

Impressions

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Journal of Indian Dental Association
Attingal Branch



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Multi Speciality Dental Clinic,

Kadakkal P.O., Kollam - 691536

Mob: 9497456020

secretaryidaattingalbranch@gmail.com



Indian Dental Association
Attingal Branch

Office:

The Editor-In-Chief,
Impressions-Journal of IDA
Attingal Branch,
Flat No. 5D

Queensway point
Pattom Kowdiar Road
Kuravankonam

Trivandrum - 695 003

Mobile : 94471 29221

e-mail: journalidaatl@gmail.com

President's Message



Dear Members,

It gives me immense pleasure to pen down my words for the first issue of impressions for the year 2020. I sincerely admire the persistent efforts of members who have contributed articles.

As this new association year unfolds with new hopes and goals, am looking forward to work for our profession with the vibrant team of new office bearers. I am sure that we can achieve better results with the help of this new sincere team and with the cooperation of our members. As all of us know, our profession is facing a lot of new challenges, COVID -19 super bugs are emerging, challenging the antibiotic mines. I request all the members to follow strict protocols formulated by the government to break the chain of the pandemic disease. We are planning to implement Dental awareness programs for school children with customized posters, to start an active dental clinic for the economically underprivileged people, programs for women and child safety. I sincerely request maximum support from every member in every activities and projects of our association.

I wholeheartedly wish all the very best to Editor Dr. Dinesh to achieve ISSN indexing this year and our journal to achieve new milestones.

Thanking you

Dr. Sherin A. Khalam

President

IDA Attingal Branch.

Secretary's Message

Dear Members,

“ Greetings from Secretary's desk”

As we welcomed this new year with new hopes and expectations on the tag 2020, But the beginning has been with the world in a state of pandemic threat of novel corona virus 'COVID19'; The virus is in our state too, we know its alarming, Its natural to feel anxious, worried & confused However we being Health providers “ This is a time for Prudence; Not Panic Science; Not Stigma Facts; Not Fear.

When it comes as a global threat, If anybody thinks that it wont happen to us, is making a deadly mistake. It Can happen to anyone, anywhere, any country. It took only a few days to reach us from Italy. As we are most suspected to be affected most vulnerably, request all our members to follow strict precaution protocols and to spread the proper hygiene instructions to the society as well to control this pandemic.

Regarding association matters, we being the host branch of 52nd KSDC 'CORDIAL 21' at the venue Sports hub Kariyavattom; The registration process is on full fledge, All members are requested to register for our conference and request each and every members whole hearted support to make this event a grand success. All members are requested to renew membership fees. Keep in touch with the office for any help.

Thank you

With Regards

Dr. Deepak S Das

Hon: Secretary

IDA Attingal Branch



ABOUT IDA ATTINGAL

IDA Attingal, symbolizes & represents, updates & educates, promotes & supports the local dental community of erstwhile Attingal, in delivering, quality dental health care to the general public. Maintenance of proper standards & ethical manner in practice, better interpersonal relations, as well as willingness to share knowledge among members has provided a high degree of respectability to the organization. Effective follow up of organizational proceedings at the state & national level by the branch executive, ensures that the members are kept abreast of all IDA activities. Regular representation at IDA events & healthy interaction with other branch members has made IDA Attingal quite popular & a force to reckon. Adding to this would be a plethora of eminent leaders from the branch, who have raised to higher echelons in IDA. Through various Scientific programmes, presentations, journals & newsletters, the branch creates awareness of the latest advancements in dentistry, among members.

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Editorial



Break the FEAR....

Dear members,

In this COVID -19 crisis, our fraternity is facing unparallel challenges like never before, in this desperate time, let us stand united and show solidarity and be responsible to our profession and society at large. There has been lot of talk about what prevails POST COVID? How long it lasts? Whether the dental practice remain same as before? Or How safe is our practice? What precautions/guidelines do we need to follow? and many more impinging questions. The media is flooded with webinars, discussion's, and suggestions from experts in the field. Although much of this information are justified and warranted, it also adds to more confusion and fear among the minds of dental practitioners who are already eluded with the current happenings. And the fact remains that the answers to these questions are still unclear or is too early to draw conclusion. So, let us show some patience and act prudent.

There is too much fear among ordinary dentist about looming economic situation which is highly unwarranted. Few months of lockdown or stringent contingency measures POST COVID will not be a burden rather improve our state of affairs. So the bravery here is to be patient enough without unwanted fears until things evolve and clarity prevails.

For a break.... Let us look at the positives that emerge

- A) The whole world is realising the importance of Health care sector and workers, which means from now on more money is going to be pumped into the industry, which otherwise being wasted on less important sectors, which is the case at least in India.
- B) Government will give more attention to research activities which will generate more jobs in this sector.

- C) Public health is going to be a hot debate Which helps community dentistry and medicine
- D) The awareness among general public has improved more than one can imagine. For ages doctors are trying to convince patients about their self-role in containing and treating disease. From now on, doctors need less effort to convince the proposed treatment plan and get less blame.
- E) With more awareness practitioners can improve quality with ease
- F) We suffer in our practice because people think "a low-quality dental treatment is not going to affect their health" recent events rewrites this thinking

So friends let's stay safe for now so that we can reap the benefits.....

I would also like to put into notice to our members that recent lockdown has impaired the normal functioning of our branch activities. Our CDEs are already gave way to webinars and hence our first issue of 2019 Journal IMPRESSIONS is releasing ONLINE in our website. Print issue will be released after easing of lockdown. I whole heartedly express my gratitude towards DR. PRADEEP DATHAN, past EDITOR of IMPRESSIONS for his efforts and support in bringing out this volume. This would not have been possible without his generous contribution. I also like to express my appreciation to DR. RUDY GEORGE, website coordinator in showing affection and patience in bringing this volume. Last but not least I like to thank PRESIDENT, DR. SHERIN KALAM, SECRETORY, DR. DEEPAK S. DAS and all other executive members for their untiring support and trust showed to me in bringing this journal.

Dr. Dinesh N.
Editor, Impressions

Tiny Steel Wonders in Pediatric Dentistry

***Dr. Suprasidh S, *** Dr. Aswathy Babu, *Dr. Soumya Rajan, **Dr. Firoz A.**

*Associate Professor, **Assistant Professor, Department of Pediatric Dentistry, Sri Sankara Dental College, Varkala, Kerala. ***Clinical Research Assistant, Orkids Smiles Dental Clinic, Attingal, Kerala

Send correspondence: Dr. Suprasidh S., E-mail: suprasidhsuprakasam@yahoo.com

Ever since first introduced by Rocky Mountain Company in 1947 and later popularised by Dr. William Humphrey in the 1950s, preformed steel crowns have been modified to perfection in both adaptation to tooth morphology as well as fitting for over the past 50 years or so.¹

For the longest time, dentists struggled to treat extensive caries of primary dentition. While amalgam was the sought after choice; multi surface restorations meant more amalgam than tooth structure which eventually defeated the purpose of saving the tooth from extraction.¹ What paved the way to discovering pre formed metal crowns was an intermediate restorative technique involving orthodontic bands filled with amalgam, as a last resort of restoration when scanty tooth structure remained above gingiva. This unique method gave Dr. Humphrey, the idea to use the same material; but, as a crown. From primitive crowns resembling used shotgun casings to morphologically prime preformed steel crowns, the superiority of the steel crowns remain unchallenged.¹ While the use of preformed metal crowns in primary molars is old news, its use in permanent molars need much advocacy while a plethora of options both aesthetically pleasing while functionally adequate exists.

Deriving retention from the bulbous cervical third of primary molars, the thin metal of the pre-

formed crown margin is flexible enough to spring into and be retained by this undercut area. The primary pulp being large with prominent pulp horns and residing in proximity to the mesial surface of the tooth crown, requires exacting demands on cavity design. This unfortunately applies alike to both permanent and primary molars. While doubts do not exist where preformed steel crowns are to be used in primary molars, in permanent molars, preformed metal crowns are usually used as interim restorations or when there is an economical constraint in receiving esthetically superior counterparts or if there is a structural anomaly or when the tooth is only partially erupt and not patent for other full coverage options.²

The crown in its own is a simple entity while it takes years to master the process of adaptation onto the primary and permanent molars. While different opinions exist as to which surface has to be prepared first for ease of access, occlusally, a reduction of 1.5mm is recommended unanimously.^{3,4,5} Preformed metal crowns for primary molars are not close fitting, so preparation coronal to gingiva does not need to be precise. For optimal retention, crown must seat subgingivally to a depth of 1mm. A certain amount of gingival blanching is to be expected; but anything over the top has to be seen as an indication for further contouring of the crown. Trial and

error happens to be the way to pick the crown size; whichever gives the “snap” or “click” on trying-in is usually the best choice.²

Preformed or the prebelled variety of steel crowns does not mean they don't need adjustments⁶. The less festooning done, more the adjustments required in the long run.⁷ Fitting a permanent molar metal crown is far more tedious than primary tooth fitting. Once the adjustments for perfect fit are completed, the crown margins should be thinned and smoothened, final polishing being done with a rubber wheel. On special occasions, like a crown being too small or a crown being too big and nearest size isn't a solution either, further specialized adjustments are required. A crown can be cut and overlapped to reduced circumference, with overlapping margins welded^{8,9}; or an additional band piece added to increase circumference after cutting the crown wall.⁶ Minor hyperocclusion can be forgiven in primary dentition while it is of paramount importance in permanent dentition to ensure normal growth and development of occlusion that the crowns are not left in hyperocclusion. Interestingly enough, sometimes, occlusal wear occurs on the

crowns and even perforations can occur from long time wear.¹⁰ To counteract the wear, amalgam or bonded composite resin maybe used for repair without breaching the marginal ridges of the crown.¹¹

While preformed steel crowns are known for their better qualities, they do have the occasional run-ins with certain aversive immunological responses. Like any other full coverage restorations, periodontal concerns exist for preformed stainless steel crowns as well; especially in ill fitting ones. Ironically, a study by Henderson reported that plaque accumulation index for stainless steel crowned teeth was generally lower than that for entire mouth.¹⁰ However there are speculations that teeth with Nickel-Chromium crowns.¹² or those with defects in adaptation of crown margins showed higher incidence of gingivitis. In essence, a well adapted crown margin facilitates good oral hygiene and healthy gingivae and gingivitis can occur if the crown margins are inadequately contoured.^{12,13,7,14,10,15}

Another immunological response was Nickel sensitization; which was a concern when traditional stainless steel crowns included a whopping



70% Nickel. Needless to say, their use has been discontinued and contemporary crowns contain only 9%-12% Nickel, just like in orthodontic bands and wires. Although it is impossible to detect how exactly Nickel is released into the oral cavity¹⁶, corrosion seems to be the best possible reason. Even more reason to religiously polish the rough edges of the crown after adjustments.

Even after being accused of the obvious esthetic compromises and minor immunological responses, the service these crowns have given over the decades is far more beneficial than any other restorations out there. They've grossly reduced the incidence of malocclusions due to space loss and have been an anchor for modifications for many space maintainers. These crowns have transformed the lives of many children; controlling as well as enhancing their facial features to give long lasting results.

"Gold has its cost, amalgam its controversy, and plastic its limits. Maybe the success of the stainless steel crown has been that it never claimed to be more than it is, yet when called upon to do more, responded so well."- Paul S Casamassimo.

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What's new.....? A review on recent advances in dentistry

*Aijin A Mohan, **Mathew John, ***Sabari C, *Archith Mannan

*Postgraduate student, **Professor, ***Reader, Department of Periodontics,
Sri Sankara Dental College, Akathumuri, Varkala.

Send correspondence: Dr Aijin A Mohan, E-mail: jalztar@gmail.com.

Abstract

Advance in dentistry and practice over the last decade have radically changed the understanding of dental diseases and have opened new exciting prospects for surgical therapy of dental diseases.

Role of dentistry will continue to evolve along the currently visible trends. Trends in oral health and disease also may change the focus on specific diagnostic and treatment modalities. Increasingly preventive approaches will reduce the need for cure prevention a viable approach for most of them. Diagnosis and treatment will be customised to match the preferences and genetics of each patient.

A new era in dental research and practice is being defined along the following lines, better understanding of the disease, emerging needs, novel treatment strategies and therapeutics. The emerging trends in the dentistry are included in this article.

Introduction

Dentistry is the profession or science dealing with prevention and treatment of diseases and malformations of the teeth, gums, and oral cavity and the removal, correction and replacement of decayed damaged, or lost parts, including such operations as the filling and crowning of teeth, the straightening of teeth, and the construction of artificial dentures.

Periodontal disease, commonly known as gum disease, affects millions of people. The current method of detecting periodontal pocket depth is painful, invasive and inadequate. As an alternative to manual probing, an ultrasonic periodontal probe is being developed to use ultrasound echo wave forms to measure periodontal pocket depth, which is the main measure of periodontal disease.

Pain management is the most important aspect of patient care. The agents and aesthetic delivery equipment's available today provide the practitioner an array of options to effectively manage the

pain associated with dental procedures.

Tissue engineering/regenerative medicine aims "to stimulate regeneration of tissues and organs by either implanting biomaterials for in vivo regeneration or by constructing substitutes in vitro". Tissue engineering is a translational research area including a broad range of disciplines, such as stem cell biology, material sciences, medicine, chemistry, and manufacturing. Recently, nanotechnology was introduced as a new area in Tissue engineering and in periodontal tissue engineering, with emerging studies demonstrating significant influence of nano scaled topography and geometry on cell differentiation, behaviour, and enhanced 3-dimensional (3D) regeneration.

1. Ultrasonographic Probe

The development of an ultrasonic alternative to conventional periodontal probing promises a much

better understanding of the pathogenesis of periodontal disease and will provide the clinician with a noninvasive method for measuring periodontal status without the often-reported discomfort of conventional periodontal probing.

It uses high frequency ultrasound to determine the depth of the periodontal ligament. In order to determine the depth of the periodontal ligament the ultrasonic transducer projects high frequency (10-15 MHz) ultrasonic energy between the tooth and the gingiva and detects echoes of the returning wave

Advantages

- Non-invasive
- Accurate measurement of pocket depth
- Printout can be obtained
- Ultrasound waves accurately detect periodontal structures.
- Provides information regarding condition of the gingival tissues.

Disadvantages

- Technique sensitive
- Expensive
- Operator training required for interpreting image.

2. Novel local anaesthetic techniques

1. Local Anaesthesia Delivery Devices

A. Vibrotactile Devices:

Pain can be reduced by using vibration which causes simultaneous activation of nerve fibers. Some of the newer local aesthetic delivery systems aimed at easing the fear of the needle take advantage of the gate control theory of pain management¹, which suggests that pain can be reduced by simultaneous activation of nerve fibers using vibration. The pain reduction due to non-noxious touch or vibration can result from tactile-induced pain inhibition within the cerebral cortex itself and that the inhibition occurs without any contribution at the spinal level, including descending inhibitory actions on spinal neurons².

a. Vibrajel

It is a small battery-operated attachment that snaps on to the standard dental syringe. It delivers a high-frequency vibration to the needle that is strong enough for the patient to feel.³

b. Dental Vibe

It uses a principle called vibration diversion based on the pain gate theory. It is a cordless, rechargeable, handheld device that delivers soothing, pulsed, percussive micro-oscillations to the site where an injection is being administered. Its U-shaped vibrating tip attached to a microprocessor-controlled Vibra-Pulse motor gently stimulates the sensory receptors at the injection site, effectively closing the neural pain gate, blocking the painful sensation of injections. It also lights the injection area and has an attachment to retract the lip or cheek.⁴

c. Accupal

It is a cordless device that uses both vibration and pressure to precondition the oral mucosa. Accupal provides pressure and vibrates the injection site 360° proximal to the needle penetration, which shuts the "pain gate," according to the manufacturer. After placing the device at the injection site and applying moderate pressure, the unit light up the area and begins to vibrate. The needle is placed through a hole in the head of the disposable tip, which is attached to the motor. It uses one AAA standard battery⁵.

3. Black Dental Floss

It is made of black nylon. It contrasts with the material removed from the teeth. It aids in learning proper flossing technique. No waxy coating is present in this product.

Advantages:

- Proper flossing technique can be easily demonstrated.
- The amount of material removed can be easily assessed.

Disadvantages:

- No waxy coating is present

4. 3D Printing for Periodontal Regeneration

The term 3D printing is generally used to describe a manufacturing approach that builds objects

one layer at a time, adding multiple layers to form an object. This process is more correctly described as additive manufacturing and is also referred to as rapid prototyping⁶. The 3D printer uses a powder or liquid resin that is slowly built from an image on a layer-by-layer basis. All 3D printers also use 3D CAD software that measures thousands of cross-sections of each product to determine exactly how each layer is to be constructed. The 3D machine dispenses a thin layer of liquid resin and uses a computer-controlled ultraviolet laser to harden each layer in the specified cross-section pattern. At the end of the process, excess soft resin is cleaned away through use of a chemical bath⁷. 3D printing uses raw materials such as plastics, resins, super alloys, nickel-based chromium and cobalt chromium, stainless steel, titanium, polymers, ceramics composite materials and polycaprolactone.

5. Nanotechnology

Nanorobotics is the technology of creating machines or robots at or close to the microscopic scale of

a nanometre (10⁻⁹ metres). These nanorobots allow precision interactions with nanoscale objects or can manipulate with nanoscale resolution.

a. Nanorobots

The size of Nanites are 10⁻⁹. They are built with carbon atom. Glucose is used for the propulsion. They have camera, payload, swimming tail and capacitor.

b. Nanites

- They are used for Nanoencapsulation.
- They can be used in drug delivery system such as triclosan loaded nanoparticles is proved to be anti-inflammatory.

c. Nano Diagnostics

- Used for the Early diagnosis of diseases such as tumour cells, toxic molecules by using human fluids and tissue samples.

d. Nanorobotic Dentifrices

- It is added with Mouthwash/Dentifrice which covers the subgingival surfaces.

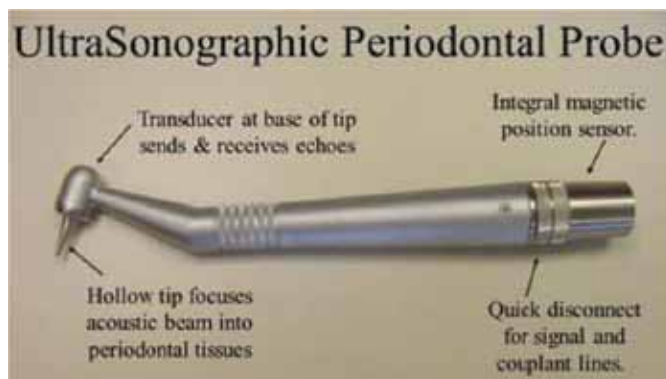


Figure 1. Ultrasonographic periodontal probe



Figure 2. Black dental floss



Figure 3. Nanorobot

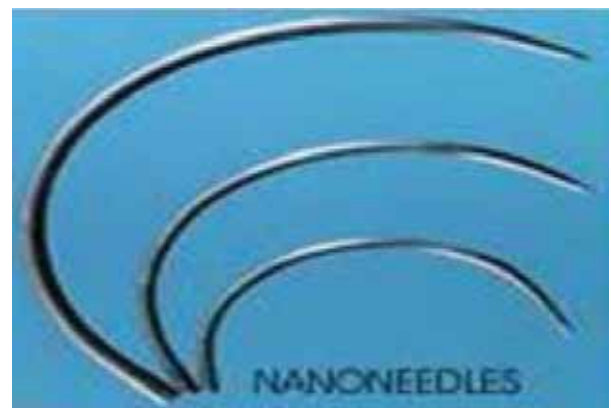


Figure 4. Nanoneedle

- It will convert organic matter to harmless odourless vapours.
- It also destroys the pathogens and act as a barrier to halitosis

e. Nano Surgical Devices

- Surgical knife using micro structured silicon with diamond layered tip. It gives sharper incisions with lower penetration pressure
- Nano stainless steel crystal suture needle

f. Nanocomposites

Composites with nano fillers has two types of nanofillers-nanomeric and nano nuclear type.

Advantages

- High filler loading
- Desirable handling characteristics
- Superior physical properties like modulus of elasticity and flexural strength.
- High polish retention because of nanosized fillers.
- Higher translucency giving it more lifelike appearance.

Nano Impression

The introduction of nanofillers into polyvinylsi-

loxanes yields a siloxane impression material with properties superior to conventional impression materials.

Advantages

- Better flow
- Improved hydrophilic characters leading to fewer voids at margin and better model pouring
- Enhanced detail precision

Nano Solutions

Unique dispersible nanoparticles with superior properties can be produced from nano solutions which forms a uniform mixture after being mixed with solvents, polymers and paints. This can be made use of dentin bonding agents as these materials have better dentin bond strength and better performance.

Nano sterilizing solution

Gandy enterprises Inc Florida, has introduced a new disinfectant based on super science of nano emulsion technology which uses nanosized emulsifier droplets of oil that bombard the pathogens.



Figure 5. Nanocomposite



Figure 6. Nano impression

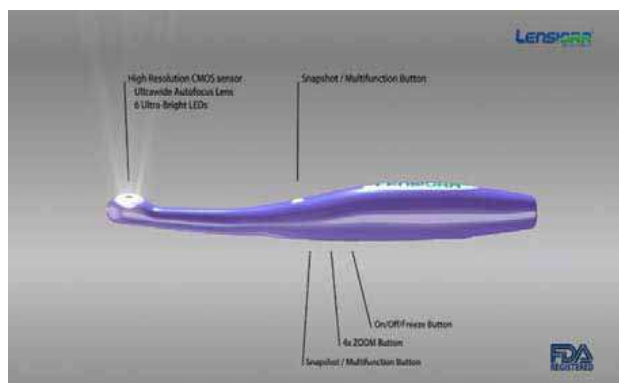


Figure 7. intraoral camera



Figure 8. intraoral scanner

Advantages

- Broad spectrum
- Hypoallergic
- Noncorroding
- Does not stain fabric
- Require no protective coating
- Environment friendly
- Compatible with various impressions

6, Intraoral Camera

With the recent launch of lensiora – the intraoral camera, it is now possible to get a clear view of the oral cavity. Dentists have started endorsing the device for its picture quality, seamless design, and integration of other latest applications for better analysis. Many dentists like the technology due to its easy operation and sleek design, patients can even be benefitted in terms of getting the high-quality images that are advisable, both for an informed decision as well as better understanding.

7, The Generation Next Intraoral Scanner

Through the launch of planmeca emerald digital scanner that can efficiently provide accurate and detailed images; dentists all over the world have gained quick access to the dental nittygritty inside the soft as well as hard tissue.

Contrary to the conventional scanners that were too huge to be able to get good scans of molars.

Dentists who have used the technology have claimed that the advanced software that is being integrated into the scanner has many simpler applications as compared to the conventional version and is being easy to access being an open system, even with your chairside tablet.

Conclusion

Dentistry will continue to evolve along the lines of visible trends.

Local anaesthetics have made a great advancement in dentistry and have changed patients' perspectives of dental procedures to a great extent. There is still room for the improvement of painless techniques in administering local anaesthetics. It is important for clinicians to be familiar with all the

local anaesthesia devices and techniques available for dental procedures to best exploit them.

Ultrasound imaging has been recognized by leading authorities as having the best potential for non-invasive periodontal disease evaluation and initial attempts at using ultrasound for intraoral diagnosis has shown promise despite difficult technology problems.

Nanotechnology is part of a predicted future in which dentistry and periodontal practice may become higher tech and more effective looking to manage individual dental health on a microscopic level by enabling us to battle decay where it begins with bacteria.

3D imaging and modelling can create a huge impact in regenerative periodontics. Regenerative medicine and three-dimensional imaging allow more predictability in management of complex interdisciplinary clinical scenarios.

The developers are expected to accelerate significantly and the trends in oral health and disease also may change the focus on specific diagnostic and treatment modalities.

The foundation has been laid and it is envisaged that this trend will be further improved in the future as more and more products are commercially explored.

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Beading and Boxing Simplified

*Nimmy K.J., *Dr. Raahee Kiran R., **Pradeep C Dathan, ***Smitha Ravindran, *Karthik. S

*Consultant Maxillofacial Prosthodontist and Implantologist, TVM; **HOD and Profesor, Department of Prosthodontics, Sri Sankara Dental College, Varkala; ***Assistant Professor, Department of Prosthodontics, Government Dental College, Alappuzha

Send correspondence: Dr. Nimmy K.J., E-mail: nimmykj1986@gmail.com

Abstract

Conventional beading and boxing procedure is time consuming and involves application of heat that might distort green stick compound used for border molding. Earlier studies regarding beading and boxing methods have shown usage of various materials that were disposable and that cannot be recycled. To reduce the time consumed for beading and boxing procedure and to make this procedure cost-effective by using recyclable beading material, "Preformed boxing appliances" are used. The duration for the entire procedure was much less than the conventional procedure. This article describes two innovative devices to easily bead and box the secondary impressions.

Key words : Final impression, Beading, Boxing, Device

Key message : Beading and boxing procedures of final impressions are simplified using two reusable cost effective, simple and economic boxing devices which can be used as chairside appliance and as laboratory technique.

Introduction

Boxing an impression involves building up vertical walls around an impression, usually in wax to produce the desired shape and form of the base of the cast and to preserve certain landmarks of the impression¹. Boxing an impression allows a controlled environment to establish and protect ideal borders on the master cast, eliminates distortion associated with slumping of the gypsum material when an impression is inverted and permits control over the thickness of the base.² Attempts are made successfully to use disposable materials for the procedure. To make this procedure cost-effective and simple, two reusable boxing appliances are described here.

Beading and Boxing Device No.1

Construction: The appliance consists of a base, an adjustable boxing rim and two side clips to fasten the base to the boxing rim (Fig.1. 1). The base is 1 cm

in height. The base consists of a horseshoe shaped beading platform about 1cm height, that serves as a support for the beading material (Play-doh). This also reduces the amount of material needed to bead the impression.

Notching device (Fig.1. 2)

This device is designed to provide three notches on the edges of the poured base area of cast. It is a fan shaped device with 3 wedge shaped metallic projections and a handle

Technique

1. After making the final impression, position the impression tray over the studs, in the base of the device.
2. Roll Play-doh into a thin rope and place it around the impression border on top of the beading platform and adapt to the impression border 2mm below the impression border.

3. Fill the tongue space (in case of mandibular impression) with play-doh up to 2 mm below the flanges of the impression. (Fig 1.3)

4. Place the boxing rim over the base and adjust with screws to closely adapt the beading and then fasten it to the base with the help of side clips

5. Pour dental stone into the beaded impression surface.

Beading and boxing device 2

This device is designed for chairside beading and boxing.



Fig.1. 1



Fig. 1.2



Fig 1.3



Fig 2.1

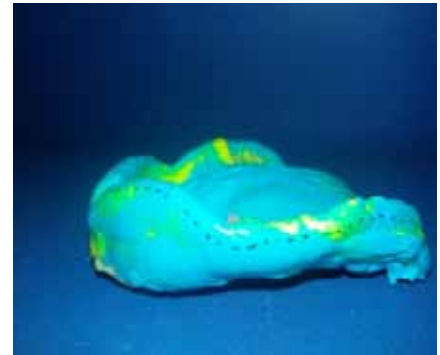


Fig 2.2



Fig 2.3



Fig 2.4



Fig 2.5

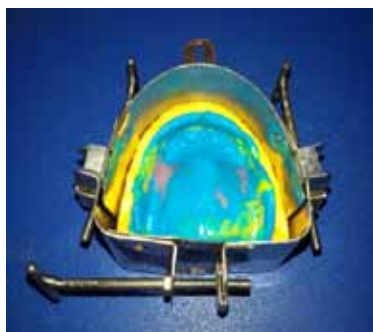


Fig 2.6



Construction: The device (Fig 2.1) consists of an adjustable boxing rim with 3 screws, and impression trays.

Technique:

1. After making the final impression, mark the level of land area along the borders of the impression (Fig 2.2). Reinsert the final impression in the mouth and take a pick up impression with alginate loaded in the perforated stock tray (Fig 2.4).
2. Cut the alginate along the periphery of the final impression at the level of 2 mm from the depth of the sulcus to provide the land area. Fill the tongue space in case of mandibular impression with play doh. (Fig 2.4)
3. Place the tray at the bottom of boxing rim, which can be adjusted to conform to contour of the tray with the help of screws. (Fig 2.5)
4. Pour dental stone (Fig 2.6) to the required height (12mm from the highest point on impression)
5. Notches can be given to the cast by inserting the notching device.

With this device beading can also be done outside the patients mouth with cheap and easily available materials like play doh or emseal,

Discussion

According to Sowter³, the boxed impression controls the thickness of the base of the cast and facilitates placing remounting plates. Harris⁴ has described plaster and pumice mix as a beading material for impressions made with elastomeric impression materials. Blank⁵ has described "Paddle

grip method" which involves the use of caulking compound rope for beading and metal strips for boxing. The full beaded and boxed impression was supported by a tennis paddle so that it can be placed on the vibrator for pouring the cast. All the techniques described by various authors over a period of time involve beading and boxing materials that cannot be reused. But, the appliance described in the present technique involves a preformed appliance which is reusable and cost effective.

Summary

The alternative beading and boxing procedure described permit final impression to be quickly and accurately poured. This minimizes the possibility of failure and preserves the details of the final impression especially of the vestibular area. There were many methods of beading and boxing proposed by many authors. This technique can be applicable to most of the situation and is a simple, economic, and clean way to bead and box the impression. Another advantage of these devices is that it is reusable unlike other conventional materials used for beading and boxing.

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The significance of oral health in HIV disease

*Thabsheera PP, *Devu Prem, **Preejapremakumar, *** M.S. Deepa

*Intern, **Assistant Professor, ***Professor and HOD, Department of Oral Medicine and Radiology, Azeezia College of Dental Science and Research, Meeyannoor, Kollam

Send correspondence: Dr. Thabsheera PP E-mail: abshira123@gmail.com

Abstract

Human immunodeficiency virus is a major global health problem. Not only does it destroy the immunity of the infected person but also it results in an elevated tendency to acquire and manifest diseases that are considered usually resistible by the normal human body. With the inclusion of depletion in health, such a state also depletes the quality of living, which results in further complications as far as oral disease states are concerned. Oral lesions that are associated with this disease are important, since they affect the quality of life of the patient and are useful markers of disease progression and immunosuppressive. This article highlights the spectrum of oral manifestations of HIV and its management.

Keywords: HIV/AIDS, candidiasis, kaposi's sarcoma,

HIV is a condition caused by human immunodeficiency virus. The condition gradually destroys the immune system which makes it harder for the body to fight infections¹. Following initial infection a person may not notice any symptoms, or may experience a brief period of influenza-like illness. Typically, this is followed by a prolonged period with no symptoms. As the infection progresses, it interferes more with the immune system, increasing the risk of developing common infections such as tuberculosis, as well as other opportunistic infections, and tumors that rarely affect people who have uncompromised immune systems. These late symptoms of infection are referred to as acquired immunodeficiency syndrome (AIDS). This stage is often also associated with unintended weight loss.

The oral cavity is an important and frequently undervalued source of diagnostic and prognostic information in patients with HIV disease. A variety of conditions affecting oral mucosal tissues may arise either de novo or secondary to lesions elsewhere in the body and may provide the physician

with additional knowledge of individual patients' biological responses to their HIV infection. The mouth may also be a primary source of infection in any individual, which may spread via the mucosal associated lymphoid tissues or stimulate systemic inflammatory immune responses via chronic low grade entry of bacterially derived antigenic/virulence factors into the gingival vasculature^{2,3}. Indeed, the gingival and periodontal tissues are unique in structure, since they form the point at which internally linked hard tissues breach the epithelial surface rather like a compound bone fracture. This junction of tooth and gingiva provides a potentially weak barrier through which bacteria and their virulence factors (for example, lipopolysaccharide) may enter the connective tissues and systemic circulation. Maintaining a low microbial load within the mouth should be seen as an essential component of preventative treatment regimens in HIV positive patients.

When one considers that approximately 98% of lymphocytes reside in the tissues rather than circulation, then the clinical condition of the oral mucosa

and periodontal tissues may potentially provide valuable information, additional to viral load or CD4 counts, that may help in the management of HIV infected patients.

With the basic biology of both the oral mucosa and periodontal tissues in mind, the importance of oral lesions in HIV infection can be summarised as follows.

Oral lesions may:

- 1) Indicate HIV infection in previously undiagnosed cases⁴
- 2) Predict HIV disease progression⁵
- 3) Represent early clinical features of clinical AIDS (for example, oral Kaposi's sarcoma)⁶
- 4) Form traditional entry or exit determinants for antiretroviral therapy^{7,8}
- 5) Be determinants of anti-opportunistic infection therapy⁹
- 6) Be used in disease staging and classification⁶
- 7) Act as markers of other more subtle mucosal immunodeficiency states often missed on clinical examination¹⁰
- 8) Lead patients to seek treatment because of pain/discomfort or aesthetic reasons⁸
- 9) Individually correlate with CD4 levels in severely immunosuppressed patients¹¹
- 10) Correlate with CD4 levels when grouped together (for CD4 counts $<200 \times 10^6/l$)⁵

Classification of Orofacial Lesions

Associated with HIV there are two main classification systems of oral lesions associated with HIV infection. The first is based on the etiology of the oral lesions. According to this system, orofacial lesions are classified as bacterial, viral, or fungal infections or as neoplastic lesions or other conditions. The second, more widely used, system—recommended by the EC Clearinghouse on Oral Problems Related to HIV Infection and WHO Collaborating Centre on Oral-Manifestations of the Human Immunodeficiency Virus—classifies orofacial lesions into three groups according to the degree of their association with HIV infection.

A review of the dental literature shows that HIV-associated orofacial lesions have been considered

- clinical indicators of HIV infection in otherwise healthy, undiagnosed individuals;
- early clinical features of HIV infection;

- clinical markers for the classification and staging of HIV disease; and
- predictors of HIV disease progression.

Evaluation of oral health status is an important part of routine health care. A thorough oral examination is important at every stage in the management of HIV disease. It is also desirable to encourage collaboration among general medical practitioners, infectious-disease doctors, general and pediatric dentists, and oral pathologists to provide the best care possible for HIV-infected patients.

The protective role of the mouth:

The protective role of the mouth against HIV transmission was initially investigated owing to the rarity of HIV infection via the oral route¹², and is thought to be due to a variety of endogenous inhibitors present within saliva. In addition, the oral mucosa is generally much thicker than vaginal or rectal mucosa, and Langerhans cells are generally deep within the epithelium. Nevertheless, the oral barrier is broken when ulcers form, during gingival/periodontal diseases or with trauma, providing open lesions through which virus may pass. Shugars et al¹² reviewed endogenous salivary mechanisms and tabulated¹⁴, including high molecular weight mucins which may bind the HIV-1 virus making it insoluble¹³, and HIV specific antibodies which may inactivate the virus. Perhaps the most interesting is secretory leucocyte protease inhibitor (SLPI) defined in 1986¹⁴ as a protein active against neutrophil proteases and secreted by non-ciliated epithelial cells of mucosal surfaces. Recently, the inhibitory activity of SLPI against HIV-1 infection of monocytes has been demonstrated in a number of reports¹⁵ and appears to be effective only during viral infection of such target monocytes. It does not block initial interaction of the virus and CD4 receptors, or affect reverse transcription, virus assembly, or budding¹⁵ and seems to function between CD4 binding and reverse transcription. The activity of SLPI and other endogenous salivary inhibitors of HIV appear to afford protection against infection, despite reports of recovery of viral RNA and proviral DNA from saliva.¹²

The HIV/AIDS pandemic continues to plague the world dental professionals have an important task of determining accurate diagnosis of oral manifestation of HIV and choosing proper treatment

for each case. HIV related oral abnormality occurs in 30-80% of the affected patients population oral findings are the early signs of HIV infection and for individuals with unknown HIV status may suggest possible HIV diagnosis person diagnosed with HIV, who are get in treatment, the presence of certain oral findings may predict progress to AIDS. People with HIV/AIDS have an increased risk for oral health problems because HIV/AIDS weakens the immune system and makes it hard to fight off infection

While nearly all oral disorders associated with HIV infection also occur in other conditions characterized by immune suppression, no other condition is associated with as wide and significant a spectrum of oral disease as in HIV infection. Based on standard classification and diagnostic criteria, common HIV-associated oral disorders can be broadly classified into four categories.

1) Infections (Fungal, Bacterial, Viral)

The most common HIV-related oral lesion is candidiasis pseudomembranes form characterized by creamy yellow curd like plaques that can be easily removed. Often leaving a red raw base, Erythematous form is characterized by reddish macular lesion. Angular cheilitis affected the labial commissures and results in cracking ulceration and pseudomembrane formation

Hyperplastic candidiasis appear white and non-scrapable.

Oral candidosis may be the first presenting sign of HIV disease and is an important marker of its progression. Although oral candidosis is regarded as being associated with reducing CD4 counts, it may also occur very early in the course of the infection. There are several distinct variants of HIV associated oral candidosis. Pseudomembranous candidosis (thrush), presents as white/cream plaques easily removed from the underlying mucosa. It may occur at any intraoral site including the oropharynx. Angular cheilitis presents at the anterior commissures as red, cracked, and fissured lesions, unilaterally or bilaterally, while chronic hyperplastic candidosis may also occur at this site although in HIV disease, it tends to occur more buccally. Classically, chronic hyperplastic candidosis appears as a white or a red and white speckled lesion that is adherent. It also has malignant potential. Erythematous candidosis is normally associated with the wearing of den-

tures, broad spectrum antibiotics, or corticosteroid therapy in the general population. In HIV infection, it presents on the dorsum of the tongue and palatal mucosa, as an area of erythema that may also contain pseudomembranous candidosis. Of the four variants described, acute pseudomembranous and erythematous candidosis are the most prevalent, occurring in 20–25% of patients with HIV infection. The pathogenesis of HIV associated oral candidosis may involve increased adhesiveness, the ability to invade mucosal surfaces encouraged by hyphal formation, thigmotropism and protease secretion, acquisition of virulent strains, and phenotypic switching. *Candida albicans* is the most common intraoral species but other species including *C. tropicalis*, *C. glabrata*, and *C. krusei* have also been isolated.

Clinical appearance. Oral candidiasis is often observed in one of the following four clinical forms: erythematous (atrophic) candidiasis, pseudomembranous candidiasis, hyperplastic candidiasis, and angular cheilitis. Erythematous (atrophic) candidiasis appears clinically as multiple small or large patches, most often localized on the tongue and/or palate.

Pseudomembranous candidiasis (oral thrush) is characterized by the presence of multiple superficial, creamy white plaques that can be easily wiped off, revealing an erythematous base. They are usually located on the buccal mucosa, oropharynx, and/or dorsal face of the tongue. Hyperplastic candidiasis lesions appear white and hyperplastic and cannot be removed by scraping.

This form of oral candidiasis is rare in HIV infected individuals.

Viral infections:

Herpes simplex virus- Recurrent HSV infection results in ulceration and pain of longer duration and painful regional lymphadenopathy. Primary HSV infection is relatively uncommon in HIV infected adolescents and adults owing to the high prevalence of antibody to HSV (seropositivity is 90–95% in homosexual men and injecting drug users). In recurrent oral herpes in HIV positive individuals the ulceration is again shallow and widespread affecting the buccal mucosa, tongue, and lips where there may be crusting and bleeding similar in appearance to erythema multiforme. The incidence

of HSV-1 and 2 oral ulceration is reported to be between 0.6–9% in HIV positive patients and lesions can be more severe and prolonged.

Clinical appearance: HSV infection appears as a crop of vesicles usually localized on the keratinized mucosa (hard palate, gingiva) and/or vermillion borders of the lips and perioral skin. The vesicles rupture and form irregular painful ulcers. They may interfere with mastication and swallowing, resulting in decreased oral intake and dehydration.

Human papilloma virus. Verruca vulgaris (common wart) resembles wart) and well circumscribed numerous soft, flat sessile, non papillomatous papules and distributed throughout oral mucosa

Clinical appearance: Oral warts may appear cauliflower-like, spiked, or raised with a flat surface. They are asymptomatic. The most common location is the labial and buccal mucosa. The most common clinical presentation is multifocal flat lesions resembling focal epithelial hyperplasia (Heck's disease).

Oral Hairy leukoplakia (OHL) It appears as an asymptomatic adherent white patch with vertical corrugations most commonly on the lateral border of the tongue. OHL is associated with Epstein-Barr virus infection and occurs most commonly in individuals whose CD4 lymphocyte count is less than 200/mm³. The incidence of OHL is reported to be 20% in CDC II individuals, increasing as CD4 counts fall and patients' clinical conditions deteriorate; it is thought to signal a more rapid progression to clinical AIDS.¹⁶

Clinical appearance. OHL presents as white, thick patches that do not wipe away and that may exhibit vertical corrugations with a hairlike appearance. The lesions usually start on the lateral margins of the tongue and sometimes inside the cheeks and lower lip. They may be unilateral or bilateral, and they are asymptomatic. OHL is often associated with oral candidiasis.

Oral cytomegalovirus infection appears as a solitary, chronic deep ulceration most commonly involving the buccal and labial mucosa.

Bacterial Infections:

The most common oral lesions associated with bacterial infections are linear gingival erythema, necrotizing ulcerative periodontitis, bacillary epithelioid angiomatosis etc, In the case of periodontal infections, the bacterial flora is no different from

that of healthy individual with periodontal disease.

a) Linear gingival erythema- A distinctive fiery red band of marginal gingival tissue without ulceration, prone to bleeding. The lesion redness is disproportional to the amount of plaque and persists after removal of plaque. LGE is a clinical term that describes the appearance of the gingival tissues, rather than representing a true diagnosis. It is characterised by a broad 2–3 mm fiery red band along the margin of the gingival tissues and diffuse or petechial-like lesions from the attached gingivae and oral mucosa.

b) Necrotizing ulcerative gingivitis- involves primarily face gingival, crest of gingiva and interdental papilla, painful hyperemic gingiva and sharply punched out crater like lesions of interdental papilla, covered by grayish pseudomembrane. In NUG the underlying immunosuppression is HIV induced, whereas in "traditional" ANUG the immunosuppression may be induced by stress or poor diet.

c) Necrotizing ulcerative periodontitis- characterized by recession and increased attachment loss with shallow probing depth, bleeding, tissue sloughing loss of interdental papillae, fetid odor, periods of quiescence. ANUG or NUG (formerly HIV periodontitis) is believed to represent a deeper seated and more chronic form of ANUG, spreading to cause destruction of periodontal ligament and loss of adjacent alveolar bone.

2. Neoplasms:

a) Kaposi's Sarcoma: It is the most common intraoral malignancy associated with HIV infection. It appears as red purple macule, nodule or as nodular mass. The palate is the most common site. It is especially common among homosexual and bisexual males and is rarely found in HIV-infected women. Kaposi's sarcoma (KS) is the most prevalent oral neoplasm in HIV infected patients, with 22% of KS lesions being present intraorally, 45% of patients presenting with both skin and oral lesions¹⁷ and the oral cavity being the first site of involvement in up to 60% of cases that present with multiple sites.¹⁸ Gingival involvement may lead to underlying bone destruction and tooth mobility⁴. Lesions may be macular or papulonodular, commonly light or dark red in colour though they may also have a blue colour and some are unpigmented. They tend to be multicentric or symmetrical and the site of the

lesion may indicate its likelihood of being a primary or secondary lesion. Palatal KS is recognised as being an important predictor of visceral lesions. There is some evidence that oral KS lesions are associated with patients who have lower CD4 counts than those with skin lesions alone.

b) Non –Hodgkin’s lymphoma- It is usually seen in late stages with CD4 lymphocyte counts of less than 100/mm³. It is, however, the second most common malignancy in this condition, with 4% of AIDS patients developing NHL during the course of their disease.

It Appears as rapidly enlarging mass and most commonly on the palate/gingiva

3. Immune – medicated Oral lesions:

In HIV there is immune suppression of cell mediated immunity. These can lead to various oral changes.

a) Aphthous ulcers- Most common ulcers are wither large solitary or multiple chronic deep and painful. HIV associated aphthae tend to be more severe in terms of their number, frequency, pain, and duration than for the general population.

b) Necrotizing stomatitis: is an acute painful ulceration which often exposes the underlying bone and leads to considerable tissue destruction.

Iatrogenic ulceration may result from the use of a variety of drugs including foscarnet and interferon, while secondary effects of drug therapy, such as zidovudine induced agranulocytosis or as a consequence of the use of cytotoxics, may also cause oral ulceration. Stevens–Johnson syndrome and toxic epidermolysis have also been reported following the administration of ketoconazole and sulphonamides. Non-ulcerative drug induced problems will be discussed briefly later.

Parotid Gland Disease

In HIV there can be gland enlargement and diminished flow of secretions. The enlargement typically involves the tail of the parotid gland or the submandibular gland and it may present uni or bilaterally with periods increased or decrease size. The onset of salivary gland involvement appears to be independent of the stage of the HIV infection and the degree of immunodeficiency. However, patients may have associated extraglandular comorbidity including lymphoid interstitial pneumonitis, gastritis, and hepatitis. HIV associated salivary gland disease is seen most commonly in children, up to 58% of them developing salivary gland enlargement and is uncommon in HIV infected adults. The pathogenesis of HIV associated salivary gland disease remains obscure.

Clinical appearance: Oral warts may appear cauliflower-like, spiked, or raised with a flat surface. They are asymptomatic. The most common location is the labial and buccal mucosa. The most common clinical presentation is multifocal flat lesions resembling focal epithelial hyperplasia (Heck’s disease).


4. Xerostomia





It is common in HIV disease, most often as side effect of antiviral medications or other medications prescribed or patients with HIV infections. The oral dryness is a significant risk factor for caries and can lead to oral candidiasis, ad occlusal injury, dysphagia and is often associated with pain and reduced oral intake of food






Oral changes as adverse effects of antiretroviral therapy



Oral hyperpigmentation can be observed if a patient is on zidovudine. Erythema multiforme, paraesthesias, taste disturbances has been reported.

Treatment of oral lesions : ^{19,20,21}

Oral lesion	Treatment for Adults	
Oral candidiasis (Erythematous, Pseudomembranous and Hyperplastic)	<ul style="list-style-type: none"> • Nystatin (mycostatin) • Oral gel: apply gel q8h or q6h, for 10-14 days • Cream: apply q12h, for 10-14 days 	

	<p>Systemic</p> <ul style="list-style-type: none"> • Nystatin (mycostatin 400000-600000 u q6h, for 14 days) • Ketoconazole (nizoral) 200-400mg PO q.d. • Fluconazole (diflucan) 50-100mg PO q.d • Itraconazole (sporanox) (capsules or solution) 200mg PO qd for 7 days • Amphotericin B 10 mg IV q6h, for 10 days 	
	<p>Prophylaxis</p> <ul style="list-style-type: none"> • Fluconazole 100mg PO, for long period 	
Angulae cheilitis	<p>Topical</p> <ul style="list-style-type: none"> • Nystatin-triamcinolone (mycolog) ointment applied on the affected areas after meals and at bedtime • Clotrimazole 1% (Mycelex) cream • Miconazole 2% cream applied q12h on the affected areas, for 1-2 weeks 	
Herpes simplex virus (HSV) infection	<p>Systemic</p> <ul style="list-style-type: none"> • Acyclovir (zovirax) 800mg PO q4h, for 10 days • Foscarnet 24-40 mg/kg PO q8h, for resistant herpetic lesions 	
Linear Gingival Erythema	<p>Local</p> <ul style="list-style-type: none"> • Scaling and root planning • 0.12% chlorhexidine gluconate (periogard peridex) 0.5 oz q12h rinse, for 30 sec. and spit 	
xerostomia	<p>Topical</p> <ul style="list-style-type: none"> • Chewing or sucking sugarless candy • Frequent sips of water • Commercial artificial saliva substitutes • Topical fluoride products <p>Systemic</p> <ul style="list-style-type: none"> • Pilocarpine (salagen) 5mg PO-q8h before meals; it may increase to 7.5 mg PO q8h 	

Parotid enlargement (of major salivary glands)	<p>Systemic</p> <ul style="list-style-type: none"> • Nonsteroidal anti- inflammatory • Analgesics • Antibiotics • steroids 	
Oral hairy leukoplakia (OHL)	<p>Local</p> <ul style="list-style-type: none"> • podophyllin resi 25% 1-2 applications on the affected areas, at 1 week apart • retinoic acid (tretinoin) • surgical excision <p>Systemic</p> <ul style="list-style-type: none"> • acyclovir (zovirax) 800mg PO q4h or q6h, for 14 days • famciclovir 500mg POq8h, for 5-10 days • valacyclovir 1000mg PO q8h, for 5-10 days 	
<p>Necrotizing ulcerative gingivitis (NUG)</p> <p>Necrotizing ulcerative periodontitis (NUP)</p> <p>Necrotizing ulcerative stomatitis (NS)</p>	<p>Local</p> <ul style="list-style-type: none"> • debridement of affected areas • irrigation with povidone iodine (10% betadine) • 0.12% chlorhexidine gluconate (peridex, periogard) mouthrinse q12h 	 <p>NUG</p>  <p>NUP</p>  <p>NS</p>

<p>Oral ulcers (recurrent aphthous ulcers)</p>	<p>Topical</p> <ul style="list-style-type: none"> • Triamcinolone in carboxymethyl cellulose 0.1% paste • Betamethasone phosphate: -0.5 mg tablet dissolved in 10ml mouthwash and rinse q4h -spray on ulcer (1 spray =100 micrograms) upto 800microgram • Fluocinonide (lidex) 0.05% ointment applied on ulcer q4h • Dexamethasone elixir (0.5mg/ml) rinse and expectorate <p>Systemic</p> <ul style="list-style-type: none"> • Prednisolone starting at 30-40 mg PO daily with taper over 1 month for severe disease resistant to topical agents • Thalidomide 200mgPO daily 	
<p>Oral warts</p>	<p>Topical</p> <ul style="list-style-type: none"> • Podophyllin resin 25% applications q6h for long period • Surgical excision • Laser ablation • Cryotherapy <p>Systemic</p> <ul style="list-style-type: none"> • Cimetidine (tagamet) 600mg POq6h, for long periods(months) • Interferon alfa- n3 sc/im 3000000 u (1 ml) qwk, for several weeks 	

Dental Patient Management

A comprehensive intraoral soft tissue, periodontal and hard tissue examination should be conducted at an HIV-positive patient's initial assessment. Dentists should continuously monitor dental and oral health for disease progression. If any oral manifestations of HIV are present, the first priority is to relieve pain and treat infections. To help prevent further disease, dentists can provide counseling about modifiable risk factors, such as use of tobacco, alcohol, or other drugs that may increase risk of oral abnormalities or complications, as well as work with the patient to implement oral hygiene regimens. Prevention is even more important for HIV-positive patients, who are more susceptible to

oral disease.

All dental practices should be able to provide routine dental care for adult or pediatric HIV-positive patients. Nearly all patients with HIV are able to tolerate routine dental care and procedures, including oral surgery. Still, dental treatment planning must be done on an individual basis, in conjunction with consultations with the patient and their physician as appropriate. HIV and antiretroviral therapies may be associated with abnormal bleeding, glucose intolerance, or hyperlipidemia, which may be identified through consultation with the patient and their physician. Other conditions that may require modification of dental treatment are reduced platelet count <60,000 cells/mL, which may

affect clotting, or white-blood-cell neutrophil counts <500 cells/mL, which may require antibiotic prophylaxis. However, antibiotic use may predispose patients to adverse drug reactions, superinfection and drug resistant microorganisms, so antibiotics should be used judiciously, not routinely. Indications for dental extractions and other oral surgical procedures are the same for HIV-positive patients as for any other patient. Preoperative scaling may be performed to help reduce the risk of postoperative complications. All procedures must be performed in a manner to minimize bleeding and avoid bringing oral pathogens into the deeper facial planes and oral spaces.

The lack of awareness and effect of antiretroviral drugs could be responsible for depleted oral health of HIV positive individuals. At the primary level of oral care, prevention of oral diseases takes priority. Prevention involves improving oral hygiene awareness through health education at the individual and community levels. Oral health education messages should be made visible in all community forums. Home-based care providers should undergo training in basic oral hygiene practices so that they can impart these to patients under their care. Use of simple materials such as warm salty mouth rinse or commercial mouthwash (chlorhexidine) can improve basic oral hygiene cost-effectively. Patients whose manual dexterity is intact should be taught appropriate brushing techniques. Other adjuvant oral hygiene methods, such as flossing and use of interdental toothbrushes, will depend on the availability and affordability of supplies.

Conclusion :

The above-mentioned list is not the complete panorama of manifestations which can be observed in an HIV patient but only an illustration of important lesions. Virtually everyone infected with HIV will have oral disease during their illness conditions such as candidiasis, oral hairy leukoplakia and kaposi's sarcoma frequently constitute the sentinel event leading to HIV diagnosis. As some oral lesions are independent marker for deteriorating immune function, their prompt identification has prognostic and aspectic implications. As understanding of the recognition, significance and treatment of said lesions is essential for long term evaluation and well-being of people living with HIV/AIDS.

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Robotics in Dentistry

***Meenu Joseph, *Thabseera PP, *Theertha Mohan, **MS Deepa**

*P.G. Student, ** Professor and Head of the Department, Department of Oral Medicine and Radiology, Azeezia Institute of Dental Science and Research, Meeyannoor, Kollam

Send correspondence: Dr. Meenu Joseph, E-mail: meenujoseph93@gmail.com

Abstract

The growing interest in the future of dental applications of robotic dentistry is leading to the emergence of a new field called Nanodentistry. Robots can supposedly induce oral analgesia, Desensitize tooth; manipulate the tissue to re-align and straighten irregular set of teeth and to improve durability of teeth. Further it is possible that robots may be used to do preventive, restorative, curative procedures in future. Using characterization tools, a variety of oral diseases can be understood at the molecular and cellular levels and thereby prevented. Nano-enabled technologies thus provides an alternative and superior approach to assess the onset or progression of diseases, to identify targets for treatment interventions as well as the ability to design more biocompatible, microbe resistant dental materials and implants. This article highlights on brief overview on robotics in dentistry.

Key words: robotics, dentistry, nanotechnology

Introduction

Robotics is the branch of technology that deals with the design, construction, operation, and application of robots as well as computer systems for their control, sensory feedback, and information processing. The term robotics was introduced by writer Isaac Asimov in his science fiction book, I Robot, published in 1950¹. Use of robotics in dentistry is caving in with all the necessary technologies which could further be developed and could be easily adapted. Some of the technologies are already being used in dentistry such as image based simulation of implant surgery, followed by the use of surgical guides and creating digital impressions of

preparations using an intraoral scanner, after which a milling device produces the restoration.

Applications

Robotics has got a wide spectrum of applications in medical and dental field

- Medical field
- Dental field

Robotics in medical field

Following the developments in industrial robot technology, robotics has found its way into the medical field and is used in a range of surgical disciplines. It has been decades since robots have been in the field of medicine. It all started way back in 1985, when a robot, the PUMA 560 was

used to place a needle for a brain biopsy using CT guidance². In 1988, the MROBOT, was used to perform prostatic surgery by Dr. Senthil Nathan at Guy's and St Thomas' Hospital, London. Further, the first complete robotic surgery took place at The Ohio State University Medical Center under the direction of Dr. Robert E. Michler, Professor and Chief, Cardiothoracic Surgery³. Advancements poured in July 1998 when a reconnection of the fallopian tubes operation was performed successfully in Cleveland using ZEUS. On May 12, 2008, the first image-guided MR-compatible robotic neurosurgical procedure was performed at University of Calgary by Dr. Garnette Sutherland using the NeuroArm. Also, revolution came in when in January 2009, the first all-robotic-assisted kidney transplant was performed at Saint Barnabas Medical Center in Livingston, New Jersey by Dr. Stuart Geffner. In September 2010, the first robotic operation at the femoral vasculature was performed at the University Medical Centre Ljubljana by a team led by Borut Geršak. The robot used was the first true robot, meaning it was not simply mirroring the movement of human hands, but was guided by pressing on buttons. This technology thus provides an intervention as well as the ability to design more biocompatible.⁴

Robotics in dental field

A) Dental patient robot

Dental therapy skills often depend on the competence and ability of clinicians and it is necessary for them to have extensive experience using methods and models that accurately reflect actual treatment procedures and conditions. 'Phantoms' consist of simple functional cephalic region and arrangement of teeth which is different from actual patients. As a result concept of dental patient robot was initiated in Japan.⁵

1. Showa Hanako

Tokyo's Showa University engaged robotics company Tmsuk to manufacture the realistic robot which is designed to simulate a number of typical patient gestures and responses, allowing dental

students to experience what it's like to work with a real patient. Showa Hanako² is said to be a more user friendly and functional replacement to Showa Hanako¹, which was presented in March 2010. "Love doll" maker Orient Industry is responsible for the silicone skin (this replaces the PVC skin of the previous model) and mouth lining, which increases the realistic feel and prevents water from getting into the machinery. It can blink, roll its eyes, sneeze, shake its head, cough, move its tongue and even get tired when having to keep its mouth open for too long. Interestingly, the robot is also capable of simulating a gag reflex, which is quite frequent during dental procedures. Japanese engineers also used a speech recognition technology developed by Raytron to facilitate conversation capability.^{6,2}

2. Geminoid DK

Hiroshi Ishiguro, (Professor at Osaka University) together with his colleagues at Japan's Advanced Telecommunications Research Institute International, created a new robot called Geminoid DK. The most interesting fact about the invention is that it represents the accurate replica of Aalborg University Professor Henrik Scharfe. It is worth mentioning that the robot is the first in a series based on personalities outside Japan. According to the inventor, the machine is intended to push forward android science and philosophy, in searching for answers to fundamental questions. The Geminoids can be remotely controlled, being equipped with advanced motion-capture technology. Another robot in the Geminoid family, the Geminoid-F, is capable of mimicking human facial expressions and even laughing. Other robots, such as the HRP-4, have learned to mimic human expressions and sound while singing.

3. Simroid

It is a super realistic dental training robot for dentists developed at The Nippon Dental University Kokoro with dental equipment maker Morita Manufacturing. It is actually an upgrade to Simuloid, a less sophisticated dental training robot created back in 2007. Its creators claim that Simroid, a next-gener-

ation dental patient simulator, has been developed to provide more emotional feedback to dentists in training. Sensors in and around the mouth allow it to feel simulated pain and discomfort, which it will react to negatively, making students more conscious of their technique. It can even react with discomfort when the dentist-to-be's elbow comes into contact with its breast. A new artificial skin has been used instead of silicone, which can easily tear when the robot has to open its mouth wide, and Simroid is now been equipped with far better communication skills. Speech recognition capabilities allow it to respond and react to questions or commands. It's even able to rate and evaluate their treatment, with two cameras monitoring the student's every move, and readings from its sensors being recorded throughout the procedure. This robot patient is manufactured by Kokoro, who also make the Actroid line of lifelike humanoid robots. It has been developed to improve student patient communication skills by emphasizing attitude rather than technique.^{2,6}

Dental Nanorobots

Nanorobots are miniature devices measured on the scale of nanometers (1 nm equals one millionth of 1 mm) constructed with nanoscale or molecular components. The possible treatment options of using nanorobots may include the application of nanotechnology to local anesthesia, dentition re-naturalization, the permanent cure of hypersensitivity, complete orthodontic realignment in a single visit, covalently bonded diamondized enamel, and continuous oral health maintenance using mechanical dentifrobots. Dental nanorobots could be used to destroy caries causing bacteria or to repair tooth blemishes where decay has set in, using computer to direct these tiny workers in their task. When we gain access to hold nano robots we will be able to treat rapidly a number of diseases.^{4,6}

Endo Micro Robot

Micro endodontic robot can provide safe, accurate, and reliable root canal treatment for patients by preventing problems identified with conventional techniques such as inadequate opening and overzealous tooth removal. With online monitoring and

intelligent management, this machine will perform the automatic probing, drilling, cleaning, and filling of root canal.

Specific objective for microrobot design includes:

1. Reducing the reliance on the skills of the dentist
2. Minimizing human error
3. Offering a method for precise diagnosis and treatment.⁷

The Advanced Endodontic Technology Development project consists of four subjects:

- (1) Development of a technique to thoroughly assess the tooth's condition using 2 dimensional x-ray images to build a computer 3-D tooth model, displaying state-of-the-art computer graphics;
- (2) Development of an automatic prescription system from the 3-D root canal model, using computer-aided treatment procedure planning;
- (3) Design and build a smart multi-purpose precision micro machine to perform automated root canal treatment;
- (4) Develop a new ultrasonic cleaning tool with pressure assisted jetting/vacuum waste removal.

Features of Micro Endo Robot

- A micro-position and orientation adjustment to ensure that the tools start at a precise point;
- An automatic feed rate and travel distance control to ensure that the tools can reach the required canal depth and stop at a designated point;
- Built-in micro sensors to monitor the probing and drilling/reaming process;
- Apex sensing and control to prevent root perforations or the potential to over shoot (exceeding the apex of the canal);
- Flexible drills or files to allow for cleaning and shaping curved canals.
- Vacuum attachments capable of sucking the debris or loose tissue from the root canal and/or pressurized solution jets to flush the chips away.
- A preliminary quantitative study established the design requirements.⁷

Dental hypersensitivity

Natural hypersensitive teeth have eight times higher surface density of dentinal tubules and diameter with twice as large than nonsensitive teeth. Reconstructive dental nanorobots, using native biological materials, could selectively and precisely occlude specific tubules within minutes, offering patients a quick and permanent cure. On reaching the dentin, the nanorobots enter dentinal tubular holes that are 1 to 4 μm in diameter and proceed toward the pulp, guided by a combination of chemical gradients, temperature differentials and even position of navigation, all under the control of the onboard nanocomputer as directed by the dentist. There are many pathways to travel nanorobots from dentin to pulp. Because of different tubular branching patterns, tubular density may present significant challenge to navigation. Assuming a total path of length of about 10 mm from the tooth surface to the pulp and a modest travel speed of about 100 μm /second, Nanorobots can complete the journey into the pulp chamber in approximately 100 seconds. The presence of natural cells that are constantly in motion around and inside the teeth including human gingival, pulpal fibroblasts, cementoblasts, odontoblasts, and bacteria inside dentinal tubules, lymphocytes within the pulp or lamina propria suggests that such journey be feasible by cell-sized nanorobots of similar mobility.^{4,2}

Surgical Robots

A surgical robot system for maxillofacial surgery has been developed with which the surgeon interactively programs the robot during the surgery after which the robot performs the preprogrammed tasks. Robotic technique is being used for milling of bone surfaces, drilling of holes, deep saw osteotomy cuts, selection of osteosynthesis plates, bending and intraoperative positioning in defined position, and orthognathic surgery planning.^{3,6}

Local nanoanaesthesia

In the era of nanodentistry a colloidal suspension containing millions of active analgesic micron-size dental robots will be instilled on the patient's

gingiva. After contacting the surface of crown or mucosa, the ambulating nanorobots reach the pulp via the gingival sulcus, lamina propria and dentinal tubules. Once installed in the pulp, the analgesic dental robots may be commanded by the dentist to shut down all sensitivity in any particular tooth that requires treatment. After oral procedures are completed, the dentist orders the nanorobots to restore all sensation, to relinquish control of nerve traffic and to egress from the tooth by similar pathways used for ingress.²

Robotics and implant dentistry

Dental implant is a surgical treatment of tooth root replacement which is the most commonly used in prosthetic dentistry. The use of robotic system for generating motion and force transmission patterns will facilitate the standardization of procedures in evaluating implant designs.⁷

Rosy

It is a new computer- aided intra-operative guidance system for implant surgery. For implant planning and surgery with the robot system Rosy; five different work processes are required.^{3,5}

Robotic dental drill

Developed by Tactile Technologies, based in Rehovot, Israel Procedure consists of clamping a frame onto a patient's jaw and very thin needles penetrate the gum to determine the location of the bone. This data is wirelessly transmitted to a PC, which combines it with CT scan data to configure a set of drill guides. The guides are then attached to the frame and finally the dentist presses a button to start the drilling in the precise location required. Once activated the drill is self-guiding but the practitioner can still alter the drilling process at any time. The system causes fewer traumas to the patient.³

Orthodontic treatment

Orthodontic nanorobots could directly manipulate the periodontal tissues, allowing rapid and painless tooth straightening, rotating and vertical repositioning within minutes to hours. Nanotechnology will have future medical applications in the field of nanodentistry. Nanodentistry

will make it possible to maintain near-perfect oral health through the use of nanomaterials, biotechnology, and nanorobotics. Through this it will be possible to provide high-quality dental care to the millions of the world's population who currently receive no significant dental care. Reconstructive dental nanorobots could selectively and precisely occlude specific tubules within minutes, offering patients a quick and permanent cure. Nanodentistry could also play a vital role in natural tooth maintenance. The appearance and durability of teeth may be improved by replacing upper enamel layers with covalently bonded artificial materials such as sapphire or diamond, which have 20 to 100 times the hardness and strength of natural enamel. A subocclusal-dwelling nanorobotic dentifrice delivered by mouthwash or toothpaste could patrol all supragingival and subgingival surfaces at least once a day, metabolizing trapped organic matter into harmless and odorless vapors and performing continuous calculus debridement.²

Orthodontic arch wire bending robots

This technology for automatically bending orthodontic wires was devised by Werner Butscher. The bending apparatus is known as Suresmile arch wire bending robot²³. It is an all new imaging system which uses 3D imaging and computer techniques for diagnosis and treatment planning and also the application of CAD CAM improves efficiency and quality of work^{24,25}. The various devices like lingual arch wire manufacturing and design aid (LAMDA) have been established by Gilbert. It has movement only in XY plane. Another type of arch wire bending robot is based on MOTOMAN UP6 is composed of PC and arch wire bending actuator. This connects with the MOTOMAN robot end and is used to stabilize and bend the arch wire. The various other things analyzed by this robot include bending position, angle of optimization of the arch wire, the kinematics and bending properties. Cartesian type is another type of arch wire bending robot which consists of base, rotary, feed and supporting structure of arch wire bending die and bending mechanism.

Tooth arrangement robot

The traditional way of complete denture manufacturing is manual and only high level dentist and skilled technician can do this work well.⁸ Robotic system is used for the manufacturing of complete dentures. It was developed using 6 degree of freedom CRS robot and produced in Canada. The various functions of this software are to choose and create medical history files of the patient followed by drawing a jaw arch and dental arch curves and finally according to the jaw arch parameters adjust the dental arch curve. It also displays the 3D virtual dentitions on the screen with a careful observational environment and aids in modification of the individual tooth posture. Its functions are to adjust the tooth arrangement initial position for the robot, create control data profile and control the robot for tooth arrangement operations. This robot system was used in the manufacture of upper and lower complete dentures. This scheme of tooth arrangement multifinger hand is designed based on MOTOMAN UP6 robot. These hands consist of three fingers for working in the three degrees of freedom and thus are able to achieve the tooth arrangement necessities theoretically. There are around 14 individual manipulators on the dental arch curve. This manipulator assist every tooth by tooth arrangement helper and supplies the controls with six degrees of freedom to modify each tooth for its position along X, Y, Z, lingual rotation and near-far medium directions. The manufacturing of complete dentures takes only 30 minutes using this robot system and the precision and accuracy of each robotic system is measured.⁹

Conclusion

Robotics has crept into every technological industry including health sciences and dentistry. It helped to reduce the human resources and work in a much more effective way. The emergence of robotics in the field of dentistry could open the door to various technical aspects. Robotics can't be called as the future anymore, it is the present practice in dentistry, which is flourishing day by day. Once

the application of robots in dentistry reach at its growth, the future of dentists is uncertain and is questionable.

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IDA Attingal Branch Reports & Activities

1. FIRST EXECUTIVE COMMITTEE MEETING IDA ATTINGAL BRANCH 2019

The First Executive committee meeting for the year 2020 of IDA Attingal branch was hereby called for on the following date and Time.. Date: 10th Jan 2020, Time 7:00pm, Venue : Al-Saj, Kazhakuttam

2. Second EXECUTIVE COMMITTEE MEETING IDA ATTINGAL BRANCH 2019

The second Executive committee meeting for the year 2020 of IDA Attingal branch was hereby called for on the following date and Time.. Date: 28th Feb 2020, Time 7:00pm, Venue : Lions club, Attingal

CDE

First CDE of IDA Attingal branch was held at Hotel Savithri on February 9th from 9am to 5pm. It was a Inter branch CDE Faculty was Dr. Jojo Kottoor. Topic was Basics to Advanced Endodontics. 50 delegates participated. Among them 15 took part in Hands on program.

First webinar held on April 8th @10.30. Topic: Infection control in Dental Practice. Faculty: Dr. Eapen Thomas. 90 IDA Members participated. Webinar was for 4hrs.

Second webinar of IDA Attingal was held on 26th April @10.30am. Topic: Tips for Planning of Occlusion in Implant and Fixed Prosthesis - A Clinicians View. Faculty : Dr. Sudeep Saratchandran. 50 IDA members participated and webinar ended by 12.30.



WDC

As a part of children health month 2020 february 12, Indian Dental Association Womens Wing Attingal branch, organized an Oral Health awareness program and Dental check-up camps for students of government LPS Pedikulam Pulimath.

The meeting was chaired by Dr. Shameema Nizam, WDC chairperson, and addressed the meeting with welcome speech the Panchayath President Mr. Vishnu inaugurated the dental camp PTA president Mr. Anuroop, Headmistress Smt. Sheelamani, PTA executive member Mr Premkumar addressed the meeting. More than hundred students and their parents were attend the program

Dr. Abhilash GS, Kerala state president addressed the meeting and Dr. Biju A Nair, KDC member addressed the meeting Dr. Swathy gave a motivational visual awareness and talk for the kids.

Dr. Abin A, executive member, Dr. Meera Murali [hon secretary], Dr Swathy, WDC member, Dr Shameema Nizam, WDC Chairperson done the dental check-up.

Vote of thanks given by Dr. Meera Murali the programme was really appreciated by the teachers and parents. Heart felt thanks to IDA Attingal branch especially to women's wing.

As a part of International Womens Health Day,



February 12th 2020, Indian Dental Association Womens Wing Attingal Branch organised an awareness talk on the topic "Defining menstuiation through a new a us fain akle approach" among asha workers, female health staff (Kummil, Madathara, Mancode) on family health centre Mancode Chithra, the topic specified on how to reduse synthetic sanitary

pads and its replacement and using eco-friendly materials especially menstrual cups.

The talk presented by Mrs. Devika Jaysell the meeting was chaired by Dr. Shameema Nizam (WDC, Hon. Secretary) gave vote of thanks.

Dr. Rekha Rakesh, Dr. Adheena Chandran (WDC members) attended the programme.

The programme was really informative to all women who attended. A heartfelt thanks to Indian Dental Association, Attingal branch, especially women's wing.

Programme 3

As a part of national Women's day, February 13th 2020, Indian Dental Association women's wing Attingal branch organized an oral health check up camp for mentally retarded girls of Bethsaida rehabilitation centre Kuriyodu.

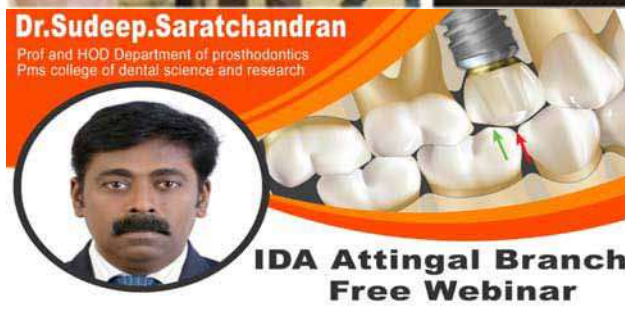
The meeting was chaired by Dr. Shameema nizam

(WDC chairperson) Dr. Abhilash GS inaugurated the dental check up camp, distributed dental paste among inmates. More than 35 inmates attended the camp.

Dr. Biju A Nair, KDC member announced the adoption procedure IDA Attingal branch adopted this centre as "oral health adoption center" for this year to meet their needs.

Sister Ivana gave a heartfelt thanks to IDA Attingal branch. Vote of thanks given by Dr. Meera Murali, WDC Secretary.

As a part of International Children Health month, February 13th 2020, Indian Dental Association Women's Wing Attingal branch organised an Oral Health Awareness program and Dental Check up camps for students of Amala Nursery School, Nilamel. 25 Students participated.



Dr Abhilash G.S, Dr Biju Nair, Dr Shameema Nizam, Dr Meera Murali done the check up camp, distributed dental paste. An awareness class took by Dr Meera.

As a part of International Women's Day 2020 March 8th Indian Dental Association, women's wing Attingal branch organised a "woman and children safety awareness programme" among students, teachers and parents of Govt Town UPS Attingal, Trivandrum. The meeting was chaired by Dr. Sherin Khalam (President, IDA attingal branch) the principal Sri. V. Radhakrishnan

done the welcome speech followed by the wonderful class of Adv. Hareesh (Munsif court, Attingal panel member of KELSA).

Dr. Shameema Nizam and Dr. Meera Murali were present in the programe Dr. Meera (WDC. Hon secratary) gave vote of thanks.

The programme was really informative to students, teachers and parents and also to know the importance of the day. A heart felt thanks to indian dental association, attingal branch especially to women's wing.





IDA HOPE

Why should I join IDA - HOPE ?

IDA HOPE is the only one scheme of its kind which provides Professional Protection & Social Security cover to its members.

PROFESSIONAL PROTECTION

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HOPE - Medi will safeguard your family against unexpected medical expenses.

HOPE - ASSURE

Hope - Assure offers extra cover (upto 25 lakh) in professional protection.

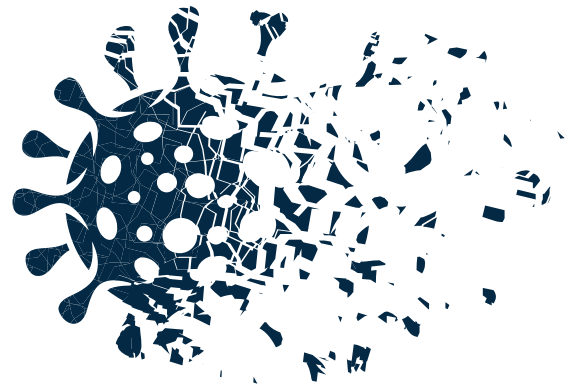
One can opt Insurance cover for their Clinic and House with a nominal additional premium amount.

**For more information please contact your Hope Representative
9895162606**



A GUIDANCE HANDBOOK OF INDIAN DENTAL ASSOCIATION KERALA STATE

COVID-19 PANDEMIC



**GUIDELINES AND RECOMMENDATIONS
for
DENTAL PRACTITIONERS AND AUXILIARIES**

VERSION 1.0



**Indian Dental Association
Kerala State Branch**





BACKGROUND

Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) is a new coronavirus that emerged in 2019 and causes Coronavirus Disease 2019 (COVID-19). SARS-CoV-2 is highly contagious. It varies from other respiratory viruses in that it appears that human-to-human transmission occurs 2 to 10 days prior to the individual becoming symptomatic.

The virus is passed from person to person through respiratory secretions that land on surfaces within two metres of the infected person. SARS-CoV-2 remains viable for at least 24 hours or more on hard surfaces and upto eight hours on soft surfaces. **

The Virus is transferred from person to person through hand contact on a contaminated surface then touching the mouth, nose or eyes. Aerosol airborne infected particles created during a sneeze or cough remain viable in the air for at least three hours. These airborne particles of SARS-CoV-2 can then be inhaled by another person or land on the mucosal membranes of the eyes.

Individuals with Covid-19 can present with influenza like illness and respiratory tract infection demonstrating fever (89%), cough (68%), fatigue (38%), sputum production (34%) and/or shortness of breath (19%). Anosmia (loss of smell) and Ageusia (loss of taste) are also common findings.

The spectrum of disease severity ranges from an asymptomatic infection, mild upper respiratory tract illness, severe viral pneumonia with respiratory failure and/or death. Current reports estimate that 80% of cases are asymptomatic or mild; 15% of cases are severe (infection requiring oxygen); and 5% are critical requiring ventilation and life support. At present the mortality rate is 3 to 5% with new reports of up to 9%, in contrast to influenza which is around 0.1%.

Based on emerging data, individuals at higher risk of developing severe COVID-19 disease requiring hospitalization and/or ICU support are those who are older, male, and have at least one co-existing comorbidity.

Ref: <https://www.nejm.org/doi/full/10.1056/NEJMc2004973>

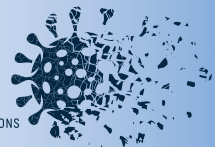




Indian Dental Association Kerala State Branch

COVID-19 PANDEMIC

PRACTICE GUIDELINES AND RECOMMENDATIONS



PURPOSE

The objective of this document is to provide information to dental practitioners in Kerala pertaining to the modifications to be adopted in their practice in the wake of COVID-19. They are guidance and not directives.

They do not override govt orders or regulations that exist or that may come into existence later. These guidelines are to assist the dentists to make informed decisions exercising their clinical judgement based on their own knowledge and experience.

THE RECOMMENDATIONS ARE BASED ON CURRENT AVAILABLE EVIDENCE AND IS SUBJECT TO REVISION IN THE WAKE OF EMERGING INFORMATION/ EVIDENCE

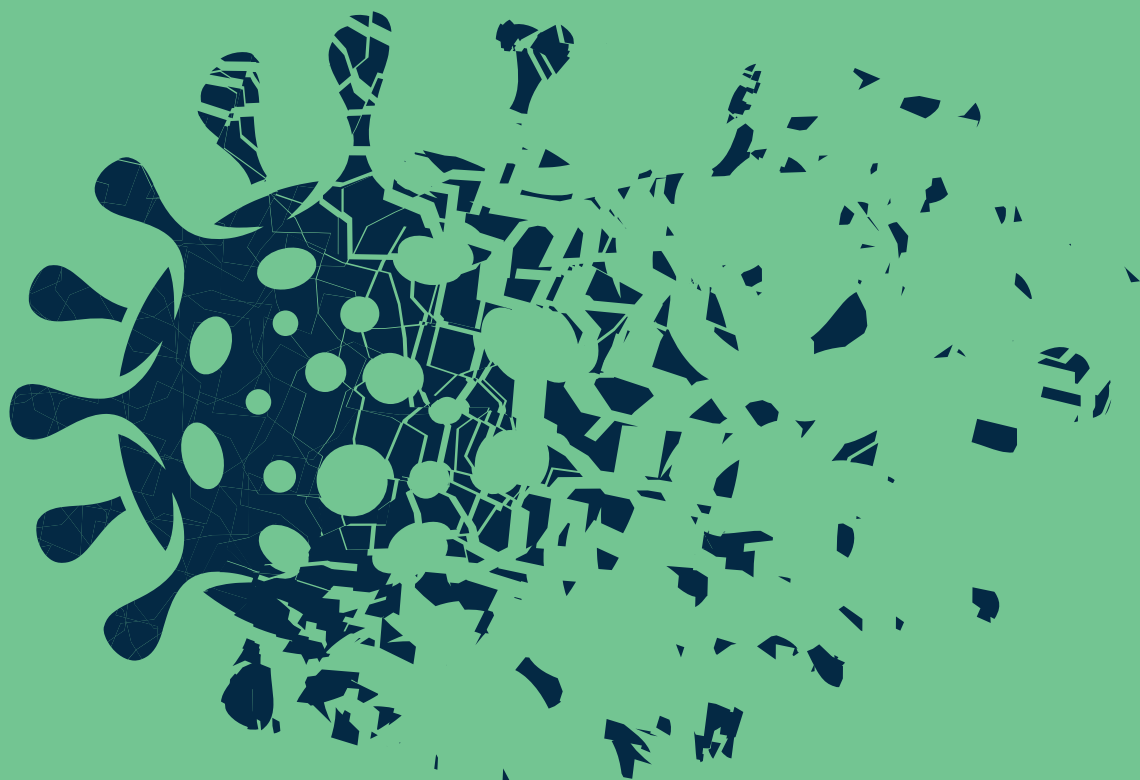




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FREQUENTLY ASKED QUESTIONS (FAQ)

What are the specific directives of the Kerala Government for dental practitioners in the state in wake of the Covid-19 pandemic?

- ▶ As per the directives of the Kerala govt, dental practices across the state should be restricted to attending to dental emergencies and providing urgent dental care until further notification.
- ▶ All elective and non-urgent procedures should be postponed.
- ▶ A thorough screening should be done for every patient before taking them for treatment.
- ▶ Adequate PPE should be worn by all dentists and staff.
- ▶ All aerosol generating procedures should be avoided except in extremely urgent/ life threatening situations where it should be done with the appropriate PPE.

Ref : https://dhs.kerala.gov.in/wp-content/uploads/2020/03/dental_24032020.pdf



What are dental emergencies and what constitutes urgent dental care?

Dental emergencies are potentially life threatening and require immediate treatment to stop ongoing tissue bleeding, alleviate severe pain or infection, and include :

- ▶ Uncontrolled bleeding
- ▶ Cellulitis or a diffuse soft tissue bacterial infection with intra - oral or extra - oral swelling that potentially compromise the patient's airway.
- ▶ Trauma involving facial bones, potentially compromising the patient's airway.

What is Urgent dental care ?

Urgent dental care is the management of conditions that require immediate attention to relieve severe pain and/or risk of infection and to alleviate the burden on hospital emergency departments especially in govt centres. These should be treated as minimally invasively as possible. The conditions are:

- ▶ Severe dental pain from pulpal inflammation
- ▶ Pericoronitis or third-molar pain
- ▶ Surgical post-operative osteitis
- ▶ Abscess, or localized bacterial infection resulting in localized pain and swelling.

- ▶ Tooth fracture resulting in pain or causing soft tissue trauma
- ▶ Dental trauma with avulsion/luxation
- ▶ Dental treatment required prior to critical medical procedures
- ▶ Final crown/bridge cementation if the temporary restoration is lost, broken or causing gingival irritation
- ▶ Biopsy of abnormal tissue in case of urgency

What are other conditions that might need urgent attention ?

- ▶ Extensive dental caries or defective restorations causing pain
- ▶ Suture removal
- ▶ Denture adjustment on radiation/ oncology patients
- ▶ Denture adjustments or repairs when function impeded
- ▶ Replacing temporary filling on endo access openings in patients experiencing pain or other difficulty
- ▶ Snipping or adjustment of an orthodontic wire or appliances piercing or ulcerating the oral mucosa.

https://success.ada.org/~media/CPS/Files/Open%20Files/ADA_COVID19_Dental_Emergency_DDS.pdf



<http://www.sdcep.org.uk/published-guidance/acute-dental-problems-covid-19>



What instruments and conditions produce aerosol in dental practice.?

- ▶ They include high speed handpiece, ultrasonic scalers, slow speed handpiece in presence of water/saliva, patient sneezing and coughing, lasers and micro-abrasion.

Who should avoid practice in dental offices?

- ▶ Dentists and auxiliary staff above the age of 65 with underlying conditions like Diabetes Mellitus, Heart and kidney disease, Chronic liver disease, Chronic lung diseases like Asthma, COPD etc., Cancer.
- ▶ Staff who are pregnant.
- ▶ Staff who have Influenza like illness (ILI) eg., cough, cold, fever, sore throat etc.

“The measure of intelligence is the ability to change.”
- Albert Einstein.

The primary objective of this guidance is to suggest effective and feasible control measures to provide a safe work place for the dental practitioners of Kerala to work in.

The control measures fall under

1. Engineering controls,
 2. Administrative controls,
 3. Workplace controls
 4. Personal protection.
- ◆ Engineering controls include any changes in design, installation of equipment, choice of disinfectants, fumigants etc.
 - ◆ Administrative controls include Screening and registration process, preparing written policies for every aspect of clinical practice, monitoring staff, inventory etc.
 - ◆ Workplace controls include Signages, Surface and environmental disinfection, Staff training, Patient education etc.
 - ◆ Personal protection includes hygiene steps, PPE (Personal Protective Equipment) based on standard and transmission based precautions.

Though the universal Infection control measures practiced by dental clinics holds good and is fundamental to the safety of the operator, staff and patient, It should be understood that the present scenario of the COVID 19 pandemic warrants additional infection control considerations.

COVID ZONES & PRACTICE LEVELS

This is a guidance based on the epidemiological distribution of Covid-19 in Kerala. Places in the state have been classified into Green, Orange, Red Zones and there are also hotspots or containment zones, which are all subject to transition.
















The practice levels are interpreted in conjunction with the Government of India classification of areas on the basis of incidence of coronavirus cases (COVID ZONES). This will help the practitioner decide on adopting the appropriate level of practice recommended at any time.



ADVISED TREATMENT MODALITIES SUGGESTED FOR DIFFERENT PRACTICE LEVELS

LEVEL	TREATMENT MODALITIES
Level 1	<ul style="list-style-type: none"> No practice restrictions. Follow the standard / universal precautions.
Level 2	<ul style="list-style-type: none"> Do screening and patient triage. Use all standard and transmission based precautions. Do aerosol work with all precautions mentioned and exercising professional judgement.
Level 3	<ul style="list-style-type: none"> Do Screening and Patient triage. Only Emergency Dental care allowed. Follow all standard and transmission based precautions.
Level 4	<ul style="list-style-type: none"> Do Screening and Patient triage. Restrict practice to telephone consultation. Do emergency care only if it's absolutely inevitable Use all standard and transmission based precautions.

RECOMMENDED LEVELS OF PRACTICE BASED ON GOVERNMENT CLASSIFIED COVID ZONES

LEVEL	COVID FREE Declared	GREEN ZONE	ORANGE ZONE	RED ZONE	GENERAL INSTRUCTION
Level 1					wherever and whenever a government advisory exist limiting the practice to emergency or essential procedures the level of practice is Level 3 or 4 .
Level 2	-				
Level 3	-				
Level 4	-				
<div> conforms to the level of practice</div> <div> does not conform to the level of Practice</div>					

GOVERNMENT OF INDIA CRITERIA FOR SHIFTING CATEGORIES OF COVID ZONES

Red zones : These are Hotspots / Containment Zones or other areas reporting a large number of cases or high growth rates. High-est case-load districts contributing to more than 80 percent of cases for each state in the country, or Districts with doubling rate at less than four days (calculated on Monday for last seven days, to be determined by the state government).

Orange zones :- Districts that do not have enough confirmed cases to meet the 'red zone', but are being seen as potential hotspots, are part of the 'orange zone'.

Green zone :- if no new confirmed case is reported in an Orange Zone for consecutive days it is classified as a Green zone.

RED ZONE / HOT SPOTS



ORANGE ZONE



GREEN ZONE

FRONT OFFICE GUIDELINES

Patient awareness, education and co-operation play a major role in effective implementation of any control measures in a dental clinic. Hence in the wake of the Covid-19 pandemic, the role of the front office and the reception staff assumes a very significant place and forms the first line of defence. This is also the stage where the patient screening is done.

RECEPTION STAFF ORIENTED

- ◆ The front office/reception staff should be well trained by the management and made aware of the Covid-19 precautionary measures.
- ◆ Should be trained on the details of COVID 19 screening process done on patients and the rationale behind it.
- ◆ The front office staff should always wear 3-ply masks, gloves, when they are in the reception area.
- ◆ Should wear separate foot wear inside the clinic. It is recommended to sprinkle 1% Bleaching solution on the floor mat / carpet or spread a cloth soaked in 1% bleaching solution to disinfect the feet of patients.
- ◆ Should instruct the patients and bystanders to wash their hands with soap and water for 20secs before being seated in the clinic.
- ◆ Should instruct the patients to carefully read the instructions and guidelines displayed in the waiting area.
- ◆ Should check the temperature of patients using a non-contact infrared scanner thermometer. Treatment for a patient with a measured temperature $\geq 38^{\circ}\text{C}$ (100.4°F) should be deferred.
- ◆ Should strictly instruct the patients not to touch the teeth while presenting the complaint to the doctor.
- ◆ They should open the doors for the patients to enter the operatory to minimise contamination.

WAITING AREA ORIENTED

- ◆ Signage provided to keep patients footwear outside.
- ◆ A hand wash facility conveniently placed for the patients as soon as they arrive in the clinic. A poster depicting the WHO recommended hand wash techniques to be displayed in the wash area.



- ◆ Erecting a barrier to ensure a physical distance of a minimum of 3 ft between the patients and the reception staff. (Eg. Plexi-glass shield) is advantageous.
- ◆ Provide Hand sanitisers, if possible, in the waiting area.
- ◆ Remove all articles like newspapers, magazines, print material, flower vases, showcase artefacts, toys, carpets etc from the waiting area to reduce areas that are not amenable for disinfection.
- ◆ Remote control devices should not be kept outside to be handled by patients or bystanders.
- ◆ The seating pattern in the waiting area should be arranged in a manner to ensure physical distancing.
- ◆ The waiting area should be mopped and disinfected, if possible, every two hours, using 1% NaOCl solution.
- ◆ Keep yellow colour coded waste bins in the waiting area with foot pedals.
- ◆ Adequate patient awareness signages should be displayed in the patient waiting area, which can be downloaded and printed from the IDA KSB websites.
VISIT : www.idakerala.com or www.idacan.in
- ◆ Importance of hand hygiene, social distancing, unnecessarily touching MEN (mouth, eyes, nose) or the T-zone on the face, spitting and putting fingers inside the mouth.
- ◆ Legal responsibilities of the patients in the Covid-19 scenario.
- ◆ Audio/visual alerts can also be used in addition to educate and motivate the patients.


PATIENT ORIENTED

- ◆ Patients should be strictly instructed to take prior appointments over telephone before coming to the clinic.
- ◆ Patients should be instructed to arrive on time, rather than too early to minimise the time they spend in the waiting area.
- ◆ Bystanders should not be allowed except for the very elderly, paediatric patients and patients who need special care.
- ◆ Patients should wear a cloth mask or tightly cover their mouth and nose with a scarf or towel.
- ◆ Patients should be instructed to keep wearing the face-masks or towels till they are instructed to remove it.
- ◆ Patients and bystanders should wash their hands for 20 secs with soap

and water or use hand sanitisers immediately on arrival before being seated in the waiting area and on completion of treatment.

- ◆ Patients should be strictly instructed not to touch the teeth with fingers or put it inside their mouths while presenting the complaint.

APPOINTMENT SCHEDULING

- 
- ◆ All patients should be instructed to take appointments over the phone.
 - ◆ Patients should be instructed to arrive on time, rather than too early to minimise the time they spend in the waiting area.
 - ◆ People who have a travel history or relevant respiratory symptoms should be urged to stay at home and do tele-consultation till the stipulated period or symptoms subside.
 - ◆ Elderly and vulnerable patients (pregnant women and others who have medical conditions compromising immunity) should be urged to stay at home and do tele-consultations.
 - ◆ Tele-consultation should focus on the provision of three A's, namely Advice, Analgesia and Antimicrobials (if appropriate).
 - ◆ Patients should be advised that treatment options are severely restricted and to call back in 48-72 hrs, if their symptoms have not subsided.
 - ◆ There should be a policy for walk-in patients in case of an emergency, based on the needs and capabilities of the clinic.
 - ◆ Instructions regarding cloth masks, hand hygiene, bystanders etc should be explained at the time of appointments. (or by the front office staff mandatorily for walk in patients)
 - ◆ There should be a minimum of 15 mts scheduled between appointments to allow proper disinfection measures.
 - ◆ Patients should be requested to wait in their vehicles or any appropriate area for observing social distancing norms, if the space is constrained in the reception area. They can be called over the phone as and when their turn arrives.
 - ◆ Patients shall be advised to install the "Aarogya Setu" app in their phones to track their contact history with Covid positive individuals.



REGISTRATION PROCESS & SCREENING

- ◆ During the appointment process itself Tele-screening should be employed the maximum to collect patient information.
- ◆ There should be a proper registration and screening policy for patients in every clinic concurrent with all the legal and regulatory norms notified.
- ◆ Informed consents and affidavits should be signed and taken from all patients.
- ◆ Patients can be provided poly-ethylene gloves, if possible, while filling the screening forms.
- ◆ Screening forms and declarations can be collected in a closed container in which formaldehyde tablets are kept to minimise contamination.

PATIENT TRIAGE

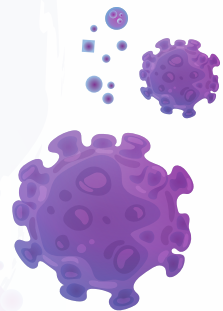
The sorting or classification of patients which is termed 'Patient triage' assumes a very significant role in dental clinical practice in the Covid-19 pandemic scenario.

This is important not only from the safety aspect of the practice, but is also a statutory requirement mandated by the Kerala state health department.

Information related to patients symptoms if any, including fever, respiratory symptoms or potential exposure, travel history, contact history are documented at this stage, with the help of IDA KSB COVID 19 Risk Assessment form, and appropriate decisions are made as per the guidelines.

These actions help staff and patients stay safe, preserve personal protective equipment and patient care supplies, and expand available health system capacity by preventing spread of the pandemic.

Ref : https://dhs.kerala.gov.in/wp-content/uploads/2020/03/dental_24032020.pdf





CATEGORISATION OF PATIENTS & TREATMENT OPTIONS

CATEGORY	HISTORY	RESPONSE
CATEGORY 1	Patients who are Covid-19 positive.	Should be referred for treatment to an appropriate facility and report to the health dept or contact Disha at 1056.
CATEGORY 2	Patients who have a positive recent travel history or contact with anyone who has come from abroad.	Should be deferred for treatment for 14 days and if warranted, report to the health dept or contact Disha at 1056. Emergency medication can be given with adequate PPE. For eg. N95 masks.
CATEGORY 3	Patients who have recovered from Covid-19 infection or completed quarantine.	Should be asked to submit their medical records and make sure they have completed their 14-day post covid treatment isolation. If so, can be taken up for treatment.
CATEGORY 4	Patients who have answered negative to the relevant questions but show related respiratory symptoms.	Should be given an appointment after 14 days. Emergency medication can be given with adequate PPE, eg. N95 masks.
CATEGORY 5	Patients who have answered negative and have no related respiratory symptoms	Can be taken up for treatment.

The IDA KSB Covid-19 Risk Assessment / Declaration / Informed consent can be accessed from the websites www.idakerala.com and www.idacan.in

OPERATORY GUIDELINES

As in the front office, the operatory guidelines include all the four controls namely, Engineering controls, Administrative controls, Workplace controls and Personal protection. It involves alteration of design, having written policies, surface disinfection, hygiene and personal protective equipment (PPE).

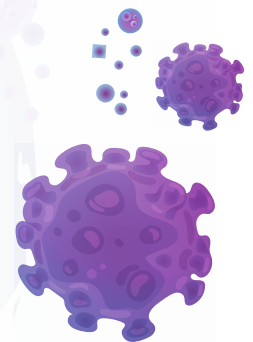
AUXILIARY STAFF ORIENTED

IMMUNISATION :-

- ◆ Ideally every clinical staff should be adequately immunised. The vaccines recommended are BCG, DT, HBV.
- ◆ They should also maintain their immunity at optimal levels by proper nutrition, exercise, sleep and sufficient intake of vitamins C & D.

PERSONAL PROTECTIVE EQUIPMENT(PPE):-

- ◆ Chair-side assistants should ideally have the same protective equipment as that of the dentist. It includes masks, gloves, head cap, eyewear, face shields and gowns with long sleeves (fluid resistant material).
- ◆ The auxiliary staff in general should be instructed to wear a pair of gloves and masks from the moment they enter the clinic till they leave except for the breaks where proper hand hygiene protocol should be observed.
- ◆ The auxiliary staff handling Bio-medical waste (BMW) should wear N95 masks along with the other PPE.
- ◆ The staff should be made aware of the heightened importance of hand hygiene and to wash their hands with soap and water after every patient interaction.



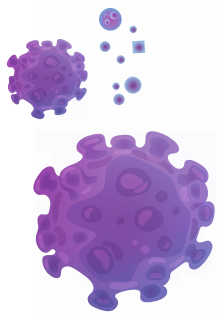
OPERATORY AREA ORIENTED

DESIGN :-

- ◆ Keep separate dental chairs or cubicles for examination/minimally invasive procedures and for aerosol generating procedures.
- ◆ Prescriptions and post-operative instructions to the patients should be provided in an area separated from the procedure area



- ◆ A minimum of 6 ft distance around the dental chair where aerosol generating procedures are done should be designated as a red (danger) zone.
- ◆ Restrict entry of bystanders and clinical staff into this area during procedures.
- ◆ Avoid trolley, table, instruments which are not required for procedure into this zone
- ◆ Disposable bins should be placed within this area so that contaminated waste can be sorted in this same area.
- ◆ Keep an alcohol based sanitizer (>70%) on the side of the dental chair. Soap/Hypochlorite solution should be placed within the area for immediate immersion of instruments post use.
- ◆ The red zone (danger) area should be cleaned, wet mopped and meticulously disinfected using 1% NaOCl solution after every procedure.
- ◆ If a wall is present within the radius of 6 ft. then the wall should be sanitised after each procedure.



PRACTITIONER ORIENTED

STANDARD PRECAUTIONS:-

The dental clinic should compulsorily have a written policy with regard to standard precautions that apply to all patient care, which should be adhered to on a routine basis, irrespective of any emergency.

<https://www.cdc.gov/oralhealth/infectioncontrol/summary-infection-prevention-practices/standard-precautions.html>

For more info : 

IMMUNISATION:-

- ◆ Every dental practitioner should be adequately immunized. The vaccines recommended are BCG, DT, HBV.
- ◆ They should also maintain their immunity at optimal levels by taking proper nutrition, exercise, sleep and sufficient intake of vitamins C & D.
- ◆ In the wake of Covid-19, a chemo-prophylaxis of HCQ (HydroxyChloroquine) is recommended, but only strictly after consulting with an appropriately qualified physician. But this should not by any means instill a sense of false security.

<https://www.mohfw.gov.in/pdf/AdvisoryontheuseofHydroxychloroquinasprophylaxisforSARSCoV2infection.pdf>

For more info : 

Personal Protective Equipment (PPE) :-

Apart from the standard precautions, Covid-19 calls for added precautions based on the mode of transmission which is primarily through droplets.

- ◆ 3-ply masks and a pair of gloves should be worn by dental practitioners always inside the clinic.
- ◆ N95 masks, head cap, goggles or face-shield, have to be worn by practitioners while doing procedures.
- ◆ A gown with long sleeves, Fluid resistant material (Ideally of 70 gsm or above. If reusable, the material should be certified by a recognised body like SITRA, to ensure that the barrier properties are retained even after wash/disinfection) is recommended for additional protection. Disposable shoe-covers are optional.

For more information on PPE:

<https://www.mohfw.gov.in/pdf/AdditionalguidelinesonrationaluseofPersonalProtectiveEquipmentsettingaproachforHealthfunctionariesworkinginnonCOVIDareas.pdf>



<https://www.mohfw.gov.in/pdf/AdditionalguidelinesonrationaluseofPersonalProtectiveEquipmentsettingaproachforHealthfunctionariesworkinginnonCOVIDareas.pdf>



https://success.ada.org/~media/CPS/Files/COVID/ADA_Interim_Mask_and_Face_Shield_Guidelines.pdf



<https://www.cdc.gov/hai/pdfs/ppe/ppe-sequence.pdf>



- ◆ It is recommended for practitioners and staff with beards to remove their facial hair for ensuring a proper fit of the N95 masks.
- ◆ All personal items like watches, belts, earrings, wallets and purses, mobile phones, pens etc should not be brought into the operatory especially to the chairside areas.
- ◆ Hand hygiene has to be meticulously observed following all standard recommendations related to hand washing.

https://www.cdc.gov/oralhealth/pdfs_and_other_files/BESC2-Hand-Hygiene-508.pdf



Practitioners are advised to install the '**AROGYA SETU**' Covid tracking app of the Government of India in their mobiles to assess their Covid-19 status and keep abreast of the latest developments with regard to this pandemic.

DISINFECTION & STERILISATION

Ensure that accepted routine environmental cleaning and disinfection procedures are followed consistently and correctly. Clean and disinfect room surfaces promptly after completion of clinical care. Proper disinfection and sterilisation of Instruments and Personal protective equipment is mandatory.

- ◆ Cleaning, disinfection and sterilization of equipment should be done by personnel who are properly trained and using appropriate PPE only.
- ◆ Personnel assisting the dentist in the operatory should undertake disinfection and sterilisation procedures only after removing the PPE used in the operatory and sufficient cleaning.
- ◆ Make sure that manufacturer's instructions for reprocessing are followed and personnel understand that cleaning is always the first step before disinfection or sterilization.

An infection control policy should be drafted by every dental clinic complying with standard guidelines released by established agencies and every staff member should be trained based on that.

For more info.: <https://www.cdc.gov/oralhealth/infectioncontrol/index.html>



AEROSOL MANAGEMENT

Dental procedures that use low or high speed handpieces, lasers, electro-surgery units, ultrasonic scalers, air polishers, hand instruments or air/water syringes can create bioaerosols and splatter.

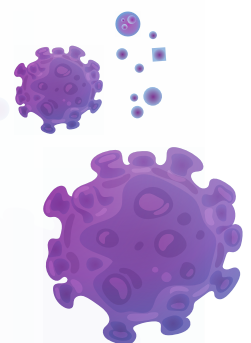
The problem occurs when viral particles are aerosolized by a cough, sneeze, or dental care. In these instances, particles can potentially travel across far greater distances, with estimates up to 20 feet, from an infected person and then incite secondary infections elsewhere in the environment.

These aerosolized droplet nuclei can remain in an area, suspended in the air, even after the person who emitted them has left and thus can infect health-care workers and contaminate surfaces.

Aerosol prevention can be achieved in a dental clinic by taking 3 precautionary steps.

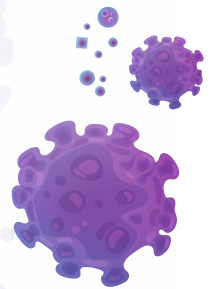
BEFORE & DURING PROCEDURE

- ◆ Pre-procedural antimicrobial rinse for all patients above 6 yrs can reduce around 50% of bioaerosol during a dental procedure. 1% hydrogen peroxide or 0.2% povidone-iodine oral rinse is recommended.





- ◆ To get optimal results it is better to make the patient rinse thoroughly with 1% hydrogen peroxide for at least 1mt before he is seated on the chair for the procedure. Then one more rinse at the start of the procedure will reduce the microbial load considerably.
- ◆ Water and air should be discharged for a minimum of 20-30 secs after each patient.
- ◆ The tubings of airtor, scaler and three-way syringes should be decontaminated with surface disinfectants. This should be completed for all devices that connect to a waterline and enter patients' mouth, such as handpiece, ultrasonic scaler and air/water syringes.
- ◆ Check and maintain anti-retraction devices (that prevent water/fluid back-flow in a waterline) Use of rubber dams is always recommended for aerosol generating procedures.
- ◆ Practice of 4-handed dentistry is recommended for reducing aerosol contamination. High vacuum suction/evacuator can be used and if correctly positioned shall reduce 90% of aerosol production.
- ◆ Position yourselves at 11 o' clock or 12 o'clock and never at an 8 o' clock position to minimise direct contamination and avoid splatter trajectory.



AIR CLEANSING SYSTEMS

- ◆ Use of air-conditioners is not recommended and natural ventilation to be promoted during aerosol generating procedures.
- ◆ If Air conditioners are used air purifiers with High Efficiency Particulate Air (HEPA) filters and other purifying systems are recommended.

PPE (PERSONAL PROTECTIVE EQUIPMENT)

- ◆ The practitioner and ideally the chair-side assistant should wear appropriate PPE conforming to all standard and transmission based precautions.

INSTRUCTIONS TO CLEANING STAFF

- ◆ Should be adequately trained regarding the importance of Covid-19 precautions.
- ◆ Adequate PPE should be worn by the cleaning staff including protective eyewear, masks and heavy duty gloves.
- ◆ Staff handling waste should wear N95 masks in addition.

PREPARING DISINFECTANT SOLUTIONS

0.1% BLEACHING SOLUTION

- ◆ 0.1% = 0.1gm/100ml water (weight/volume). That can be prepared by mixing 1gm in 1000ml water (1L) or 10gms in 10000ml (10L). Make sure there is a 10gm spoon and measuring jar in the clinic.

1% SODIUM HYPOCHLORITE (NaOCl) SOLUTION

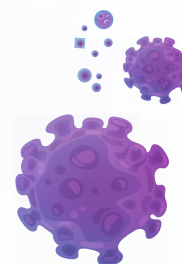
- ◆ Commonly available brands have 6% NaOCl in it. Buy 500 ml and use the formula, Concentration * Volume ($C_1V_1 = C_2V_2$). $C_1 = 6\%$, $V_1 = 500\text{ML}$, $C_2 = 1\%$, $V_2 = ?$
- ◆ $V_2 = (6 * 500) / 1 = 3000 \text{ ml (3L)}$. So add 500ml NaOCl to 3L water and we have 3.5L of 1% Sodium Hypochlorite solution.
- ◆ Similarly, 0.5% NaOCl, 1% H₂O₂ %, 0.2% Povidone-Iodine etc can be prepared using the same formula.

OPERATORY DISINFECTION

Operatory disinfection remains one of the major challenges considering the risk of aerosol contamination associated with dental procedures. Surface cleaning procedures such as mopping and fogging along with systematic disinfection of the Dental unit with accepted disinfectants are the choice.

MOPPING :-

- ◆ Use a damp mop and start working from the cleaner areas and move towards the soiled areas.
- ◆ All indoor areas such as entrance lobbies and corridors should be mopped with a disinfectant with 1% sodium hypochlorite or phenolic disinfectants while closing and before midday session.
- ◆ Equipment like telephone, printers and other office machines should be cleaned twice daily by mopping with a linen/absorbable cloth soaked in 1% sodium hypochlorite / sanitizer.
- ◆ For metallic surfaces like door handles, security locks, keys etc.,
- ◆ 70% alcohol /appropriate surface disinfectant can be used to wipe down surfaces where the use of bleach is not suitable.





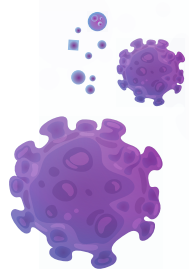
CHAIR AREA (DANGER ZONE) :-

- ◆ Cleaning to be started 20 mins after last use of aerosol generating equipment (time required for aerosol to settle).
- ◆ All chair surfaces, arm rest, head rest, tray, handles, switches, light to be wiped with an alcohol based disinfectant or 1% Sodium Hypochlorite solution
- ◆ Floor around the chair to be mopped last with 1% sodium hypochlorite or phenolic disinfectants after every patient, till the danger zone marking of 6 ft radius.
- ◆ An average of 45 minutes break should be considered practically in between consecutive patients for danger zone sanitation.
- ◆ In clinics with multiple chairs, 2 chairs can be alternately used for aerosol-generating procedures. In that case, the danger zone should be marked around both chairs and a minimum of 2 feet should be left between the marked areas.
- ◆ Waste bins and solution can be discarded at the end of the day before finally mopping the floor by adhering to proper Bio-Medical Waste Management Practices...

FUMIGATION

- ◆ Fogging of dental clinics should be considered periodically as per the convenience of the clinician.
- ◆ Fogger machines work with silver nitrate and hydrogen peroxide. Fumigating time is 15 min, after fogging we can use the room within 15 min
- ◆ Chlorine Dioxide is also being suggested as a chemical fumigant which appears more suitable for a dental clinic setting.

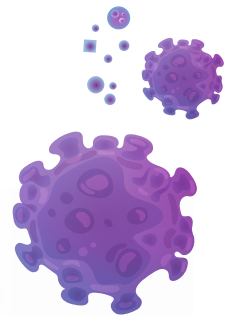
LABORATORY DISINFECTION



- ◆ Dental impressions are categorized as semi critical objects in dental offices, so sterilize impression trays before use and disinfect impression trays after every use.
- ◆ Impressions should be washed under running water before being disinfected to reduce the bioburden.
- ◆ Similarly impression trays should be thoroughly rinsed under running water to remove residual blood and saliva.
- ◆ After removing the bioburden by precleaning, trays are cleaned, packaged and heat-sterilized. Single-use, plastic impression trays provide a disposable alternative to heat sterilization.



- ◆ All types of impression materials (Irreversible hydrocolloid (Alginate), ZnO Eugenol, Polysulfide, Polyether, Addition Silicon, impression compound) should be disinfected with 2% Glutaraldehyde, or 1% Sodium hypochlorite or Chlorhexidine Gluconate with 10 min after preparing impression.
- ◆ Ammonium compounds and Phenol detergents should not be used for disinfecting impression materials.
- ◆ Dental cast can be a medium of cross infection, so disinfection of dental cast is mandatory by disinfectant spray, immersion in disinfectant solution, or incorporation of disinfectant in stone at the time of mixing.



STERILISATION OF INSTRUMENTS

The clinic should have a sterilisation protocol in accordance with the guidelines stipulated by established agencies.

For info click : https://www.cdc.gov/oralhealth/pdfs_and_other_files/BESC7-Sterilization-508.pdf



- ◆ Post procedure, all used instruments should be immediately immersed into a phenolic /peroxide solution /hypochlorite solution. (Solution bath to be kept in proximity to the dental chair). A minimum of 20 mins bath is advised before proceeding to routine scrubbing and sterilizing.
- ◆ Sterile instruments are to be kept at a distance from the danger zone and should not be unnecessarily exposed to aerosol.

PRECAUTIONS AFTER DENTAL CARE

- ◆ Clean PPE with soap and water, or if visibly soiled, clean and disinfect reusable facial protective equipment between patients.
- ◆ Non-dedicated and non-disposable equipment (e.g., handpieces, dental x-ray equipment, dental chair and light) should be disinfected according to manufacturer's instructions.
- ◆ Handpieces should be cleaned to remove debris, followed by heat sterilization after each patient. Surfaces such as door handles, chairs, desks, floor, elevators, and bathrooms should be cleaned and disinfected frequently.
- ◆ Soak all the instruments in bleaching powder for 10 min and wash with running water before sterilization.

BIOMEDICAL WASTE MANAGEMENT

The dental clinic should adhere to all the regulatory norms as in the Bio-Medical Waste Management Rules, 2016 and associated directives of Kerala State Pollution Control Board. with regard to bio-medical waste handling and disposal.

Since there would be a definite increase in the disposables used in dental clinics and a possibility for handling Covid-19 contaminated material, the practitioners/clinic management should be aware of all the existing recommendations and also the new guidelines issued by Central Pollution Control Board (CPCB) in the wake of Covid-19.

Ref : <https://www.keralapcb.nic.in/cmsadmin/fileUploads/BMW%20Rules%202016.pdf> 

https://cpcb.nic.in/uploads/Projects/Bio-Medical-Waste/Guidelines_healthcare_June_2018.pdf 

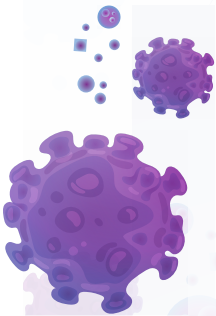
BIOMEDICAL WASTE SEGREGATION CHART

Category	Type of Waste
YELLOW  	<ul style="list-style-type: none"> • Post Operative Body Parts • Placenta • Plaster of Paris (POP) • Pathological Waste • Cotton Waste • Dressing Materials • Beddings • Body Fluid Contaminated Paper and Cloth • Face Mask, Cap • Cytotoxic, Expired & Discarded Medicines • Microbiology, Biotechnology Lab Waste
RED  	<ul style="list-style-type: none"> • Syringe with out needles • I.V. Set • Catheters • Gloves • Urine Bag • Dialysis Kit • IV Bottles
WHITE (Translucent)  	<ul style="list-style-type: none"> • Needles • Syringes with fixed needles • Blades • Scalpels <p><small>* Use 1% Hypo Chloride Solution for disinfecting Glass & Metal Sharps</small></p>
BLUE  	<ul style="list-style-type: none"> • Glass <ul style="list-style-type: none"> - Broken Glass - Ampoules - Lab Slides • Metals <ul style="list-style-type: none"> - Nails - Metallic Body Implants - Scissors <p><small>* Use 1% Hypo Chloride Solution for disinfecting Glass & Metal Sharps</small></p>

MANAGEMENT ORIENTED

The primary responsibility of the dental clinic management is to co-ordinate the different links in a clinical practice, like the patient, practitioners, auxiliary staff, lab etc to ensure a smooth functioning of the establishment. The duties include creating policies, patient education, staff monitoring and scheduling, inventory management, especially of essentials like PPE, fee collection etc.

STAFF TRAINING & SCHEDULING, INVENTORY MANAGEMENT & FEE COLLECTION

- 
- ◆ The management should ensure that the clinic staff is well aware of the risks involved while working, during the Covid-19 pandemic.
 - ◆ The staff should be thoroughly instructed by the management on the additional precautionary measures to be adopted while working in the new scenario.
 - ◆ Work with minimum staff that is required and assign duty on a rotational basis.
 - ◆ Staff members who are elderly, having any pre-existing medical conditions, or pregnant should not be given duty.
 - ◆ Designate specific jobs for each staff member and don't allow multitasking, since lapses in following protocols normally happen when staff is assigned multiple tasks.
 - ◆ No staff with Covid related symptoms should be allowed to work. The temperature of the staff should be regularly monitored.
 - ◆ The management should take an inventory of the PPE stock constantly and ensure its availability.
 - ◆ The management should promote cashless transactions like contact less POS, Paytm App based payments like, UPI and digital payments etc.
 - ◆ Currency notes can be disinfected if they are collected in a UV container or in a closed container containing formaldehyde tablets.
They should be ideally stored there for 24hrs to be disinfected.
 - ◆ The management should invest in improving and upgrading the sterilisation and infection control standards in the clinic.

SELF ASSESMENT QUESTIONNAIRE TO EVALUATE STERILISATION AND DISINFECTION PROTOCOLS

This self assesment questionnaire is based on an article published in the International Journal of Oral Health and Medical Research.

The objective is for every dental practitioner in Kerala to make an assessment of the sterilisation and disinfection protocols followed in their practices and make modifications or improvements if needed. The recommendations provided in this document and the suggested links should help the practitioner in achieving it.

- 1) Name the primary sterilisation method utilised in your dental clinic?
 - A) Autoclave
 - B) Dry heat
- 2) How frequently is the process of sterilisation followed in the dental clinic?
 - A) Once daily
 - B) Once after every patient treatment
- 3) Name the type of disinfection method utilised in your dental clinic?
 - A) High Level
 - B) Medium Level
- 4) How frequently is the process of disinfection performed in the dental clinic?
 - A) Once daily
 - B) Once after every patient treatment
- 5) Has the entire staff including dental auxiliaries, been provided official training in operating sterilisation procedures?
 - A) Yes
 - B) No
- 6) Does the dental clinic keep updated on a regular basis, on the new information available for sterilisation and disinfection?
 - A) Yes
 - B) No



- 7) Does the dental clinic follow the sterilisation protocols formulated by established agencies ?
 - A) Yes
 - B) No
- 8) Does the dental clinic have a predilection for disinfection over sterilisation?
 - A) Yes
 - B) No
- 9) Does the dental clinic provide all the clinical staff with Personal Protective Equipment (PPE)?
 - A) Yes
 - B) No
- 10) Does the dental clinic maintain a complete record of sterilisation and disinfection procedure performed everyday?
 - A) Yes
 - B) No
- 11) Does the dental clinic have the sterilisation equipment checked by a testing agency periodically?
 - A) Yes
 - B) No
- 12) Does the dental clinic follow all the standard guidelines of Bio-medical waste management?
 - A) Yes
 - B) No



DENTAL SPECIALITY WISE MODIFICATIONS - DO'S AND DONT'S

As per the Kerala state health departmentt directive on March 24th 2020, all dental clinics in Kerala are to suspend normal practice and restrict their functioning to providing emergency dental care only.

THIS CONFORMS TO THE LEVEL 3 OR LEVEL 4 PRACTICE RECOMMENDATIONS MENTIONED IN THIS DOCUMENT.

The following is a detailed description of the speciality-wise modifications that should be made into our practice under these restrictions.

PERIODONTICS PRACTICE MODIFICATIONS

- ◆ Periodontal procedures are the basic dental procedures but it's not an emergency. But it produces a significant amount of bioaerosols.
- ◆ Avoid all elective procedures
- ◆ Pre-procedural Mouth rinse with 0.2% PI, or 1% H2O2.
- ◆ Use high vacuum suction tip and se hand instruments for scaling.



THE DO'S

- ◆ Management of gingival/periodontal/ pericoronal abscess
- ◆ Management of ulcerative/ desquamative lesions
- ◆ Management of food impaction / coronoplasty of plunger cusps
- ◆ Topical application of desensitizing agent
- ◆ Cauterization of periodontal pocket/ pericoronal flap/pulp polyp



THE DONT'S

- ◆ Use of ultrasonic scaler/micromotor/ airtor
- ◆ Surgical/laser excision of gingival overgrowth
- ◆ Oral prophylaxis/scaling & root planing
- ◆ Planned periodontal surgery
- ◆ Implant surgery

ORAL PATHOLOGY



THE DO'S

- ◆ Hemogram for emergency dental extractions



THE DONT'S

- ◆ Hemogram for elective surgical procedures

PROSTHODONTIC PRACTICE MODIFICATION

- ◆ Pre procedural Mouth rinse with 0.2% PI, or 1% H₂O₂ before crown preparation. Operators should wear a surgical mask and eye protection with solid side shields or a face shield to protect mucous membranes of the eyes, nose, and mouth.
- ◆ Schedule aerosol producing procedures at the end of the day or the time before going fogger fumigation.
- ◆ Use high vacuum suction tips while doing tooth preparation.
- ◆ Use disposable airtor or anti retraction handpiece .
- ◆ Dental impressions are categorized as semi critical objects in dental offices, so sterilize impression trays and disinfect
- ◆ impression trays before every use. All types of impression materials (Irreversible hydrocolloid, ZnO Eugenol, Polysulfide, Polyether, Addition Silicon, impression compound) should be disinfected with Glutaraldehyde, or Sodium hypochlorite or CHX with 10 min after preparing impression. Ammonium compounds and Phenol detergents should not be used for disinfecting impression materials
- ◆ Polyvinyl siloxane impression materials were disinfected with microwaves with no changes in physical properties of impression material.
- ◆ Dental cast can be a medium of cross infection, so disinfection of dental cast is mandatory by disinfectant spray, immersion in disinfectant solution, or incorporation of disinfectant in stone at the time of mixing.



THE DO'S

- ◆ Minor adjustment/occlusal equilibration in the existing complete/partial denture
- ◆ Removal of crown/fractured segment of prosthesis
- ◆ Re-cementation of dislodged crown / bridge
- ◆ Removable complete/partial denture insertion



THE DONT'S

- ◆ Biomechanical tooth preparation for receiving crown/bridge
- ◆ Placement/removal of dental implant
- ◆ Impression making for removable/ fixed prosthesis
- ◆ Removal of faulty prosthesis/ complicated crown/bridge

ORAL MEDICINE AND RADIOLOGY MODIFICATION

- ◆ Avoid intra oral radiographs, when intra oral radiographs are mandatory the sensor should be double barriered to prevent perforation and cross contamination.
- ◆ Make use of Extra Oral Radiographs like OPG to avoid cough and gag reflux.
- ◆ Operators should wear a surgical mask and eye protection with solid side shields or a face shield to protect mucous membranes of the eyes, nose, and mouth.



THE DO'S

- ◆ Use of all barrier protective gears & use of alcohol based sanitizer during examination.
- ◆ Medicinal treatment of oral precancerous lesions & other oral precancerous lesions.
- ◆ Follow disinfection protocol like fumigation and cleaning with disinfectant.



THE DONT'S

- ◆ IOPA radiographs.
- ◆ Extraoral radiographs and CBCT except in case of emergency.

CONSERVATIVE AND ENDODONTICS PRACTICE MODIFICATION

- ◆ Use of Rubber Dam.
- ◆ Use hand instruments for caries excavation, flattening the pulpal floor etc
- ◆ Use high vacuum suction tip
- ◆ Use disposable airtor or anti retraction handpiece.



THE DO'S

- ◆ Caries hand excavation & dressing
- ◆ Glass ionomer restoration in cervical abrasion
- ◆ Emergency root canal opening if swelling/abscess/pain in tooth
- ◆ Recementation of inlay



THE DONT'S

- ◆ Airtor/Aerosol use for any procedure except emergency RCO
- ◆ Surgical endodontics
- ◆ Ultrasonic use in endodontics



ORTHODONTIC PRACTICE MODIFICATIONS

- ◆ Bonding the metal brackets by dual cure GIC, it can bond with wet enamel so that we can avoid acid etching.
- ◆ Use Hydrophilic primers also bonded well to wet and dry enamel.
- ◆ Microetching or Sandblasting technique can be used to modify enamel surface for bonding without etching.
- ◆ Self etching primers eliminate rinsing and drying steps.
- ◆ Crystal bonding techniques & Laser etching can cause Aerosols.



THE DO'S

- ◆ Hanging or dislodged molar tube or dislodgement of appliance/ components
- ◆ Wire pricking or any other component of fixed appliance injuring soft tissue
- ◆ TPA, TAD's, Class II correctors which are likely to be ingested or inhaled



THE DONT'S

- ◆ Use of micromotor/airotor
- ◆ Removal of any residual composite from de-bonded enamel
- ◆ Bracket Bonding, change of wires, E-chains, modules
- ◆ Broken removable appliances

PAEDODONTICS PRACTICE MODIFICATIONS



THE DO'S

- ◆ Severe dental pain/pulpitis in mixed dentition
- ◆ Management of acute dentofacial trauma
- ◆ Management cleft lip & palate
- ◆ Management of cellulitis/facial swelling



THE DONT'S

- ◆ Airotor/Aerosol use for any procedure except emergency Root Canal Openings
- ◆ Elective surgical procedures



ORAL AND MAXILLOFACIAL SURGERY PRACTICE MODIFICATION

- ◆ Pre procedural Mouth rinse with 0.2% PI, or 1% H₂O₂. Use a high vacuum suction tip. Surgical procedures come under essential service, so it's mandatory that the dental surgeon must wear adequate PPE.
- ◆ Simple extraction will produce a minimum amount of bioaerosol.
- ◆ Complex surgeries inside the OT should be followed by fumigation.



THE DO'S

- ◆ Suturing of bleeding wounds
- ◆ Incision & drainage of severe space infections
- ◆ Emergency extraction of tooth
- ◆ Correction of acute TMJ dislocation
- ◆ Conservative management of fracture



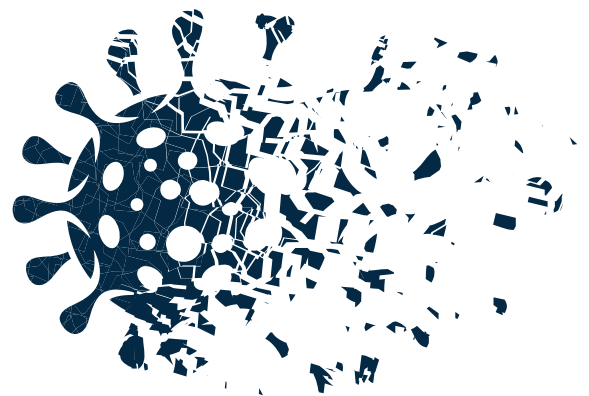
THE DONT'S

- ◆ Definitive management of soft & hard tissue trauma
- ◆ Mild & moderate space infections
- ◆ Planned tooth extraction/impacted tooth
- ◆ Biopsy/wire; suture material/bone plate removal
- ◆ TMJ/Orthognathic/Pathology/Dental Implant surgery



A GUIDANCE HANDBOOK OF INDIAN DENTAL ASSOCIATION KERALA STATE

COVID-19 PANDEMIC



GUIDELINES AND RECOMMENDATIONS FOR AUXILIARIES



**Indian Dental Association
Kerala State Branch**



ഡെൻറൽ ക്ലിനിക് സ്റ്റാഫിനുള്ള മാർഗ്ഗനിർദ്ദേശങ്ങൾ

കൊറോണ രോഗവ്യാപനം തടയാൻ ചില മുൻകരുതലുകൾ നമ്മൾ എടുക്കേണ്ടതുണ്ട്. നമ്മൾ ഡെന്റിസ്റ്റുകൾ മാത്രമല്ല, നമ്മുടെ ഡെന്റൽ ക്ലിനിക്കിലെ ഓരോ സ്റ്റാഫും ശ്രദ്ധിക്കേണ്ടതുണ്ട്.

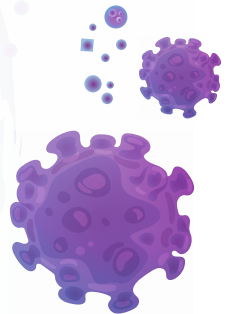
ഈ മുൻകരുതലുകൾ എന്തെല്ലാമാണ് എന്ന് നാം എല്ലാവരും തിരിച്ചറിയണം. മാത്രമല്ല, ഓരോരുത്തരുടെ ചുമതലകൾ എന്തെല്ലാം ആണ് എന്ന് മനസ്സിലാക്കി പ്രവർത്തിക്കുകയും വേണം. അല്ലാത്ത പക്ഷം, കൊറോണയെ നമുക്ക് തടയാൻ സാധിക്കുകയില്ല.

നാം പൊതുവെ തുടർന്ന് വരുന്ന സ്റ്റെറിലൈസേഷൻ പ്രോട്ടോക്കോൾ (sterilization protocol) കൾ ഒപ്പം, ഈ മുൻകരുതലുകൾ കൂടി ഭംഗിയായി നിർവ്വഹിക്കുമ്പോൾ ആണ് "Break the chain" സാധ്യമാകുന്നത്. ഈ ചുമതലകളെ കുറിച്ച് നിങ്ങൾക്ക് ഒരു ധാരണ നൽകുന്നതിനോടൊപ്പം, രോഗികൾക്കുള്ള നിർദ്ദേശങ്ങളും, ക്ലിനിക്കിലെ ഓരോ സ്റ്റാഫിന്റെ ചുമതലകൾ സംബന്ധിച്ചും ചെറിയ "charts" നിർമ്മിക്കാനും ഇത് നിങ്ങളെ സഹായിക്കും.

ഓരോ ക്ലിനിക്കിനും അവിടുത്തേതായ പ്രവർത്തന ശൈലി ഉണ്ടാകും. അത് കൂടാതെ, ഈ ലേഖനത്തിൽ പറഞ്ഞിരിക്കുന്ന കാര്യങ്ങൾ ക്ലിനിക്കിലെ രീതികൾക്ക് അനുസരിച്ചു ഉപയോഗപ്രദമാക്കാം.

പൊതു നിർദ്ദേശങ്ങൾ (General Tips)

- ◆ Front office & operatory area കൈകാര്യം ചെയ്യുന്നത് ഒരേ സ്റ്റാഫ് ആയിരിക്കരുത്.
- ◆ എല്ലാ സ്റ്റാഫും ക്ലിനിക്കിൽ മാത്രം ഉപയോഗിക്കാൻ പാകത്തിന് ചെരുപ്പ് കരുതിവെക്കണം.
- ◆ നമ്മൾ ഉപയോഗിക്കുന്ന product എന്താണെന്നും അതിന്റെ manufacturer's instructions വായിച്ചു മനസ്സിലാക്കി Dentist ന്റെ മേൽനോട്ടത്തിൽ ചെയ്യുക.
- ◆ Mops, towels എന്നിവ Front office & operatory area യിൽ വെച്ചേറെ കരുതണം.



അപ്പോയിൻറ്മെൻറ് (APPOINTMENTS)

പഴയതു പോലെ ദന്താശുപത്രിയുടെ വാതിലുകൾ എല്ലാവർക്കും ഒരേ സമയം തുറന്നിടാൻ സാധിക്കുകയില്ല. കർശനമായ നിയന്ത്രണങ്ങൾ പാലിക്കേണ്ടതുണ്ട്.

- ◆ ചികിത്സ വേണ്ടവർ മുൻകൂട്ടി ഫോൺ വഴി അപ്പോയിൻറ്മെൻറ് (appointment) എടുക്കേണ്ടതാണ് എന്ന് നിഷ്കർഷിക്കുക.
- ◆ അപ്പോയിൻറ്മെന്റിനു രോഗി വിളിക്കുമ്പോൾ അദ്ദേഹത്തിന് കൃത്യമായ സമയം പറയുക. ശരിയായ സമയം പാലിക്കേണ്ട ആവശ്യം അവരെ അപ്പോൾ തന്നെ പറഞ്ഞു മനസ്സിലാക്കി കൊടുക്കേണ്ടത് ആവശ്യമാണ്.

(അതായത്, 10.00 മണിക്ക് വരേണ്ട രോഗി, കൃത്യ സമയം പാലിക്കണം എന്നും സമയം

വൈകി 10.30 മണിക്ക് എത്തിയാൽ അത് അടുത്ത രോഗി വരുന്നതിനു മുൻപ് ക്ലിനിക് പാലിക്കേണ്ട രോഗപ്രതിരോധ പ്രവർത്തനങ്ങളെ തടസ്സപ്പെടുത്തും എന്നും പറഞ്ഞു മനസ്സിലാക്കി കൊടുക്കുക.)

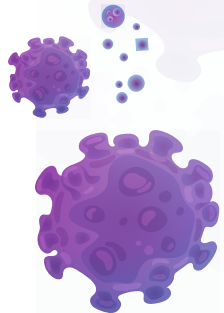
- ◆ ഓരോ രോഗിക്കും ശ്രദ്ധയോടെ സമയം ഇടവിട്ട് അപ്പോയിൻറ്മെൻറ് ടൈം ചാർട്ട് (appointment time chart) ചെയ്യാൻ ശ്രദ്ധിക്കുക.
- ◆ രോഗി വിളിക്കുമ്പോൾ എന്ത് ഡെൻ്റൽ പ്രശ്നത്തിനാണ് വരുന്നതെന്ന് മനസ്സിലാക്കി, അതിനനുസരിച്ചു നമ്മൾ ചികിത്സക്ക് എടുക്കുന്ന സമയം കണക്കാക്കി വേണം പേഷിയൻ റ്റ് ടൈമിംഗ് ചാർട്ട് (patient timing chart) തയ്യാറാക്കുക.
- ◆ അല്ലാത്തപക്ഷം, രോഗികൾ എല്ലാം ഒന്നിച്ചു എത്താനും, നിങ്ങളുടെ വെയ്റ്റിംഗ് റൂമിൽ (waiting room / reception area) ആവശ്യമായ സാമൂഹിക അകലം (social distancing) പാലിക്കാൻ കഴിയാതെ വരികയും ചെയ്യും.
- ◆ വളരെ സൗഹാർദ്ദപരമായി രോഗി ഒറ്റയ്ക്ക് വരണം എന്ന് പറയണം. അങ്ങനെ സാധിച്ചില്ലെങ്കിൽ, ഒരാൾ മാത്രമേ കൂടെ വരാൻ പാടുകയുള്ളൂ എന്നും ഇത് കൊറോണ രോഗത്തെ പ്രതിരോധിക്കാൻ നമ്മൾ ക്ലിനിക്കിൽ എടുക്കുന്ന മുൻകരുതലിൻ്റെ ഭാഗമായിട്ടാണ് ഇങ്ങനെ നിഷ്കർശിക്കുന്നത് എന്ന് ബോധ്യപ്പെടുത്തണം.
- ◆ രോഗിയും കൂടെ വരുന്ന വ്യക്തിയും മാസ്ക് (mask) ധരിക്കണം എന്നും ഓർമ്മപ്പെടുത്തുക.
- ◆ ചുമ, പനി, ശ്വാസതടസ്സം തുടങ്ങിയ രോഗലക്ഷണങ്ങളോ, അല്ലെങ്കിൽ ക്വാറൻറ്റൈൻ / നിരീക്ഷണത്തിലോ ഉള്ള വ്യക്തിയോ വീട്ടുകാരോ ആണെങ്കിൽ കഴിവതും അപ്പോയിൻറ്മെൻറ് (appointment) ഒഴിവാക്കുകയും, ചികിത്സിക്കാൻ പരിമിതികൾ ഉണ്ട് എന്നും അങ്ങനെ ചെയ്തതിൻ്റെ കാരണവും മാനുവലായി പറഞ്ഞു കൊടുക്കുക.

റിസപ്ഷൻ ഏരിയ - (RECEPTION AREA)

റിസപ്ഷനിസ്റ്റിൻ്റെ ചുമതലകൾ

1. ക്ലിനിക്കിലെ റിസപ്ഷനിൽ രോഗ പ്രതിരോധത്തിനായി ഒരുക്കേണ്ട സജ്ജീകരണങ്ങൾ.

- ◆ ക്ലിനിക്കിൻ്റെ പ്രധാന കവാടത്തിനോട് ചേർന്ന് ഒരു shoe rack ഒരുക്കുന്നത് പ്രധാനമാണ്.
- ◆ രോഗിക്ക് കൈ കഴുകാനായിട്ടുള്ള സോപ്പ്, hand sanitizer, വാഷ് ബേസിൻ, tissue paper/hand dryer, വേസ്റ്റ് ബിൻ എന്നിവ ക്രമീകരിക്കുക.
- ◆ റിസ്ക് അസ്സെസ്സ്മെൻ്റ് / കൺസെൻ്റ് ഫോറം പ്രിൻ്റ് ചെയ്തു വയ്ക്കുക.
- ◆ ക്ലിനിക്കിൻ്റെ പ്രധാന വാതിലിനു പുറത്തു താഴെ carpet / തറയിൽ 0.1 ശതമാനം(0.1%) ബ്ലീച്ചിങ് സൊല്യൂഷൻ (bleaching solution) തളിക്കുക. അല്ലെങ്കിൽ carpet-നു പുറത്തു ബ്ലീച്ചിങ് സൊല്യൂഷനിൽ മുക്കിപ്പിഴിഞ്ഞു തുണി വിരിക്കുക. ഇങ്ങനെ ചെയ്യുമ്പോൾ രോഗികളുടെ പാദരക്ഷകളിൽ പറ്റിയിരിക്കുന്ന രോഗാണുക്കൾ സംക്രമിക്കുന്നത് തടയാൻ പറ്റും.

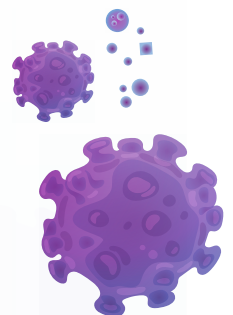




- ◆ Reception/waiting area ഇൽ ആവശ്യത്തിന് വായു സഞ്ചാരം ഉണ്ടായിരിക്കണം, വാതിലുകളും ജനാലകളും തുറന്നിടുക. Exhaust പ്രവർത്തിപ്പിക്കുക.
- ◆ കസേരകൾ തമ്മിൽ കുറഞ്ഞത് 1 മീറ്റർ അകലം പാലിക്കണം. അധികം ഉള്ള കസേരകൾ മാറ്റുകയോ, അല്ലെങ്കിൽ, ഇടയിൽ വരുന്ന കസേരകളിൽ റിബൺ കെട്ടിവച്ചും, ഇവിടെ ഇരിക്കരുത് എന്ന് എഴുതി വച്ചോ അകലം പാലിക്കാൻ ശ്രദ്ധിക്കുക.
- ◆ പത്രങ്ങൾ, magazines, പ്ലവർ വാസ്, തുടങ്ങി അധികം ആയി തോന്നുന്ന വസ്തുക്കൾ ഒക്കെയും താത്കാലികമായി മാറ്റി വയ്ക്കുക. ഇവയുടെ പ്രതലങ്ങൾ ഒക്കെ രോഗാണുവാഹകർ ആകാം. മാത്രമല്ല, ഇതൊക്കെ alcoholic disinfectant വച്ച് തുടക്കാൻ സാധിച്ചെന്നും വരില്ല.
- ◆ ഫീസ് വാങ്ങാൻ ഡിജിറ്റൽ (digital) ആയ മാർഗ്ഗങ്ങൾ ഉപയോഗിക്കാൻ ശ്രദ്ധിക്കുക. അല്ലാത്തപക്ഷം, പണം സ്വീകരിക്കാൻ ഒരു ഫോർമാൽഡിഹൈഡ് ടാബ്ലറ്റ് ഇട്ട (Formaldehyde Tablet) ബോക്സ് സജ്ജമാക്കുക.
- ◆ IMAGE waste disposal unit സ്റ്റാഫ് വന്നാൽ അവരെ ചികിത്സ മുറിയിലേക്ക് കയറ്റാതെ, clinical waste പുറത്തു നിന്നും തന്നെ പോകാൻ സൗകര്യം ഒരുക്കുക. വേസ്റ്റ് ഡിസ്സോസലുമായി ബന്ധപ്പെട്ട് എല്ലാ ദിവസവും clinical waste ഒഴിവാക്കാനുള്ള സംവിധാനങ്ങൾ ഏർപ്പെടുത്തണം.

2. റിസെപ്ഷനിസ്റ്റ് അറിഞ്ഞിരിക്കേണ്ട രോഗികൾക്കുള്ള നിർദ്ദേശങ്ങൾ താഴെ കൊടുത്തിരിക്കുന്നു .

- ◆ ക്ലിനിക്കിനു പുറത്തു തന്നെ രോഗപ്രതിരോധത്തിനായി ദന്താശുപത്രി ഒരുക്കിയിരിക്കുന്ന സജ്ജീകരണങ്ങൾ രോഗി മനസ്സിലാക്കും വിധം charts പ്രദർശിപ്പിക്കുകയും മനസ്സിലാക്കിക്കൊടുക്കുകയും ചെയ്യുക എന്നത് റിസെപ്ഷനിസ്റ്റിന്റെ ചുമതലയാണ്.
- ◆ ക്ലിനിക്കിന്റെ പ്രധാന വാതിലിനു പുറത്തു രോഗിയുടെയും കൂടെയുള്ളവരുടെയും- ചെരുപ്പുകൾ അഴിച്ചു വയ്ക്കുക.
- ◆ അപ്പോയിൻറ്മെൻറ് എടുത്തവർ മാത്രം അകത്തു പ്രവേശിക്കുക. ഒരു രോഗിക്കൊപ്പം ഒരാൾ മാത്രം.
- ◆ രോഗി ക്ലിനിക്കിൽ എത്തുമ്പോൾ വാതിൽക്കൽ നിന്ന് തന്നെ സ്വീകരിച്ചു, കൈ കഴുകാൻ നിർദ്ദേശിക്കുക. രോഗിയുടെ കൂടെ വന്ന വ്യക്തിയും കൈകൾ കഴുകിയിട്ടു വേണം, സാമൂഹിക അകലം പാലിച്ചു കസേരയിൽ ഇരിക്കാൻ.
- ◆ ക്ലിനിക്കിൽ വന്ന രോഗിയും, കൂടെ വന്ന വ്യക്തിയും നിർബന്ധമായും മാസ്ക് ധരിച്ചു മാത്രമേ റിസെപ്ഷനിൽ വെയിറ്റ് ചെയ്യാവൂ. മാസ്ക് ഡോക്ടർ ആവശ്യപ്പെടുമ്പോൾ മാത്രം ഊതുക എന്ന് രോഗിയെ ഓർമ്മിപ്പിക്കുക.
- ◆ രോഗിയുടെ കൂടെ വന്ന വ്യക്തിയെ റിസെപ്ഷനിൽ തന്നെ ഇരുത്തുക, കുട്ടികളുടെയോ മുതിർന്നവരുടെയോ, അതുമല്ലെങ്കിൽ ഡോക്ടർ നിർദ്ദേശിച്ചാൽ മാത്രം ബൈസ്റ്റാൻഡേഴ്സിനെ ഓപ്പറേറ്ററിക്കു അകത്തോട്ടു പ്രവേശിപ്പിക്കാവൂ.





- ◆ ശരിയായ രോഗ വിവരം ചോദിച്ചറിയുക.
- ◆ സാമൂഹിക അകലം പാലിക്കാൻ ശ്രദ്ധിക്കണം. "Break the chain" നടപ്പിലാക്കുക.

3. ക്ലിനിക്കിലെ റിസപ്ഷനിൽ റിസെപ്ഷനിസ്റ്റ് ചെയ്യേണ്ട കാര്യങ്ങൾ.

- ◆ Receptionist നിർബന്ധമായും three ply mask, gloves എന്നിവ ധരിക്കണം.
- ◆ ഒരു കാരണവശാലും വിരലുകൾ ഉപയോഗിച്ച് മുഖത്തോ (T zone), മുടിയിലോ തൊടരുത്. സാധാരണയായിട്ടു ഉപയോഗിക്കുന്ന പേന, എഴുതുന്ന പാഡ്, ഫോൺ എന്നിവ ഇടവിട്ട് വൃത്തിയാക്കുക.
- ◆ ഇനി രോഗിയുടെ ശരീര ഊഷ്മാവ് (temperature) infrared thermometer വച്ച് അളക്കുക. ഇത് റിസ്ക് അസ്സെസ്സ്മെന്റ് / കൺസെന്റ് ഫോറത്തിൽ അടയാളപ്പെടുത്തുക.
- ◆ അതിനു ശേഷം റിസ്ക് അസ്സെസ്സ്മെന്റ് / കൺസെന്റ് ഫോറം, പേന എന്നിവ രോഗിക്ക് കൈമാറി പുരിപ്പിച്ചു വാങ്ങുക.
- ◆ പേര്, അഡ്രസ്സ്, രോഗ വിവരം, പനി, ചുമ എന്നിവ ഉണ്ടോ, നിരീക്ഷണത്തിൽ ആണോ , വിദേശത്തു നിന്ന് തിരിച്ചു ദിവസം, സമയം എന്നിവ എഴുതാൻ പറയുക. രോഗിയോടു valid ID proof ചോദിക്കുന്നതിൽ തെറ്റില്ല.
- ◆ പുരിപ്പിച്ച ഫോറം രോഗിയോടു തന്നെ ഫോർമാൽഡിഫൈഡ് ട്രാഞ്ച്ലൈറ്റ് ഇട്ട കൺടെയ്നറിൽ നിക്ഷേപിക്കാൻ പറയുക. അടുത്ത ദിവസം മാത്രം ഈ ഫോറം ഫയൽ ചെയ്തു സൂക്ഷിച്ചു വയ്ക്കുക.
- ◆ തറ ഒന്നരമണിക്കൂർ ഇടവിട്ടു 1% bleaching solution കൊണ്ടു തുടക്കുക, ചുമരുകൾ, പ്രതലങ്ങൾ, കസേരകൾ, വാതിൽപ്പിടിക്കൽ തുടങ്ങിയവ സമയം ഇടവിട്ട് alcoholic disinfectant കൊണ്ട് തുടക്കുക.
- ◆ രോഗിക്ക് 1% hydrogen peroxide / 0.2% povidone iodine mouthwash solution നൽകി വായ 2 മിനിറ്റ് നേരത്തേക്ക് കോപ്ലിച്ചു കരുതലോടെ തുപ്പാൻ പറയണം. അതിനു ശേഷം കസേര കാണിച്ചു ഇരിക്കാൻ പറയുക.
- ◆ ഓരോ രോഗിയുടെ ഊഴം ആകുമ്പോൾ റിസെപ്ഷനിസ്റ്റ് തന്നെ വേണം രോഗിക്ക് ചികിത്സാ മുറിയിലേക്കുള്ള വാതിൽ തുറന്നു കൊടുക്കാൻ.
- ◆ രോഗി കുട്ടിയോ, പ്രായമേറിയ വ്യക്തിയോ ആണെങ്കിൽ മാത്രം കൂടെ വന്ന ആളോട് അകത്തു പ്രവേശിക്കാൻ പറയുക. ഡെന്റിസ്റ്റ് ആവശ്യപ്പെടാതെ രോഗി mask ഊരരുത് എന്ന് ഓർമ്മിപ്പിക്കുക.
- ◆ ഒരു കാരണവശാലും വായയിലെ അസുഖം ചൂണ്ടിക്കാണിക്കാൻ വിരൽ വായയിൽ ഇടരുത് എന്ന് ഓർമ്മിപ്പിക്കുക.
- ◆ ഡെന്റിസ്റ്റിന്റെ സമ്മതം ഇല്ലാതെ spittoon ഇൽ തുപ്പരുത് എന്ന് ഓർമ്മിപ്പിക്കുക.
- ◆ ചികിത്സ കഴിഞ്ഞു പുറത്തു വരുന്ന രോഗി mask ധരിച്ചിട്ടുണ്ട് എന്ന് ഉറപ്പു



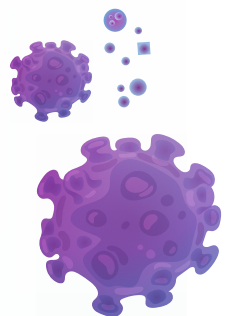
വരുത്തുക. ചികിത്സ കഴിഞ്ഞു പുറത്തു വരുന്ന രോഗിയെ അധിക സമയം വൈകാതെ പോകാനനുവദിക്കുക.

- ◆ ഫീസ് ഡിജിറ്റലായ (digital) മാർഗ്ഗങ്ങൾ ഉപയോഗിച്ച് സ്വീകരിക്കുക. അല്ലാത്തപക്ഷം, പണം ഫോർമാൽഡിഹൈഡ് ട്രൈബ്ലൈറ്റ് ഇട്ട കൺടെയ്നറിൽ നിക്ഷേപിക്കാൻ പറയുക. അടുത്ത ദിവസം മാത്രം അത് കൺടെയ്നറിൽ യിൽ നിന്നും കളക്ട് ചെയ്യുക.
- ◆ വാതിൽ തുറന്നു കൊടുത്തു, അവർക്കു എവിടെയും തൊടാതെ തിരിച്ചു പോകാൻ സൗകര്യം ഒരുക്കുക. രോഗിയും കൂടെ വന്ന വ്യക്തിയും പോയതിനു ശേഷം, അവർ ഇരുന്ന കസേരകൾ ഡിസൈൻഫെക്ട് ചെയ്തു വൃത്തിയാക്കുക.

ട്രീറ്റ്മെൻറ് സോൺ (TREATMENT ZONE) :

1. ചെയർ സൈഡ് അസ്സിസ്റ്റന്റിന്റെ ചുമതലകൾ (Duties of chair side assistants)

- ◆ ആവശ്യത്തിന് വായു സഞ്ചാരം ചികിത്സ മുറിയിൽ ഉണ്ടായിരിക്കണം. വാതിലുകളും ജനാലകളും തുറന്നിടുക. Exhaust പ്രവർത്തിപ്പിക്കുക.
- ◆ തറ ഒന്നരമണിക്കൂർ ഇടവിട്ടു 1% bleaching solution കൊണ്ടു തുടക്കുക.
- ◆ Barrier film ഉപയോഗിച്ച് ഡെന്റൽ ചെയറിന്റെ ആവശ്യമുള്ള ഭാഗങ്ങൾ മറയ്ക്കണം.
- ◆ Mask, gloves, head cap, face shield, polyethylene cover glove (optional) എന്നിവ അസിസ്റ്റന്റ് റ്റാരിക്കണം.
- ◆ കഴിയുമെങ്കിൽ ക്ലിനിക്കിൽ ഉപയോഗിക്കാനായി മറ്റൊരു ജോഡി ഡ്രസ്സ് കരുതണം.
- ◆ എപ്പോഴും കൈ ശുചിത്വം പാലിക്കുക. Hand sanitizer ഉപയോഗിക്കുക.
- ◆ രോഗിയിൽ നിന്നും ആവശ്യമായ അകലം പാലിക്കുക.
- ◆ രോഗി spittoon ഉപയോഗിക്കുന്നത് നിരുത്സാഹപ്പെടുത്തുക
- ◆ ഏറോസോൾസ് (Aerosols) ഉണ്ടാകുന്ന സമയങ്ങളിൽ N95 mask ഉപയോഗിക്കുക.
- ◆ ഹൈ വാക്വം സക്ഷ്യന്റെ (High vacuum suction) പ്രവർത്തനരീതി പഠിക്കുക, രോഗിക്ക് ഓക്കാനം വരാത്ത രീതിയിൽ ശ്രദ്ധിച്ചു ഉപയോഗിക്കുക.
- ◆ ചികിത്സക്കു ശേഷം dental chair, operator stool, suction tube, പരിസരങ്ങൾ എന്നിവ ഡിസൈൻഫെക്റ്റന്റ് (disinfectant) ഉപയോഗിച്ച് തുടയ്ക്കുക. തറ 1% bleaching solution കൊണ്ടു തുടക്കുക.
- ◆ 100-150ml bleaching solution വലിച്ചെടുത്തു സക്ഷൻ ട്യൂബിന്റെ (suction tube) ഉൾഭാഗം ശുചിയാക്കുക.

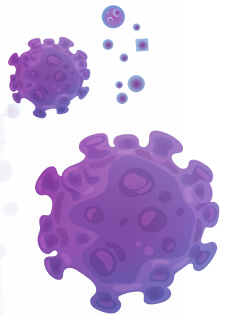


- ◆ ഡെന്റിസ്റ്റ് ഉപയോഗിച്ച ഉപകരണങ്ങൾ ശ്രദ്ധയോടെ dental chair ന് സമീപം കരുതി വച്ചിട്ടുള്ള NaOCL solution / soap solution ഇൽ ഇട്ട ശേഷം sterilization/cleaning area ഇൽ കൊണ്ടുപോകുക.
- ◆ ഡെന്റിസ്റ്റ് തൊട്ടു ഓരോ വസ്തുവും (composite tube, light body gun , acid etchant tube etc) ഡിസൈൻഫെക്റ്റ് ചെയ്യുക.
- ◆ എല്ലാം ചെയ്തതിനു ശേഷം മാത്രം gloves ഉറക്കുക. കൈകൾ soap ഇട്ടു 20 seconds കഴുകുക. Hand sanitizer ഉപയോഗിക്കുക.
- ◆ ക്ലിനിക്കിന്റെ ഓരോ മുക്കിലും മൂലയിലും നിങ്ങളുടെ ശ്രദ്ധ എത്തണം.

സ്റ്റെറിലൈസേഷൻ ഏരിയ (STERILIZATION AREA):

ക്ലീനിങ്ങ് സ്റ്റാഫിന്റെ ചുമതലകൾ (Duties of the Cleaning Staff)

- ◆ Sterilization protocols ന്റെ chart ഒട്ടിച്ചു വെക്കുന്നത് ആവശ്യമാണ്. ഇവിടുത്തെ സ്റ്റാഫ് utility gloves, mask, head cap, gown എന്നിവ ധരിക്കുക.
- ◆ കഴിയുമെങ്കിൽ ക്ലിനിക്കിൽ ഉപയോഗിക്കാനായി മറ്റൊരു ജോഡി ഡ്രസ്സ് കരുതണം.
- ◆ എല്ലാ ഉപകരണങ്ങളും tap water & soap ഉപയോഗിച്ച് scrub ചെയ്തു കഴുകുക.
- ◆ അതിനു ശേഷം ക്ലിനിക്കിലെ സ്റ്റെറിലൈസേഷൻ പ്രോട്ടോക്കോളനു സരിച്ച് പ്രവർത്തിക്കുക.



ഡിസിൻഫെക്റ്റന്റ് സൊല്യൂഷൻസ് (Disinfectant Solutions - HOW TO PREPARE)

ഈ അവസരത്തിൽ നമ്മുടെ ക്ലിനിക്കിന് ആവശ്യമായ ഡിസിൻഫെക്റ്റന്റ് സൊല്യൂഷൻസ് (disinfectant solution) ശെരിയായ തോതിൽ ഉണ്ടാക്കേണ്ടത് എങ്ങിനെ എന്ന് മനസ്സിലാക്കണം.

0.1% ബ്ലീച്ചിങ്ങ് സൊല്യൂഷൻ (Bleaching solution)

0.1%= 0.1 gm/100ml water (weight/volume). അതായത് 1 gm in 1000ml water (1L) or 10gm in 10,000ml water(10L) കലക്കി എടുക്കുക. (10 gm spoon, measuring jar ക്ലിനിക്കിൽ കരുതുക.)

1% ഹൈഡ്രജൻ പെറോക്സൈഡ് (Hydrogen Peroxide)

സാധാരണയായി കടയിൽ നിന്നും ലഭിക്കുന്നത് 6% H₂O₂ ആണ്. 100 ml വാങ്ങുക

The formula is Concentration x Volume (C₁V₁= C₂V₂)

C₁= 6%, V₁=100ml, C₂=1% V₂=? , V₂= (6 x 100)/ 1 = 600ml

അതായത് 100ml കടയിൽ നിന്നും വാങ്ങിയ H₂O₂, 600ml വെള്ളത്തിൽ കലക്കുക.

0.2% പോവിഡോൺ അയിഡിൻ (Povidone Iodine)

Eg: 10% Betadine of 100ml solution : $C_1V_1 = C_2V_2$ $10 \times 100 = 0.2 \times V_2$, $V_2 = (10 \times 100) / 0.2 = 5000\text{ml (5L)}$

അതായത് 100ml കടയിൽ നിന്നും വാങ്ങിയ 10% Betadine, 5 Litre വെള്ളത്തിൽ കലക്കുക.

CHECK LIST FOR THE RECEPTIONIST

- ◆ Mask ധരിക്കുക, Head cap, gloves ഉപയോഗിക്കുക
- ◆ രോഗിയുടെയും സഹായിയുടെയും കൈ സോപ്പ് അല്ലെങ്കിൽ സാനിറ്റൈസർ ഉപയോഗിച്ച് വൃത്തിയാക്കാൻ പറയുക.
- ◆ രോഗിയും കൂട്ടാളിയും mask നിർബന്ധമായും ധരിക്കണം.
- ◆ രോഗിയുടെ ശരീര ഊഷ്മാവ് രേഖപ്പെടുത്തുക
- ◆ അവർ social distancing പാലിച്ചു കണ്ടേയ്ക്കിൽ ഇരുത്തുക .
- ◆ ശരിയായ രോഗ വിവരം രേഖപ്പെടുത്തി വാങ്ങുക.
- ◆ ഫോർമാൽഡിനൈഡ് ട്രാപ്പ് ഇട്ട കൺടെയ്നറിൽ നിക്ഷേപിക്കാൻ പറയുക.
- ◆ രോഗിയുടെ വായ 1% H₂O₂ /0.2% povidone iodine ഉപയോഗിച്ച് കഴുകുക.
- ◆ ഓരോ രോഗിയുടെ ഊഴം ആകമ്പോൾ റിസെപ്ഷനിസ്റ്റ് തന്നെ വേണം രോഗിക്ക് ചികിത്സാ മുറിയിലേക്കുള്ള വാതിൽ തുറന്നു കൊടുക്കാൻ.
- ◆ പണം digital ആയി സ്വീകരിക്കുക
- ◆ ചികിത്സ കഴിഞ്ഞു പുറത്തു വരുന്ന രോഗിയെ അധിക സമയം വൈകാതെ പോകാനനുവദിക്കുക.
- ◆ അവർ പോയതിനു ശേഷം പരിസരം disinfect ചെയ്യുക.

CHECK LIST FOR THE CHAIR SIDE ASSISTANT

- ◆ Mask, head cap, face shield, gown എന്നിവ ധരിക്കുക .
- ◆ കൈകൾ ഇടവിട്ട് soap ഉപയോഗിച്ച് കഴുകുക.
- ◆ T zone തൊടാതിരിക്കുക.
- ◆ Dental Chair , operator stool പരിസരം , നിലം എന്നിവ disinfect ചെയ്യുക
- ◆ Barrier film ഒട്ടിക്കുക
- ◆ ഡെന്റിസ്റ്റ് ഉപയോഗിച്ച ഉപകരണങ്ങൾ sterilization/cleaning area ഇൽ കൊണ്ടു പോകുക.



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and

- ◆ IDA MALABAR WOMENS DENTAL COUNCIL 2020 (Auxiliary Handbook)

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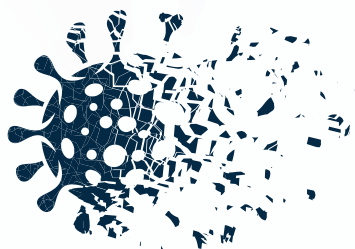
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PRACTICE GUIDELINES AND RECOMMENDATIONS