VIII: 46-52

2. Thomas MV, Jarboe G, Frazer RQ. Infection control in the dental office. Dent Clin North Am 2008;52:609–628.

3. Guo, Y.-R.; Cao, Q.-D.; Hong, Z.-S.; Tan, Y.-Y.; Chen, S.-D.; Jin, H.-J.; Tan, K.-S.;Wang, D.-Y.; Yan, Y. The origin, transmission and clinical therapies on coronavirus disease 2019 (COVID-19) outbreak—An update on the status. Mil. Med. Res. 2020, 7, 1–10.

4. McCarthy GM, Koval JJ, John MA, MacDonald JK. Infection control practices across Canada: do dentists follow the recommendations? J Can Dent Assoc. 1999;65(9):506-11.

5. Recommended infection-control practices for dentistry, 1993. Centers for Disease Control and Prevention. MMWR Recomm Rep. 1993 28;42(RR-8):1-12.

6. Volgenant CMC, Persoon IF, de Ruijter RAG, de Soet JJH. Infection control in dental health care during and after the SARS-CoV-2 outbreak. Oral Dis. 2021;27 Suppl 3:674-683.

7. Blignaut E, Nemutandani S, Samaranayake L. Strategic implementation of dental infection control in resource-poor jurisdictions during COVID-19 pandemic: a perspective from South Africa. Acta Odontol Scand. 2020;78(8):614-617.

8. Jean G, Holden ACL, Tennant M, Kruger E. Infection Control Standards in Private Dental Practice - The Role of Accreditation. J Law Med. 2018;25(4):1146-1156. PMID: 29978692.

9. Steinle, S., Sleeuwenhoek, A., Mueller, W., Horwell, C. J., Apsley, A., Davis, A., … Galea, K. S. (2018). The effectiveness of respiratory protection worn by communities to protect from volcanic ash inhalation. Part II: Total inward leakage tests. International Journal of Hygiene and Environmental Health, 221(6), 977–984.

10. Cook HA, Cimiotti JP, Della-Latta P, Saiman L, Larson EL. Antimicrobial resistance patterns of colonizing flora on nurses' hands in the neonatal intensive care unit. Am J Infect Control. 2007;35(4):231-6.

Bacterial Contamination of Clinical Coats Worn By Dental Students

Patel H [1], Njiru W [2], Mua B [3]

1. University of Nairobi-School of Dental Sciences, Nairobi, Kenya
2. Department of Oral and Maxillofacial Surgery, Oral Pathology and Oral Medicine, University of Nairobi-School of Dental Sciences, Nairobi, Kenya
3. Department of Periodontology/Community and Preventive Dentistry, University of Nairobi-School of Dental Sciences, Nairobi, Kenya

Corresponding author: Henal Patel, henalkkp@yahoo.com

Keywords: Clinical coats, bacterial contamination, dental students, infection prevention and control

Abstract

Background: Infection control in hospitals is a major concern and fomites play a role in the spread of infections. Clinical coats carry the risk of transmission of bacteria from patient to doctor, doctor to patient, doctor to other health care workers and from patient and doctor to the community.
Objective: To assess presence and the type of bacterial contamination on clinical coats of clinical year four (IV) and five (V) students at a certain Dental School in Kenya.
Materials and Methods: This was a descriptive cross-sectional study. The study population was clinical years (year IV and V) undergraduate dental students at a certain Dental School in Kenya. Each participant responded to a self-administered questionnaire and samples from three (3) different parts (pockets, sleeves and lapel) of the clinical coat were collected and sent to the laboratory for microbial analysis. The data collected was analysed using SPSS (Version 25.0) program.
Results: A total of sixty-one participants were recruited into the study. 37 (60.7%) female and 24 (39.3%) male. 32 (52.5%) participants were fourth year dental students and 29 (47.5%) were fifth year students. 24 (39.3%) participants owned 2 clinical coats, 37 (60.7%) owned 3 or more clinical coats. A minority of 5 (8.2%) changed their coats daily, 15 (24.6%) thrice a week, 33 (54.1%) twice a week and 8 (13.1%) once a week. Only one (1.6%) washed their clinical coat every day, 28 (45.9%) every three days, 32 (52.5%) weekly. In regard to the method of cleaning, 3 (4.9%) got their clinical coats laundered professionally while 58 (95.5%) did their own laundry, with only 26 (42.6%) using disinfectant. All the participants always used a clinical coat in the clinic. Almost half (47.5%) also wore the coat in the classroom, and a quarter (24.6%) wore their clinical coat at the cafeteria, 19 (31.1%) entered the washroom in their clinical coats.
Out of 60 clinical coats swabbed, 59 (96.7%) were contaminated with Staphylococcus aureus and beta hemolytic streptococcus bacteria, 4 (6.6%) were contaminated with alpha hemolytic streptococcus bacteria and 2 (3.3%) were contaminated with Escherichia coli.
Conclusion: There were high levels of contamination of clinical coats of the sampled dental students. Even though the contaminants isolated are part of the normal flora of the human body, they possess pathogenic potential and are an area of concern. Majority of the student population were not abiding by the Kenyan Infection and Prevention Control Guidelines.

Introduction

Clinical coats are a traditional symbol of the medical profession, a symbol of hope and a symbol of responsibility towards patient. Transmission of infection has been associated with transient pathogenic microorganisms harbored on clinical coats and other personal protective equipment (PPE) worn by health care professionals. Use of clinical coats should ideally be confined to clinical areas but this does not always happen. Staphylococcus aureus is a gram positive facultative anaerobic bacterium which is part of the normal flora of the skin, upper respiratory tract and in the gastrointestinal mucosa. Streptococcus bacteria are also part of the normal flora found in the oral cavity and the skin. The nature of dental work allows for contamination with bodily fluids routinely[1], and the coats can act as vehicles for transfer of pathogens. Clinical coats therefore act as fomites and are a source of indirect transmission[2].

Materials and Methods

Ethical approval to carry out this study was obtained from the Kenyatta National Hospital/University of Nairobi Ethics and Research Committee (Ref-KNH-ERC/UA/55). This was a descriptive cross-sectional study carried out on fourth- and fifth-year students at a certain Dental School in the country. A total of 61 participants were recruited into the study out of a total population of 72 clinical year students. The study involved two parts. In the first part participants completed a questionnaire. The Second part involved obtaining microbiological samples from the subjects' clinical coats. The samples were collected at the end of the clinical session using a rolling swab technique. Samples were collected using sterile, cotton-tipped plain swabs dipped in normal saline. The samples were collected from: pockets, sleeves and lapels. These sites are the most likely areas that a dentist will touch during a clinical session of patient treatment. These are also areas likely to come into direct contact with the patient during the treatment, especially the sleeves, hence most likely to be contaminated[1].

The collected samples were inoculated into Blood agar and MacConkey agar and then incubated at 37°C overnight. Quality control was done by culturing control microorganisms, American type culture collection (ATCC) in blood agar and MacConkey agar.

Results

A total of sixty-one participants 84.7% of the total population of fourth- and fifth-year clinical students were recruited for the study. Of these 37 (60.7%) were female and 24 (39.3%) were male. 32 (52.5%) participants were fourth year dental students and 29 (47.5%) were fifth year students.

Majority of the participants wore a clinical coat to protect their clothing (88.5%), and more than half were also complying with the dress code (55.7%). Almost half wanted to look professional (47.5%). Almost two third (60.7%) owned three or more coats, and 39.3% owned only two coats. No one had only one clinical coat. Only 8.2% changed their coats daily, with about half (54.1%) changing twice a week. A quarter of the subjects (24.6%) changed thrice a week. Just over a tenth (13.1%) changed their coats only once a week. All the participants laundered their coats at home. 29 (47.5%) wore their clinical coats in the classroom, 15 (24.6%) wore their clinical coats at the cafeteria and 19 (31.1%) wore them to the washroom. A few individuals number, 3(4.9%), wore their clinical coat outside the campus. Although all the participants knew clinical coats are a form of fomites and play a role in transfer of pathogenic bacteria, majority 36 (59.0%) considered their coats clean at the end of the clinical session.
Almost all the coats, 59 (96.7%) were contaminated with Staphylococcus aureus and beta hemolytic streptococcus bacteria. A few were contaminated with alpha hemolytic streptococcus bacteria 4(6.6%) and Escherichia coli 2(3.3%).

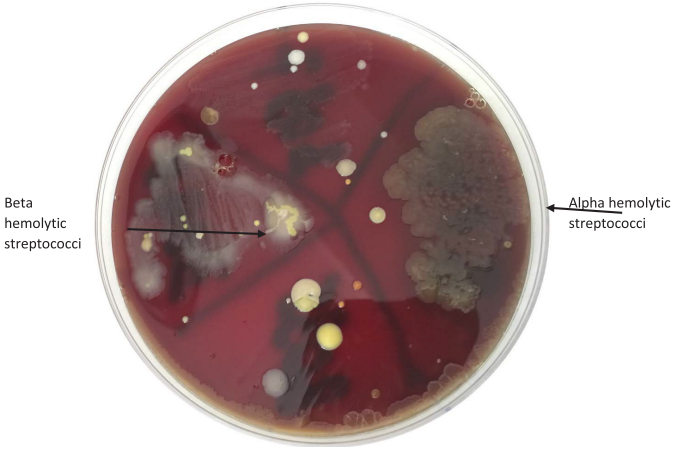

Figure 1 A clinical photograph showing complete and partial hemolysis on blood agar indicating growth of beta hemolytic streptococci and alpha hemolytic streptococci respectively

Discussion

Clinical coats represent purity of and respect towards the medical profession; they are a sign of a healer. However, these clinical coats have been shown to harbor microorganisms that may aid in transmission of nosocomial infection. Nosocomial pathogens can survive for several days on fabrics such as cotton and polyester, which are the same materials used to make clinical coats[3].

The female: male ratio of 1.5:1 is representative of the student population distribution within the Dental school. There was no significant difference (P value of 0.117 at 95% confidence level) in contamination of the two groups. This is in contrast to a study conducted by Muhadi et al.4 that showed that males had more contaminated white coats compared to

females. The exact cause for this difference cannot be explained. Majority of the participants, 88.5% wore the clinical coat to cover their clothing and 55.7% wore clinical coats because it is a dress code requirement for the university. Although all 61 participants were aware that clinical coats act as a means of fomite, 62.3% of the participants wore their clinical coats outside the clinical setting. This includes areas like the cafeteria, classrooms, washrooms, and outside the campus. This is a matter of concern because it presents a potential path for community spread of infection.

This was in contrast to findings from a study which was conducted by Banu et al.[5] where more than half the study population (82%) wore their clinical coats only within the hospital premises. Even though 59.0% perceived their clinical coats to be clean, all the 61 students were aware that clinical coats can be used as a means of spread of pathogenic microorganism which was in line with a study conducted by Banu et al.[5] Despite the high rate of contamination from splatter that dental students experience during a dental procedure, only 8.2% changed their clinical coats daily.

This shows a large percentage of the students wore the same clinical coat for multiple days hence increasing the level of contamination and spread of bacteria. This is an indication of majority of the study population (91.8%) not abiding by the Kenyan infection prevention and control guidelines, which recommends change of protective clothing at least daily or immediately visible soiled areas are observed[6].

All the participants laundered their coats at home, meaning that even if they took off the coats before leaving the clinical areas, the risk of exposing other members of the public as they travelled home or even members of the family when they got home remained. In addition, if the participant did not handle the cleaning personally, they risked exposing other people who would have no training in handling of contaminated clothing. Current regulations advocate for handling of soiled linen in a manner that minimizes spread of microorganisms to patients, other personnel, and the environment[6]

Staphylococcus aureus was the major contaminant isolated (96.7%), which is in line with the studies done by Wong et al.[7], Treakle et al.[8], and Muhadi et al.4. Staphylococcus aureus is a gram positive facultative anaerobic bacterium which is part of the normal flora of the skin, upper respiratory tract and in the gastrointestinal mucosa. Approximately 30% of the human population is colonized with staphylococcus aureus[9]. Staphylococcus aureus can spread through skin to skin contact, aerosols, contact with pus from infected wounds or contact with objects used by infected people such as clothing, sheets or towels. It is one of the most common causes of bacteremia and infective endocarditis, as well as soft tissue and skin infections[10].

The other major contaminant was beta hemolytic streptococcus (96.7%). This group includes bacteria such as streptococcus pyogenes and streptococcus pharyngitis. The diseases that may be caused by this group of bacteria include streptococcal toxic shock syndrome, necrotizing fasciitis, pneumonia, and bacteremia. Alpha hemolytic streptococcus (6.6%) and Escherichia coli (3.3%) were also isolated. Alpha hemolytic streptococcus includes bacteria such as streptococcus pneumoniae, a leading cause of bacterial pneumonia and streptococcus viridans.

Conclusion

There was a high level of knowledge on infection prevention and control protocols in relation to protective clothing, but this did not translate well to effective practices since the clinical coats were contaminated.

Recommendations: There is need for the infection prevention and control guidelines to be reinforced more thoroughly in this setup. Alternatives to clinical coats such as scrubs and disposable aprons and gowns should be considered. Continuous sensitization of infection control and prevention practices would be beneficial.

References

1. Reis PF, Pagliari BG, Reis CM, Moro AR, Santos JB, Freire AC, Vilagra JM. Dental care clothing: an investigation the presence of bacterial contamination by public health professionals in southern Brazil. Journal of Food Processing and Technology. 2015;6(1).

2. Shelley BP. Doctors' white coat and the evidence boondoggle: Microbiology, desiderata, symbolism, or professionalism decorum? Archives of Medicine and Health Sciences. 2016 Jul 1;4(2):161.

3. Chacko L, Jose S, Isac A, Bhat KG. Survival of nosocomial bacteria on hospital fabrics. Indian journal of medical microbiology. 2003 Oct 1;21(4):291

4. Muhadi SA, Aznamshah NA, Jahanfar S. A cross sectional study of microbial contamination of medical students' white coat. Malaysian Journal of Microbiology. 2007;3(1):35-8.

5. Banu A, Anand M, Nagi N. White Coats as a Vehicle for Bacterial Dissemination. Journal of ClinicalandDiagnosticResearch: JCDR.2012;6(8):1381-1384. doi:10.7860/JCDR/2012/4286.2364.

6. National infection prevention and control guidelines for health care services in Kenya. Ministry of public health and sanitation. Ministry of medical services. December 2010.

7. Wong D, Nye K, Hollis P. Microbial flora on doctors' white coats. Bmj. 1991 Dec 21;303(6817):1602-4.

8. Treakle AM, Thom KA, Furuno JP, Strauss SM, Harris AD, Perencevich EN. Bacterial contamination of health care workers' white coats. American journal of infection control. 2009 Mar 31;37(2):101-5.

9. Andersen PS, Larsen LA, Fowler VG, Stegger M, Skov RL, Christensen K. Risk factors for Staphylococcus aureus nasal colonization in Danish middle-aged and elderly twins. European Journal of Clinical Microbiology & Infectious Diseases. 2013 Oct 1;32(10):1321-6.

10. Tong SY, Davis JS, Eichenberger E, Holland TL, Fowler VG. Staphylococcus aureus infections: epidemiology, pathophysiology, clinical manifestations, and management. Clinical microbiology reviews. 2015 Jul 1;28(3):603-61.

Use of Elastomeric Half Face Respirators (EHFRs) in controlling the spread of the novel coronavirus (COVID-19) amongst dental and other health care workers: a review

Okemwa K

1. Moi University School of Dentistry.

Corresponding author: okemwaken@mu.ac.ke , okemwaken@gmail.com

Keywords: COVID 19, dentistry, elastomeric half face respirators, prevention

Abstract

Objectives: The aim of this review was to look at the viability of using Elastomeric Half Face Respirators (EHFRs) as an alternative method of protection against COVID-19 infection in dental health care workers. Specifically, the objectives were to find out if use of EHFRs is recommended by infection control authorities, user acceptability and other advantages or disadvantages.
Methodology: A literature search was done in Google scholar and PubMed using the terms COVID-19, dentistry, inhalation, elastomeric respirator, elastomeric half-face respirators (EHFRs)
Data Analysis: No data analysis was necessary as this is a narrative review based on literature search
Findings: EHFRs have been shown to be effective, efficient and less expensive when used as alternatives to N 95 masks among health care workers but user acceptability remains low. However, cost effectiveness, ease of fit-testing, fault tolerance design, reliability of fit and perception of greater protection are the main advantages of EHFRs. Disadvantages include reduction in intelligibility of verbal communication, increased temperature under the facepiece and claustrophobia.
A number of dental associations do recommend their use but there are hardly any studies done so far to specifically gauge their use among dental health care workers.
Conclusion: The use of EHFRs for protection against COVID 19 is recommended as they are efficient, effective and less expensive. However, there is a need for more studies to be done which assess their use among dental health care workers.

Introduction

COVID- 19 was first reported as pneumonia of unknown cause in Wuhan, China, in December 20191. On 08 January 2020, the pathogen causing this pneumonia was identified as a novel corona virus. The virus was officially named as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) on 12 February 2020 by the World Health Organization (WHO). On 11 March 2020, the WHO elevated the status of the outbreak from an epidemic to a pandemic[2].

The first case of COVID-19 in Kenya was reported on 12 March 20203. Since then, the diagnosed cases have gradually increased. As at 14 November 2020, 69,273 cases had been reported. By the same date, the number of deaths from the disease stood at 12494. Sadly, a number of health care workers, including ten doctors, had lost their lives by the same date5. The first case of a dentist succumbing to the disease in Kenya was reported on 14 November 2020[5].The outbreak of the COVID-19 pandemic has come with massive challenges to dental health care worldwide. Shortly after the Outbreak of the Pandemic, the WHO and other International and national health bodies recommended that all elective procedures and non-emergency dental services be suspended temporarily[6].

However, there is now a realization that the pandemic will become endemic. As a result, routine dental services cannot remain suspended for ever. There is need therefore to look at ways of addressing the various challenges which have come up in order to enable service provision to continue. Even with the current recommendations, dental services still need a high level of infection prevention and control due to the risk of infection from the patient's exhaled breath.

One of the most critical areas for dentists is the need to prevent the risk of contracting infection through inhalation during aerosol generating procedures (AGP). The use of surgical face masks for routine AGP is now being discouraged. The current recommendation is the correct use of respirators

with a filtration capacity of at least 95%. Such respirators must, crucially, be able to provide a good seal in order to prevent inhalation through the skin/ mask interface. This is one of the weakest points with regard to surgical mask use.

There is currently a severe shortage of the recommended N95, KN95, FFP2 and equivalent masks globally[7]. This has led to an astronomical increase in the cost of these masks. Additionally, some of the masks which are being sold may be of questionable quality. In one of his regular press briefs on the COVID-19 pandemic, the Cabinet Secretary of Health in Kenya, expressed concern that some of the Personal Protective Equipment (PPEs) being imported into the country had been found to be substandard. This had, therefore, exposed heath care workers to the risk of contracting the disease8. Reusable respirators (specifically, reusable half-face piece elastomeric respirators (EHFPs) are the standard respiratory protection device used in many industries, and they provide an option for use in health care that has to date not been fully explored.[9,10,11].

The Occupational Safety and Health Administration (OSHA) considers the protective factor for the elastomeric respirators to be the same as the disposable standard N95 [12]. Some types of elastomeric respirators can offer higher assigned protection factors (APFs) than N95[13]. Reusable elastomeric respirators with N95 cartridges were used to protect healthcare workers during the SARS outbreak of 2003 and the flu pandemic in 2009[14]. Bodies like the American Dental Hygiene Association (ADHA) are recommending the use of elastomeric respirators in their Interim Guidance on Returning to Work guidelines[15].

This paper reviews the use of EHFRs as an alternative respiratory protection device (RPD) and their possible use in dental settings.

What are elastomeric respirators?

Figure 1. Elastomeric respirators and N 95 mask. ©Shutterstock

Elastomeric respirators have more commonly been used in industrial and mining settings, but can be considered for use in the health care setting during times of increased demand such as during infectious disease outbreaks9. They can be full face or half face in design. Full face elastomeric respirators have goggles attached; which helps protect the eyes.

Reusable elastomeric respirators are made from elastomeric materials (flexible polymer materials resembling rubber) and can be cleaned, disinfected, and reused. Elastomeric respirators differ from disposable filtering face piece respirators (Often referred to by the health care community simply as N95s and equivalent) in that N95s are formed directly from a filter material (i.e., a filtering facepiece). The N 95 respirator is designed to be disposable after one use. Elastomeric respirators have replaceable filters or cartridges with the same filter media used for N95-N100 masks9, 13. For particulates such as dust, aerosols mold, and bacteria, electrostatic particulate filters are used, and the more the filter is filled with contaminant, the more effective these electrostatic forces are.

Hence, particulate filters are more effective with use over time given proper conditions; although once they become too difficult to breathe through they must be replaced16. In this regard, respirator masks with particulate filters can be used for an extremely long duration in a hospital setting, at least 1 year, so long as the filter is not damaged or soiled13.

Some replaceable filters are cartridge style in which the filtration media is housed inside a cartridge. Others consist of flexible, disc or pancake-style

filters, in which the filter media are not housed within a cartridge body.

The attached filtering cartridge(s) can be easily changed17. This makes the device valuable during times of high demand, such as during pandemics.

Efficacy

Research in controlled laboratory settings have demonstrated the efficacy of reusable elastomeric respirators12. Compared to disposable respiratory masks of the same filter efficiency, elastomeric respirators have been found to have a 60% higher filtration performance and better seal[18,19]

The facepiece is made of synthetic or rubber materials that form a seal against the user's face, with properties that allow the original shape to be repeatedly re-established if it is temporarily deformed. As the facepiece of the elastomeric respirator should form a tight seal against the user's face, just like the disposable [N95s], fit testing is still required[12].
Elastomeric respirators may be equipped with filters that block 95%, 99%, or 100% of very small particulates.

EHFRs have been evaluated, tested, and approved by the American National Institute for Occupational Safety and Health (NIOSH) as per the requirements in 42 CFR Part 84. In March the United States Food and Drug Administration (FDA), in a communiqué to the Centre for Disease Control (CDC), authorized the use of EHFRs by health care workers20.

Acceptability of EHFR by health care workers

Use of reusable (elastomeric facepiece) respirator types have been viewed less favorably by medical workers in the past21. A study done among Health care workers consisting of doctors, nurse practitioners, physician assistance, registered nurses and respiratory therapists in Maryland, USA, concluded that despite somewhat less favorable ratings on comfort and communication, experienced EHFRs users still preferred these reusable respirators over N95s in certain higher risk scenarios22. This suggests that reusable respirators are an acceptable alternative to N95 respirators in health care and offer a viable solution to prevent pandemic-generated respirator shortages.

Benefits, Limitations and challenges

Medical centers like the University of Maryland, Baltimore, USA, that have implemented the use of EHFRs have documented benefits that include cost effectiveness, ease of fit-testing, fault tolerance design, reliability of fit and perception of greater protection[23].

In pandemic situations where availability of single use filtration respirators like N 95 becomes a challenge, EHFRs confer the benefit of reusability as the non-filtration components can be cleaned and disinfected. This can be done using readily available diluted hypochlorite (household bleach)[24] or alcohol based solutions containing at least 70% ethanol. In addition, intermediate level disinfectants can be used.

However, the need for cleaning and disinfection of the face piece components such as straps, valves and valve covers imply an additional maintenance requirement. The filter material itself typically cannot be cleaned or disinfected for reuse. Instead, filter components should be discarded when they become damaged, soiled, or clogged[12].

There are studies which have shown that multiple donning and doffing processes significantly compromise the protective capability of the personal protective equipment and a maximum of five repeated processes should be instituted as the maximum acceptable[25]. However Elastomeric respirators can be worn continuously; therefore eliminating the need for several changes.

Some of the challenges experienced in the use of elastomeric respirators by workers include perceived increase in temperature under the facepiece and skin irritation[26, 27]. Psychological responses like anxiety and claustrophobia have also been reported[28].

The intelligibility of verbal communication is reduced when wearing a reusable elastomeric respirator[29]; this may discourage some dentists from using EHFRs, since constant clear communication with the dental assistant and the patient is important during treatment.

In order to achieve a good face seal, wearers must be clean shaven and they should not have facial jewelry and piercings. Heavy cosmetics may also interfere

with formation of a tight seal. This may be a challenge as it requires a change in an individual's grooming behavior. Apart from being an individual choice, grooming behavior in individuals is determined by other factors like gender, religion and culture. This implies that some of the changes that may be needed to enable proper use of EHRs may not be acceptable to some dentists.

The use of elastomeric respirators on some freshly shaven faces have been reported to result in instances of skin irritation26. Heavy cosmetics may also interfere with a tight seal. For individuals who wear eyeglasses, care must be taken to ensure that the glasses do not interfere with the sealing surfaces of the EHFR. All the factors mentioned above must be taken into consideration when making decisions about the use of EHFRs.

Discussion

Health care workers and dentist in particular, are at a high risk of contracting COVID-19 due the nature of their work. This review shows that EHFRs are effective in protecting health care workers against respiratory acquired infections. The main advantage of EHFRs over the N95 and equivalent seem to be the tight seal they provide. This is a great advantage for dentists because of the close proximity of the patients during treatment. They can also be reused over a long period of time therefore making them more cost effective. However, they do have disadvantages which have to be taken into consideration. For dentists in particular, intelligibility of verbal communication is an important challenge since continuous communication with the patient is necessary during treatment.

There are many studies which have been done to determine the efficiency, effectiveness, and user acceptability of EHFRs. Most of these studies have been done in USA. As much as these studies have been done among health care workers, none could be found that specifically investigated the use of EHFRs amongst dental health care workers. This may imply that elastomeric respirators have not been given much thought by dentists and dental researchers despite the obvious benefits which have been documented in studies among other health care workers and in laboratory settings.

This literature review, found out that, very few dental health care bodies in particular recommend the use of EHFRs including the American Dental association and the American Dental Hygiene Association.

Following the outbreak of COVID 19 in Kenya, there was a severe shortage of PPEs including surgical masks and N95 masks. This resulted in the prices skyrocketing, with the price of normal surgical masks and N95 masks increasing more than tenfold. A look at various Kenyan dentists' social media forums confirmed the frustration the dentists were going through in trying to procure N95 or equivalents respirators (whatsapp and Telegram group pages-undocumented)

However, in all the social media pages, there was not a single suggestion on the use of elastomeric respirators as an alternatives to N95 masks.

The Directorate of Occupational safety and Health Services-Kenya (DOSHS) released an occupational safety and health advisory on COVID-19 on 14th march 202030. This advisory does not mention the use of EHFRs as an alternative for protection for Health care workers

Similarly, in its recommendation on ways of managing Dental services in Kenya during the Pandemic, the ministry of Health does not mention use of EHFRs. Yet, in other countries like the USA, the FDA, in a communiqué to the CDC on 28th March, 20020, authorized the use of reusable elastomeric respirators by health care workers20.

Conclusion and recommendations

The findings from this review confirm that EHFRs are recommended as alternative to disposable respirators as they have been found to be effective, efficient and more cost effective. However, they do have some limitations which must be taken into consideration by each individual user. There is need to encourage dentists to consider use of EHFRs as an alternative to N95 masks for protection against COVID-19 infection during the course of dental treatment. In addition, more studies are recommended to specifically gauge the use of EHFRs among dental health care workers.

Ethical considerations: This was not necessary as this was a literature review.

Funding: There was no funding for this review.

References

1. N. Zhu, D. Zhang, W. Wang, X. Li, B. Yang, J. Song, X. Zhao, B. Huang, W. Shi, R. Lu, P. Niu, F. Zhan, X. Ma, D. Wang, W. Xu, G. Wu, G.F. Gao, W. Tan. A novel coronavirus from patients with pneumonia in China, 2019.New Eng. J. Med., 382 (2020), pp. 727-733, 10.1056/NEJMoa2001017. CrossRefView Record in Scopus Google Scholar

2. World Health Organization. (2020). COVID-19: operational guidance for maintaining essential health services during an outbreak: 1st June 2020. . https://www.who.int/publications-detail/covid-19-operational-guidance-for-maintaining-essential-health-services-during-an-outbreak

3. Ministry of Health, Kenya. Press release. 19 November 2020. (https://www.health.go.ke/first-case-of-coronavirus-disease-confirmed-in-kenya/#:~:text=Press%20Releases-,FIRST%20CASE%20OF%20CORONAVIRUS%20DISEASE%20CONFIRMED%

4. Ministry of Health, Kenya. National Emergency Response committee on coronavirus .Daily Brief N0. 235. 14 November 2020. https://www.health.go.ke/wp-content/uploads/2020/11/NERC-MOH-CS-COVID-RELEASE- 14.11.2020-.pdf

5. Kenya Medical Practitioners, Pharmacist and Dentist Union. Press statement on the plight of doctors in the COVID 19 Pandemic. 19 November 2020. https://twitter.com/kmpdu/status/1327951278094360576/photo/1

6. World Health Organization. (2020). COVID-19: operational guidance for maintaining essential health services during an outbreak: 1st June 2020. https://www.who.int/publications-detail/covid-19-operational-guidance-for-maintaining-essential-health-services-during-an-outbreak

7. Tirupathi R, Bharathidasan K, Palabindala V, Salim SA, Al-Tawfiq JA. Comprehensive review of mask utility and challenges during the COVID-19 pandemic. Infez Med. 2020 Jun 1;28(suppl 1):57-63. PMID: 32532940.

8. Daily Nation. 22/5/2020. https://www.nation.co.ke/dailynation/news/covid-19-52-more-test-positive-309890

9. National Academies of Sciences, Engineering, and Medicine; Health and Medicine Division; Board on Health Sciences Policy; Liverman CT, Yost OC, Rogers BME, et al., eds. Reusable Elastomeric Respirators in Health Care: Considerations for Routine and Surge Use. Washington (DC): National Academies Press (US); 2018. 10.17226/25275 (accessed 3/6/2020)

10. Wizner K, Stradtman L, Novak D, Shaffer R. Prevalence of Respiratory Protective Devices in U.S. Health Care Facilities: Implications for Emergency Preparedness [published correction appears in Workplace Health Saf. 2017 Aug;65(8):380]. Work place Health Saf. 2016;64(8):359-368. doi:10.1177/2165079916657108 DOI: 10.1177/2165079916657108

11. Brown LM, Rogers B, Buckheit K, Curran JP. Evaluation of 9 health care organizations' respiratory protection programs and respiratory protective device practices: Implications for adoption of elastomerics. Am J Infect Control. 2018;46(3):350-352. doi:10.1016/j.ajic.2017.09.002 DOI: 10.1016/j.ajic.2017.09.002

12. Michael Bach. Understanding respiratory protection options in Healthcare: The Overlooked Elastomeric respirator. CDC. https://blogs.cdc.gov/niosh-science-blog/2017/07/06/elastomerics/.Accessed on 22 November 2020

13. CDC. Elastomeric Respirators: Strategies During Conventional and Surge Demand Situations Conventional, Contingency, and Crisis Strategies https://www.cdc.gov/coronavirus/2019-ncov/hcp/elastomeric-respirators-strategy/index.html

14. RELIAS MEDIA. NIOSH looks to expand use of elastomeric respirators. https://www.reliasmedia.com/articles/141391-niosh-looks-to-expand-use-of-elastomeric-respirators. Accessed on 11 November 2020

15. American Dental Hygienists Association. Interim Guidance on Returning to Work. https://www.adha.org/resources-docs/ADHA_TaskForceReport.pdf . Accessed on 11 November 2020.

16.16. Chiang, J., Hanna, A., Lebowitz, D. et al. Elastomeric respirators are safer and more sustainable alternatives to disposable N95 masks during the coronavirus outbreak. Int J Emerg Med 13, 39 (2020). https://doi.org/10.1186/s12245-020-00296-8

17. Bessesen et al., 2015-Bessesen MT, Adams JC, Radonovich L, Anderson J. Disinfection of reusable elastomeric respirators by health care workers: A feasibility study and development of standard operating procedure. Am J Infect Control. 2015;43(12):1376. https://europepmc.org/article/med/26416528 . Accessed on 23 November 2020.

18. Lawrence RB, Duling MG, Calvert CA, Coffey CC. Comparison of performance of three different types of respiratory protection devices. J Occup Environ Hyg. 2006;3(9):465–74. Google Scholar

19. Duling MG, Lawrence RB, Slaven JE, Coffey CC. Simulated workplace protection factors for half-facepiece respiratory protective devices. J Occup Environ Hyg. 2007 Jun;4(6):420-31. doi: 10.1080/15459620701346925. PMID: 17474032.

20. FDA communiqué . https://www.fda.gov/media/135763/download. Accessed on 23 November, 2020.

21. Pillai SK, Beekmann SE, Babcock HM, Pavia AT, Koonin LM, Polgreen PM. Clinician Beliefs and Attitudes Regarding Use of Respiratory Protective Devices and Surgical Masks for Influenza. Health Secur. 2015;13(4):274-280. DOI: 10.1089/hs.2015.0011. https://pubmed.ncbi.nlm.nih.gov/26173092/

22.Hines SE, Brown C, Oliver M, et al. User acceptance of reusable respirators in health care. Am J Infect Control. 2019;47 (6):648-655. doi: 10.1016/j.ajic.2018.11.021

23.Chang J. Use of elastomeric respirators in clinical practice: The UMMC experience. Washington, DC: 2018. Presentation at the March 22, 2018, public meeting of the National Academies of Sciences, Engineering, and Medicine Committee on the Use of Elastomeric Respirators in Health Care. https://www.ncbi.nlm.nih.gov/books/NBK540080/

24. Mary T. Bessesen a, Jill C. Adams , Lewis Radonovich , Judith Anderson. Disinfection of reusable elastomeric respirators by health care workers: A feasibility study and development of standard operating procedures. Am J Infect Control. Vol 43, issue 6, p629-634. https://doi.org/10.1016/j.ajic.2015.02.009

25. Reusable Elastomeric Respirators in Health Care: Considerations for Routine and Surge Use. https://www.ncbi.nlm.nih.gov/books/NBK540078/#sec_000067

26. Floyd EL, Henry JB, Johnson DL. Influence of facial hair length, coarseness, and areal density on seal leakage of a tight-fitting half-face respirator. Journal of Occupational and Environmental Hygiene. 2018;15(4):334–340. [PubMed]

27. Ciconte R, Danyluk Q, Astrakianakis G, Percy Chua P, Ducholke G, Daniels S, Dickson T, Perry I. Assessment and determination of practical considerations for wide-scale utilization of elastomeric half-facepiece respirators during a pandemic or outbreak situation. WorkSafeBC; 2013.[August20,2018].https://www.worksafebc.com/en/resources/about-us/research/assessment-and-determination-of-practical-considerations-for-wide-scale-utilization-of-elastometric-half-facepiece-respirators-during-a-pandemic-or-outbreak-situation?lang=en.

28. Wu S, Harber P, Yun D, Bansal S, Li Y, Santiago S. Anxiety during respirator use: Comparison of two respirator types. Journal of Occupational and Environmental Hygiene. 2011;8(3):123–128. [PubMed]

29. Radonovich LJ Jr., Cheng J, Shenal BV, Hodgson M, Bender BS. Respirator tolerance in health care workers. JAMA. 2009;301(1):36–38. [PubMed]

30. (https://www.health.go.ke/wp-content/uploads/2020/06/OCCUPATIONAL-SAFETY-AND-HEALTH-ADVISORY-ON-COVID-19.pdf

Restoration of an Endodontically Treated Molar Using an Endo-crown: A Case Report

Maronga GO[1], Mpungose S[2], Irari WK[3].

1. Private Practice, P.O. Box 963-20116, Nakuru, Kenya.
2. Faculty of Dentistry, Uni. of the Western Cape, Francie Van Zijl Drive, Parow, Cape Town, 7500- South Africa.
3. Department of Conservative Dentistry and Prosthetics, Moi University School of Dentistry, Eldoret, Kenya.

Corresponding author: drobaigwamaronga@gmail.com

Keywords: endodontic treatment, molar, endo-crown

Abstract

Introduction: The restoration of extensively damaged teeth which also require endodontic treatment poses a significant challenge in dental practice. The endodontic procedure itself may lead to further loss of tooth structure, hence the importance of placing a definitive restoration that preserves the remaining tooth structure, provides a good coronal seal, and prevents further damage.
Case report: A 21-year-old male patient presented with an endodontically treated mandibular right first molar. On examination, the tooth was found to have a composite restoration with secondary caries. Radiographic examination showed the tooth had previously been root-treated with a metallic post present in the distal canal. A diagnosis of a failed coronal restoration on root canal treated 46 with extensive loss of coronal tooth structure was made.
Definitive management involved placement of a lithium disilicate endo-crown extending 2 millimeters into the canal orifices. The patient was followed up for a period of three months and a positive feedback and good clinical outcome was maintained.
Conclusion: Bonded, partial coverage indirect restorations have a role in the management of severely broken down endodontically treated teeth.

Introduction

Restoration of endodontically treated teeth with extensive loss of coronal tooth structure poses a considerable clinical challenge[1]. Besides the tooth structure that is already lost due to trauma or caries, the operative procedures involved in caries removal and endodontic access cavity preparation may lead to further loss of tooth structure[2]. To avoid this further, more conservative restorative approaches should be adopted in the provision of the definitive restoration for such teeth.

Successful endodontic therapy is characterized by a well-debrided and obturated root canal system. Longevity of the treatment is conferred by a coronal restoration that prevents coronal leakage and re-infection of the root canal system[3]. Restoration of Root canal treated posterior teeth with crowns have been shown to have better longevity than those without crowns4. This can be explained by the fact that cuspal coverage prevents the wedging effect masticatory forces place on the tooth-restorative interface when the teeth are restored with direct restorations.

Whilst provision of crowns for posterior root treated teeth ensures longevity, the tooth preparation involved in order to place posts, when required, and crowns, result in further removal of tooth structure. Sorensen and co-workers showed that preparation of teeth for conventional crowns removes up to 67.5% to 75.6% of tooth structure[5]. Placement of endocrowns should be considered when there is extensive loss of coronal tooth structure.

Endocrowns are a more conservative approach used to restore endodontically treated molars[1]. The rapid developments that have occurred in the last two decades in ceramic processing and material characteristics as well as bonding materials and technology have given rise to this evolutionally and conservative restorative approach. Endocrowns utilize both mechanical and chemical mechanisms for retention within the tooth structure. The extension of 1.5-2 millimeters (mm) of preparation into the canal orifice as well as the gently divergent walls of the prepared tooth ensure mechanical retention. Since the restoration is manufactured from an etchable ceramic, usually lithium disilicate, the tooth and the restoration are etched and a chemical bonding

procedure used to bond the restoration to the tooth6. Although only studies with medium term follow-up of the clinical success of the concept of endocrowns have been done, the results of these studies show that they are a viable approach for restoring endodontically treated molars, as concluded by one systematic review1. In contrast, one laboratory study showed ambiguous and less favorable results[7] though the methodology used in this particular study was questionable. Load-to-failure tests do not represent the actual mechanism through which restorations fail. Rather, fatigue failure in laboratory conditions that simulate the chemical and thermal conditions of the oral environment can more reliably predict the clinical performance of restorative materials[8]. It can therefore be concluded that while endocrowns provide a promising restorative option, more long-term randomized medium and long-term clinical studies are required to prove their viability as a mainstream restorative option for endodontically treated teeth.

Case Report

Presenting complaint and clinical examination: A 21-year-old male presented with a one-day history of a fractured tooth on the lower right side that had previously been restored. The patient reported that a tooth-coloured filling was placed one year prior after completion of a root canal treatment on the tooth. The patient expressed the desire to retain the tooth. Examination revealed an extensive, failing post-retained composite restoration on 46. The tooth had secondary caries with part of the buccal, distal and lingual tooth structure fractured. Radiographic examination showed a well-done obturation of the canals and a parallel metallic post in the distal canal extending to the junction between the middle and apical third of the root. There was extrusion of the sealer cement visible around the distal root and a periapical radiolucency. See figure 1 below

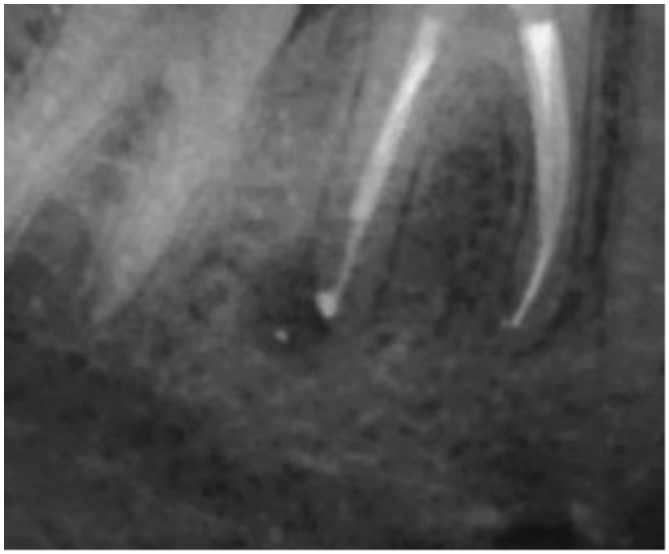

Figure 1: Periapical radiograph showing satisfactory obturation of all canals and a healing periapical lesion on the distal canal of 46.

Diagnosis and Treatment Plan: A diagnosis of a failed coronal restoration on root canal treated 46 was made. Since the tooth was asymptomatic, a differential diagnosis of a healing peri-apical lesion was made. The risk of extensive tooth removal and possible toot fracture during attempted post removal was considered to be high and therefore a decision not to attempt post removal was made. Since the extent of coronal leakage could not be established, a decision was made to place a provisional restoration (figure 2)

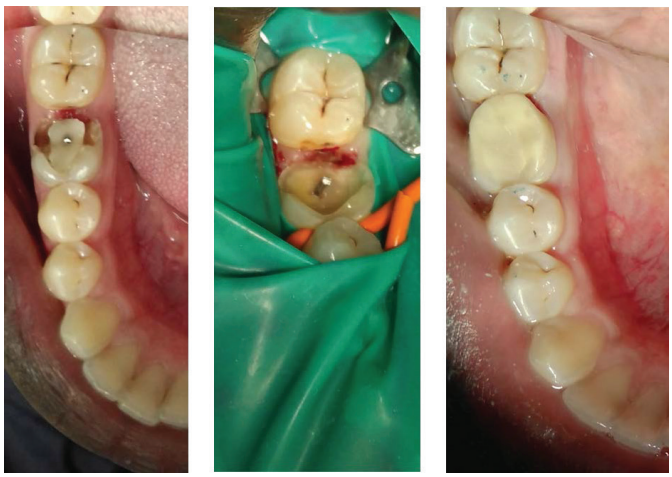

Figure 2: Clinical view of tooth 46 at presentation (left), following removal of failed coronal restoration (middle) and after placement of the provisional restoration (right).

Clinical Procedures: Fuji IX (GC America) restorative Glass Ionomer Cement (GIC) material was used to make the provisional restoration after complete caries removal. The post was severed at the canal orifice level

The patient was followed up for a total of one year with periodic review visits at one, three, six and twelve months. During this time, the tooth remained asymptomatic and the periapical lesion on the distal canal did not increase in size.

The tooth was prepared for a definitive restoration as follows: The provisional restoration was removed and the coronal 3mm of the root filling material in each canal removed. A one mm layer of a dual cured resin-modified glass ionomer cement, Vitrebond (3M, ESPE) was placed over the root filling material to seal off the canals and light-cured for 20 seconds. Tooth preparation was then completed, following tooth preparation guidelines provided by Giovanni9. The completed preparation had a 2mm extension into the canals for retention, smooth and rounded transitional line angles, gentle divergence of the internal walls with no undercuts, a 2mm cuspal reduction following the outline of the tooth and a full shoulder (butt) margin all around the tooth. All the margins were placed equi-gingival or supra-gingival. The distal margin that was initially extending sub-gingivally was elevated to be supra-gingival by maintaining part of the GIC restoration that was used during provisional restoration (figure 3).

An impression of the lower arch was made using a polyether impression material- Impregum (3M, ESPE) on custom tray. An alginate impression of the upper arch was made and bite registration done using Jet Bite (Coltene) bite registration material. The prepared tooth was provisionalized using a bis-acrylate based temporary crown and bridge material, Protemp (3M, ESPE). The completed layered lithium disilicate endocrowns was received from the laboratory and evaluated for accuracy and fit (figure 4).

The temporary restoration was then removed from the tooth, selective enamel etching done, a universal bond applied and cured for 20 seconds. The restoration was etched for 60 seconds using 9% HF acid and silanated and the endocrown bonded using an adhesive resin cement, RelyX Ultimate (3M, ESPE). All procedures were done under rubber dam isolation. The restoration was finished, occlusion checked and final finishing and polishing completed (figure 5).

The patient was reviewed one week, one month and three months after bonding of the restoration with a positive feedback and a good clinical outcome.

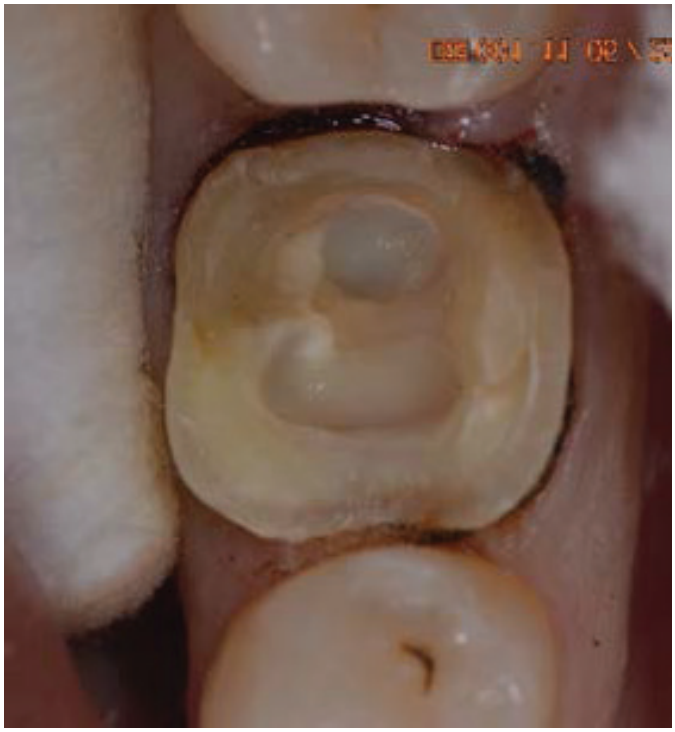

Figure 3: Occlusal view of prepared tooth with retraction cord in-situ.

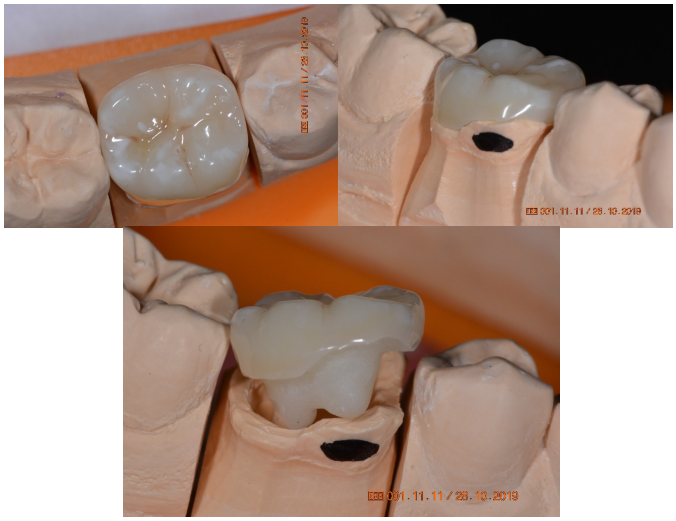

Figure 4: Completed views of final lithium disilicate restorations; occlusal (top left), buccal (top right) and displaced (bottom).

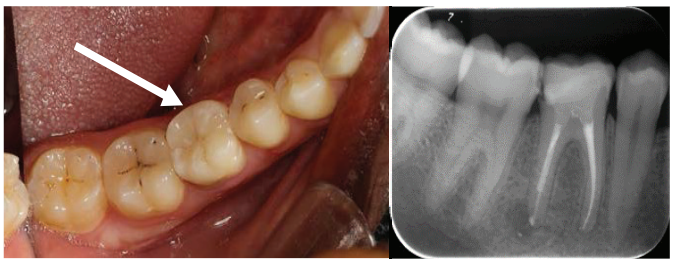

Figure 5: Completed restoration after cementation (right, with arrow) and radiographic view post cementation (left).

Discussion

Endocrowns provide a conservative approach for providing definitive restorations for endodontically treated molars that have a substantial loss of coronal tooth structure. Without Figure 5: Completed restoration after cementation (right, with arrow) and radiographic view post cementation (left).

cuspal coverage restorations, such teeth are likely to be lost as a result of fracture of the direct restoration and secondary caries as would have occurred in this case. If the tooth is lost, either a fixed partial denture or an implant-supported crown would be the options to be considered. Both are more invasive and costlier than the endocrown option that was selected.

The tooth preparation procedure and bonding procedures as well as impression making have to be meticulous and accurate to avoid contamination from oral fluids and ensure accurate fit of the final restoration respectively. The former has to be done under rubber dam isolation and the latter using an elastomeric impression material.

Selective etching of enamel was done to create microscopic zones of demineralization within the enamel for mechanical resin retention. A universal bond that was used as it is a self-etching bonding mechanism for dentin. The adhesive cement that was used ensured that the restoration and the tooth were bonded together as a monobloc.

Acknowledgements

The authors would like to acknowledge Dr Fredrick Mukorera, MSc. Restorative Dentistry Registrar in the University of the Western Cape for the chairside assistance. The authors also acknowledge Mr. Trevor Bath of FK Laboratory, Durbanville, Cape Town for the master laboratory work.

References

1. Sedrez-Porto JA, da Rosa WL, Da Silva AF, Münchow EA, Pereira-Cenci T. Endocrown restorations: A systematic review and meta-analysis. J Dent. 2016 Sep 1; 52:8-14.

2. Zarow M, Ramírez-Sebastià A, Paolone G, de Ribot Porta J, Mora J, Espona J, et al. A new classification system for the restoration of root filled teeth. Int Endod J. 2018;51(3):318–34.

3. Estrela C, Holland R, de Araújo Estrela CR, Alencar AHG, Sousa-Neto MD, Pécora JD. Characterization of successful root canal treatment. Braz Dent J. 2014; 25(1):3–11.

4. Ng YL, Mann V, Gulabivala K. A prospective study of the factors affecting outcomes of nonsurgical root canal treatment: part 1: periapical health. Int Endod J. 2011 Jul; 44(7):583-609.

5. Edelhoff D, Sorensen JA. Tooth structure removal associated with various preparation designs for anterior teeth. J Prosthet Dent. 2002 May 1; 87(5):503-9.

6. Polesel A. ScienceDirect Restoration of the endodontically treated posterior tooth. G Ital Endod 2014; 28(1):2–16.

7. Krance A, DuVall N, Brewster J, Roberts H. Fracture resistance of all-ceramic crowns based on different preparation designs for restoring endodontically treated molars. J Esthet Restor Dent. 2019 Jan; 31(1):72-9.

8. Tian T, Tsoi JK, Matinlinna JP, Burrow MF. Aspects of bonding between resin luting cements and glass ceramic materials. Dent Mater [Internet]. 2014; 30(7): 147–62.

9. Rocca GT, Rizcalla N, Krejci I, Dietschi D. Evidence-based concepts and procedures for bonded inlays and onlays. Part II. Guidelines for cavity preparation and restoration fabrication. Int J Esthet Dent. 2015 Sep 1;10(3):392-413.

Colgate

Be the one to **ease** their pain **in an instant***

...and help them experience **lasting† relief** on their own

Recommend
Colgate® Sensitive Pro-Relief

- **Clinically Proven† occlusion**
- **Instant* relief**
- **Lasting† relief**

*For instant relief, apply as directed to the sensitive tooth and gently massage for 1 minute.
†Lasting relief with continued 2X daily brushing.
‡Vs sensitive toothpastes containing 5% potassium nitrate (equivalent to 2% potassium ion).

INFORMATION FOR CONTRIBUTORS

The Journal of Kenya Dental Association (JKDA) is a quarterly publication that provides a forum for publication of original scientific articles, reviews, clinical case reports and opinion pieces concerning the dental sciences and oral health care.

1 The JKDA Editorial Process

All the manuscripts submitted to the JKDA are peer reviewed, and every submission will be acknowledged by email within a week. The first stage of review examines the originality of the material presented, scientific relevance and statistical consistency.

The manuscripts are then further reviewed by at least two external referees before evaluation at an editorial panel meeting.

A final decision on publication will be communicated to the submitting/corresponding author within 3 months of manuscript submission. Proofs will be sent to authors for final publication approval except in the case of letters to the editor and obituaries.

Manuscript Submission

1.1 Type of Manuscript

Articles should report data from original research that is relevant for the provision of oral health care in developing countries. Reviews must be objective, comprehensive analyses of the subject matter, giving a current and balanced view of the issues discussed. Case reports must be authentic, appropriately illustrated and of critical significance to the practice of dentistry. Letters to the editor should not be more than 800 words and should contain only one illustration and not more than 5 references. Priority shall be given to letters responding to articles published in the journal in the last four months.

Editorials are usually commissioned, but unsolicited communications of up to 1,000 words are welcome. These will also be subjected to a peer review process. Obituaries which are of interest to the JKDA readership may also be submitted. The formal obituary should contain the following information: full names, date and place of birth, education history, degrees and
qualification, year and place of qualification, recent appointments and achievements, family members and date and cause of death.

1.2 JKDA Policy and Ethics

We only accept manuscripts not already published elsewhere or under consideration by any other journal or publication.

The submission should include signed consent for publication from all authors. Each author's contribution to the paper should also be indicated1,2. An accompanying letter should indicate each author's name, degrees and professional titles. It should also include the work affiliation, and complete address, as well as telephone number and email address.

Manuscripts resulting from clinical research work should include proof of ethical approval to conduct the study, and are expected to have adhered to the Helsinki declaration3. Authors are encouraged to write their report using STROBE checklists4 for observational studies and CONSORT5 checklist for clinical trials. Clinical trials must also be registered, with published protocols. Systematic reviews and meta-analyses should preferably be reported using PRISMA checklist6.

Manuscripts containing clinical photographs should include signed consent for publication from patients. In addition, the photographs should be adequately disguised so that the patient is not identifiable.

Written permission from original author for reprinted tables or figures should be included. Conflict of interest should be stated7. Source of funding should be included. The role of the funding entity in the entire research and publication process should be stated clearly. Possible sources of conflict include: Direct funding for the research or publication; Funding you have received from any organization involved in this or similar research; Any position you hold in an organization that is involved in this or similar research.

The JKDA holds all submissions in confidence, and this extends to the reviewers. Our reviewers are normally blind to the authors to enhance impartiality in the review process.

Definition of authorship:
<https://publicationethics.org/files/u7141/Authorship_DiscussionDocument_0_0.pdf>

More information on authorship and contributorship may be found at <https://publicationethics.org/authorship>

<https://www.wma.net/policies-post/wma-declaration-of-helsinki-ethical-principles-for-medical-research-involving-human-subjects>
<https://www.strobe-statement.org/index.php?id=available-checklists>

<http://www.consort-statement.org/consort-2010>

<http://prisma-statement.org/>

More information on conflict of interest in publication may be found at <https://publicationethics.org/competinginterests>

1.3 Format and Style

The manuscript should be submitted through email as a Word document. All images should be copied onto a Word document.

Artwork guidelines: Illustrations, pictures and graphs, should be supplied in the highest quality and in an electronic format that helps us to publish your article in the best way possible. Please follow the guidelines below to enable us to prepare your artwork for the printed issue as well as the online version.

Format: TIFF, JPEG: Common format for pictures (containing no text or graphs).

EPS: Preferred format for graphs and line art (retains quality when enlarging/zooming in).

Placement: Figures/charts and tables created in MS Word should be included in the main text rather than at the end of the document.

Figures and other files created outside Word (i.e. Excel, PowerPoint, JPG, TIFF, EPS, and PDF) should be submitted separately. Please add a placeholder note in the running text (i.e. "[insert Figure 1.]")

Resolution: Rasterized based files (i.e. with .tiff or .jpeg extension) require a resolution of at least **300 dpi** (dots per inch). Line art should be supplied with a minimum resolution of **800 dpi**.

Colour: Please note that images supplied in colour will be published in colour online and black and white in print (unless otherwise arranged). Therefore, it is important that you supply images that are comprehensible in black and white as well (i.e. by using colour with a distinctive pattern or dotted lines). The captions should reflect this by not using words indicating colour.

Dimension: Check that the artworks supplied match or exceed the dimensions of the journal. Images cannot be scaled up after origination

Manuscripts should be in English, typed in Ariel size 12 font with double-spacing. The AIMRADAR format (Abstract, Introduction, Materials and Methods, Results and Discussion, Acknowledgements and References) should be used where applicable. Keywords should be included at the end of the abstract. The same subheadings should be reproduced in the main text of the manuscript.

The corresponding author should be clearly indicated. Articles should be between two and four thousand words, with a maximum of eight figures. Case reports are limited to one thousand five hundred words, inclusive of a structured summary of not more than one hundred words. This must be in the form of a Structured Abstract to include (where relevant) the following headings: aim(s) or objective(s), study design, setting, participants, interventions/ methods, main outcome measures, results and conclusions.

For reviews, the abstract and manuscript should be structured according to objective(s), data sources, study selection data extraction and conclusions. Statistical methods should be defined and the level of significance used, clearly stated.
If the manuscript is part of a series of publications or if essential components of the paper such as methodology have been published elsewhere, copies of related papers already published should also be submitted. Any non-standard questionnaire should also be submitted for possible publication if considered necessary by the reviewers.

Obituary announcements should be 400 words or less, accompanied by a good quality colour passport size photograph.

Submissions by email. Papers and articles for submission may be sent as Word file attachments by email. Figures should be inserted where appropriate in the text. Files must be virus checked before sending but if discovered to be infected may be deleted without opening and the sender informed.

Products, Units Abbreviations and Symbols. Non-scientific abbreviations such as etc., e.g. should not be used. Where possible all products (drugs, dental materials, instruments and equipment etc.) should be referred to by generic names. Otherwise product names must bear an initial capital letter and their manufacturer or supplier should he indicated in parentheses. Units used must conform to the Système International d'Unités (SI). Generally accepted abbreviations and symbols may be used provided that the terms appear in full together with the abbreviation when first used in the text e.g. fluoride (F), decayed, missing and filled surfaces (DMFS), and thereafter F, DMFS. The two-digit tooth notation system of the FDI must be used (see Int Dent J 1971 21: 104). Bacteria must be described by their generic and species names – both in full on the first occasion, subsequently the generic name may be abbreviated.

Illustrations. Submitted illustrations must be numbered consecutively with Arabic numerals and their orientation indicated. Lettering and symbols should be of sufficient size to permit reproduction without loss of detail. A concise legend must be provided for each figure, typed in consecutive order. Tables should be Vertical and horizontal rules should not be used. A brief explanatory caption should be placed at the top of the table.

References. Only references which are clearly related to the authors work should be quoted. The JKDA allows up to **twenty references for original articles, forty for reviews and ten or less for case reports.** The Vancouver style should be used. References should be numbered in the order in which they appear in the text, and these numbers should be inserted as superscript each time the author is cited. At the end of the manuscript the full list of references should give the names and initials of all authors unless there are more than six, when only the first six should be given followed by et al. The authors' names are followed by the title of the article: the title of the journal abbreviated according to the style of the Index Medicus and Index to Dental Literature; the year of publication; the volume number: and-the first and last page numbers in full. Titles of books should be followed by the place of publication, the publisher, and the year. Information from manuscripts not yet in press, papers reported at meetings and conferences, or personal communications may be cited only in the text and not as a formal reference. Internet references should quote the URL and date of access.

The author is responsible for the accuracy of the reference list at the end of the manuscript and for permission to cite unpublished material.

Examples:
Book

Schubert M M, Epstein J B, Petersen D E. Oral complications of cancer therapy. In: Pharmacology and Therapeutics for Dentistry, 4th Ed, Yagiela J A, Neidle E A, Dowd F J (Eds). The CV Mosby Company, St. Louis, 1998. pp 644 – 655. Internet access

World Health Organization. World Health Report (Online) 2005. URL: http://www.whot.int/whr/2005/r; accessed on 05.06.05.Editorial

Miraa. East Afr. Med. J. 1988; 65:353 – 354.Article

Awange D O, Onyango J F. Oral Verrucous Carcinoma: Report of two cases and

review of literature. East Afr. Med. J. 1993; 70: 316 – 318.

Ethical Issues. Authors are responsible for the views, opinions and authenticity of the material published in the JKDA.

Acceptance. Authors will be informed upon acceptance of a paper with an estimate of the issue of the JKDA in which it will be published.

Editorial Rights. It is a condition of acceptance of a manuscript for publication that the Editor shall have the right to edit the text to improve its clarity and style and to bring its length within the available space. Pre-publication editing will examine all aspects of the manuscript including the title.

Page Proofs Reprints and Offprints. Page proofs will be forwarded to authors for minor corrections, and must be returned within 2 weeks. Neither late nor major changes can be implemented at this stage of publication. Reprints should be ordered on the form provided with the page proofs. The order, accompanied by the necessary payment, should be returned as directed.

Address for correspondence with Editor

Email: journal@kda.or.ke