Brito Muthunayagam Oration - 2020.

"Dental and medical emergencies in the perspective of a general dental practitioner".

I consider it a great pleasure and an honour to have been given this opportunity to deliver the 33rd Professor Britto Muthunayagam Oration this year.

Micheal Angelo Bonaventure Brito- Muthunayagam was born in 1898. After completing his school education at St Joseph's College Colombo, he entered the Ceylon Medical College to do his LMS. Subsequently, having obtained both MRCP and LRCS from UK, he served the Department of Health in Sri Lanka for few years before proceeding to UK to be qualified as a dentist. It is also recorded that he had done DPH and DTM while in the UK.

On his return from UK, Dr Brito Muthunayagam set up his own Dental practice and became a General Dental Practitioner (GDP). He was one of the founder members of Ceylon Dental Association the predecessor of SLDA in mid 1930s. While being a GDP, he was appointed as a visiting lecturer in Prosthetics in the Dental School. Later he joined the permanent staff and subsequently became the professor of prosthetics. In 1954, Prof Brito Muthunayagam was appointed as the Head of Department of Dental Surgery of the Dental school. He was the first Sri Lankan to occupy this prestigious position. He retired in 1965 and passed away in 1972.

In remembrance of this great personality and his service to the field of Dentistry Brito Muthunayagam Oration had been delivered continuously for nearly quarter of a century.

With great veneration and heartfelt gratitude I dedicate this Oration- to late Professor Brito Muthunayagam

Ladies and gentlemen, let me now focus on the main theme tonight "Dental and medical emergencies in the perspective of a general dental practitioner".

I would like to draw your attention to a well known personality, an international celebrity who faced a tragic death recently due to a helicopter crash. He was the basketball giant Kobe Bryant who lost his life along with his lovely daughter. I will be discussing about emergencies today but can the accident be called an emergency one? Certainly not as it was a disaster. This happened in the aviation industry we very much rely on and have assurance on safety measures. What if they had found the fault and avoided the disaster by any chance? Then it could have been an emergency which was dealt safely and then it would have been a near miss.

Prof. Manjula Attygalla - BDS(SL), MS (Col) FDSRCS(Eng)

Professor in Oral and Maxillofacial Surgery
Department of Oral and Maxillofacial Surgery
Faculty of Dental Sciences
University of Peradeniya

Haven't we as dentists had near misses at some stage during our practice, may it be inadvertently dropping an implant screw driver into the mouth of a patient forgetting to put a floss around it or an anaphylactic reaction in a patient due to a medication? Some of these could have been avoided but others, maybe not. Therefore, the end result may depend on how well we are prepared to handle such a situation however remote the possibility may be.

WHO defines an emergency as a state in which normal procedures are interrupted and immediate measures need to be taken to prevent that state turning into a disaster.

Emergency management involves in a broader sense, organization and management of the resources and responsibilities for dealing with all humanitarian aspects of emergencies (preparedness, response mitigation and recovery)

Now let us focus on the emergencies we may encounter in a dental office. These could be pure dental emergencies, medical emergencies or situations completely of a different nature such as a fire, an electric shock or even an infection risk where the end result may not create that much of a difference. However today I would like to draw your attention to some aspects of dental and medical emergencies and their relevance in general dental practice.

A dental emergency could be defined as an acute disorder of oral health that requires dental and or medical attention including broken, loose or avulsed teeth caused by trauma, infections and inflammations of soft tissues of the mouth and complications of oral surgery such as a dry socket.

Any dental emergency like that of an injury to the teeth or gums can potentially be serious and should not be ignored. Ignoring a dental problem can increase the risk of permanent damage as well as the need for more extensive and expensive treatment later on.

Some of the dental emergencies like Ludwig angina pose a threat to the life of a patient and may need urgent referral following prompt diagnosis, reassurance, pain relief and broad spectrum antibiotics for definitive management. There may be other conditions that pose no threat to the life at all but there may be an urgent social or functional implication for the patient who is seeking treatment. One example is fracture of a front tooth in a patient about to attend an important public event. We should be able to identify the distress of the patient and offer management professionally with a touch of empathy at such instances. Further, patients may present with dental emergencies or it could be a complication arising while managing a routine dental condition.

Regarding management of restorative, periodontal and pedodontic emergencies, there are well established international guidelines to be followed. Some of these include International Dental Trauma Guidelines (IDT) and guidelines of the American Academy of Paediatric Dentistry(AAPD).This knowledge is being transferred to dental surgeons during their undergraduate curriculum and through post graduate courses such as DHDP. However, it is important to make sure that the same continuous knowledge and skills transmission is taking place among the general dental practitioners throughout their career. This point emphasizes the fact of the necessity of starting or recommencing the post graduate courses such as DGDP other new course in a manner suited to GDPs such as distant learning modules enabling in achieving these goals. This is the current vision of the Post Graduate Institute of Medicine of the University of Colombo. It may be appropriate to think of further opportunities in upcoming institutes such as the Post Graduate Institute being affiliated to the University of Peradeniya

in the years to come. I am sure that you will agree with me that some of the general dental practices offer full range of treatment in the scope of dentistry with a very high standard. However with regards to emergencies, the vision should be to think of minimum standards to suit the entire country and a mechanism to raise the standards across the country gradually which will improve the standard of care for the patients. In this regard, professional bodies like the College of General Dental Practitioners, SLDA, College of Dentistry and Stomatology and respective associations of the specialties have much responsibility in setting these standards in the future.

Ladies and gentlemen, let me elaborate on some of the aspects of dental emergencies relevant to my field in dentistry which I think is important. In this respect, however, rare conditions like Ludwig Angina and other spreading fascial space infections need emphasis as in no time these conditions can lead to airway obstruction or severe complications such as cavernous sinus thrombosis specially in a medically compromised patient. Therefore being conversant with the features of these acute conditions are imperative and should have the appropriate decision making abilities in the management. The Golden rule to remember in such cases is that prevention is the key and to make sure that your patients, specially the medically compromised ones are well educated regarding oral hygiene and preventive measures are being taken to avoid such emergencies. In spite of all the facilities available in the dental teaching hospital Peradeniya, we lost more than 4 young males and females during last two decades due to late presentations with Ludwig angina. With that, the point to emphasize is the prevention that when a patient presents with an odontogenic infection to assess the risk and prevent the infection progressing into a potential life threatening situation. Therefore an immuno compromised patient presenting with an odontogenic infection with a history of difficulty in breathing, swallowing or speaking and trismus will need urgent attention. Another feature is the gradual obliteration of the mandibular outline due to a spreading of infection.

However, I would like to draw your attention to a recent evidence based guideline issued by ADA. **Antibiotic Use for the Urgent Management of Dental Pain and Intra-oral Swellings. Clinical Practice Guideline (2019)- ADA centre for evidence based dentistry**

The guideline recommends against using antibiotics for most pulpal and periapical conditions and instead recommends only the use of dental treatment and, if needed, over-the-counter pain relievers such as acetaminophen and ibuprofen.

Further, it states that instead of prescribing antibiotics, dentists should prioritize dental treatments such as pulpotomy, pulpectomy, nonsurgical root canal treatment, or incision and drainage for symptomatic irreversible pulpitis, symptomatic apical periodontitis, and localized acute apical abscess in adult patients who are not severely immuno compromised.

It warrants prescription of antibiotics only if a patient's condition progresses to systemic involvement, showing signs of fever or malaise.

Another complication which could encounter is the oro antral fenestration during an extraction. The best chance the patient will have in this instance is to immediately recognize the situation and repair surgically which is possible in a general dental practice. Any delay might cause establishment of chronic infection of the sinus which makes it much difficult to manage.

I experienced several referrals of fractured mandibles with attempted extractions or surgical removal of wisdom teeth. Mostly this happens with distoangular impactions when dealt with heavy duty elevators without necessary bone removal and sectioning of the tooth. Therefore it is important to recognize vertical impactions from distoangular impactions and have radiographic investigations to assess any pathology associated and to prevent possible neural complications.

In all these instances it is important to take appropriate measures for symptomatic relief and inform the patient and explain about the complication to minimise any miscommunications and do appropriate referral with relevant details immediately. In case of litigation, good record keeping, proper written consent and good communication will always be useful.

A patient may present with oral ulcers for emergency advice and one should be careful as the causes may range from aphthous ulceration, a severe immuno compromised state to a malignancy. This is of much importance to us as Sri Lankans due to the fact that our number one malignancy in males is oral squamous cell carcinoma. Early detection of oral malignancies, specially oral cancer and also OPMD will enable a patient a complete cure in most instances. I emphasize this as a person who has dealt nearly for two and a half decades managing patients afflicted with oral cancer. Nearly half of these patients will die of the disease despite all modern equipment, and technological advances available in the world. I need to congratulate the president of the college of general dental practitioners and the council for their vision with regards to this as they have proven their commitment to highlight this problem in the general practice by allocating substantial time of this annual sessions on the theme of oral cancer and OPMD through a world renowned expert of this subject.

Two other dental emergencies one could encounter is aspiration of foreign objects and allergic reactions to substances such as local anesthetic, latex and other dental materials which may precipitate to a state of anaphylaxis.

With regards to aspiration, appropriate preventive measures are of utmost importance including use of a rubber dam, securing small instruments with floss etc. In the instance of such an incident, reassurance of the patient and attempting to remove the object keeping your calm is necessary and having a Magill forceps may be of much help. One should be conversant in Heimlich maneuver and differences to be applied in the case of adults and small children. Cricothyrotomy is a procedure that may help in case of failure of retrieval of the object in a patient having airway obstruction until the definitive management.

Patients may seek management of dental emergencies mostly due to pain of odontogenic origin. According to a study done in a British Dental Hospital by Scully in 1995, oro facial pain constituted 77% of cases and 22% comprised of acute swellings. In another study conducted in a French emergency dental hospital by Roger - Leroi et al in 2007 pain constituted only 34% whereas 42% presented with prosthetic problems.

Management of pain constitutes a key role in dentistry. Further it has been identified as a basic human right locally and globally. Pain is defined as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage" by the International Association for the Study of Pain.

The deleterious effects of pain could be tachycardia, hypertension, and tachypnea and result in arrhythmia's precipitating to VT and VF in a compromised patient. It may further lead to worsening of angina and ischemic heart disease and left ventricular failure. These are the effects of sympathetic stimulation due to pain. Similarly it has effects on cardiovascular and respiratory systems as well. A dental patient will have stress responses due to multiple factors such as the disease itself, surgery and due to pain. Research indicated that stress response to pain to be more detrimental to the patient compared to the other stress responses. Ultimately these act as a vicious cycle leading to perception of more pain.

There may be other metabolic effects of pain such as hyperglycemia, protein catabolism and increased tendency for bleeding and reduced immunity. Therefore, sound pain management in a dental patient is of utmost importance.

Due to the complexity of Pain pathway the management necessitate multi-modality and multidisciplinary treatment including pharmacological and non-pharmacological methods.

The pharmacological armamentarium available to a dental surgeon will range from local anesthetic agents, paracetamol with or without codeine, NSAIDs and Tramadol. There are a variety of NSAIDS ranging from conventional non selective ones like diclofenac sodium, Ibuprofen, Mefenamic acid Cox2 selective inhibitors like meloxicam and Cox 2 specific NSAIDS like celecoxib or Etorcoxib. We can use Tramadol 50 mg tds when NSAIDS are contraindicated knowing 10 - 15% of patients can have nausea, vomiting and dizziness.

In addition, there are other groups of drugs which will be helpful in managing a patient presenting with oro facial pain. These include benzodiazepines, antidepressants and anticonvulsants etc.

Combination of drugs will help in managing some conditions such as pain related to TMJ. As there are well established clinical groups interested in pain management locally as well as internationally, it is time for the dental professional to get updated in the recent trends in pain management for the betterment of patient care.

The other important aspect I would like to highlight today is the management of medical emergencies in dental practice. The range of medical emergencies one may encounter vary from a simple syncopal attack to a life threatening situation like cardiac arrest. The incidence one would encounter such problems may vary widely depending on the type of patients catered by the particular practice as well as the scope of dental work undertaken. Obviously there is more risk with patient groups such as paediatric, geriatric, medically compromised and patients with special needs etc.

The frequency of encountering with a medical emergency in the dental office may vary according to the studies shown with less than one case per year or once in every 3 - 4 years. One could wonder whether we should bother so much for a case encountered so rarely. It is obvious that with the potential life threatening nature of these complications, it is imperative that as dental professionals we should be in full readiness to handle such a situation. Ethically and morally we are bound with it. It is good if we give the same priority to update our skills and knowledge in the management of emergencies on the dental chair with respect to other areas of dentistry.

This slide highlights the incidence of medical emergencies encountered by 2000 odd dentists over a

ten year period in US. As you can see, nearly one, third include syncope and almost 80 % include non-life threatening situations provided proper management measures were taken. Rest of the smaller percentage will undoubtedly involve life threatening situations where it is a must to adhere to proper basic life saving measures (BLS).

There is no doubt the best way to manage medical emergencies would be prevention. For this purpose, knowing your patients will help immensely. Apart from the usual questionnaire given to a patient to record any medical conditions, it is necessary to have an interview with the patient to clarify points which may have been missed or not apparent in their version. Following this a proper physical examination will further clarify a-particular medical condition to be further investigated or to have necessary precautionary measures. Based on previous procedures it is possible to do the risk assessment of a particular patient. American society of anesthesiologists physical status (ASAPS) classification system is one such categorization for risk assessment. In this there are five categories ranging from a normal healthy patient to a moribund patient who may not survive 24 hours. Depending on the experience and the facilities available, there is a possibility of treating ASAPS 1- 3 categories in a general practice.

Knowing your patients

It is best to adopt stress reduction protocols in vulnerable patients which may be simple measures but help immensely in reducing anxiety of the patient which in turn reduces the possibility of any complications.

During treatment, it is best to recognize any distress of the patient early to minimize consequences. The problem may be a respiratory distress , chest pain, altered consciousness due to vasovagal syncope or hypoglycemia, bleeding or an allergy. Therefore one has to be vigilant following administration of local anesthesia to observe any apparent changes

The moment the recognition of an impending medical emergency the initial management should commence which consists of position (P) , Airway (A) , Breathing (B) ,Circulation (C) and definitive treatment comprising of differential diagnosis, drugs and defibrillation(D).

This should be a team effort and each member of the team will be assigned a specific task which should have been pre-rehearsed and well communicated periodically. Appropriate preparation makes this team work effectively and it should also improve the patients chance of achieving a good result.

The problem in executing a fool proof team work is not easy as number or medical conditions and appropriate measures to be taken may be too numerous. In a state of emergency, the diagnosis may not be clear and it is difficult to formulate a treatment plan. The way out is to understand the salient point in this kind of situations , that is in almost all medical emergencies in the dental surgery ,the aim I to prevent or correct inadequate oxygenation of the brain or the heart.

Unconsciousness of a patient is usually due to hypoxia of the brain and lack of oxygenation to the heart will elicit acute angina. The idea of the BLS or CPR is to to keep the brain oxygenated and protected until the definitive management is carried out. PABC approach facilitates this specially when the cause is not clear

It is important to have facilities and equipment conducive to achieve afore mentioned objectives. For

example the dental chair should be positioned in such a way that a patient can be put in to trendelenburg position which is putting the legs up in relation to heart level about 10 to 15 degrees.

Suction apparatus, an emergency kit, BP apparatus, a glucometer, a wall clock with a second hand which may be visible from the surgery will be necessary in case of emergency. A pocket mask or a bag valve mask with supply of oxygen is essential.

A conscious and talking patient poses not much of a problem. Still it is necessary to observe rate and adequacy of breathing as too slow breathing leads to hypoventilation and too rapid breathing cause hyperventilation syndrome with carpopaedal spasm. Look Listen Feel method is adopted to assess whether there is breathing. An unconscious patient needs to be cared with the emergency protocol PABCD. First the unconscious patient should be put in supine position with legs slightly raised. If there is no response for 10 seconds, the airway should be cleared with head tilt and chin lifting. This should be followed by checking for breathing with look listen and feel method. At this time a team member should call for help and in Sri Lanka it is 1990 and 119. Once confirmed that there is no breathing, it is time to start chest compressions immediately at a rate of 100 - 120 beats per minute. Chest compressions should be done with heel of the palm, hands interlocked in the middle of the lower half of the sternum. Compressions must happen to a depth of 4-5 cm allowing full recoil with compressions to breaths ratio of 30; 2. One of the main differences between the latest guidelines and the old guidelines is the emphasis on starting effective chest compressions first and not rescue breaths.

Breaths can be delivered mouth to mouth but this is not encouraged. It is better to use an ambu bag with oxygen for this purpose or at least a pocket mask. After 2 mins of CPR carotid pulse should be checked to look for return of spontaneous circulation. This process of CPR at a ratio of 30 compressions to 2 breaths should be continued until the pulse is felt and help arrives. The patient would benefit immensely if there is an automated external defibrillator in the dental clinic which will act as an ECG monitor, defibrillator and will give voice prompting guiding resuscitation in the correct direction.

The American Dental Association's (ADA) Council on Dental Practice (CDP), with support from the ADA Health Policy Institute (HPI), conducted the 2018 CDP Survey on Preparedness for Medical Emergencies in the Dental Practice. The purpose of the survey was to assess preparedness for medical emergencies that could occur in the dental practice.

Key findings revealed that the top three medical emergencies occurring in dental practices during the 12 months prior to the survey were not specific to the dental setting or treatment. Those incidents were syncope (39.77 percent), epinephrine reaction (37.43 percent), and postural hypotension (33.92 percent). The top ten reported emergencies also included allergic reactions, injuries requiring first aid, hyperventilation, seizures, insulin shock, and asthma.

A large percentage of dental officers said that they are prepared to handle medical emergencies. Almost 97 percent of all dental practices reported having a plan for responding to medical emergencies. More than 86 percent of those practices reported that they have trained the staff to respond to medical emergencies that can occur in the practice. The most common types of staff training for managing medical emergencies in the practice were:

reviewing written materials - 60.26 percent

live training by an outside presenter - 58.01 percent

training exercises - 52.56 percent

Almost all practices (96.52 percent) have at least one staff person trained in Basic Life Support as offered by the American Heart Association or the American Red Cross.

More than 93 percent of dental practices have an emergency medical kit with drugs to manage routine medical emergencies.

Practices with emergency medical kits containing medications report having:

epinephrine auto-injectors for adult patients - 83.57 percent

epinephrine auto-injectors for pediatric patients - 61.76 percent

oxygen available for emergencies - 94.96 percent

an automated external defibrillator (AED) - 75.73 percent

Maintaining a crash cart or emergency kit is equally important. This slide shows the drugs and equipment which are necessary for this purpose. Regular updating is a requirement.

As I mentioned earlier, relieving stress of patients undergoing dental treatment, specially the extremely anxious patients will help them as well as the practitioner immensely. One method of achieving this is the use of conscious sedation with local anesthesia in the dental practice. Currently this method is used very scarcely in our country. Myself together with an enthusiastic and dedicated anesthetist, Dr Saman Nanayakkara commenced conscious sedation in general dental practice and we have been practicing it for nearly 9 years. We have performed 60 conscious sedation cases without any adverse events up to now. We were able to perform procedures ranging from simple extractions to implant surgery including sinus lifts in patients with age range of 12 to 80 years. A combination of oral and IV midazolam together with entonox using a demand valve -mask apparatus. When the patient was in a brief high flowing Entonox the local anesthetic was administered. If the patient is still anxious 1-2 mg of IV midazolam will be used. A pulse oxymeter is used to continually monitor the patient. Light sedation is only maintained enabling continuous communication with the patient. Oral paracetamol and codeine was used together with oral midazolam preemptively (One hour before) for analgesia and the first dose of oral or rectal diclofenac sodium was given soon after the procedure in the clinic itself. This made sure that diclofenac had started action by the time the effect of the local anesthetic was worn off and there was continuous analgesia . The only other adjuvants were an intravenous dexamethasone for reduction of swelling and Ondansetron for prevention of nausea and vomiting

Initially an experienced retired sister who was with experience was used for this purpose. Gradually the others were trained to fit as the team members. When planning the clinic setup it was arranged with unhindered moving of a trolley in an emergency. Following the procedure patient is observed for 2 hours. generally by that time the patient is fully recovered and taking oral fluids. Dr Nanayakkara used to get the feedback with the patients who underwent this procedure immediately after and over the following day over the phone. Nobody could remember any unpleasantness of the procedure, in fact 85% of them could remember only sitting on the dental chair and not even the procedure. Nobody had nausea, vomiting or heart burn. Average pain score during the procedure was 23 out of 10. Procedure of lowers had an average of pain score of 0-1 and uppers 23 out of ten. Pain scores after going home was 0-1 out of 10 when the patient was on a combination of oral panedine/ rapidine and diclofenac sodium or ibuprofen.

The picture on the left shows the equipment and medications maintained for any emergency. However for conscious sedation there will be no necessity for having equipment like laryngoscopes and

laryngeal masks as only very light sedation is achieved and no fasting will be necessary. We had to initially maintain this standard as we had to take a risk in initiating it in the general practice as there was an incident at the time we commenced this where a medical doctor died following an anaphylactic attack following a plastic surgical procedure at a private clinic.

The way forward here as I discussed with my colleague is that actually an accredited dental surgeon with necessary training and qualifications in conscious sedation to carry out the procedure as is done in other countries. It is up to the respective bodies to consider this and have a vision to achieve this at least in ten years as I feel that conscious sedation will be very much advantageous to patients who are anxious but cooperative.

Ladies and gentlemen finally let's see what is currently happening locally for the transmission of knowledge and skills in the areas we discussed. As you are already aware the dental curriculum has changed from 4 yrs to 5 yrs. In the process when considering the feedback from stake holders one major requirement was to improve the skills and knowledge in the management of emergencies on the dental chair as well as managing medically compromised patients. The faculty has taken due consideration of this fact and a course has been included in the 5th year as maxillofacial surgical care which addresses this issue to a certain extent. The in-course assessment of that particular course will include performing CPR on a dummy and the end semester assessment will include a portfolio viva which encourages continuous and lifelong learning process.

Another positive aspect as I realize, is the initiative taken by the ministry of health together with the GDSA to arrange a training course for the intern dental surgeons which is going to be an annual event.

In addition, many professional associations from time to time organize BLS programs of the membership. However, I still feel that it is necessary to conduct audits and research covering various aspects of medical dental emergencies to plan improvement across the country. A process of continuous updating of skills and knowledge in the areas of dental and medical emergencies and pain management together with the accredited bodies in Sri Lanka is necessary.

A national minimum standards guideline to be formulated on level of resuscitation training, the recertification intervals and the equipment and drugs that should be available in the case of a medical emergency which is applicable to a dental setup is another vital necessity.

To see the possibility of establishing conscious sedation to be available in all sectors in the dental profession in the years to come is another preventive method.

I have to emphasize the importance of avoiding an emergency rather than managing it. Spending little more time in knowing your patient, adhering to good pain relief and stress relief, being observant during the procedure, proper post-operative care will help in preventing the emergencies.

Further habit interventions, careful oral examination and preventive measure will enable early detection of specially OPMD and Oral cancer which will immensely benefit the patient.

Once again I consider it a privilege to deliver this oration to honor a great personality Prof Brito Muthunayagam who commenced his career as a general dental practitioner and ended up as an academic with the honour of becoming the first Sri Lankan to hold post of head of the dept of Dental

surgery in the Dental School Peradeniya. I think that the Dean of the Faculty of Dental Sciences University of Peradeniya Dr. Vajira Jayasinghe will agree with me that there are opportunities to strengthen the links with the faculty and the College of General Dental practitioners with new reforms taking place with regard to the dental curriculum and to think of collaborative work in the areas discussed today.

Before concluding I would like to extend my sincere thanks to the President of the College of General Dental Practitioners Dr. Ganananda Nanayakkara and the committee for this opportunity and the excellent arrangements I would like to acknowledge and thank Dr. Saman Nanayakkara and Dr. Dileep de Silva for their contribution in making this presentation I would like to pay my gratitude to all my teachers present here today and specially to late Dr. R Vigneswaran, who helped me to get through my first hurdle. Further I will be failing in my duty if I do not pay my tribute to Prof N A de S Amaratunga and Dr. Reggie Gunathilake for their guidance throughout my career.

On this occasion, I would like to pay my utmost gratitude to my father and late mother for all the sacrifices they have made as parents. And finally my love and gratitude to my wife Namalee and daughters Erandi and Vinuri for their tolerance.

Ladies and gentlemen, thank you very much for your patient listening.