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Journal of Indian Dental Association
Attingal Branch

INDIAN DENTAL ASSOCIATION
ATTINGAL BRANCH

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Office:

The Editor-In-Chief,
Impressions-Journal of IDA
Attingal Branch,
Prathyusha Dental Care
IIIrd Floor YCDC, Opp
Vydyuthi Bhavanam, Pattom,
Thiruvananthapuram-695004.

Mobile : 9447060374

e-mail: journalidaatl@gmail.com

President's Message

Dear Members,

I am glad to inform that the 2nd edition of our branch journal is ready for publication. All articles in the journal are very informative to general practitioners. I sincerely admire the persistent efforts of members who had contributed articles for publications. Our journal is living up to the expectations of all class of dentists impacting a mydriad of information pertaining to dental and allied fields.

I request your whole hearted support and participation for the upcoming Kerala State Dental students conference 2019 'Vaibhavam-2019' on the October 12th and 13th at Sivagiri HSS, Sreenivasapuram,Varkala. The revamping of our branch website has been completed, requesting all members to log in at www.idaattingalbranch.com.

I fervently solicit the efforts of our editor Dr. Pradeep C. Dathan and his team for making this journal a reality.

Thanking You

Dr. Afzal A
President
IDA Attingal Branch.

Secretary's Message

Dear member,

"Greetings From Branch office"

As we traverse the first half of the association year, I'm happy to write you that we had a comfortable journey till today, I wish to mention some of the matters which went smoothly and a few matters we are going to encounter in the near future through this 2nd issue of our journal IMPRESSIONS.

IDA State Branch called for an one day strike along with IMA for job security. Even though the strike was declared in a short notice, most of the members joined and took the branch's initiative very positively. We thank all the members for their commitment and responsibility shown towards our association and expect it in future also. Now our profession is facing so many hardships. The public is throwing stones towards us in one side and the Government is trying to implement strict rules to tie our hands in other side. So dear friends don't forget the proverb "United we stand divided we fall". This is high time to go hand in hand.

In the near future CE bill will be implemented by the Government. We request you to upgrade your clinics according to the norms of IDA CAN, which will be easier for us to get an accreditation.

In October our branch is hosting a Mega event " The Kerala State Dental Students Conference" at Varkala, students from 26 colleges of Kerala State, is participating and we need help from all members of our branch to make the event a grand success.

Keep in touch with branch office for any queries regarding CE bill. Our team is always ready to give support and guidance as off your need.

Thank you

With Regards

Dr. Deepak S Das
Hon: Secretary
IDA Attingal

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

Be alert on Nipah Virus

Nipah Virus infection is the newly emerging Zoonosis (a disease transmitted to humans from animals). It is found that the virus belongs to a new genus named as Henipavirus (subfamily Paramyxovirinae). The infection can cause severe disease conditions to both the animals and human beings.

Fruit bats of Pteropodidae family (Pteropus genus)are the natural hosts of the virus as the virus is present in their body fluid such as saliva and urine. The epidemic of the disease was initially reported in the year 1998 in Kampung Sungai Nipah, Malaysia. Pigs were found to be the intermediate hosts for the spread of this deadly virus infection. Again in the year 2004, in Bangladesh, humans were infected with the Nipah Virus after eating the date palm sap which was contaminated by infected fruit bats. Human-to-human transmission of Nipah virus has also been reported among family and care givers of infected patients. The present outbreak of Nipah is the fourth reported in India, with previous ones having occurred in 2001 (45 deaths), 2007 (5 deaths) and 2018 (17 deaths).

Key facts

- Nipah virus infection in humans causes a range of clinical presentations, from asymptomatic infection (subclinical) to acute respiratory infection and fatal encephalitis. In some cases, the symptoms of Nipah Virus include pain in the stomach, choking, vomiting and blurred vision. There are high chances for a patient to get into coma a few days after the symptoms begin. People of all ages are at risk from Nipah virus in Asia.
- The case fatality rate is estimated at 40% to 75%. This rate can vary by outbreak depending on local capabilities for epidemiological surveillance and clinical management.
- There is no treatment or vaccine available for either people or animals. The primary treatment for humans is supportive care. Ribavirin has been used on a few patients but its efficacy for Nipah virus disease has not yet been determined.
- The 2018 annual review of the WHO R&D Blueprint list of priority diseases indicates that there is an urgent need for accelerated research and development for the Nipah virus.
- Nipah Virus is classified as a biosecurity level (BSL) 4 agent and the tests needs to be carried out in the special labs to prevent its spread.

Controlling infection in health-care settings

Health-care workers caring for patients with suspected or confirmed infection, or handling specimens from them, should implement standard infection control precautions at all times

As human-to-human transmission has been reported, in particular in health-care settings, contact and droplet precautions should be used in addition to standard precautions. Airborne precautions may be required in certain circumstances.

Samples taken from people and animals with suspected Nipah virus infection should be handled by trained staff working in suitably equipped laboratories.

It is very important for a healthy person to maintain a distance from the infected person. Washing hands properly and sanitizing them regularly will be helpful in keeping the infection at bay. Maintain hygiene in the surroundings by cleaning clothes and utensils.

Dental professionals are to be alert against Nipah virus.

Dr. Pradeep C. Dathan
Editor, Impressions

REVIEW

Information on Guided Endodontics

***Poojitha Burugupalli, *S.U. Meghana Gajavalli, **D. Bheemalingeswara Rao, ***Suresh Sajjan, ****Ramaraju, *****K. Chandrasekharan Nair**

*P G Student, **Professor, ***Professor & Principal, ****Professor & Vice Principal, *****Professor Emeritus, Department of Prosthodontics, Vishnu Dental College, Bhimavaram, AP

Send correspondence: Dr. Poojitha Burugupalli E-mail: dr.poojitha93@gmail.com

Pulp canal calcification (PCC) is a common consequence of dental injuries and may occur in patients after a luxation. Guided endodontics is gaining momentum in the root canal treatment of teeth with calcified canals. Such situations with radiographically invisible root canals are rated as cases with highest difficulty level by the American Association of Endodontists because a predictable treatment outcome may be challenging even for most experienced practitioners. However, recent developments allow for matching a surface scan with CBCT data, for the creation of a virtual template and producing the template through 3D printing. The technique was designed to treat teeth with PCC and narrow roots using a printed template with incorporated sleeves that guide a bur to the calcified root canal. Due to the high accuracy of the printed templates, this technology seems very promising. Use of guided procedures in dental traumatology and endodontology is relatively new. Guided endodontics helps in the management of complicated cases by providing reasonable conservation of coronal tooth structure, reducing the risk of root perforation and provides economy of time. Guided preparation requires a straight line access to the root canal and may modify the root canal geometry according to the dimension of the drill and this fact may be considered as a limitation of the technique. The final shape of the prepared root canal may not be considered as excessive in a central incisor of a young patient. However with further development and miniaturization of the preparation drill and the corresponding sleeve, it is possible to reduce the substance loss and make the guided endodontic technique suitable for even delicate mandibular incisors. Dentinal cracks are initiated while using the drill to locate the root canal which is not exclusive to guided endodontics. It is well known that mechanical root canal preparation results in dentinal defects such as craze lines and cracks.

Procedure:

1. Preoperative CBCT images are made and stored as Digital Imaging and Communication (DICOM) files (Fig 1).

2. Surface scans are done using a 3D-intra-oral surface scanner and the data is stored as Surface Tessellation Language (STL) files (Fig 2).

3. The scans are matched and the CBCT data is uploaded into a planning software designed for guided implant surgery (coDiagnostiXTM version

9.2, Dental Wings Inc., Montreal, Canada) (Fig 3,4).

4. The software allowed the creation of a virtual image of a commercially available bur. In addition, a virtual sleeve for guidance with an inner diameter of 1.5 mm, an external diameter of 2.8 mm and a length of 6 mm is created for planning purposes. The virtual bur is superimposed on each tooth with the aim of creating a direct access to the apical third of the root canal (Fig 5).

5. Virtual template is designed by applying a tool of the coDiagnostiXTM software. Information on sleeve's position is considered in the planning. Exported STL-files allowed a 3D printer(Objet Eden 260 V, Material: MED610, Stratasys Ltd.,Minneapolis, MN, USA) to produce the template. Computerized numerical control (CNC) technology is used to fabricate the designed sleeves which are integrated into the printed templates (Fig 6).

6. Templates are attached to the teeth and their correct and reproducible fitting is checked. Marks are set through the template sleeves to indicate the region of access cavity. Enamel is removed in this area using a diamond bur until dentine is exposed. Then, the specific bur is used to gain access to the

Fig 1. CBCT scan

Fig 2. Surface scan

Fig 3. Matched scans

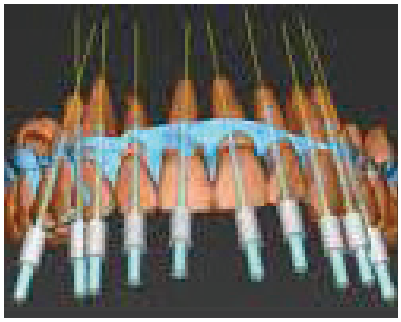

Fig 4. Superimposition of virtual burs

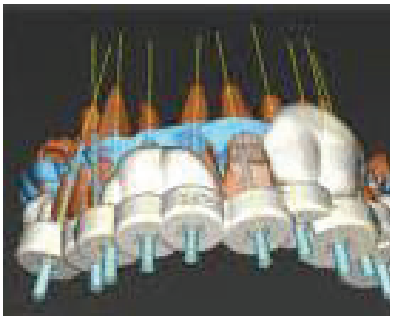

Fig 5. Designed template including sleeves and burs

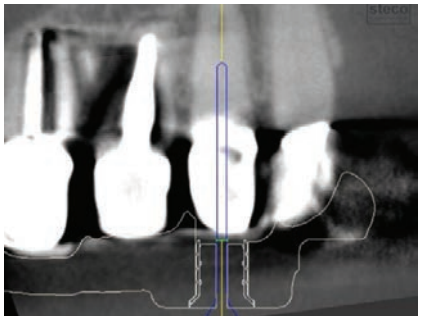

Fig 6. Template and sleeve in position

Fig 7. Template and drill in position

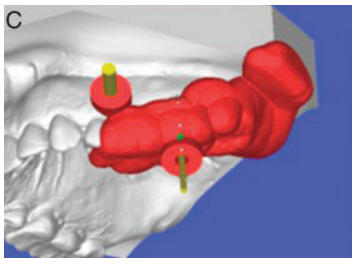

Fig 8. Template in position

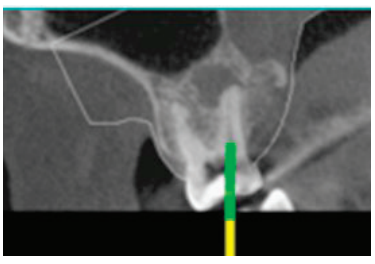

Fig 9. Radiographic image of drill

Fig 10. Schematic diagram of template, sleeve and the drill

root canal. Rotational speed is set at 10000 rpm, and pumping movements are applied. The bur is cleaned regularly during preparation. The final position is reached when the bur hits the mechanical stop of the sleeve (Fig 7-9).

The 'Guided Endodontic' technique allows accurate access cavity preparation utilizing printed templates which are designed by matching CBCT data with an intra-oral scan. It is possible to locate all root canals in the apical third and thus perforations are eliminated.

Further reading

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REVIEW

Basic facts on Bruxism

*** D. Bheemalingeswara Rao, ** Poojitha Burugupalli, *S.U. Meghana Gajavalli, ***Suresh Sajjan, ****Ramaraju, *****K. Chandrasekharan Nair**

* Professor, **P G Student, ***Professor & Principal, ****Professor & Vice Principal, *****Professor Emeritus, Dept of Prosthodontics, Vishnu Dental College, Bhimavaram, AP

Send correspondence: Dr. D. Bheemalingeswara Rao E-mail: bheemalingeswararao29@gmail.com

Bruxism has been defined by the American Academy of Sleep Medicine as the "repetitive jaw muscle activity characterized by the clenching or grinding of teeth and/or bracing or thrusting of the mandible.''

The study of bruxism has gained interest over the past years, thereby focussing on aspects such as its definition, etiology, the different motor activities characterising bruxism, its relationship with TMJ disorders and its consequences on the natural dentition and dental implants. The prevalence of Awake Bruxism in adults was reported to range from 22.1% to 31% while that of Sleep Bruxism was more consistent at 13%. The prevalence of Sleep Bruxism in children varied from 3.5% to 40.6%. While Awake Bruxism tends to be higher for women, no gender difference was observed in Sleep Bruxism. Both Awake Bruxism and Sleep Bruxism generally decreases with age.

Criteria	Classification	Description
When it occurs	AS	Occurs when individual is awake
	SB	Occurs when individual is sleeping
	Combined	Occurs in both situations
Etiology	Primary	No identifiable cause
	Secondary	Secondary to neurologic, psychiatric, sleep or movement disorders, or of an iatrogenic type associated with drug use/withdrawal, etc.
Motor activity type	Tonic	Muscular contractions lasting >2 s
	Phasic	Brief repeated muscular contractions with at least three consecutive electromyographic bursts of 0.25 and 2 s duration
	Combined	Variation of tonic and phasic episodes
Activity status	Nonactive	Past bruxism
	Active	Current or present bruxism

AS: Awake bruxism, SB: Sleep bruxism

Classification of Bruxism:

Etiology of Bruxism:

The etiology of Bruxism is multifactorial: stress, lifestyle habits, medications, medical conditions and occlusion are the major contributors.

Stress

Stress is a reaction to a stimulus that disturbs our physical or mental equilibrium creating unresolved emotions such as frustration, anger, competitiveness, aggressiveness, anxiety, tension, hyperactive personality or unresolved conflict. Suppression of feelings can also cause undue stress. The grinding of teeth has long been held as one physical manifestation of stress and anxiety. For example, individuals who grind their teeth tend to report more symptoms of anxiety and depression than non-bruxers. Also, compared to non-bruxers, those who grind their teeth tend to report greater life stress and are more likely to suffer from depression and anxiety disorders.

Lifestyle Habits

Many lifestyle choices can increase the cycle of bruxism, especially with the use of psychoactive substances such as alcohol, tobacco, drugs and caffeine.

Alcohol

Drinking alcohol excessively doubles a patient's chance of developing sleep bruxism. Bruxing tends to intensify after alcohol consumption. The occasional drink such as a glass of wine or two before going to bed helps one sleep better sounds good–but

in reality, alcohol is known to break up sleeping patterns. If your patient sleeps poorly, this triggers their muscles to hyperactivate and the teeth to grind. It also increases the amount of arousal sleep.

Tobacco Use

Tobacco is a stimulant and affects the dopaminergic system. Bruxism in tobacco users is twice as prevalent as in non-users with sleep bruxism episodes five times more frequent per night. Bruxism related symptoms are three times higher in tobacco users than non-users.

Recreational Drugs

Stimulants in recreational drugs such as ecstasy, cocaine, methamphetamine (meth) and heroin increase bruxism. These drugs are central nervous system stimulants. Their mechanism of action is based on the neuronal transmitters in the brain with the dopaminergic system being the most involved. Neuronal transmitters are essential for functions in the central nervous system that involve learning, memory, sleep cycle, body movement, hormone regulation and many more. They also initiate motor disorders causing bruxism. Ecstasy generates the most concern in relation to severe awake and sleep bruxism. It can last in the system for 6-8 hours, with bruxism as a side effect in one-third of users. With regular use, these drugs can promote bruxism leading to severe attrition in a short amount of time.

Caffeine

Drinking caffeinated drinks, such as tea and coffee (six or more cups a day) increases the risks of bruxing. Caffeine has a half-life of six hours after it has been consumed. Caffeine is a stimulant that can promote muscle activity and cause frequent waking periods at night.

Fig 1. Attrition in bruxism

Fig 2. Attrition on canine in bruxism

Fig 3. Abfraction

Fig 4. Chipping of enamel

Attention Deficit Hyperactivity Disorder (ADHD)

ADHD is one of the most common childhood disorders. Symptoms include inattentiveness, impulsivity and hyperactivity, but they differ from person to person. The disorders can continue through adolescence and into adulthood. A person is unable to control behavior due to difficulty in processing neural stimuli, accompanied by an extremely high level of motor activity. In ADHD, bruxism is caused by extensive sleep disturbances and medications used to treat the disorder.

Autism

A neurodevelopmental disorder described by impaired social interaction, verbal and non-verbal communication and restricted and repetitive behavior. Bruxism can be caused by the antipsychotic medications used in its treatment, high stress and anxiety experienced with autism.

Brain Injury

There are many conditions that fall into this category. The most common includes: strokes, brain damage, dementia or Alzheimer's disease and traumatic brain injuries, including concussions. Bruxism is a secondary disorder of these conditions.

Cerebral Palsy

This condition primarily affects body movement and muscle coordination. Bruxism is a secondary disorder due to accompanying abnormal conditions in the oral cavity. These patients usually have a higher incidents of crowding, variable sizes, shapes and malaligned teeth, all of which can promote bruxism.

Depression

A mental illness that causes sadness. A patient experiences a mood of sadness or a more severe condition of deep depression with possible suicidal

Fig 5. Gingival recession in bruxism

Fig 6. Buccal exostosis in bruxism

Fig 7. Occlusal splint

Fig 8. Biofeed back therapy in bruxism(Brux relief)

thoughts. Patients may only have one episode depending on a particular life situation or with most people it is a reoccurring condition. Episodes may last a few months to many years. The state of mind including unconscious unresolved emotions and medications taken for depression may cause bruxism. Depressed individuals wanting to forget their problems tend to turn to alcohol and/or drugs, which is another source of bruxism.

Down Syndrome

This condition is usually associated with physical growth delays, characteristic facial features and mild to moderate intellectual disability. These patients tend to have smaller teeth than normal with shorter roots, missing teeth, and a Class III occlusion with crowding. This crowding results in some permanent teeth being unable to erupt. Bruxism is a common side effect of these oral conditions.

Obsessive-compulsive Disorder

An anxiety disorder in which people have unwanted and repeated thoughts, feelings, ideas, sensations (obsessions) or behaviors that make them feel driven to do something (compulsion). Bruxism can be caused from the anxiety involved and from the side effects of the serotonin reuptake inhibitors used to treat this disorder.

Parkinson's Disease

A chronic and progressive disorder of the central nervous system, which involves the malfunction and death of vital nerve cells, causing a movement disorder. This condition is often treated with Levodopa, also known as L-DOPA. The brain converts it into dopamine which aids in body movement. Bruxism is a side effect of the long-term use of the medication Levodopa.

Occlusion:

Malocclusion is more common among bruxers than in the general population. Malaligned teeth may serve as the cause of bruxism, not as its consequence. If malocclusion is the cause of bruxism, orthodontics is the treatment of choice. Malocclusion is the main cause of bruxism in children and adolescents. The mixed dentition stage is a prime time for bruxism to develop. In a mixed dentition, the permanent teeth are larger than the primary teeth and may have erupted malaligned. This eruption or partial eruption may cause crowding and displacement of teeth, making it natural for the mind to want the teeth to be in centric occlusion.

Clinical signs of Bruxism:

Attrition and loss of Vertical Dimension

Attrition is the normal loss of tooth substance that results from friction by physiologic forces. Dental attrition is caused by tooth-to-tooth contact, resulting in loss of tooth tissue, usually starting at the incisal or occlusal surfaces. Clinical crown damage of the teeth can significantly thin the enamel structure, thus exposing the underlying dentin. Dentin is softer and darker, increasing the risks of sensitivity, decay and discoloration. The etiology of dental attrition is multifactorial, with the most common cause being bruxism.

Due to attrition, the teeth will appear flattened from the wearing down of the occlusal surfaces of the enamel, causing enough reduction to alter the vertical dimension. Changes may be noticed not only by the reduction of the crown height, but also with the interproximal contact relationships. What was once a tight contact can eventually open up due to grinding of the teeth down past the contact point. In this situation it eventually puts the mandible and maxilla closer together when in occlusion, bringing the nose and chin nearer to each other. This effect may also portray an older appearance. The jaw will appear sunken and deeper wrinkles of the skin around the mouth cause the lips to seemingly disappear.(Fig 1)

Wear Patterns

The distal corners of the maxillary central and lateral incisors are very common areas where damage from bruxism is noticed. Common canine wear facets are rounded over to the labial surface of the cusp tip, whereas normal mastication wear blends over to the lingual surface.

Canines tend to show the first visual signs of bruxism because the anatomy of a canine is longer and more pointed than other tooth types. As the canines become shorter and become in line with the occlusal line of the premolars, the force is then shared with the rest of the molars. Signs of attrition on molars start with the cusps flattening out and can

even wear through to the dentin.(Fig 2)

First molars can show significant wear since they are one of the first permanent teeth to erupt in the oral cavity. Having the longest longevity in the mouth leaves them exposed to maximum activity over a lifetime.

Abfractions

Abfraction is a mechanism that explains the loss of enamel and dentin caused by flexure and ultimate tissue fatigue of susceptible teeth at locations away from the point of loading. This happens when the tooth has flexed greatly during the grinding process and the root surface begins to break down and form a scooped or notched out appearance.(Fig 3)

Chipping, Breaking, Cracks and Fractures

Putting a constant amount of force on the enamel weakens the area and can contribute to small fractures, which leads to chips and breaks. As teeth wear, the edges of the anterior teeth and the cusps or corners of the posterior teeth will begin to show micro-fractures or cracks, which usually cannot be seen on radiographic images. Sometimes patients think these fractures are cavities because they can become stained or discolored and may be sensitive to hot and/or cold. (Fig 4)

Periodontal Recession and Bone Loss

Bruxism can be a serious, aggravating factor in periodontal disease because it can interfere with the normal recovery time of the periodontium. Regeneration of the tissue is constantly taking place, and adding bruxism disturbs the circulation by interfering with the functional adaptability and regeneration of the periodontal tissues. Bruxism and periodontal disease in all stages contributes additional stress and strain on the diseased tissues. This increases the risks for tissue breakdown and reduces the rate of regeneration. Disturbances caused in the periodontium by altering the circulation can cause interference with the nutrition of the periodontal tissues.(Fig 5)

Mobility

The periodontal ligament may respond to increased occlusal forces by resorbing alveolar bone resulting in mobility. With bruxing, the teeth gets forcefully rocked back and forth in the socket, which can cause temporary mobility, progressing to risks of permanent mobility. Tooth mobility with sleep bruxism is greater in the morning and is significant when found in teeth with little or no evidence of periodontal disease. Such teeth may exhibit a dull percussion sound and patient may report soreness when biting on the tooth or teeth.

Buccal Exostosis and Tori

Bony out-growths that form where there is an excessive amount of stress and tension placed on the teeth's underlying structures are called tori or exostosis. With excess strain and tension placed on the teeth and jaws, the body's defense is to produce extra bony material to support the teeth. This bone grows and become visible under the soft tissue. (Fig 6)

Force and Wear

The grinding force compared to regular mastication is three to ten times more powerful enough to crack a walnut. Functional tooth contact during a 24-hour period is approximately 20 minutes. Excessive forces generated by bruxism extends for more than 20 minutes. Normal tooth wear in non-bruxers is considered to be ~29μm (micrometer) in molars and ~15μm in premolars per year. Dental enamel loss of 10-40 μm occurs from friction of normal biting or chewing, while the forces generated for mastication are between 20-120 Newton (N). While bruxing, the load can be as high as 1000 N, changing normal physiologic wear to severe wear, leading to fatigue failure and fractures.

Symptoms

Acute or Chronic Pain

When grinding with the anterior teeth, there may not be any pain beyond those specific teeth. But when grinding the posterior teeth, the masseter and temporalis muscles are more involved, which can create more facial and head ache. Myalgia may worsen during function, along with tenderness on palpation.

Sensitivity of the Teeth

One of the first symptoms of bruxism is hot and cold sensitivity to the teeth. This is caused by the flexing that occurs when teeth are ground from side to side. Teeth are not designed to flex, so they deteriorate at the areas of bending above the gingiva.

This area can become very sensitive with abfractions developing at the roots and causing receding gingiva. Many times patients do not know which exact tooth is causing the sensitivity, or even if it is maxillary or mandibular. When there are no obvious signs of bruxism, treatment is usually desensitizing toothpaste, which temporarily resolves the problem.

Jaw Pain

A common symptom is pain in and around the TMJ. This pain is usually felt when opening and closing the mandible; however, it can also occur while the mandible is in the resting position. Discomfort can occur through hyperactivity, spasms or overworked muscles. As with any other muscle, when contracted for a long period of time, the muscle fibers start to present fatigue or inflammation that produce the pain. A sharp, brief shooting pain or a feeling of numbness in the orofacial area is another symptom. Bruxism can cause stiffness in the TMJ and masseter muscles.

TMJ Discomfort

Changes that happen in the TMJ arise from pathologic processes more than physiologic adaptation, which can cause the entire dentition to undergo a continuous adaptation to functional wear. Bruxing pain in the TMJ area includes the retrodiscal pad, synovial membranes of the joint capsule and collateral ligaments of the disc-condyle complex. Patients with Temporomandibular Disorder (TMD) often hear clicking, popping, or grating noises in their TMJ. The clicking noise commonly heard and palpated during opening or closing is a result of the disc slipping out of place, sticking, or malfunctioning.

Muscles, Neck Pain and Headaches

Since the masseter muscle is considered one of the strongest single muscles in the body, when the muscle is worn and fatigued from bruxing, it can cause localized and referred pain. The masseter alone can be inflamed and fatigued, causing localized pain. Even if muscle pain does not occur, muscle hypertrophy can result. Bruxism involves excessive muscle use, which can lead to enlargement of the facial muscles. In long-term bruxers this enlargement can cause a square jaw appearance.

Bruxism may lead to chronic headaches, although the correlation is not entirely clear. One perspective could be the aches and pains are from disturbed circulation in the muscles. Another suggestion is the tightening of the entire mandible and face during bruxing can cause headaches. Bruxers are three times more likely to experience headaches than non-bruxers

Treatment of bruxism:

Currently, no specific treatment exists that can stop sleep bruxism even though many methods, including prosthetic treatment, have been tried in the past. On the other hand, it has been suggested that various treatments, based on behavior modification such as habit awareness, habit reversal therapy, relaxation techniques, and biofeedback therapy may eliminate awake bruxism. There is no strong evidence that any of these methods is effective in the treatment of bruxism. However the matter of consolation is that they are not harmful. If the patient's awareness is enhanced, the frequency and/or intensity of daytime tooth contact and muscle tension is controlled. Absence of a treatment to eliminate bruxism permanently has led to the development of strategies to reduce its deleterious effects. The most common method used to prevent the destructive effects of bruxism is through different types of interocclusal appliances (e.g. occlusal splints, nightguards, etc.). There is total consensus amongst professionals that bruxism splints play a positive role in protecting dental hard tissues.

Effects of bruxism on prosthetic restorations on natural teeth:

Fixed dental prostheses (FDP) are successful prosthetic restorations in partially dentate patients. Systematic reviews have demonstrated survival rates of conventional FDPs of 94% after 5 years and 89% after 10 years. The most common technical failures reported included loss of retention and fracture of material. It is often suggested that the occurrence of such failures is greatest in patients with bruxing habits. With an opposing occlusion of tooth enamel, most clinicians and researchers agree that a metal occlusal surface, and preferably one with high noble content, is preferred in order to minimize wear of the natural dentition. Unpolished ceramics could be especially hazardous to opposing natural teeth. In bruxers, the situation becomes very complex as we

need to consider not only the risk of wear but also the need for sufficient strength in all the components of the superstructure to withstand the applied load.

Implant-supported restorations :

The success of implant surgery depends upon osseointegration. Osseointegration is gradual and it is not complete for several months. During this time excessive masticatory load should be avoided. Repeatedly gnashing and grinding the teeth during the osseointegration process can increase the risk of implant failure. The effects of bruxism on implants are compounded by the fact that they lack periodontal ligament. Earlier researches on survival of fixed prostheses on osseointegrated implants often referred to bruxism and heavy occlusal loading as the cause of implant failures. But long term studies on mandibular implant-supported fixed prostheses, smoking and poor oral hygiene had a significant influence on bone loss, while occlusal loading factors such as bruxism, maximal bite force and length of cantilevers were of minor importance.

Effects of bruxism on removable dentures:

Bruxism is a frequent cause of complaint of soreness of the denture-bearing mucosa. Though the relationship between oral parafunctions and residual ridge resorption has not been investigated, it can be presumed to be a related factor. Removable partial denture therapy in heavy bruxism may have detrimental effects on the residual dentition and the denture-bearing tissues in patients wearing RPDs, although this has not been systematically studied.

Current Treatments of Bruxism :

Treatment aims to find and remove the causes of bruxism, change the behaviour that causes bruxism and repair the damage that bruxism often causes. Occlusal splints have been considered as the first-line of management to prevent grinding noise and tooth wear in case of sleep bruxism. These splints have different names such as occlusal bite guard, bruxism appliance, bite plate, night guard and occlusal device. They are classified into hard splints and soft splints. Hard splints are preferred over soft splints because soft splints are difficult to adjust than hard splints and hard splints are effective in reducing the bruxism activity. (Fig 7)

Behavioural modification:

Psychoanalysis, hypnosis, meditation, relaxation techniques and self- monitoring have been considered for the treatment of bruxism. The treatment of sleep bruxism usually begins with counselling of the patient with respect to the sleep hygiene viz. maintenance of a regular sleep routine, avoidance of naps, staying in bed awake for more than 5-10 minutes, avoiding TV or reading in bed, avoiding caffeinated drinks, regular exercise and quiet, comfortable bedroom.

Biofeedback:

Biofeedback works on the principle that bruxers can unlearn their behaviour when a stimulus makes them aware of their adverse jaw muscle activities. An EMG technique that provides the daytime bruxer with auditory feedback from his/her muscle activity letting him know the degree of muscle activity or relaxation that is happening.(Fig 8)

Pharmacological therapy

Certain drugs have paralytic effect on the muscles, by inhibiting acetylcholine release at the neuromuscular junction there by decreasing bruxism activity in severe cases like coma, brain injury etc. Botox injections over a period of 20 weeks showed decrease in bruxism. Researches suggests that Gabapentin may improve sleep quality and reduce teeth grinding and clenching in bruxism sufferers, but the drug carries side-effects. Gabapentin is used to control certain types of seizures in people who have epilepsy. On comparison it was found that both the drug and splints reduced muscle activity associated with bruxism.

Conclusion:

When prosthetic intervention is indicated in a patient with bruxism, efforts should be made to reduce the effects of likely heavy occlusal loading on all the components that contribute to prosthetic structural integrity. Failure to do so may lead to earlier failure than is the normal.

Further reading

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Gummy smile correction: A Solution to pleasing aesthetics

*** Jayakrishnan U., ** Anjali Jayaraj, ***K. Nillan Shetty, ****Rohan Rai, *****Abhinay Sorake, ******Pratham Shetty**

* Postgraduate, Department of Orthodontics and Dentofacial Orthopedics, A.J Institute of Dental Sciences, Mangalore; **Postgraduate, Navodaya Dental College, Raichur; ***Principal & Head of the Department, ****Professor, *****Reader, ******Assistant Professor, Department of Orthodontics and Dentofacial Orthopedics, A.J. Institute of Dental Sciences, Mangalore

Send correspondence: Dr. Jayakrishnan U., E-mail: jayakrisjk@gmail.com

Abstract

Aesthetics, especially a pleasing smile is one of the prime concerns which brings an individual to the Dental Office. The inherent quality of youth and beauty of smile is leading practitioners to try to discern the elements that determine facial esthetics and treatment alternatives. The excessive gingival display in smiling makes the smile displeasing or even repulsive. As the awareness among the individuals towards the smile aesthetics are on the high, it is of utmost importance that the Orthodontist is equally ready for the task. The evaluation of smile should begin from the smile line, etiology of the gummy smile and also the underlying causes. Options are then open from Orthodontic treatment to Surgical intervention. With the advent of TAD's (Temporary Anchorage Devices) correction of gummy smile has taken an elevated treatment outcome.

Key Words: Etiology of Gummy smile, Surgical intervention, TAD's in smile correction

Introduction

Gone are those days when the patient came to the dental office for functional correction alone. An increased number of patients now seek treatment for correction of their smile, which has turned as a part of their personality. An esthetic smile boosts the confidence and soft skills of a patient and helps them to perform better in their workplaces. The esthetics of smile mainly depends upon three anatomical components namely: gums, lips and the teeth.

As mentioned, gum is one of the important factors in determining the smile aesthetics. A harmonious smile depends upon the gingival health, alignment and shape of the tooth necks, a pleasing gingival line and a proper smile line. The lips are also having a major impact on the aesthetics of smile as they demarcate the aesthetic area. Their inter relationship with the other two components determines the beauty of smile. The teeth are also an essential component which has its own contribution to the sense of harmony of the face and smile. This depends on their size, shape, colour and also their overall relationship with the gums and lips.

There are three types of smile lines[1]. (Fig 1)

1. Low smile line: Exposes less than 75% of anterior maxillary coronal height. This is predominantly seen in males. (Fig 1a)
2. Medium smile line: Exposing 75-100% of anterior maxillary coronal height and the interproximal gum. (Fig 1b)
3. Huge smile line: Exposing the entire coronal height and a continuous band of gum (Fig 1c). This

is the pattern that will particularly be called as the "gummy smile".

According to Miller[2], the following characteristics are required to depict a smile as beautiful:

- The marginal gum along the anterior maxillary teeth should follow the contour of the upper lip, while the incisor edge should follow the lower lip.
- There should be a symmetry between left and right side.
- The central incisors and canines should be of same length and the lateral incisors should be 1 or 2mm short.
- The line of the upper lip should touch the marginal gum of central incisors and canines and lower lip should touch the incisor edge of the anterior maxillary teeth.
- The teeth dimensions should follow the "golden proportions"[3]

Description of Gummy smile

Allen[4] describes smile to be a "gummy smile" when there is more than 2-3 mm of gums visible during sustained smile, this is then confirmed on forced smiling. As such, the gummy smiles are not aesthetically displeasing if certain rules of harmony (Fig 2) are followed. It is not the excess soft tissue in itself that makes the smile displeasing, but its relation to the teeth and lips[5].

Diagnosis of Gummy smile

It is essential to determine the causes before arriving at a diagnosis as gummy smile is fairly easy to diagnose. A comprehensive assessment should be done before arriving at a definitive diagnosis with the help of cephalometric characteristics.

Etiology of Gummy smile

To optimize the treatment, the primary goal should be to identify the causative factors beneath the presentation of gummy smile[6]. The etiology behind gummy smile can be broadly classified into three.

1. Cutaneo mucosal origin
2. Dento- periodontal origin
3. Alveolo- skeletal origin

Cutaneo- mucosal origin

For proper analysis of this, the patient should be

Fig: 1a: Low smile line

Fig: 1b: Medium smile line

Fig: 1c: High Smile line

Fig:2- Gummy smile

at rest, so the upper lip length can be determined. Various factors underlying this are:

- Upper lip length is considered thin if <20 mm[7], increasing the visibility of the teeth at rest (Fig:3).
- Upper lip levator muscle hypertonicity during smiling is another factor leading to excessive gum exposure.

Dentoperiodontal origin

There are three forms of Dento-periodontal etiology:

- Abnormal maxillary incisor size, with clinically short crowns due to relative microdontia or bruxism. The gum exposed during smiling looks greater in comparison to the incisors.
- Gingival hypertrophy and hyperplasia, especially of the interdental papillae, will create displeasing results.
- Impaired passive eruption of teeth is a developmental abnormality which leads to short clinical crowns. Gum tissue is then coronal to the cementoenamel junction, projecting a gummy smile.

Alveolo Skeletal origin

This is the most often seen etiology behind gummy smile. It may be due to excessive vertical growth of the maxilla or superior alveolar bone, causing discrepancy between the upper lip and gum line in spontaneous smiling.

It can also be due to a labio version or increased labial inclination of the incisors. This in turn leads to dento-mucosal sliding of upper lip, revealing a wide band of gum.

Another contributing factor can be the anterior maxillary dentoalveolar protrusion, due to the over eruption of maxillary incisors and their dentogingival complex. This is usually due to anterior supra occlusion with discordance between the occlusal planes of the anterior and posterior sectors.

Other possible Etiology can be excessive vertical maxillary growth, usually associated with the "Long face syndrome". Occlusion analysis usually reveals Angle's Class II malocclusion associated with supra occlusion due to dento alveolar compensation. As per the findings by Peck et al[8], the distance between the palatal plane and the free edge of the maxillary incisors has been shown to be about 2 mm greater in gummy smile than in the control group.

Treatment of Gummy smile

1. Cutaneo mucosal etiology: Reconstruction surgery of the soft tissue and notably of the upper lip may correct the gummy smile. The objective of treatment is to weaken the lip levator muscles to achieve a more coronal position and reduce the gum exposure. The Type A Botulinum toxin injection has provided a non-operative solution[9,10]. The reduced exposure is obtained by weakening upper lip levator muscle contractility. This is reversible and the injection has to be renewed.
2. Dentoperiodontal origin: Here, the peri-

Fig: 3: Thin upper lip

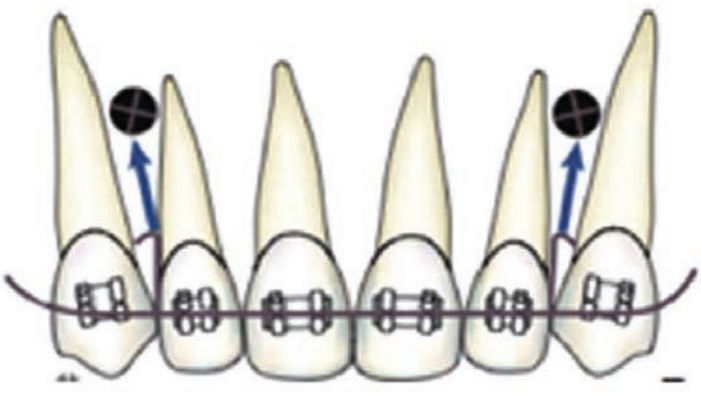

Fig 4: Intrusion using Mini implants

odontal treatment can harmonize the contour of the gum with or without associated implantation. Coronal lengthening of the clinical crown can be achieved either by gingivectomy by internal bevelling or by an apical flap, with or without bone resection. Lasers have reduced the complexity of such procedures.

3. Alveolar origin: It is associated with supra occlusion of incisor segment. Therefore, in such cases, intrusion of maxillary incisors can be the treatment of choice. This can be achieved by conventional techniques such as intrusion of arches or the mini screw bone anchors (Fig 4)

In cases of excessive gum exposure, especially when associated with a skeletal origin extending beyond the premolars, surgical alternative should be sought. Surgery usually comprises of total or segmental maxillary osteotomy which can improve the relation between the maxillary arcade and the upper lip. Le Forte I osteotomy is usually performed, consisting of mobilizing the entire maxillary plate by resecting a band of bone tissue, so as to achieve maxillary intrusion[11].

Conclusion

Moderate gummy smiles are not that displeasing to the observer and it can be quite acceptable if the gums are healthy, but more pronounced cases are less well tolerated and require complex treatment. When it is associated with a skeletal discrepancy, maxillofacial surgery is often indispensable. But when it is related to the supra occlusion of the maxillary incisors alone, Orthodontic treatment provides satisfactory results, more so, with the advent of mini implants. Therefore, a proper clinical diagnosis and thorough examination of the skeletal components proved to be very effective in treating gummy smile. A well-balanced harmonious smile not only boosts the patient's confidence, but also the best reward a clinician can achieve.

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REVIEW

A Spick and Span Articulator: A Tee Off

*** Lakshmi Ajithan S, * Ambadi Jayakumar, *Anju D, *Arunima Upendran, **Pradeep Dathan**

*P.G. Student, **Professor and Head of the Department, Department of Prosthodontics,
Sri Sankara Dental College, Akathumuri, Varkala - 695 318

Send correspondence: Dr Lakshmi Ajithan S, E-mail: laxmiajithan@gmail.com

Introduction

An articulator is a mechanical instrument that represents the temporomandibular joints and jaws, to which maxillary and mandibular casts may be attached to simulate some or all mandibular movements[1]. They help to simulate jaw movements in the absence of patients.

During the fabrication of prosthesis once jaw relation is recorded, it is transferred to the articulator and casts are attached using dental plaster. Thus the attachment of cast is according to the recorded jaw relation.

By accurate transfer of jaw relation a correct static and dynamic occlusal relationships, can be established and more visualization of the existing occlusal relation can be analyzed. Thus a final restoration with minimum occlusal discrepancies can be fabricated[2]. Conventionally the casts are attached to the articulator by using mounting plaster and modelling wax blocks are used to support the cast during the process. But this process is quite cumbersome and mounting using dental plaster or dental stone can cause expansion which eventually leads to increase in vertical dimension[3, 4]. Viscosity of the mounting material can affect the positional accuracy. When two viscous materials are used it can cause inadvertent movement leading to inaccuracies[5].

Various techniques have been described in the literature to stabilize the casts during articulation process. Rigid rods secured by sticky wax, cyanoacrylic adhesive, rubber bands, clay, plaster, and silicone material are examples[6]. However, no evidence based study has suggested one universal technique that can suit all cases and completely eliminate all cast movements.

In order to overcome these disadvantages few modifications were made to the mean value articulator.

Modification

The lower member of the articulator is attached with a model rotating ball and socket with a ball rotating ring attached to it. On top of this assembly a cast holder is attached. Cast holder consists of a model clamp and model table lock nut to secure the mandibular cast in position. The model rotating ball and socket joint permits the movement of the cast in any direction or angle and by tightening the nuts this position can be secured [Fig 1].

The upper member is attached with a cast holder similar to that of the mandible with same model clamp and model table lock nut so that the maxillary cast can also be secured in position.

The maxillary cast holder is attached with four vertical rods whose length can be adjusted and the relation can be secured using tightening nuts [Fig 2].

So the maxillary member helps in changing the vertical dimension whereas the mandibular member permit angulations [Fig 3]. With these adjustments the jaw relation of the patient can be simulated in the articulator even without mounting using dental plaster or dental stone.

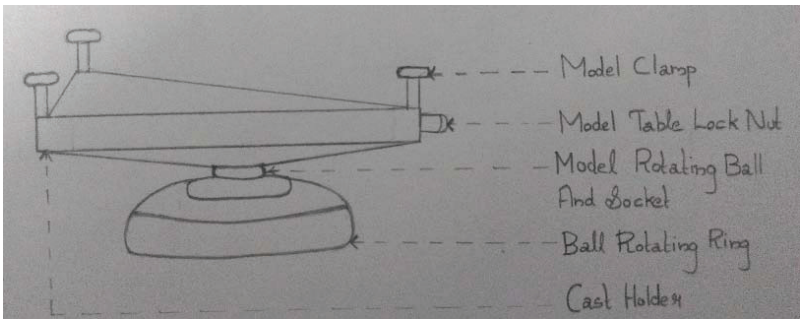

Fig 1

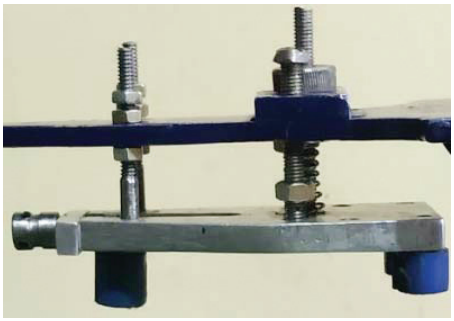

Fig 2

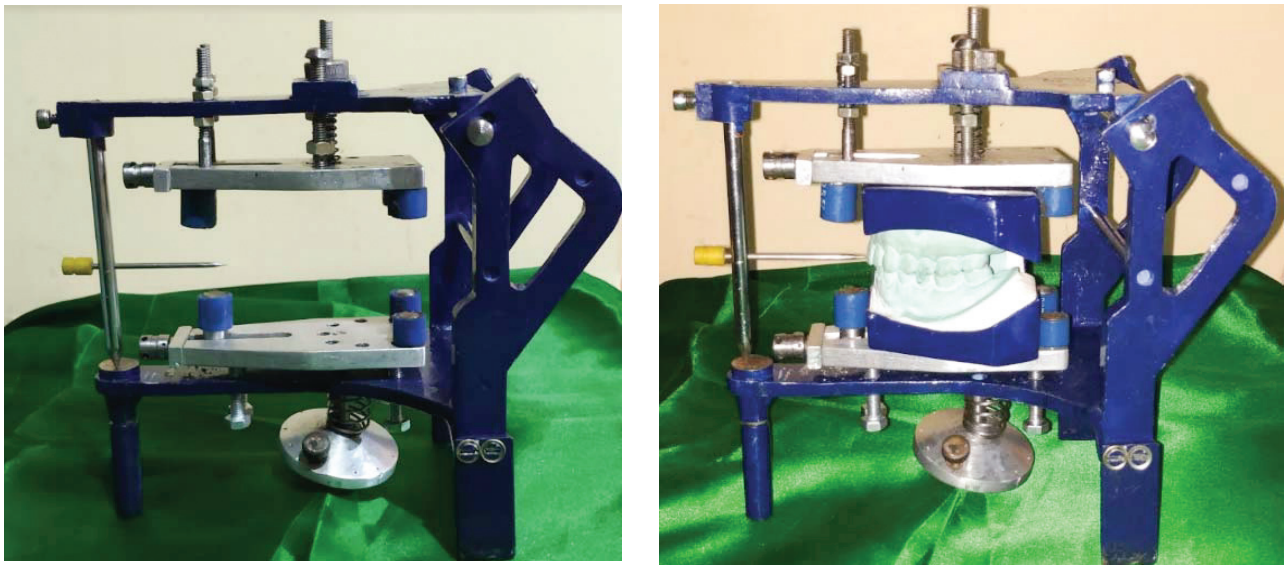

Fig 3

Garganeseet al[7] in 1983 proposed a plasterless articulator named Galetti articulator. But this articulator did not permit vertical adjustments or angulations.

The advantages of this newly modified articulator includes less time consumption, easy to mount, no mess and expansion due to the dental plaster. Also the casts may be removed and returned to their original position with precise reliability.[8]

Conclusion

Accurate and easy attachment of the cast in an articulator can duplicate the individual's maxillomandibular relation. Ease of attachment can reduce the laboratory time and delay in fabrication of restoration. The modifications suggested can be incorporated to mean value articulator so that the cumbersome mounting procedure and the waiting period of the setting of mounting plaster can be avoided.

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CASE REPORT

Buccal Pad of Fat for Closure of OAF– Case Series

***Shiad Salim, **Afreen Reffique Meher**

*Senior Lecturer, Dept of Oral and Maxillofacial Surgery, **House Surgeon, PMS College of Dental Science, Vattappara, Trivandrum, Kerala

Send correspondence: Dr. Afreen Reffique Meher, E-mail: drafreenrmeher@gmail.com

Abstract

The case series aims at describing the method of closure of oroantral fistula using BPF as an autograft, invested as an outpatient procedure. The effect of procedure, wound healing, flap adaptation was then evaluated under pre and post procedural antibiotics, after a 3-4 weeks interval.

Methods : A simple intraoral approach was done, in which a pedicled flap of buccal pad was used to cover the oroantral communications and sutured in place.

Result and conclusions: There were no complications during the procedures and also a 3 months follow up.

Keywords: Buccal fat pad, oroantral fistula, contour of cheek, reconstruction.

Introduction

The buccal pad of fat is a specialized type of fat located within the masticatory space, anterior to the masseter muscle and deep to the buccinator muscle. It is an axial flap viz adherent to skin and distinct from the sub cutaneous fat[1] passing through the zygomatic ligaments, laterally passing deep through the plain of conduit parotid and branches of facial nerve[2], extending forward to the facial vessels. It presents a main body and 4 extensions (buccal, pterygoid, superficial and deep temporal) which is responsible for the contouring of the cheek. It derived its blood supply from the facial, transverse facial and internal maxillary arteries where its anastomosing branches enter the adipose layer to form a sub capsular vascular plexus.

It was first described by Hiester in 1732 followed by an entailed description by Bichat in 1802[3]. Egyedi[5] reported the first ever use of BPF in oral reconstruction which was also used by Tideman[10] for covering a defect of 50x30mm[2]. He also demonstrated that epithelialisation of a BPF flap occurs in 4-6 weeks[10]. BPF has many functions in the field of cosmetology and aesthetics as well for reconstructions.

Advantages and disadvantages

The surgery involving buccal pad of fat allows reduction in the width of the face thereby enhancing the contours of the face, a well known process for face lifting amongst aged individuals making them look more young and slender.[4] BPF has an immense application in the field of reconstructive surgery[6] for congenital defects (<5cm) or acquired soft tissue defects. Its another wide application is seen for the exposed maxillomandibular bone grafts or flaps[9]. In case of oroantral fistula[3] it can be undoubtedly regarded as one of the advancement flaps alongside of palatal or subcutaneous flaps.

The possible complications resulting from the surgical intervention of the buccal fat pad are: lesion of the buccal branches of facial nerve, bruises and edema, infection, traumatic lesion of the parotid duct and lesion of the facial vessels.[8]

Case report 1

Patient named Mohammed Haneefa, aged 77 yrs reported to the Dept of Oral and Maxillofacial Surgery on 28.04.18 with chief complaint of communication between oral and nasal cavity irt 27.

On routine clinical examination closure of OAF was planned.

Event that led to the communication was extraction of grossly decayed 27 with roots extending into maxillary sinus. During the process of intra- alveolar extraction immediate communication occured and was rectified with immediate closure. On review after one week OAC of more than 1 mm was noted.

After obtaining adequate local anesthesia using 2% lignocaine and 1:200000 adrenaline, betadine scrub was applied. Trapezoidal buccal mucoperiosteal flap was raised. Posterior vertical incision was given 1cm vertical to the reflected periosteum posterior to zygomatic buttress to allow exposure and advancement of buccal pad of fat (BPF) using Matarazzo's method. BPF placed over the bony defect where it was sutured with buccal and palatal mucosa with a 4x simple interrupted suture with 3.0 black braided silk to retain the flap in position. Antibiotics, Antihistamines and Analgesics were prescribed for 5 days. Post-operative instructions and warning against blowing of nose was given.

The patient was reviewed weekly to assess proper healing and to evaluate if herniation or any bruising of facial nerve have taken place for 4 weeks.

The patient was then followed up after 3 months to evaluate any failure in the closure and was found devoid of any symptoms or complications.

Case report 2

Patient named Saji, aged 38 yrs reported to the Dept. of Oral and Maxillofacial Surgery with chief complaint of communication between oral and nasal cavity. Patient gave the history of extraction of maxillary right Ist molars few weeks back. On routine clinical examination anomalous communication was found, closure of OAF was planned.

The closure was carried out in the same manner with advancement of buccal pad of fat using Matarazzo's method. Antibiotics, Antihistamines and Analgesics were prescribed for 5 days. Post-operative instructions and warning against blowing of nose was given. Steam inhalation was advised for twice daily.

The patient was reviewed weekly to assess proper healing and evaluate if herniation or any bruising of facial nerve have taken place for 4 weeks.

The patient was then followed up after 3 months to evaluate any failure of the closure and was found devoid of any symptoms or complications.

Conclusion

Repairing oro-antral defects like OAC/OAF is one of the most challenging and difficult problems. In selecting the surgical approach to close an oroantral fistula; location of defect, size of defect, height of the alveolar ridge, vestibular depth, persistence of defect, sinus inflammation or infection and general health of patient are the criterias that are taken into consideration before surgical closure. OAC/ OAF should be managed promptly by creating a barrier between oral cavity and maxillary sinus. Treatment modalities to repair the oro-antral defects include local or free soft tissue flaps, with or without autografts or alloplastic materials. The buccal flap is suitable for closure of small and mesial fistulas; the palatal flap is a feasible option for repairing OACs, more likely for defects in the premolar area. The BFP is suitable for the closure of large posterior OAC/OAFs.[8]

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CASE REPORT

Use of soft liners to aid in the retention of windowed partial dentures - A case report

***Saranya S K, **Nandita Venkatesh, ***Aswini Kumar**

*Assistant Professor, **House Surgeon, ***Reader, Department of Prosthodontics and Crown and Bridge; Amrita School of Dentistry, Amrita Institute of Medical Sciences, Amrita Vishwa Vidyapeetham, Kochi, Kerala, India

Send correspondence: Dr. Saranya S K, E-mail: drascoini2000@gmail.com

Introduction

During the diagnosis and treatment planning for prosthetic rehabilitation, it is natural to come across partially edentulous conditions, where there is a few remaining natural teeth. In most of these cases it is common to extract those remaining teeth and fabricate a complete denture[1]. Fabrication of complete dentures may not always be possible due to patient reluctance to undergo extraction. This could be due to a variety of physiological and psychological factors. Moreover, such cases increase the difficulty in achieving retention of the denture. A novel approach to counter this problem is the windowed partial denture or cu-sil denture[2, 3, 4].

The cu-sil denture is essentially a windowed denture with a silicone gasket surrounding the remaining natural teeth thereby allowing for suction to be achieved in the denture along with providing support to the denture from the remaining natural teeth[1, 3]. The problem with cu-sil dentures is that it is not cost effective and is technique sensitive. As an alternative to this, soft liner was used instead of the silicone gasket to achieve retention and support for the denture.

Methodology

The upper and lower complete dentures were fabricated using conventional processing techniques. Following diagnosis and treatment planning, primary impressions were made using alginate (Fig a). Diagnostic casts were obtained, and wax spacer was placed on the relief areas and around the remaining teeth to provide space for the impression material (Fig b). Special tray was fabricated using self-cure acrylic resin, involving the retained natural teeth (Fig c). Final impression was made using elastomeric impression material (heavy body for border moulding and light body for wash impression) (Fig d). A working model was obtained, undercuts were blocked out and surveying was done.

Temporary denture bases with occlusal rims were fabricated and tentative jaw relation records were made (Fig e), followed by wax try in (Fig f). Maxillary and mandibular dentures were fabricated, with heat cure acrylic resin, similar to conventional complete dentures with openings/windows to accommodate the remaining natural teeth (Fig g). Prior to acrylization, soft tissue block outs were removed without removing the block out surrounding the remaining teeth.

Insertion of upper and lower dentures was done; areas of overextension and interferences were trimmed to aid in easy insertion and removal of the denture. A rim of acrylic was trimmed around the remaining natural teeth to provide space for soft liner. Occlusal corrections were done (Fig h).

Soft liner was then added to the rim of the windowed area and inserted to engage the undercuts around the teeth, thereby improving the retention (Fig i). Post insertion instructions were given and patient was instructed regarding maintenance of good oral hygiene.

Discussion

Several studies have shown that residual ridge resorption occurs over a period of time on removal of natural teeth and use of complete dentures[3, 4]. Hence one of the goals of fabricating cu-sil dentures or cu-sil like dentures is the preservation of the remaining natural teeth to reduce the extent

of ridge resorption and improving retention of the prosthesis.

The advantages of cu-sil dentures as stated by Jindal et al (1) include:-

1. Preservation of the remaining natural teeth and thereby the underlying alveolar bone.
2. Improves the retention and stability of the denture.
3. Psychological comfort to the patient.
4. Does not require any special impression techniques or materials.
5. Future add-ons or relining is possible.
6. Can be converted into conventional complete denture on a later date.
7. Does not require clasps on teeth.

Despite these advantages various disadvantages exist while using cu-sil dentures. Fabrication of the cu-sil denture is a technique sensitive process and

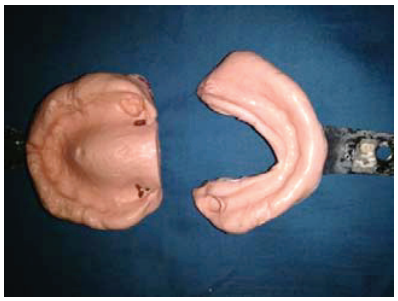


Fig. a Primary impression

Fig. b Wax spacer

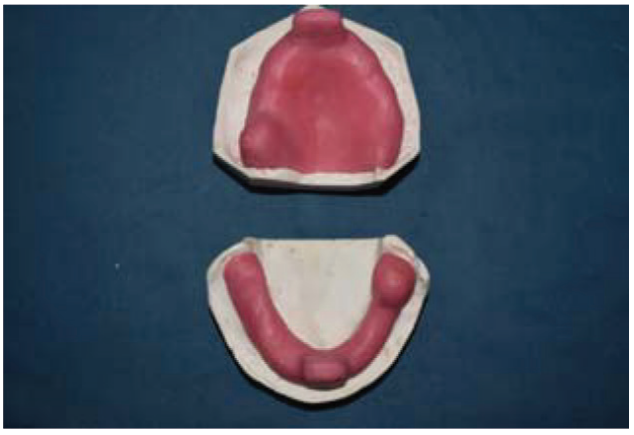


Fig. c Special trays

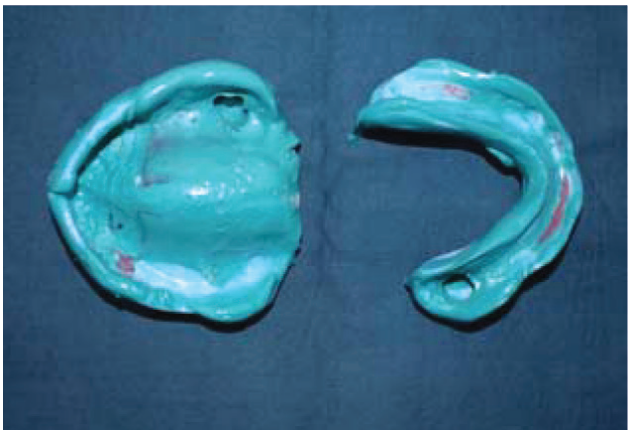


Fig. d Secondary impression

Fig. e Jaw relation

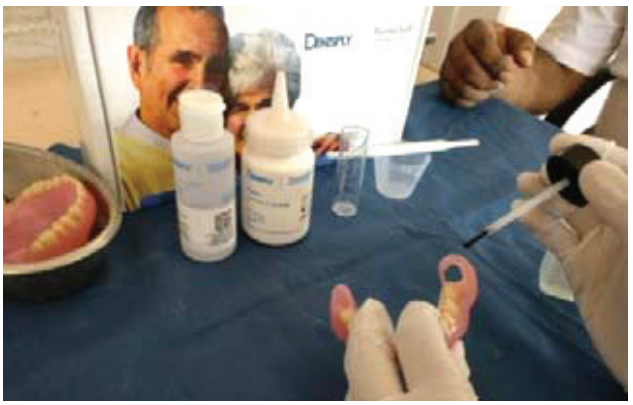
Fig. f Wax try-in

needs special processing equipment. It is also not ideal in conditions where the teeth hinder the path of insertion, in cases of severe undercuts[1,5]. The advantage of using soft liners is its ability to act as shock absorber. It distributes functional and para-functional forces thereby it is useful in patients with increased ridge resorption and severe undercuts[6]. It is also less technique sensitive and more commonly/ easily available.

Though there are drawbacks associated with the use of soft liners such as loss of adhesion between denture base and liner, increased porosity and soft-

Fig. g Polished upper and lower denture

Fig. h Occlusal corrections being done



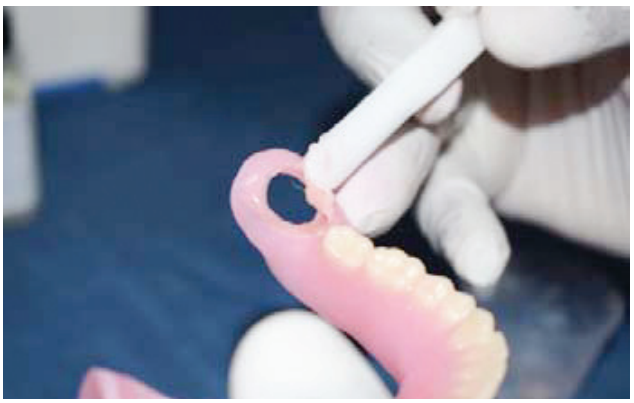


Fig. i Denture being relined using soft liner

Fig. j Cusil denture after insertion

ening of the liner due to chemical and mechanical factors, and fungal colonization by Candida, it still remains a more viable option than the cu-sil dentures which have similar drawbacks[7, 8].

Preservation of even a single natural tooth is possible using the cu-sil like denture but should only be done in cases where the prognosis for such teeth is good[2]. Preservation of these teeth helps to maintain the integrity of the ridge by reducing the amount of ridge atrophy and also helps to increase the stability of the denture[8]. In cases where the prognosis for the remaining natural teeth worsens, the cu-sil like denture can easily be converted to a complete denture.

The cu-sil denture therefore proves to be an excellent alternative to complete dentures fabricated after extracting the remaining natural teeth or to a removable partial denture with compromised retention and stability.

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CASE REPORT

Dens invaginatus: review and case report on endodontic management of type III dens invaginatus with the aid of CBCT-images

***Princy B P, *Deepak Dinesh, **Lekshmy Devi,**

*P.G. Student, **Professor and Head of the Department, Department of Conservative Dentistry and Endodontics, Sri Sankara Dental College, Akathumuri, Varkala - 695318

Send correspondence: Dr. Princy B P, E-mail: princyprassy@gmail.com

Introduction

Dens invaginatus is a developmental anomaly resulting from the invaginations of the enamel organ into the dental papilla during the soft tissue stage of development. As the hard tissues are formed, the invaginated enamel organ produces a small tooth within the future pulp chamber. This kind of tooth malformation was first described by Ploquet in 1794 (Schaefer 1955), who discovered this anomaly in a Whales' tooth (Westphal 1965). Dens in a human tooth was first described by a dentist named Socrates in 1856 (Schulze 1970). Synonyms for this malformation are: Dens in dente, invigilated odontome, dilated gestant odontome, dilated composite odontome, deep foramen caecum, tooth inclusion, dentoid in dente, gestant odontome, dents telescopes.

Aetiology of dens

The aetiology of dens malformation is controversial and remains unclear. Over the last decades several theories have been proposed to explain the aetiology of dental coronal invaginations:

1. Kronfeld (1934) suggested that the invagination results from a focal failure of growth of the internal enamel epithelium while the surrounding normal epithelium continues to proliferate and engulfs the static area.

2. Infection was considered to be responsible for the malformation by Fischer (1936) and Sprawson (1937)

3. Rushton (1937) proposed that the invagination was a result of rapid and aggressive proliferation of a part of the Internal enamel epithelium invading the dental papilla. He regarded this as a benign neoplasm of limited growth.

4. Oehlers (1957) considered that distortion of the enamel organ during tooth development and subsequent protrusion of a part of the enamel organ will lead to the formation of an enamel-lined channel ending at the cingulum or occasionally at the incisal tip. The latter might be associated with irregular crown forms.

5. The "twin-theorie" (Bruszt 1950) suggested a fusion of two tooth-germs.

6. Gustafson & Sundberg (1950) discussed trauma as a causative factor, but could not sufficiently explain why just maxillary lateral incisors were affected and not central incisors.

Classification of Dens Invaginatus

The first classification of dens invaginated teeth

was published by Hallet (1953). The most commonly used classification proposed by Oehlers (1957) is shown below. This system classifies the invagination into three types, based on the extent of the invigilated dental tissues and communication with the periodontal or periapical region.

Type I is an enamel lined minor invagination that remains in the crown, not extending beyond the cementoenamel junction. (fig 1)

Type II is an enamel lined invagination that goes beyond the cementoenamel junction forming a blind sac inside the root and it may or may not communicate with the dental pulp (fig 2).

Type IIIa is an invagination that extends through the root and opens laterally in the periodontal tissues.

Type IIIb is an invagination that extends through the root and opens apically in the periapical tissues. (Fig-3)

Prevalence

The global prevalence of this developmental anomaly ranges from 0.3% to 12%, and also varies between types. A study by Kirzioglu and Ceyhan evaluated 2477 patients, from those, 87.8% had regular anatomy. 11.3% showed Type I configurations, whereas Type II and III were present only in 0.7% and 0.8%, respectively, making those a quite rare occurrence. This same study reported that none of the Type I cases displayed periapical pathosis, while Types II and III had lesions in 4% and 33% of cases, respectively. Interestingly, some reports identified the presence of normal, vital pulp tissue in Type III invaginations with periapical pathology.

The coronal type is caused by an invagination of all layers of the enamel organ into the dental papilla. The pulp is usually exposed and becomes necrotic or inflamed. Not infrequently, periapical lesions are associated with this type, necessitating endodontic therapy. In the Radicular type of dens there is a folding of Hertwig's sheath into the developing root, much like the coronal type, and pulpal necrosis and apical lesions are often associated.

Fig.1 Fig.2 Fig.3

Clinical findings

The permanent maxillary lateral incisors are the most frequently involved teeth, with the maxillary central incisors following as the second most common area of involvement. Bilateral occurrence of the conditions also seen. Multiple dens involving all four maxillary incisors has been reported by Conklin, Ulmansky and Hermel.

Histological findings

Baynon in 1982 reported hypomineralized enamel at the base of the invagination whereas Morfis (1992) in a chemical analysis, detected upto eight times more phosphate and calcium compared with the outer enamel, but in his analysis magnesium was missing completely.

Most interesting facts about dens in histology is that the arrangement of enamel which is in the reverse order,outer dentin and inner enamel. The outer enamel of the tooth is continuous with the enamel lining the cavity within the crown; the point of reflection of the outer and inner enamel is the lingual pit. The cavity in the crown contains connective tissue of periodontal origin, and islands of bone; at its apical end, the cavity is connected with the pulp-chamber by numerous fine canals. This is the primary cause of pulp involvement.

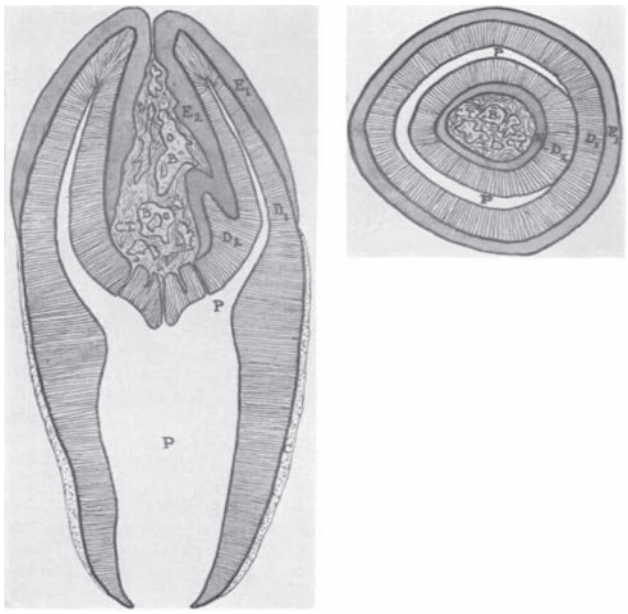

Fig.4

Diagnosis of Dens Invaginatus

Clinically, an unusual crown morphology(dilated, peg-shaped, barrel-shaped) or a deep foramen caecum may be important hints, but affected teeth also may show no clinical signs of malformation. As maxillary lateral incisors are the teeth most susceptible to coronal invaginations these teeth should be investigated thoroughly both clinically and radiographically, at least in all cases with a deep pit at the foramen caecum. If one tooth is affected in a patient the contralateral tooth should also be investigated. In most cases a dens is detected by chance on the radiograph.

Case report

A 28 old year female patient reported to the Dept of Conservative and Endodontics with a chief complaint of pain in the upper left anterior region since one week. Extra oral examination revealed no significant finding. Intraoral examination revealed mild pain on palpation of the mucobuccal area of maxillary left lateral incisor without any swelling or redness in that area. Hard tissue examination showed a bulbous maxillary left lateral incisor, tooth was tender on percussion. Tooth responded negatively to vitality test (thermal tests). IOPA was taken (fig 5). Provisional diagnosis was Oehlers type III/type II dens with periapical lesion. Final diagnosis as type III dens invaginatus was made after CBCT findings.

Based on these findings, we planned for nonsurgical endodontic treatment following rubber dam isolation. Access preparation was made to gain entry with the main canal and expose the invagination. The length of both canals were established and recorded with apex locator (fig 6). This case was then classified as Type III Dens. A CBCT scan was made to detect the presence of extra canals. Cleaning and shaping were done; the main canal was cleaned up to F3 of protaper files. The canal in the dens was shaped up to 25 size hand file. During cleaning and shaping copious irrigation with 5.25% Hypochlorite,

Saline, 2% Chlorhexidine were done, ultrasonic activation also done. Intracanal calcium hydroxide medicament was given for two weeks (ultra cal). Patient was recalled after two weeks. Symptoms had subsided in the second appointment. After removing temporary restoration cleaning was done. Thermoplasticised obturation was done using seal apex as sealer (fig 7). Temporary restoration was given followed by composite restoration after one week.

Discussion

Complex root canal morphologies require complex endodontic treatment. Each type require different approaches. Inability to locate, debride and obturate the complex root canal spaces can lead to failure. The current case was diagnosed as Oehlers type III. In type III nonvital cases endodontic therapy of invaginated space alone or both root canals and invigilated space can be done. Because of the limitations of radiographs, CBCT was considered -sharp focused and 3D view of exact location and anatomy of root canal could be seen.

CBCT findings were

-Enamel lined pear shaped invagination demonstrated with respect to palatal aspect of crown of 22, at the junction of incisal and middle third of the crown, located distally to the main mesial canal was the dens. (fig 9)

- At the junction of cervical third and middle third of the root, the pear shaped invagination shows multiple branching. The distolabial branch gets obliterated at the middle third of root which was not traceable from that level. The distopalatal portion with a large lumen lined with enamel, extend palatally into the root surface at the level of middle third of the root (fig 9). At the apical third, the opening of the canals are at different levels-mesial canal opening on the apical foramen, a distal canal (canal of invagination?) opening on the lateral root

Fig 5 Preoperative Radiograph

Fig 6 Working length radiograph

Fig 7 Obturation

Fig 8(Follow up after 2 years)

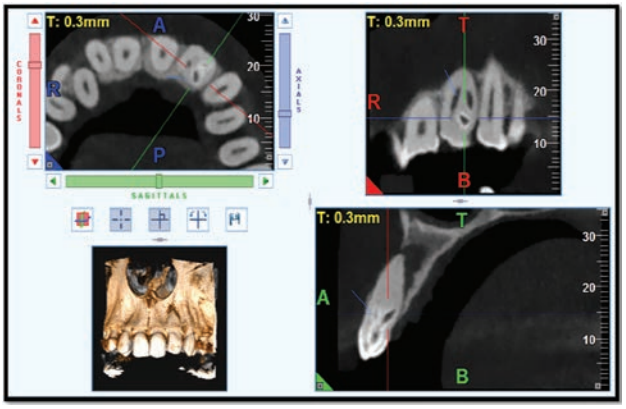

Fig 9 CBCT Images

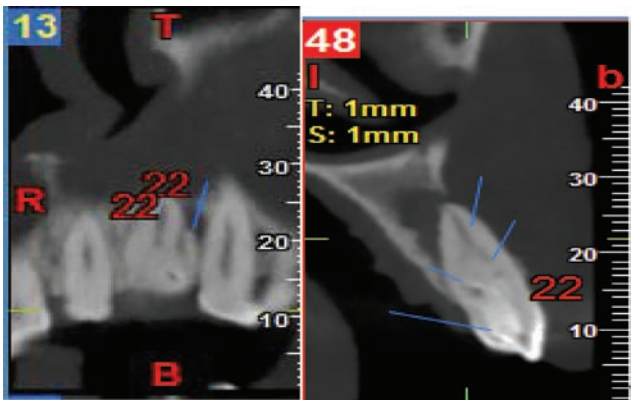

Fig 10

surface at the junction of apical third and the middle third at a lower level. So it could be concluded that its a Type IIIa dens invaginatus (fig-10)

Conventional cleaning and shaping methods were difficult due to invagination and the actual canals were narrow, hence effective disinfection relied on disinfecting agents and intracanal medicaments.

Conclusion

With advancement in diagnostic imaging like CBCT, rotary endodontics, improved irrigation regimen and obturation systems, treatment of such challenging cases can be more predictable and rewarding to both the patient and endodontist.

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IDA Attingal Branch
Reports & Activities

2nd Tri Monthly Report of IDA Attingal Branch Activities (from 1st April to 30th June 2019)

ACTIVITIES

1) 4/4/2019 Emergency executive meeting lions club 19 members
2) 14/5/2019 3rd Executive committee meeting Lions club 25 + 2 Members
3) 31/ 5/2019 No tobacco day Observation (cdh No 5) 10 members
4) 31/5/2019 No tobacco day observation (by WDC) 15 members
5) 31/5/2019 Family get together at Eco tourism Aripa 20 members
6) 9/6/2019 2nd CDE at Karthika Park Kazhakoottam 115 members

REPORT:

A) An Emergency Executive Meeting was called forward on 4/4/2019 At LIONS CLUB ATTINGAL to discuss Matters related to CE ACT and its implementation

1) Advisory charges of Dental Treatments
2) Future course of action of IDA KSB on CE ACT:
3) Identify a Nominee from each District to District registering Authority (DRA) :

19/29 executive members attended the meeting.

B) 3rd Executive committee was held on 14/5/2019 at lions club Attingal 25/29 Executive Members attended the meeting, 2 Observers were present

C) World NO TOBACCO DAY was Observed by CDH wing at ATTINGAL BUS STAND and Govt Poly Technic Attingal, Hazards of Tobacco use Pamplets were distributed at KSRTC & PVT BUS STANDS, an Awareness talk was given at Govt Poly technic College, No Tobacco Pledge was Taken there, 10 Members attended the function

D) World No Tobacco Day Observation by WDC on 31/5/2019

WDC Organised Anti Tobacco Awareness Programme Among Tribal People Of Pottammavu Settlement Colony, Arippa Thiruvananthapuram. The programme was inaugurated by Sri Mullakara Ratnakaran, (MLA)

- The meeting was chaired by Smt Sashikala, (Ward Member Peringamala Panchayath)
- Welcome speech was done by Dr. Meera Murali (WDC Chairperson).
- Presidential address was done by Dr. Afzal S (President, IDA Attingal branch).
- Antitobacco awareness talk was given by Dr. Rakesh (Sr. Assistant Surgeon)

Mancodu PHC and Dr.Mukesh (Chief Medical Officer Alpha Medicare Hospital).

- Felicitations were given by
- Dr. Deepak Das (Hon.Secretary Attingal branch);
- Dr. Biju A Nair (KDC member)
- Dr. Alex
- Vasudevan (Kani Moopan Tribal Leader)
- Dental checkup camp was done by Dr.Rakhi Rakesh; Dr. Asok Gopan.
- Vote of thanks was given by Dr.Shameema Nizam (WDC Hon.Secretary)

E) FAMILY GET TOGETHER On 31st may 2019

A FAMILY DAY OUT AT ARIPPA ECOTOURIST VILLAGE

One day out from all fast life through the greeneries of nature was done by our IDA family members of attingal branch at Arippa, Madathara. We had great lunch arranged at Sangily mansion in that forest. Kids had funtime through guided trekking and swings around tents. Members participated are Dr. Afsal, Dr. Deepak

Das, Dr. Asok Gopan, Dr. Biju A. Nair, Dr. Alex Philip, Dr. Rakhi, Dr. Rakesh, Dr. Mukesh, Dr. Meera Murali, Dr. Shameema and their families

F) 2nd CDE: on 9th June 2019:

The 2nd CDE of our Branch was held on 6th June 2019 at Karthika Park, Kazhakoottam, on the Topic MINOR ORAL SURGERY FOR GENERAL PRACTITIONERS-TECHNIQUES & COMPLICATIONS. Faculty Dr Eapen Thomas, 115 Members attended the CDE.

G) International Yoga Day 21st June 2019 (By WDC)

The International Yoga Day on 2019 June 21 st, -Attingal branch, Womens Dental Council organised a program Yoga for dentists and their families at Kerala School of Yoga, Attingal, conducted by yoga instructor Mr. Abhee Rajan and Beena teacher (Govt School Thonnakkal) 9 members attended the program.

6th WDC PROGRAM

As part of International Yoga Day on 2019 june 21st Indian Dental Association-Attingal branch, Womens Dental Council organised a programe Yoga for dentists and their families at Kerala School of Yoga, Attingal, conducted by yoga instructor "Mr. Abhee Rajan" and Beena teacher (Govt School Thonnakkal).

The training session started by 9am with an introductory talk on health benefits and tips to release stress with Yoga. The practice session started at 9.30 and continued till 11am. The programe was attended by our members and their families and kids. Dr Meera Murali (WDC Chairperson), Dr.Shameema Nizam (WDC Hon. Secratary), Dr. Adheena Chandran, Dr.Nizam, Shanthi, Rishabh, Nakul Krishnan, Nihaal and Niyas.

WOMENS WING Report

FAMILY GET TOGETHER 31st May 2019

5TH WDC PROGRAM

WDC conducted a one day trip with our members of ida attingal branch with their kids and families at Arippa Eco-Tourist Village, Madathara. Guided trekking were arranged in the forest of about 200 type of pepper plants and various wild animals and peacocks. Kids had a very nice time around swings and a great feast was arranged for members in Sangily Mansion.Leisure time activities and fun games were exciting for children as well as members. Dr. Biju A. Nair, Dr. Afsal, Dr.Mukesh, Dr.Meera Murali, Dr.Shameema Nizam, Dr. Rakhee Rakesh, Dr. Alex, Dr. Asok Gopan, Dr. Deepak Das, Dr. Nizam and with their kids.

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.

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IDA HOPE will provide legal aid , in case of a medicolegal issue or consumer litigation , to its members which they may come across in clinical practice.

A compensation amount upto 4 lakh will be covered in the basic membership and with an additional rider, HOPE Assure, one can avail an additional 25 lakh coverage in professional protection.

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In case of a Death / Mishap / permanent disability , HOPE member's family / HOPE member will be compensated with a substantial amount from HOPE. As of now it's between 12-13 Lakh, and the amount will increase with increase in membership numbers.

Additional Benefits

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Members of IDA - HOPE are privileged to join HOPE - Medi. It's a group health Insurance scheme. In this scheme HOPE member can include their spouse, kids & parents irrespective of their age and health status.

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
9539064346
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