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THE JOURNAL:
This is an official publication of the KMCT Dental College, Manassery P.O., Mukkom, Kozhikode 673 602, Kerala, India. The journal caters to scientific research and its application to practice for clinicians. This is a quarterly publication, with 4 issues per year.

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SUBSCRIPTION:
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EDITORIAL OFFICE:
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Editor, Dental Bites
KMCT Dental College
Manassery P.O., Mukkom
Kerala, India

DENTAL BITES

VOLUME 4, ISSUE 1

January-March, 2017

A publication of

Manassery P.O., Mukkom, Calicut-673602, Kerala

Phone (0495) 229 0690/229 0693, Fax (0495) 229 4726

E-mail: dental@kmct.du.in, Web: www.kmct.edu.in

Editorial

Mouth is the mirror of overall health. In India, the second most populous country in the world, there are 70 million elderly people over 60 years of age. Geriatric health problems with respect to the quality of life often remain neglected. Geriatric dentistry is the branch of dentistry that emphasizes dental care for the elderly population and focuses upon patients with chronic physiological, physical and/or psychological changes or morbid conditions/diseases. As per the WHO objectives, one of the global goals for the oral health is that at the age of 65 and above, there should be 25% reduction in the present level of edentulous status. The presence of 20 teeth is an oral health goal of the WHO.

The role of a dental physician in geriatric dentistry becomes more purposeful since the life expectancy of an average individual has increased considerably over a period of time. Older patients should be given advice and assistance in support of their continued efforts to adequately maintain good oral hygiene. As more and more physicians and other professionals understand the links between oral and systemic health and quality of life, they will be prepared to refer patients and to work with dental professionals during treatment planning to identify and clarify systemic issues that may affect the delivery of treatment. We as dental professionals should be able to mix professional treatment with humane touch for our geriatric population. The inclusion of Geriatric Dentistry in BDS undergraduate curriculum is the need of the hour.

Dr. Pradeep Kumar C

Editor

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PRIONS IN DENTISTRY

* Dr. Fathima Shirin.V, **Dr. Elsy.P.Simon,***Dr. Mohammed Sadique.K.P, ****Dr. Ravi.S.V

Abstract

Prion diseases are a group of neurodegenerative disorders characterized by accumulation of abnormal prion proteins in the central nervous system. Prion diseases also known as transmissible spongiform encephalopathies (TSEs) are a group of fatal neurodegenerative diseases occurring in both humans and animals. The pulp cavity contain blood and peripheral nerves known to carry the prion proteins and the surface topography of endodontic files enable them to trap the proteins and thus makes the disease contagious. The prions resist conventional sterilization procedures especially when infected tissue becomes dried onto metal or glass surfaces.

Key Words: Prion, sterilisation, dentistry

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Introduction

A prion is an infectious agent composed entirely of protein material, called PrP (short for prion protein), that can fold in multiple, structurally distinct ways, at least one of which is transmissible to other prion proteins, leading to disease that is similar to viral infection (Fig 1). They are the causative agents fora group of neurodegenerative diseases in humans and animals called Transmissible Spongiform Encephalopathies (TSEs).Prion disease occur worldwide with an incidence of roughly 1 per 106 population per year for sporadic disease.

In 1982, Stanley B Prusiner of the University of California, San Francisco announced that his team had purified the hypothetical infectious prion. Prusiner won the Nobel Prize in Physiology or Medicine in 1997 for his research into prions.[1]

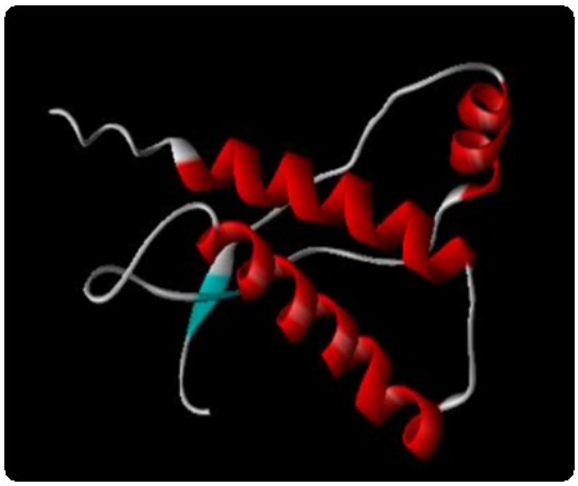

Fig 1: Prion

Prions may propagate by transmitting their misfolded protein state: When a prion enters a healthy organism, it induces existing, properly folded proteins to convert into the misfolded prion form. In this way, the prion acts as a template to guide the misfolding of more proteins into

prion form. In yeast, this refolding is assisted by chaperone proteins such as Hsp104p. These refolded prions can then go on to convert more proteins themselves, leading to a chain reaction resulting in large amounts of the prion form.[2] All known prions induce the formation of an amyloid foldwhich is an aggregate of tightly packed beta sheets. This causes entanglement of neurofibrils in CNS and interfere with synapse function.Nerve cells are eventualy damaged and lost causing tiny vacuoles in brain and histologically, brain attain a sponge like appearance. This causes brain damage and symptoms of prion disease which include impaired brain function, changes in personality, loss of memory, altered behaviour, intellectual decline and ataxia which worsen and finally cause the death of the organism.

Structure

The normal form of the protein, referred to as PrPc, is a cell surface protein expressed in a wide range of cell types particularly in neuronal cells. Its normal functioning is not well known, but the suggested functions are signal transduction, cell adhesion, regulation and distribution of acetyl choline receptors. It is expressed in most adult tissues, but is found at the highest levels in the CNS and immune system. It is located in the short arm of chromosome 20 between position 12 and terminus of the chromosome (Fig 2).

However, PrP found in infectious material has a different structure and is resistant to proteases (the enzymes in the body that can normally break down proteins).

The normal form of the protein is called PrP^{C}, while the infectious form is called PrP^{Sc} — the *C* refers to 'cellular' PrP, while the *Sc* refers to 'scrapie', the prototypic prion disease, occurring in sheep.[3]

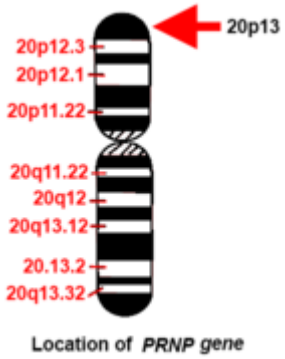

Fig 2: Structure of a prion

Prion Hypothesis

It states that an abnormal conformer (PrPSc) of PrPc is capable of inducing PrPc to undergo a change of conformation into PrPsc.[4]

Prion Diseases

In Humans

Kuru, Iatrogenic Creutzfeldt-Jakob disease, Variant Creutzfeldt-Jakob disease, Familial Creutzfeldt-Jakob disease, Gerstmann–Sträussler–Scheinker disease, Fatal familial insomnia, Sporadic Creutzfeldt-Jakob disease.[5] The affected sites are shown in Fig 3.

In Animals

Scrapie (sheep), Bovine spongiform encephalopathy (cattle), Transmissible mink encephalopathy (mink),Chronic wasting disease (mule deer, elk), spongiform

encephalopathy (cats), Exotic ungulate encephalopathy (greater kudu, nyala, oryx).[5]

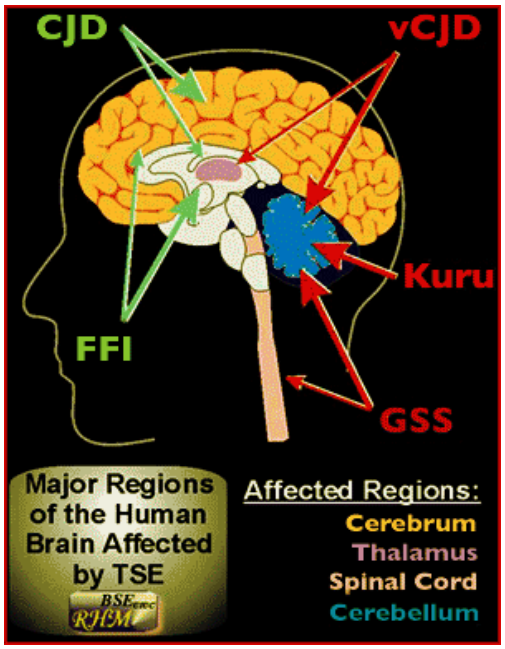

Fig 3:Vaious sites affected by prions

Oral Manifestations of Prion Disease

Pseudobulbar palsy may cause dysphagia and dysarthria in patients with TSEs. Orofacial dysesthesia or paresthesia, as well as loss of taste and smell (in one case), have been reported in patients with vCJD.[5]

Transmission

It has been recognized that prion diseases can arise in three different ways: acquired, familial, or sporadic.[6] One idea, the "Protein X" hypothesis, is that an as-yet unidentified cellular protein (Protein X) enables the conversion of PrP^{C} to PrP^{Sc} by bringing a molecule of each of the two together into a complex.[7]

Current research suggests that the primary method of infection in animals is through ingestion. It is thought that prions may be deposited in the environment through the remains of dead animals and via urine, saliva, and other body fluids. They may then linger in the soil by binding to clay and other minerals.[8]

Diagnosis

Surround Optical Fiber Immunoassay (SOFIA)-After amplifying and then concentrating any PrP^{Sc}, the samples are labelled with a fluorescent dye using an antibody for specificity and then finally loaded into a micro-capillary tube. This tube is placed in a specially constructed apparatus so that it is totally surrounded by optical fibres to capture all light emitted once the dye is excited using a laser.[12,13]

The RT-QuIC assay- a microplate reader- Based prion detection method which uses as reagents normally folded prions, fluorescently labelled so that they "light up" when they are misfolded; samples suspected of containing misfolded prions are added and misfolded reagents can be detected by standard fluorescence detection methods.[14-16]

Luminescent conjugated polythiophenes- Fluorescent compounds that are often used to stain tissue samples.[17,18]

Treatment

Anti-Prion antibodies capable of crossing the blood-brain-barrier and targeting cytosolic prion protein have been described.[9] In the last decade, some progress dealing with ultra-high-pressure inactivation of prion infectivity in processed meat has been reported.[10] In 2011, it was discovered that prions could be degraded by lichens.[11]

Astemizole has been found to have anti-prion activity.[17]

Prevention

1. In a patient diagnosed with prion disease, always try to postpone the appointment till the end of the day.
2. Avoid activating waterlines because of risk of retraction of prions in oral fluids.
3. Standalone suction units with disposable reservoirs and bowls can be used.
4. All the dental equipments should be shielded with impermeable barriers.

Sterilisation

The World Health Organization recommends any of the following three procedures for the sterilization of all heat-resistant surgical instruments to ensure that they are not contaminated with prions:

1. Immerse in 1N **sodium hydroxide** and place in a gravity-displacement autoclave at 121 °C for 30 minutes; clean; rinse in water; and then perform routine sterilization processes.
2. Immerse in 1N **sodium hypochlorite** (20,000 parts per million available chlorine) for 1 hour; transfer instruments to water; heat in a gravity-displacement autoclave at 121 °C for 1 hour; clean; and then perform routine sterilization processes.
3. Immerse in 1N **sodium hydroxide** or sodium hypochlorite (20,000 parts per million available chlorine) for 1 hour; remove and rinse in water, then transfer to an open pan and heat in a gravity-displacement (121 °C) or in a porous-load (134 °C) autoclave for 1 hour; clean; and then perform routine sterilization processes.

Relevance in Endodontics

While doing dental procedures like root canal treatment in a person infected with prions, the surface topography of endodontic files enable them to trap the proteins from the blood and peripheral nerves in the pulp cavity. When we use the same instrument in a healthy person without adequate sterilisation precautions, prion protein from the file gets deposited onto the nerve endings and the proteins will be finally transported to the CNS via nerves and blood vessels.

Conclusion

Recently, there has been an increase in scientific and public awareness about prion disease. The theoretical risk of transmission of prion disease through dental treatment points to the importance of maintaining optimal standards of infection control and decontamination for infectious agents, including prions.[19]

At present, the dental instruments of patients with known prion disease should be discarded after use. In view of the possible risk of contamination with prions due to retraction of oral fluis,it is advisable not to use the water lines or suction systems of dental units when treating patients with known prion disease.[5]

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CARPAL TUNNEL SYNDROME AND DENTISTRY

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*** Aarathi Krishna, ****Dr. Vivek G

Abstract

Carpel tunnel syndrome, or CTS, is a muscle-, tendon-, and nerve related disorder that affect people performing intensive work with their hands. It is a common upper extremity disorder, and the most common mononeuropathy.A relatively high number of dentists have a prolonged median ulnar latency, yet two thirds of the dentists affected are asymptomatic.Early recognition of symptoms and education regarding ergonomic risk factors is important in the successful management of CTS. Furthermore, because the relationship of symptoms to CTS still is not fully understood, proactive management of people at risk of developing CTS or experiencing pain is a reasonable approach to reducing the risk of future development of CTS.

Key Words: Carpel tunnel syndrome, median nerve, dentists

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Introduction

Carpel tunnel syndrome, or CTS, is a muscle-, tendon-, and nerve related disorder that affect people performing intensive work with their hands. It is a common upper extremity disorder, and the most common mononeuropathy. The main cause of CTS is increased pressure within the carpal tunnel, which consequently applies compressive force to the median nerve. The increased pressure upon the median nerve causes nerve ischemia, which is the source of the motor and sensory dysfunction experienced by patients inflicted with CTS. Most cases are idiopathic but are associated with other conditions such as obesity, hypothyroidism, arthritis, diabetes and trauma.

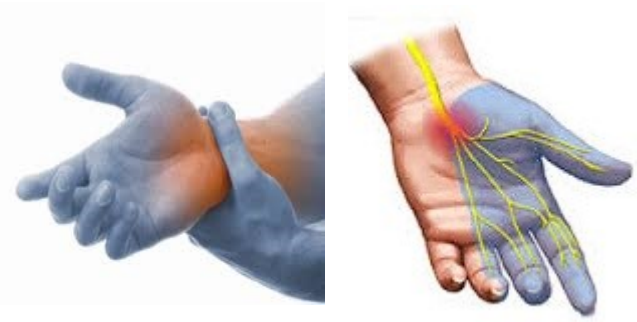

Fig 1 : Picture representation of CTS

Both dentists and dental hygienists have been reported to have a high prevalence of upper extremity musculoskeletal disorders, including CTS. A 1997 American Dental Association survey reported that 9.2% of dentists had been diagnosed by a physician as having some type of repetitive motion disorder. The

prevalence was higher among females and older dentists. Within this group of dentists who had a diagnosed repetitive motion disorder, approximately 19% required surgery and more than 40% shortened their working hours.

History

The condition known as carpal tunnel syndrome had major appearances throughout the years but it was most commonly heard of in the years following World War II. Individuals who had suffered from this condition have been depicted in surgical literature for the mid-19th century. In 1854, Sir James Paget was the first to report median nerve compression at the wrist in a distal radius fracture.

Carpel tunnel syndrome was most commonly noted in medical literature in the early 20th century but the first use of the term was noted in 1939. Physician Dr. George. S. Phalen of the Cleveland Clinic identified the pathology after working with a group of patients in the 1950s and 1960s.

Carpal Tunnel Syndrome(CTS)

CTS is characterized by numbness, tingling or pain in the distribution of the median nerve in the hand. The palmar surface of the thumb, index and middle finger are the primary areas involved.

CTS remains a clinical diagnosis because there is no criterion standard test for the condition. Certain intrinsic predisposing factors of CTS are female gender, pregnancy, diabetes and rheumatoid arthritis. A clinical diagnosis of CTS consists of the patient's history and a physical examination. Typical symptoms are pain and paresthesias of the palmar radial hand, which is worse at night and often awakens the patient from sleep.

The ergonomic risk factors associated with CTS include repetitiveness of work, forceful exertions, mechanical stress, posture, temperature and vibration. These risk factors are present for dentists and dental hygienists: dental instruments may cause contact stress over the carpal tunnel, and wrists may be held in awkward positions for prolonged periods.

The Phalen test and the Hoffmann-Tinel sign assist in deducing the diagnosis. Factors believed to contribute to CTS include repetitive or forceful tasks, and mechanical stress of the hands. Physicians often employ electro diagnostic tests to assist in deducing the clinical diagnosis and locating areas of compressive neuropathy. Still the physical examination is the hallmark tool in making a diagnosis of CTS.

Diagnosis

There is no consensus reference standard for the diagnosis of CTS. A combination of described symptoms, clinical findings, and electrophysiological testing may be used.

Physical examination

- Phalen's manoeuvre is performed by flexing the wrist gently as far as possible, then holding this position and awaiting symptoms. A positive test is numbness when holding the wrist in acute flexion position within 60 seconds.

- Tinel's sign, a classic though less sensitive test is a way to detect irritated nerves. It is performed by lightly tapping the skin over the flexor retinaculum to elicit a sensation of tingling or "pins and needles" in the nerve distribution.

- Durkan test, carpel compression test, or applying firm pressure to the palm over the nerve for up to 30 seconds to elicit symptoms has also been proposed.

- Hand elevation test has higher sensitivity and specificity than Tinel's test, Phalen's test and carpel compression test. There are many electro diagnostic tests used to make a diagnosis of CTS but the most sensitive, specific and reliable test is the Combined Sensory Index [also known as Robinson Index].

The role of MRI or ultrasound imaging in the diagnosis of carpal tunnel syndrome is unclear. Their routine use is not recommended.

Treatment

For people who have symptoms of CTS or are at an increased risk of developing the condition, early intervention can be important. When recognized early, CTS can be managed effectively with conservative and non-invasive treatment, such as the following:

Since the extremities of wrist flexion and extension are the positions that place the median nerve at the highest risk of injury, the use of a night-time wrist splint is the most common intervention. This device helps the patient avoid wrist flexion and extension extremes during sleep and thus decreases the pressure on the median nerve.

Fig 2: Night-time wrist splint

Pacing of work activity can be helpful, as extended wrist flexion or extension can place the median nerve at risk. A short break from activity can reduce the pressure on the nerve and prevent injury.

Fig 3: Pacing of work activity

Direct instrument pressure over the carpal tunnel can be reduced by the use of large handled instruments that distribute pressure over a larger surface area.

Management of ergonomic stressors could include the use of fitted gloves that reduce hand tension.

Avoidance of awkward wrist posture during procedures reduces the stress on the median nerve.

There are many unproven interventions, including Vitamin B_6 supplements, nonsteroidal anti-inflammatory drugs and diuretics. More aggressive and invasive treatments that have been shown to be successful include steroid injections into the carpal tunnel and surgery. However surgical treatment should be reserved for people with whom other treatment modalities and therapies have failed.

Conclusion

A relatively high number of dentists have a prolonged median ulnar latency, yet two thirds of the dentists affected are asymptomatic. There also is a higher rate of hand and finger pain symptoms among dentists than among the general population. This higher rate of pain is associated with dentists who reportedly work longer hours.

Early recognition of symptoms and education regarding ergonomic risk factors is important in the successful management of CTS. And although the prevalence of CTS appears no different in dentists than in the general population, implementation of some of the strategies no doubt would be useful in alleviating the hand fatigue and pain reported by dentists all over the world. Furthermore, because the relationship of symptoms to CTS still is not fully understood, proactive management of people at risk of developing CTS or experiencing pain is a reasonable approach to reducing the risk of future development of CTS.

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ORAL STEREOGNOSIS IN COMPLETE DENTURE: A REVIEW

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***Dr. Sheejith M, ****Dr. Ranjith M

Abstract

Oral stereognosis is the neurosensorial ability of the oral mucous membrane to recognize and discriminate the forms of objects in the oral cavity. The sensorial ability of the tongue, lips, thumbs and index fingers is greater than that of other parts of the body. Therefore, a dentist's understanding of oral stereognosis is important to understand the expectations of patients during complete denture. Oral perception of a person could play a vital role and provide information to the dentist which can be utilized for successful prosthesis. Oral stereognostic tests can provide information related to oral discriminating skill of a patient. These tests can be performed in a short period of time and requires no specialized training by the dentist. The aim of this review article is to assess the changes in oral stereognostic ability in relation to subject and dental related factors.

Key Words: Oral stereognosis, complete denture, sensory perception

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Introduction

Stereognosis or recognition of shape involves, 'the most elaborate function subserved by the parietal cortex of the brain'. This function necessitates perfect reception of the impulses set by the stimuli from the object. The sensations produced are synthesized in the cortex and compared with previous similar sensory memories.[1]

Oral tactile information is conveyed through the trigeminal nerve. Neurophysiological investigations of the trigeminal system in man are extremely scarce. Indeed, it is difficult to isolate peripheral bundles except, perhaps, for the mandibular nerve. Needle recordings of the latter have been rarely performed because these are painful. Therefore, psychophysical approaches have been used, which imply that subjects are questioned about their perception of the stimulus applied and eventually about how they sense it. Psychophysical tests have been developed to assess the tactile function of the hand and fingers in particular.

When these psychophysical methods are carried out in a standardised way, the results seem to match the neurophysiological receptor function. One should make a

distinction between proprioceptive and exteroceptive receptors responding to mechanical stimuli (mechanoreceptors). Proprioceptors [muscles spindles, tempero-mandibular joint (TMJ) receptors] provide information about the relative positions and movements of the limbs. They are activated by stimuli from inside the body.

Exteroceptors located in the periodontal ligament, alveolar mucosa, gingiva and jaw bone, inform the central nervous system of external loading. Mucosal mechanoreceptors serve in a variety of functional capacities including sensation, composite sensory experiences (e.g. oral kinaesthesia and oral stereognosis), reflex initiation and modulation of patterned motor behaviour. In addition, mechanoreceptors in the periodontal ligament are primarily responsible for the tactile function of teeth. The latter receptors can also contribute to the coordination of jaw muscles during biting or chewing.[2]

The oral stereognostic ability test has a special interest when comparing patients with different dental status. Changes in oral sensation occur after the loss of natural teeth and edentulous patients show difficulties, most of the time, in adaptating to their new dentures. Many previous studies used the stereognostic ability test to evaluate such problems and also to evaluate differences in oral sensation when changes in the oral cavity take place.[2]

Oral stereognosis involves a certain amount of motor activity, manipulating the object within the mouth and feeling its surfaces with lips, tongue, teeth, and palate. The information obtained must be associated with oral sensory memories derived from visual and tactile experiences.[1]

Classification of oral stereognosis

Oral stereognosis can be classified according to the following[3] :

[a] General stereognosis: overall capacity to recognize the shape of the objects.

[b] Homostereognosis: self-body recognizing capacity, like teeth, tongue and palate.

[c] Organstereognosis: capacity to recognize muscular units as target areas, concomitant to conscious projection of organism in environment (position of limbs to execute routine tasks).

[d] Heterostereognosis: capacity to recognize foreign body inside oral cavity (glass particles or wood stick).

Tests to verify oral stereognosis level

Testing one's oral stereognostic level can involve some motor activity and manipulation of test pieces inserted into the oral cavity and their interactions with lips, tongue, and teeth. Testing can also measure recognition times, surface texture of objects, and sensibility thresholds.[3]

There are certain parameters that apply to the recognition of forms[4].

1) Pieces must not have sharp angles.
2) A length of 2 to 3 mm is adequate.
3) Metallic pieces are not tolerated, and flexible forms are not correctly identified.

4) Form must be defined in a simple way (square, round, triangle).

5) Small number of pieces must be used.

The form, size and surface characteristics of the test piece, the presentation order, subject-related factors and the method of scoring all have their effect on the results.

(i) *Subject - related factors*

(a)Age

Ageing has a negative influence on stereognostic ability.[2] Oral stereognosis involves cortical function, memory, and vision factors that are impaired in elderly. The oral perception levels were higher for young dentate individuals and lower in the elderly.

Differences were not observed in dentate and edentulous subjects between 50 to 60 years of age. In a study it was found that older people needed 80% more time to identify pieces than younger ones.[3]

Evaluating oral stereognostic levels in subjects of different age groups and in subjects with and without dentures may not only provide useful information about sensory ability of the denture subjects but may also aid in relating age to the success of the denture.

(b) Gender

Gender is considered of no importance.[2] Studies that included examinations of gender were few and inconclusive.[3]

(c) Patient satisfaction

It is of great value to verify sensorial perception even before the initiation of therapy with complete dentures in order to advise the patient about further complications.[4] In a study done by Litvak Het al[5] in 105 denture wearers, half were dissatisfied with their prosthetics treatment.

Another study done by van Aken et al[6] concluded that oral stereognosis cannot be related to patient satisfaction degree (unsatisfied patients with higher perception levels).

(ii) *Dental-related factors*

(a) Dentate status

A healthy natural dentition offers very good oral stereognostic ability. Edentulous subjects usually show decreased oral stereognostic ability, depending on the rehabilitation form.

In a study it was found that patients with palatal fissure did not show differences when compared with the control group for the time and the number of correct responses in the stereognostic tests applied; however the extension of defects and type of treatment (surgical or prosthetic) were not considered.[3]When the effects of palatal coverage were assessed in dentate and edentulous subjects (with and without dentures), palatal coverage per se did not interfere with recognition of forms(although older subjects identified fewer forms than the younger ones).[7]

(b) Masticatory efficiency

In a study it was found that there existed a weak correlation between oral stereognosis and masticatory efficiency. Oral stereognostic ability improves with

time, which might be due to adaptation to the denture. As adaptation towards denture improves masticatory efficiency improves as well.[8]

(c) Denture experience

In a study done by Mantecchini G et al,[9] it was found that the correlation between duration of edentulism and oral stereognostic levels with new dentures in patients who had been edentulous for 8 years resulted in poor values (r= -0.01). When patients had been denture wearers for 11.5 years, oral stereognostic levels did not affect the patient's adaptive capacity with new dentures (r= 0.23).

(iii) Oral motor ability

Oral motor ability is a test of motor proficiency and was devised by Berry and Mahood (1966).[4] Oral stereognosis and oral motor ability tests are useful in considering the prognosis of treatment with dentures. Patients who have low denture tolerance generally tend to have high stereognostic ability and vice versa and older patients were seen to have lower scores than younger in oral motor ability tests. It is therefore difficult to use oral motor ability tests as a diagnostic procedure as most complete denture wearers are in fact old.[10] In a study done by Leung K C et al[11] it was found that oral perception and oral motor ability in edentulous subjects with stroke and Parkinson's disease can improve if dentures are worn during rehabilitation with no statistically significant differences between the two affected groups.

Summary

Stereognosis, in general, is a tactile discrimination of the shape of an object by means of manual palpation, without the use of eye-sight. It is a common diagnostic procedure for neurological functions. It is generally found that the dentulous subjects show decreased oral stereognostic ability, depending on the rehabilitation form.[12]

Stereognostic ability diminishes with age. It was found to be highest in younger dentulous age group. But stereognosis can be improved with training in case of denture wearers. The degree of satisfaction of oral stereognosis is not related to a high or low perception level. The use of complete denture during the rehabilitation of oral-motor disorders, such as Stroke and Parkinson's disease, enhances oral sensation. Implant-supported prosthesis provides stereognostic levels near to that of natural dentition.[3]

Oral stereognosis constitutes the highest level of learning because it can only be applied after sensitization and orientation of objects in the oral cavity. Some studies that have tried to link the degree of satisfaction of denture wearers with a high or low oral stereognostic level have had dissimilar results. It is important to point out that previous frustration of denture wearers is one of the multiple factors that influence oral perception indexes. Since aging decreases muscular ability and increases the time needed for the recognition of forms, a special training program for perioral musculature and complete dentures (being implant-supported or not) may benefit patients. Although the tongue and palate

constitute more than one third of the somatosensorial cortex area, further studies with immunohistochemical and magnetic resonance imaging techniques are necessary to determine the role of gingival exteroceptors, since most of the treatment modalities are conceived in the form of implant-supported or implant-retained overdentures. Thus, the role of oral stereognosis cannot be underestimated.[3]

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ADENOMATOID ODONTOGENIC TUMOUR: A CASE REPORT

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Abstract
Adenomatoid odontogenic tumour (AOT) is a distinct odontogenic tumour that is entirely odontogenic epithelium in origin which accounts for about 3-7% of all odontogenic tumours. It is a benign (hamartomatous), non-invasive lesion with slow but progressive growth. It is predominantly seen in young female patientsand is usually associated with impacted teeth in maxillary anterior region. Histologically, AOT is composed of odontogenic epithelium arranged in a variety of histoarchitectural presentations and closely resembles an ameloblastoma. Treatment is conservative surgical excision, and the prognosis is excellent. Here we report a case of AOTin the maxilla of a 20 year old female patient.

Key Words: Adenamatoid odontogenic tumour; hamartomatous;odontogenic epithelium

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Introduction

Adenamatoid odontogenic tumour (AOT)was first described by Dreibladt, in 1907 as a pseudo adenoameloblastoma.[1] In 1948 Stafne considered it a distinct entity, but it was classified by others as a variant of ameloblastoma. As a result, the lesion is known by many names, including adenoameloblastoma, adenoameloblasti codontoma, epithelial tumour associated with developmental cysts, ameloblastic adenomatoid tumour and adenomatoid or pseudo adenomatous ameloblastoma.[2-4] Later in 1869 Philipsen and Birn proposed the name adenomatoid odontogenic tumour and suggested that it was not regarded as a variant of ameloblastoma because of its distinct behaviour.[4] Later the term AOT which was widely accepted was adopted by the World Health Organization (WHO) classification in 1971.[5]

The WHO has defined AOT as a tumor of odontogenic epithelium with duct-like structures and with varying degree of inductive changes in the connective tissue.[6] AOT has tendency to affect the younger age group usually during the second decade, also an apparent inclination toward female presentation, as the established male to female ratio of occurrence is 1:2. This lesion is known to be allied with unerupted canines and lateral incisors. The clinical course of the lesion is slow and remains clinically unnoticeable for a long time. The deformity produced by the lesion manifests as displacement of adjoining teeth and an obvious expansion of the surrounding bone.[7, 8]

AOT is also called "two-third tumor," because two third occur in young females as well as in maxilla, two-third of the cases are associated with unerupted teeth, and two-third of the affected teeth are canines.[9,10] AOT is subdivided into three groups by Philipsen et al. and referred to as follicular, extra follicular, and peripheral. [4, 9]

All the variants have common histological characteristics as well as indicative of a common origin as a complex system of the dental lamina or its remnants. The follicular and extra follicular variants comprise 96% of all AOT, and 71% of these are the follicular variant.[9] Most of AOT arises in anterior maxilla, it can rarely also originate in the wall of a dentigerous cyst of the maxillary antrum and very rarely in posterior maxilla with an impacted second molar.[4,9,10] Conservative surgical enucleation is the most suggested choice of treatment. Recurrence rate for AOT is exceptionally rare. [6]

Here we present a case of AOT in the anterior maxilla ofa 20 year old female patient.

Case Report

A 20 year old female patient reported to Out patient department with a chief complaint of swelling in the upper front teeth region since 5 years. Initially the swelling was small in size and gradually increased and reached up to the present size. It was not associated with any pain or discharge. Extra oral examination showed slight facial asymmetry. Intraoral examination revealed a swelling at thebuccal vestibule in the 13, 14 region measuring approximately 3x2 cms. The overlying mucosa appeared to be normal as adjacent mucosa. On palpation all the inspectory findings were confirmed, the swelling was firm in consistency, nontender with smooth borders and surfaces.

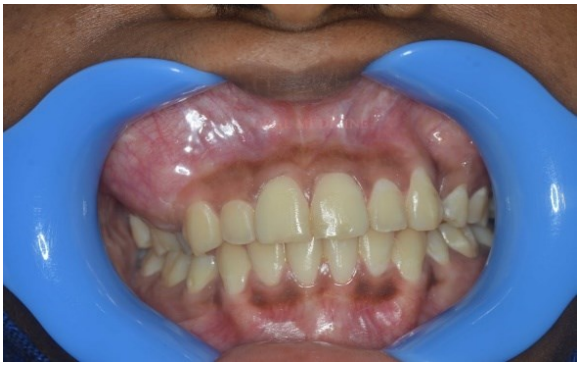

Fig 1: Swelling in 13 and 14 region

Orthopantogram (OPG) of the patient showed well defined mixed radiolucent to radiopaque lesion between the roots of 13 and 14 of size approximately 3x2 cm with displacement of 13,14. Internal structure mixed with multiple areas of calcifications. On the basis of clinical and radiological features a provisional diagnosis of Adenamatoid Odontogenic Tumour was given.

The lesional tissuewas removed completely by surgical excision and specimen was sent for histopathologic examination. Histopathology of lesional tissue revealed multinodular proliferation of ovoid to spindle cells in streaming and whorl pattern. Irregular deposits of eosinophilic material was seen in between these cells. Irregular to round calcified bodies in many areas and some showing lamellar pattern

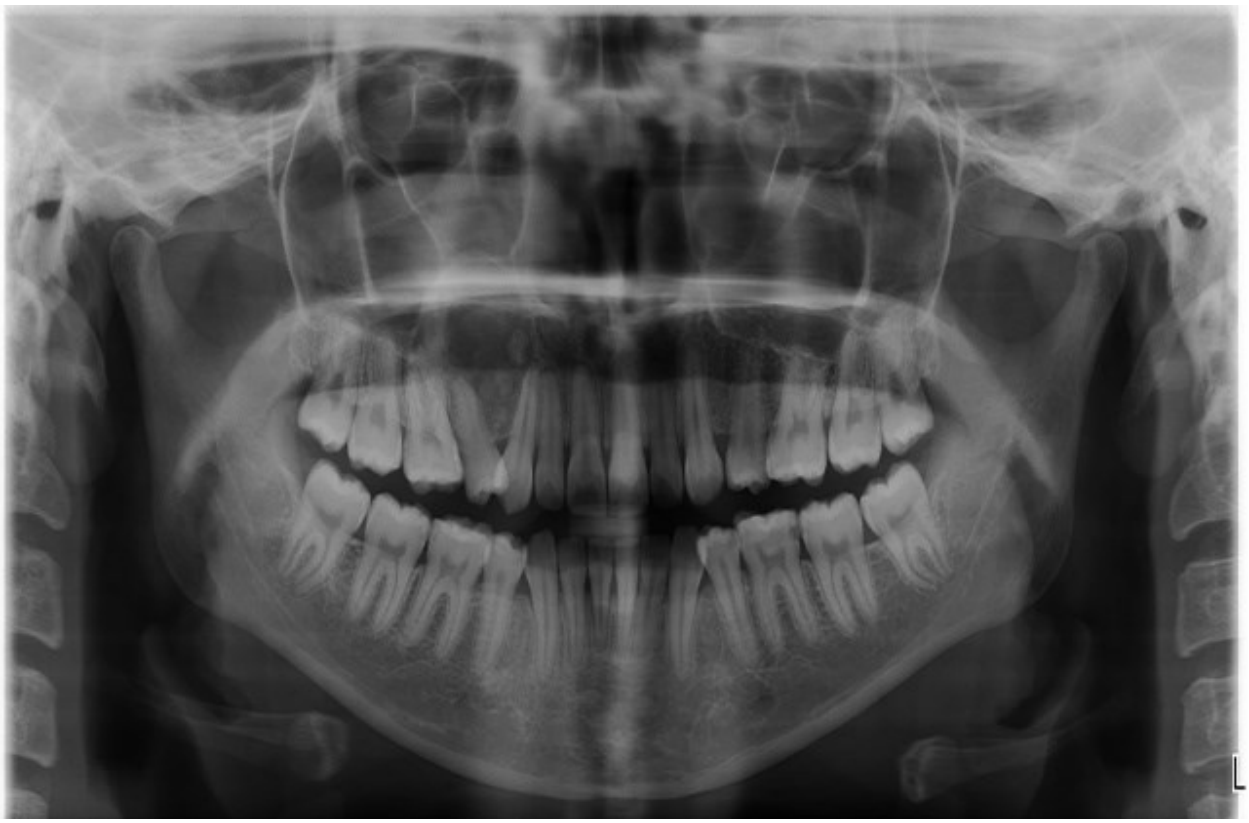

Fig 2: OPG revealed a well-defined mixed radiolucent to radiopaque lesion measuring approximately 3x2 cms between 13 and 14

were evident. The stroma was loosely collagenous with areas of haemorrhage, extravasated RBCs and surrounding bone. Based on these findings a histopathologic diagnosis of adenamatoid odontogenic tumour was given.

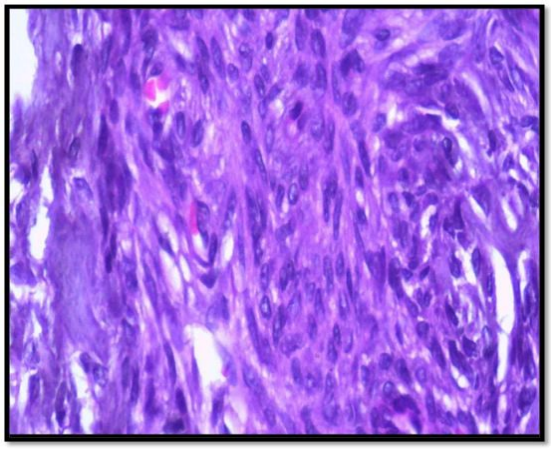

Fig 3: Darkly stained spindle cells arranged in whorls(400X magnification)

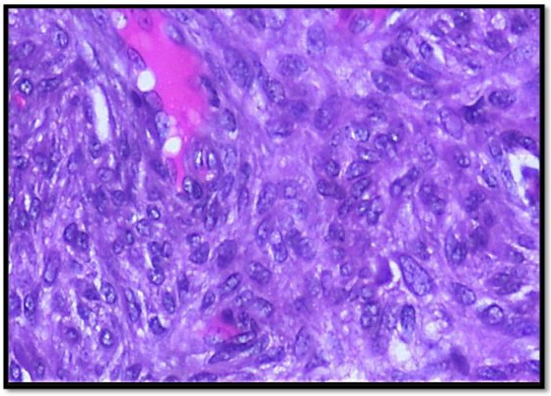

Fig 4: Irregular deposits of eosinophilic material (400 X magnification)

Discussion

Adenomatoid odontogenic tumour (AOT) belongs to a group of rare benign odontogenic lesions and constitutes approximately 3–7% of all odontogenic

tumours.[11- 13] It affects young patients and is usually seen in anterior maxilla. AOT involves both bone and soft tissues in anatomic configuration.[14]

The lesion usually presents as an asymptomatic swelling, which is slow growing, non-invasive and is often associated with an unerupted tooth. The tooth most often associated with AOT is seen to be an unerupted permanent maxillary canine.[15] In our case the lesion is between an erupted 13 and 14.

Radiographically, AOT manifests as an intraosseous lesion (central type) in the majority of cases (96%). Extra osseous or peripheral lesions account for less than 4% of cases. Intraosseous AOT may be radiographically divided in to 2 types: follicular (pericoronal) and extra follicular (extra coronal) types. The former is characterised by a well-defined unilocular radiolucency surrounding the crown and partly the root of a unerrupted tooth. The latter is not associated with a unerrupted tooth and the well-defined unilocular radiolucency is found between, above or superimposed upon the roots of erupted, permanent teeth. Minute, variable shaped radioopacities are frequently found within the lesion.

The extra osseous (peripheral/ gingival) type of AOT is rarely detected radiographically, but there may be slight erosion of the underlying alveolar cortex. Displacement of neighbouring teeth due to tumour expansion is much more common than root resorption. Larger lesions are known to cause expansion of cortical plates, displacement of teeth, root resorption.[11]

Differential diagnosis radiographically includes dentigerous cysts, calcifying odontogenic cysts, calcifying odontogenic tumours, globulo-maxillary cysts and ameloblastomas. As AOT imitates a dentigerous cyst in large number of cases, differentiation from a dentigerous cyst is important. The latter frequently appears as a pericoronal radiolucency in the jaws i.e. enclosing only the coronal portion of the impacted tooth whereas AOT shows radiolucency usually enclosing both the coronal and radicular portions of the tooth. Mostly, follicular AOT closely resembles a follicular cyst, extrafollicular AOT a residual or "globulo-maxillary" cyst, and the peripheral variant a gingival fibroma.[16]

All variants of AOT appear remarkably similar histologically and are composed of odontogenic epithelium embedded in connective tissue stroma. The presentation is usually seen as spindle or polygonal shaped cells arranged in sheets and whorled masses in a scant connective tissue stroma. Between epithelial cells as well as in the centre of rosette-like structures is an amorphous eosinophilic material. Duct-like structures in the lesion are seen to be lined by a single row of columnar epithelial cells, the nuclei of which are polarized away from the central lumen.[17] The reason for characteristic ductal architecture is still hypothetical. Some believe it to be due to a cystic change in the follicles of tumour islands, or probably an attempt to form glandular tissue, since the origin is from the basal cells of the oral epithelium that have multiple differentiation capacity.[6]

The histogenesis of AOT is still unknown. Whetherit is a hamartomatous malformation or a neoplasm continues to be debatable. Because of the relatively small size of lesion and lack of recurrences in most cases, findings to a large extent, support the fact that it is a hamartoma. On the other hand, few authors suggest that early detection is the reason for small size of the lesion. Increased variation and aggressive features in few reported cases is indicative of its neoplastic origin.[6] Considering the benign behaviour of AOT, its slow growth, clear delimitation, and low recurrence, the treatment of choice is conservative enucleation and simple curettage. In exceptional cases where tumour size is large or when risk of bone fracture exists, partial enbloc resection of the mandible or maxilla is indicated.[18]

Recurrence of AOT is extremely rare. Only three cases have been reported till now in Japanese patients where recurrence of this tumour has been observed,[9] therefore it can be said that the prognosis is excellent when completely removed in toto.

Conclusion

AOT is a benign neoplasm of odontogenic epithelial origin. It can occur as intraosseous and peripheral forms. AOT can be associated with an impacted tooth and give a radiographic impression of a dentigerous cyst. Enucleation is the treatment of choice and prognosis is excellent without recurrence.

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TYPE III – DENTURE STOMATITIS: A CASE REPORT AND MANAGEMENT

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Abstract

Denture stomatitis is most commonly seen in elderly females, especially in nocturnal denture wearers. Signs of denture- induced stomatitis are chronic erythema and sometimes, oedema of the mucosa that contacts the mucosal surface of the denture. Clinical diagnosis is usually made after observing the pattern of inflammation on the mucosa and after culturing has demonstrated the presence of *C. albicans* on the denture or underlying mucosa.A case of Type-III Denture stomatitis along with its' management has been detailed here.

Key Words: denture stomatitis, Candida albicans, management

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Introduction

Cahn (1936) used the term "Denture Sore Mouth" (DSM) to describe the diffuse inflamed mucosa seen under maxillary full dentures usually accompanied by pain. *Nyquist* (1952) and *Newton* (1962) rather inconsistently included in the term DSM both localised and diffuse inflammation irrespective of the presence of pain. [1]

Denture stomatitis is most commonly seen in elderly females, especially in nocturnal denture wearers. It presents different degrees of severity ranging from multiple pin-point red spots (petechiae) to generalized inflammation with or without papillary hyperplasia.

Signs of denture- induced stomatitis are chronic erythema and sometimes, oedema of the mucosa that contacts the mucosal surface of the denture. It is usually asymptomatic, but may also present as mucosal bleeding, swelling, burning or other painful sensations, halitosis, unpleasant taste and dryness in the mouth.[2] Denture Stomatitis may be associated with angular cheilitis in which both yeasts and bacteria (especially *Staphylococcus aureus*) are involved, as interacting, predisposing factors.[3] Angular cheilitis presents as fissuring at the corners of the mouth along with erythema and pain. Atrophic glossitis, acute pseudomembranous candidiasis and chronic hyperplastic candidiasis are other associated factors.[4]

Clinical diagnosis is usually made after observing the pattern of inflammation on the mucosa and after culturing has demonstrated the presence of *C. albicans* on the denture or underlying mucosa.A case of Type-III Denture stomatitis along with its' management has been detailed here.

Case Report

A healthy, 60 year old, male from Mukkam, Calicut presented with the complaint of a broken tooth during extraction about an hour back which was previously asymptomatic. The right lower back tooth and chin region were anesthetised. Examination of the oral cavity revealed spontaneous bleeding and fractured roots of 36, for which he was advised to bite on a piece of gauze. Patient had a non-contributory medical and dental history.

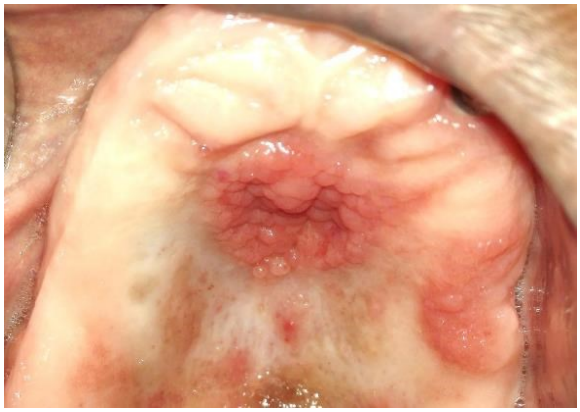

Fig 1: First visit

Edentulous maxillary arch with a removable acrylic complete denture was noted. He reported to have removed the denture less than 10 times since its placement about 8 years back; with no signs of discomfort or other symptoms associated with its use. The denture was unclean and had a depression (suction chamber) measuring 2cm in diameter at the centre of its' mucosal surface which may have been created for the purpose of retention.

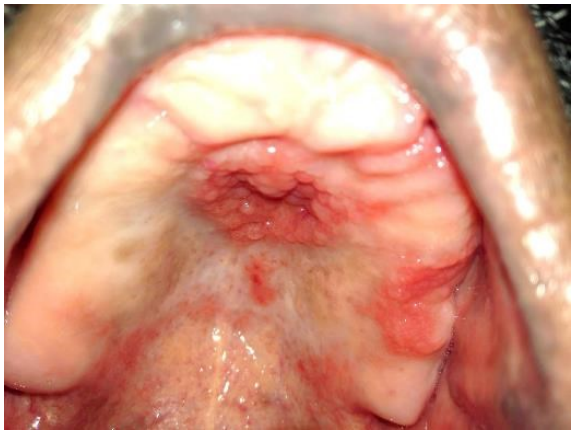

Fig 2: Second visit

The entire denture bearing area which included the alveolar ridges, gingiva and palate was erythematous. Well defined, multiple, raised pebbly/nodular hyperplastic region approx. 2 cm in diameter over the mid-palatine region of hard palate and 26 27 region of alveolar crest was observed. Sparse strands of cheesy white discharge were seen on palpation of nodular mass on the palate.

A diagnosis of Type III Denture Stomatitis was made. A cytological smear was obtained which tested positive for *C. albicans* and the patient was sent for extraction of the root stumps with a

subsequent appointment for treatment of the palatal lesion.

The patient was advised to discontinue use of the present denture and instructed on proper oral hygiene techniques. He was prescribed Clotrimazole 1% w/v (Candid mouthpaint – Glenmark) four times daily for 2 weeks and 0.12% Chlorhexidine gluconate mouth rinse, twice daily for 2 weeks. The next visit shows slight improvement in the erythema only.

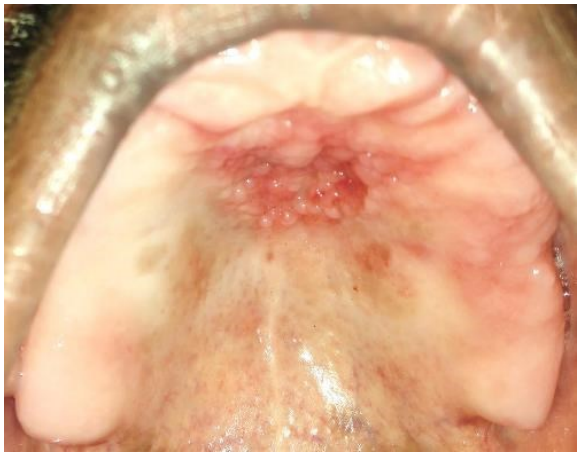

Fig 3: Third visit

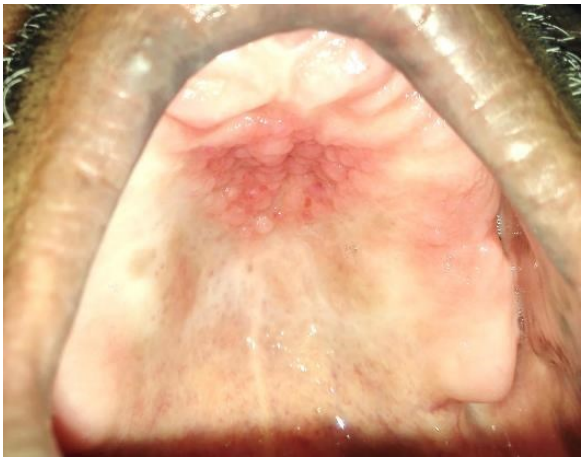

Fig 4: Fourth visit

Systemic antifungal, tab. fluconazole 50mg twice daily for 14 days was prescribed. Marked reduction in erythema and slight decrease in the hyperplasia was noted 7 days with no change in 2 weeks were observed. Ketoconazole 200mg once daily was advised for the next 14 days. On the last follow up consultation, there was a remarkable improvement from the initial visit with complete absence of erythema and definite reduction in size of nodular lesion. Subsequent Cytologic smears for candida came back negative. The patient was sent for prosthodontic rehabilitation.

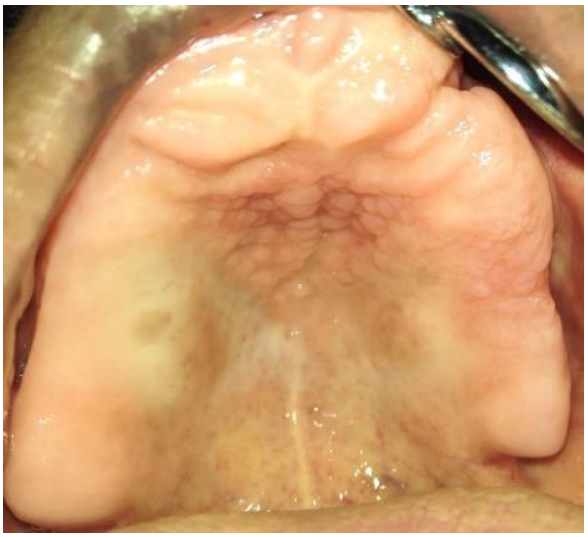

Fig 5: Fifth visit

Discussion

Denture – related stomatitis consists of mild inflammation and erythema of the mucosa beneath a dental appliance, usually a complete upper denture.[5] Mandibular arches are rarely affected. DS is also known as Denture-induced Stomatitis, Denture Sore Mouth or Chronic Atrophic Candidiasis. There is up to 70% incidence of denture stomatitis in institutionalised elderly population with marked female predilection.[5-7] The high proportion of women to men sufferers is more likely

because of the higher incidence of edentulism among women and because of the tendency for women to seek dental treatment more often than men.[8]

Classification

Newton (1962) [6, 9] proposed a classification of the disease based on clinical aspects of the lesions:

- Punctiform hyperemia (Type I): hyperemia signs of the minor palatine salivary glands; there is an erythematous punctiform aspect, and small or diffuse areas in palate may be affected.
- Diffuse Hyperemia (Type II): smooth and atrophic mucosa, with erythematous aspect under the denture. It is considered the most common aspect of CADS.
- Granular Hyperemia (Type III): more common in dentures with suction chambers. Affect the central region of the palate, with rough and nodular appearance of the mucosa.

Eiology

Micro-organism*: Candida albicans* is the most common Candida species isolated from the oral cavity both in health and disease, while other species such as *C. glabrata*, *C. tropicalis*, and *C. guilliermondii* are infrequently but consistently isolated. Although these organisms typically colonize mucocutaneous surfaces, the latter can be portals of entry into deeper tissues when host defenses are compromised. [10]

Since, *C. albicans* is the predominant species isolated in denture stomatitis patients, therefore, these lesions are also called as 'Candida associated denture stomatitis' (CADS).

The mechanism(s) by which *C. albicans* contributes to the pathology are still unknown, histologic preparations have not shown the penetration of the yeast into the oral tissues.

Predisposing factors for denture stomatitis[4]

- Chronic local irritants
- III-fitting appliances
- Age
- Denture lining materials E.g.: silicone elastomers.
- Inadequate care of appliances
- Disturbed oral ecology / microbial flora due to - antibiotics, corticosteroids
- Xerostomia
- Dietary factors
- Immunological and endocrine disorders
- Heavy smoking

Inflammation: Barbeau J et al (2003) in a study aimed to re-evaluate the link between *Candida albicans* and denture-related stomatitis and suggested that the inflammatory process of stomatitis favours the colonization of Candida.[11] This also explains the reason why they invariably recur after a course of medication.

Nocturnal wear: Nocturnal users have a high frequency of denture stomatitis which can be generally explained by the fact that nocturnal wear of the prosthesis can reduce the protective effect of saliva, cleaning

action of the tongue, and good oxygenation of the mucosa, which are key factors in the resistance of mucosal tissue to mechanical and microbiological aggression.[12]

Trauma: The risk of denture stomatitis was 4.5 times greater in individuals wearing conventional dentures than in those who wore mandibular two-implant overdentures which supports the concept that denture stomatitis may be more strongly related to denture trauma than to other risk factors, such as microbiological factors.[13] Deficiency in vertical dimension during denture construction could lead to uneven distribution of loads and traumatogenic contacts.

Denture surface: Surface roughness may facilitate microbial retention while a polished surface with minimal porosity did not allow attachment of plaque by penetration of surface defects or by mechanical fixation to surface irregularities.[4]

Management

Continued assessment: Elderly people, whether at home, in hospital, or in residential accommodation are a high-risk group. Do not assume that if patients are alert, they have no oral health problems and are conducting oral hygiene themselves.[15] Initial and regular ongoing assessment at appropriate intervals is necessary.

The first and foremost step in the management of Denture stomatitis is the removal of etiological agent i.e, reduction in the level of fungal and other species and associated inflammation.

It is mandatory for the patient to discontinue nocturnal use of dentures and keep them out of the mouth for extended periods (6-8 hours). Oral as well as denture hygiene should be improved. In addition, the professional should evaluate the necessity to construct another denture (especially in case of unclean, fractured, old or ill-fitting/improperly constructed dentures) considering that infected prosthetic devices would result in recurrence or failure of treatment.

Maintaining existing/new dentures: Reasonably good dentures must be maintained well and ideally brushed in warm, soapy water and soaked overnight in an antiseptic solution. Additionally, a30 minutes soak in solutions containing benzoic acid, 0.12% chlorhexidine or 1% sodium hypochlorite (may damage denture in the long run) with thorough rinsing may be performed.

Ellepola et al (2001) reports that, despite the availability of a number of effective antimycotics, failure of therapy or recurrence of disease therapy is rather common. This is due to the unique environment of the oral cavity where the flushing effect of saliva and the cleansing action of the oral musculature tend to reduce the drug concentration to sub-therapeutic levels. Therefore Chlorhexidine maybe prescribed as both antiseptic mouthwash and a denture disinfectant in order to supplement other antifungals.[16] After the soak and rinse routine, the mucosal surface may be painted with a thin film of Nystatin or Clotrimazole 1% solution after each meal.

Microwave irradiation of dentures in water for 3-6 mins at 650 W can sterilise complete dentures.

Antifungal medications are recommended when yeasts have been isolated, or when lesions do not resolve with hygiene instructions.

Topical antifungals:

First choice of treatment is the topical application. They are available as pastilles, troches, creams, ointments and oral suspensions. The most commonly used dosage of medication is:

1% Clotrimazole has anti-staphyloccal activity too. Miconazole 2-4% may also be used four times a day preferably after meals. Sterile Cotton applicator may be used.

Systemic antifungals:

Systemic antifungal agents[17] have been recommended for patients with poor compliance such as patients with special needs and also immunocompromised patients. The drug of choice is fluconazole, taking into account that it has lower toxicity, it is highly bioavailable in oral formulations, and less expensive in relation to other antifungal agents.[6] Usually it is prescribed in 50mg dosage, twice daily or fluconazole 100mg or Itraconazole 100mg capsule once daily for 1-2 weeks.

Bissel et al (1993) noted similar efficacy fluconazole and amphotericin in the management of denture stomatitis, in a comparative trial. 50 mg of fluconazole daily for 14 days and amphotericin lozenges and cream for 28 days were given to two groups and both clinical and mycological investigations were conducted.[18]

Another systemic antifungal agent is ketoconazole, which is absorbed from the gastrointestinal tract and must be administered in a single dose of 200 mg during 14 days. This is a hepatotoxic drug and can cause cardiac arrhythmias when used in combination with antihistamines or macrolide antibiotics.[6] For a long time, amphotericin B was used in the treatment of CADS. However, it is extremely nephrotoxic and is administered intravenously, being nowadays less used in DS therapy.

In severe hyperplasia of palate, cryosurgery, laser or excision may be performed under LA.[14] Preprosthetic interventions in patients with aggressive forms of inflammatory papillary hyperplasia have historically involved surgery. These procedures often involve significant postoperative discomfort and morbidity. Additionally, some patients who present with dental phobias, aversions to surgery, or underlying systemic disease may not be amenable to this type of surgical intervention. By following strict adherence to a clinical protocol, DS may be resolved non-surgically too as reported by Orenstein et all (2014). The methodology involved greater patient comfort during treatment, encouraged positive reinforcement to visiting the dentist for recall appointments, and effectively eliminated the underlying inflammatory papillary hyperplasia, allowing for the successful fabrication of the definitive removable prostheses.[19]

Conclusion

In clinical practice, it's beneficial to understand the etiopathogenesis of each case of denture stomatitis for the effective and long term treatment. It is mandatory to perform mycological tests prior to starting non-surgical therapy and weekly recall and assessment of patients under such a regime must not be underestimated. The importance of follow – up after denture placement must be communicated to the patient for effective denture use and hence, improved quality of life.

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METAL BASE MAXILLARY COMPLETE DENTURE: A CASE REPORT

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***Dr.Sheejith M, ****Dr.Ranjith M, *****Dr. Nicholas Mathew

Abstract

A removable denture designed using a cast metal framework could extend denture longevity because it is unbreakable and easy to adjust. High thermal conductivity also has been deemed a significant advantage and some practitioners feel that this characteristic is responsible for enhanced health of tissues in contact with metal. The present case report deals with oral rehabilitation of completely edentulous maxillary arch by incorporating metal denture base in place of the conventional poly methyl methacrylate material.

Key Words: Metal framework; reinforced complete denture; metal base denture

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Introduction

Cast metal bases for complete dentures must be considered an adjunct to routine care for the edentulous patient. Belfiglio EJ[1] advocated the incorporation of metal base in complete dentures when a high degree of processing change is expected or when additional strength is needed. Processing changes in conventional complete denture are caused by the release of strain in the resin material after the denture has been cured and removed from the flask. It results in decreased retention, occlusal disharmony, and lateral sore spots. As the use of metal bases reduces the amount of acrylic resin in the denture, the processing changes are also reduced.

Faber B[2] has given the following advantages of metal bases: (1) prevention of acrylic warpage, (2) more strength, (3) increased accuracy, (4) less tissue change under the base, (5) less porosity and therefore easier to clean and keep clean, (6) thermal conductivity, and (7) less deformation in function. Additionally, patients perceive natural feeling from thin base which may also contribute to additional denture stability.

Being able to make the patient aware of the hot and cold sensations using a metal base instead of an acrylic base denture markedly reduces burning sensations particularly over palatal region on intake of cold food or water. Moreover, previous studies also attribute the cause of burning mouth to an allergic response to the denture materials like methyl‑methacrylate monomer.[3] Metal base also proves to be effective in decreasing the fungal growth typically present beneath acrylic base complete dentures. Studies have also demonstrated that the metal‑palate dentures

are perceived as being more comfortable than the acrylic resin dentures[4]

The major disadvantages associated with metal denture bases include the possibility of allergy, increased cost, difficulty in fabrication, compromised esthetic qualities, and inability to rebase such prostheses. Nevertheless, they may be indicated when polymer-based systems fail to provide acceptable physical properties. The fabrication of metal denture base is not complicated and not cost prohibitive when base metal alloys are used[5]

Cast gold alloys, cobalt-chrome-molybdenum and cobalt chrome alloy dentures have superior physical properties and generally occupy less space in the mouth than acrylic dentures. They are stronger, have greater resistance to fatigue, and are less likely to break under normal conditions[6] De Furio et al reported that chrome-cobalt was the most retentive base material for maxillary complete dentures.[7]

This article describes a clinical report of patient with completely maxillary and mandibular edentulism restored with a metal base maxillary complete denture and mandibular conventional acrylic resin denture. The reason to incorporate a metal base in maxillary denture is to avoid repeated fractures of the denture, which was the chief complaint of the patient. The metal base was fabricated with cobalt chrome alloy because it is the most retentive base material for maxillary complete denture. The same process can be used for tooth supported and implant-supported over dentures. This simplified technique provides fracture resistance and dimensional stability for the prosthesis.

Case Report

A 74 year old female reported to the Department of Prosthodontics, KMCT Dental College, Calicut, with a chief complaint of repeated fracture of old upper denture, and wants to replace with a new denture. Dental history revealed that the patient was edentulous since 3 years and got her teeth extracted due to mobility. Patient had previous history of using denture since 2 years. Detailed medical history was recorded and no significant medical concerns were observed. On intra oral examination it was observed that the patient had shallow, flat palate. This is considered to be one of the major cause for conventional maxillary denture fracture because these anatomic feature allow for flexure of the denture that can result in fracture in palatal region.[8] So it was decided to fabricate a complete denture with a customized metal palate for maxillary arch and conventional complete denture for mandibular arch.

Technique

The primary impression was made with irreversible hydrocolloid (Hydrogum 5, Zhermack) and plaster cast was poured for the fabrication of a custom special tray. The peripheral tracing procedures were completed with green stick impression compound(DPI Pinnacle Tracing Sticks) and the secondary impression was made with zinc oxide eugenol impression material (DPI Impression Paste).The master cast was poured in dental stone (Type III dentalstone,

Goldstone, Asian Chemicals).A sheet of spacer wax was adapted on the crest of maxillary master cast and 6 tissue stops were made (two on canine and four on molar region) to create space for acrylic material (Fig 1).

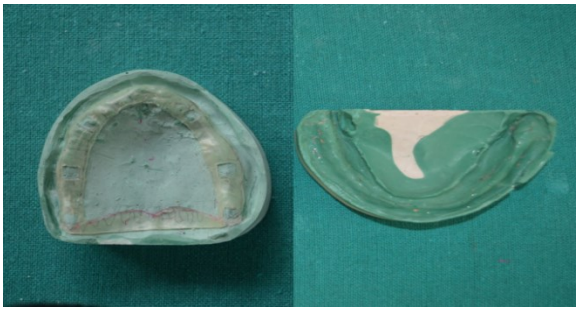

Fig 1: Maxillary and mandibular master cast (2mm thickness spacer wax attached on the crest and posterior palatal seal area of master cast.

Maxillary master cast with spacer was duplicated using reversible hydrocolloid (Agar, Castogel, Bego, Germany) and a refractory cast was poured with phosphate bonded investment material (Wirovest, Bego, Germany) (Fig 2).

Fig 2: Maxillary refractory cast

A sheet of spacer wax was adapted on palatal portion of refractory cast and mesh type spacer wax (Retention grids, fine, self-adhesive, Renfert, Germany) adapted on the crest as shown in Fig 3. For making the butt joint, a 2‑mm cylindrical blue waxbeading was adapted palatal to the crest of the ridge as shown by straight arrow in Figure 3.Once the design of the palate in wax was done, wax sprues were attached and casting was done using cobalt chrome alloy. The metal palate after finishing was placed now on the master cast (Fig 4) and maxillary rim was made for jaw relations. The jaw relations were recorded and teeth arrangement was done (Figs 5&6).

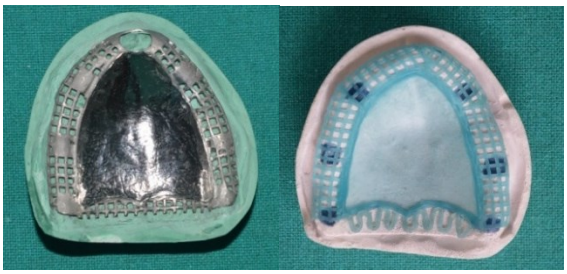

Fig 3 & 4: Wax pattern designed on the refractory cast. 2-mm cylindrical blue wax placed palatal to the crest ; Metal base placed on the master cast

Fig 5: Finished occlusal rim with metal base

Then the dewaxing of the trial denture was done. The metal framework of the denture bases were placed on their respective casts (Fig 7), then proceeded with the acrylization using heat cure denture base

materials. After curing, the maxillary metal denture was finished and polished (Figs 8,9). Then insertion of the maxillary and mandibular dentures with metal base was done and instructions were given to the patients for the proper care and maintenance of the denture.

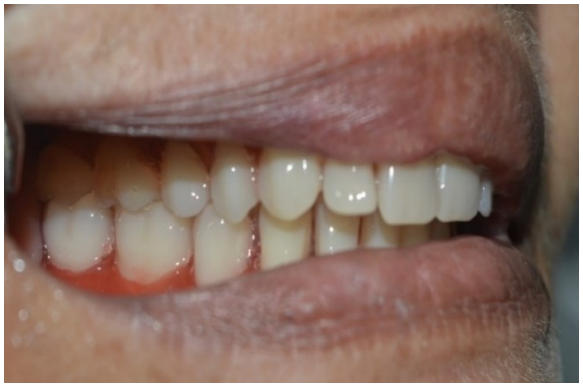

Fig 6: Try in

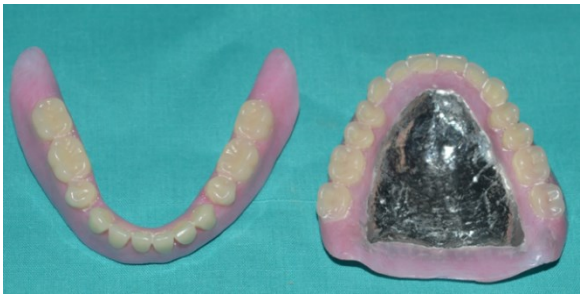

Fig 7&8: metal frame work replaced on the cast; and the completed work

Discussion

A sequential approach in fabricating a stable maxillary denture with incorporating metal frame is presented. Reducing burning sensation, eliminating microbial colonization, and resistance to midline fracture are advantages achieved with this technique. The use of a metal base or metal mesh within the prosthesis is not a new or original concept.[5,9,10] But the technique described in this case, the metal frame is being fabricated, occlusal rim is made on the metal frame and jaw relation is done. After the try-in the denture is being processed without altering the prosthetic tooth arrangement or relationship of the teeth to the master cast.

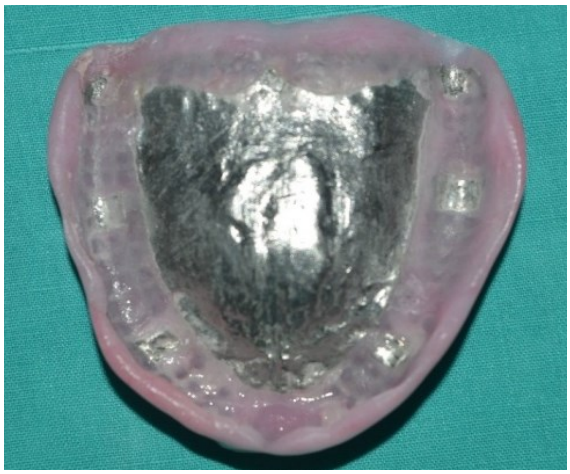

Fig 9: internal surface

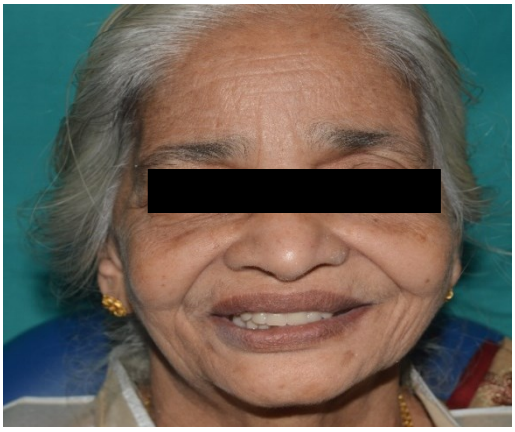

Fig 10 : Post treatment Photograph

One of the disadvantages of incorporating metal base into the maxillary complete denture is that it increases the weight of the denture. For the mandibular denture, this weight helps to keep the denture in place. However, for metal-based maxillary dentures, the added weight may compromise the retention of the prosthesis.[11] In this case we measured the weight of patient's old conventional denture and metal base denture (Fig 10&11). It was observed that the weight of the conventional maxillary denture is 12.6gm and metal incorporated maxillary complete denture weighted 20 gm. In a previous study Shiwa et al[12] investigated the weight change of a maxillary complete denture by adding 20 gm of metal on the duplicated maxillary denture and compared with the old light weight acrylic denture. They found out that there was no significant difference in masticatory movements between maxillary light dentures and maxillary heavy dentures. Further investigations are needed to evaluate how the weight of the metal denture base affect the retention of the maxillary complete denture.

Fig 11: weight of old and new dentures

Summary

This case report described a simplified technique to incorporate metal base in to maxillary complete denture prosthesis. Metal base is made from the duplicated refractory cast and transferred into the denture during processing stage of denture. It provides added strength for denture and improves the accuracy of fit to the supporting gum tissues. The disadvantage of this procedure would be the added cost for the metal frame and the additional steps needed for its fabrication.

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FABRICATION OF CONVENTIONAL IMMEDIATE COMPLETE DENTURES: A CASE REPORT

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***Dr. Sheejith M, ****Dr. Ranjith M

Abstract

The immediate denture is a dental prosthesis constructed to replace the lost dentition, associated structures of the maxillae and mandible and inserted immediately following removal of the remaining teeth. The purpose of the present clinical report is to describe the steps in fabricating a conventional immediate complete denture where the prognosis of natural teeth were hopeless and fabricating an immediate complete denture was a treatment option to prevent patient's distress, anxiety and embarrassment.

Key Words: Immediate complete denture, Conventional immediate denture, Classic immediate denture

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Introduction

Conventional complete denture can be fabricated for patients who have extracted all their natural teeth, only after waiting for at least 6-8 weeks after proper healing. The patient suffers the social indignity and functional difficulty of going without teeth for several weeks. The immediate denture solves this problem as it is constructed before and inserted immediately following the extraction of natural teeth.

One of the first references to immediate dentures in literature was that of Richardson in 1860.[1] Immediate complete denture is defined as any removable dental prosthesis fabricated for placement immediately following the removal of a natural tooth/teeth.[2] Immediate dentures are of two types: conventional/classic and interim/transitional/non-traditional dentures. After conventional or classic immediate dentures are placed and after healing is completed, the denture is refitted or relined to serve as the long-term prosthesis. This is selected when only anterior teeth remain or if the patient is willing to have the posterior teeth extracted before immediate denture procedure begins.[3] In case of interim immediate denture, after denture is made and healing is completed, a second, new complete denture is fabricated as long-term prosthesis. Interim immediate denture is made when both anterior and posterior teeth remain until the day of extraction and placement of immediate denture.

The main advantage of immediate complete denture is that it prevents patient embarrassment, promotes patient health and

provides a guide for optimal vertical dimension and aesthetics. A well-made immediate denture will act as a splint over the surgical area and therefore promotes healing and better ridge form.[4-6]

The disadvantage of immediate complete denture are that since anterior try-in is not possible, patient has no idea how the denture will look on the day of insertion. It also requires more chair-side time, additional appointments and costs. But since the advantages are more when compared to the disadvantages, immediate denture can definitely be considered as a treatment option.

Case Report

A 51 year old female patient reported to the Department of Prosthodontics and Crown & Bridge with the chief complaint of mobile upper front teeth. She also complained of poor esthetics, difficulty in chewing, and food lodgement in relation to the upper front teeth. Patient had undergone extractions of the mandibular and maxillary posterior teeth 2 months back due to pain and mobility. There was no relevant medical history. The patient had wheatish brown complexion and normal gait. She had slight lip incompetency. Intraoral examination revealed that teeth present were 15, 14, 13, 12,11,21,22,23,24,27, 34, 33, 32, 43, 44 and 45. Generalized bone loss between the teeth resulted in frequent food lodgement and discomfort to the patient. All the teeth present had grade 2 mobility. The remaining teeth had poor prognosis as she had chronic generalized periodontitis. Arch size of both maxillary and mandibular ridges was medium size and arch form of maxillary and mandibular ridges was square. Ridge form in maxillary ridge was U shaped and mandibular ridge was inverted U shaped.

The diagnosis for maxillary was Kennedy's class II modification 1 and Kennedy's class II modification 2 partially edentulous mandibular arch. The patient was given various treatment options of full mouth extraction and rehabilitation with dental implants. Fabrication of immediate maxillary and mandibular complete denture was planned. The implant supported over dentures and the conventional complete denture were the other options of rehabilitations given in the treatment plan. Since she had difficulty in facing the society without teeth, she opted for immediate complete denture and hence the treatment option of immediate complete denture was finalized (Figs 1).

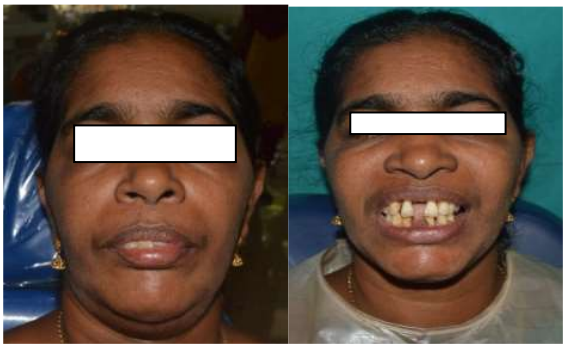

Fig 1: Preoperative photographs

Procedure

Impressions

A diagnostic impression was made for evaluation of the teeth. Care was taken to prevent accidental extraction of the mobile teeth by blocking the undercuts using modelling wax and applying petrolatum. (Fig 3) The patient was advised to extract the posterior teeth which did not provide a

vertical stop to reduce the trauma of extracting anterior and posterior teeth at a time. The premolars which provided a vertical stop was retained. Meanwhile her maxillary right central incisor got avulsed. A healing period of 4 weeks was provided after which primary impression was made with irreversible hydrocolloid (Hydrogum, hermac). Primary cast was made by pouring plaster of Paris into the impression. Secondary impression is made by dual impression technique. Special trays were fabricated using self-cure acrylic resin (DPI) covering only the edentulous space and lingual surface of anterior teeth. Border molding was done only on the edentulous area with green stick low fusing compound (DPI Pinnacle tracing sticks).

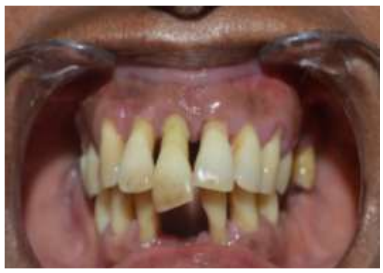

Fig 2: Intraoral View

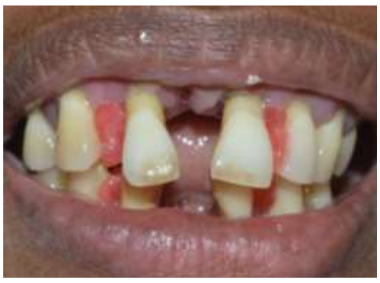

Fig 3: Undercut areas blocked out

Final impression of edentulous area and lingual part of the anterior teeth were made with ZOE impression paste. After this material got set, the impression was removed from the mouth and the tray handle was cut off. The impression is reseated in the mouth and a second impression is made over the edentulous impression and anterior teeth with a stock tray using irreversible hydrocolloid. The impression was poured with die stone to obtain the master cast. Base plate was adapted and occlusal rim was fabricated in the posterior region.

Jaw relation

Jaw relation was recorded similar to that for a removable partial denture as the patient had vertical stop in premolars. Teeth form and shade were selected. The casts were mounted on an articulator (Fig 4).

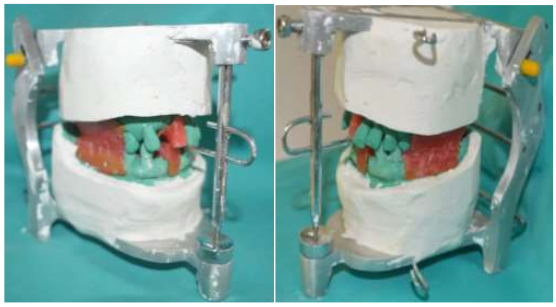

Fig 4: Mounted casts after jaw relation

Posterior try-in

The posterior teeth arrangement was done. Posterior try-in was done on the patient (Fig 5).

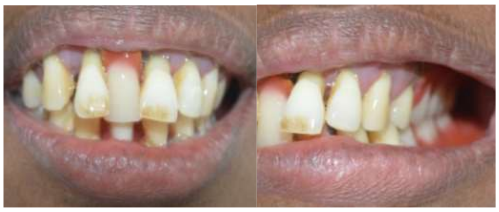

Fig 5: Try-in

Arranging the anterior teeth

The natural teeth from the master cast were removed all at a time since the patient did not want to simulate the old position of her natural teeth.[7] Anterior teeth

arrangement was done in the articulator (Fig 6).

Fig 6: Anterior teeth arrangement, wax-up and carving

Waxing and processing the denture

Wax-up and carving was done. Flasking and processing of denture was done (Fig 7). Maxillary and mandibular dentures were retrieved from the flask and finishing and polishing were done (Fig 8).

Fig 7: Flasking

Fig 8: Finished and polished denture

Surgical template

The master cast was duplicated after natural teeth were removed and before anterior teeth arrangement. A surgical template was fabricated using clear self-cure acrylic (DPI) to guide for surgically shaping the alveolar process. [8] The clear template allows dentist to visualize the adaptation of the denture base to residual ridge and blanching of tissues in pressure areas (Fig 9).

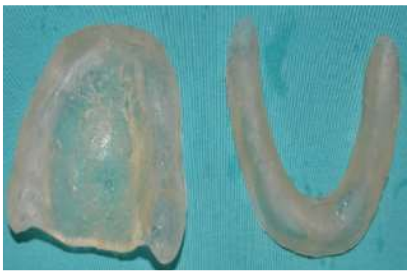

Fig 9: Surgical template

Insertion of dentures

All her maxillary and mandibular teeth were extracted at a time and alveoloplasty was performed using surgical template as a guide. Sutures were placed (Fig10). Immediate denture insertion was done at the same appointment. (Fig 11). Denture borders were checked for overextension. Mild correction was done.

Post insertion care

Patient was instructed not to remove the denture for next 24 hours and was recalled the next day. Patient was informed that removal will prevent reinsertion of denture for several days due to tissue inflammation and oedema.

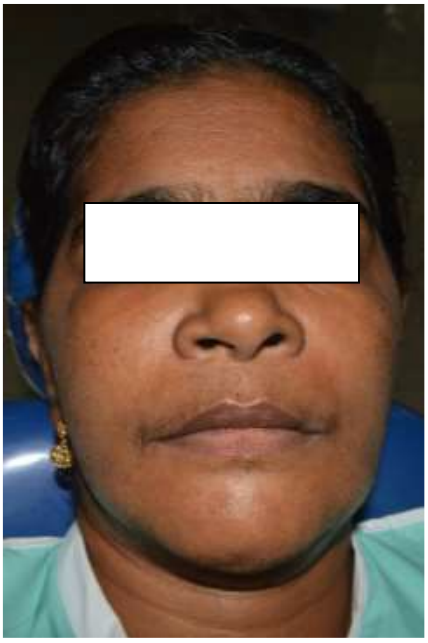

Fig 10:After total extraction

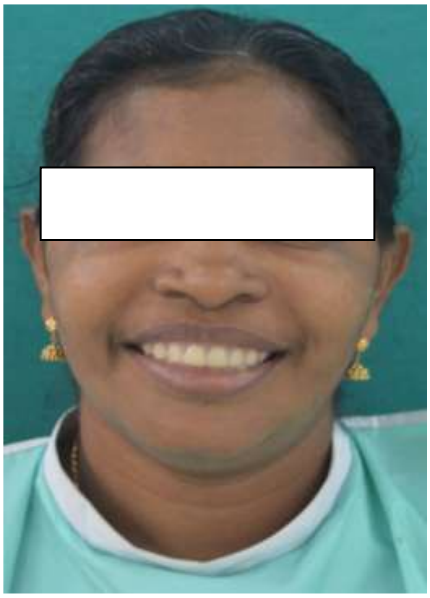

Fig 11: Immediate denture inserted

Patient was also instructed to avoid expectoration, gargling and hot liquids. Patient was asked to take soft diet and cold drinks that day. Patient reported back after 24 hours. The dentures were removed and cleaned. Denture was evaluated for overextension and pressure spots, which were corrected.

Patient was recalled after one week and one month. Healing was perfect with good esthetics.

Discussion

MM Devan stressed the importance of additive or convertible removable partial dentures before the patient is rendered edentulous. According to him, a smooth uneventful transition not only results in a better denture foundation physically and psychologically by maintenance of neuromuscular patterns, but also psychologically, such a transition diminishes the feeling of toothlessness.[9]

Immediate complete denture is an important and useful method of restoration for a patient whose last remaining teeth are to be removed.[10] The patient may not be completely satisfied with final appearance and fit of the denture on the day of insertion. Thus the patient's co-operation toward the treatment plays a major role in success.

Philosophical patients are the best candidates for this kind of treatment procedure. Thus, it is important to explain the limitations of procedures before starting the treatment.

This case did not require relining as adequate stability and retention of denture was present and the patient was satisfied with the esthetics.

Summary

Immediate dentures are an important treatment modality as they provide instant esthetics and function to the patient. The technique of fabricating a conventional immediate complete denture prevented patient's distress, anxiety and embarrassment. The vertical height was also maintained.

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AESTHETIC REHABILITATION OF MAXILLARY ANTERIORS WITH ZIRCONIA – A CASE REPORT

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***Dr. Swapna.C, ****Dr. Ranjith. M

Abstract

The aesthetic and functional rehabilitation of a missing anterior tooth is one of the greatest challenges that the dentist faces. Generally accepted treatment modalities include implant-supported prosthesis or fixed dental prosthesis. The demand for the dentist to achieve excellence in aesthetics and function has driven modern advances in materials and restoration fabrication. The development of various casting alloys and precise casting systems has contributed to the successful use of metal-based restorations. However, patient requests for more aesthetic and biologically 'safe' materials that has led to an increased demand for metal-free restorations. Recent advances in technology and dental materials have prompted the use of all-ceramic crowns which offers the potential for improved aesthetic results compared to conventional metal-ceramic crowns. This case report illustrates a successful aesthetic and functional application of CAD/CAM – digital zirconia based system for achieving the best possible aesthetic rehabilitation of missing upper right and left lateral incisors and first premolars in a 19-year-old female patient.

Key Words: Zirconia, aesthetics, fixed partial denture

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Introduction

In the past 25 years, the focus in dentistry has gradually changed. The trend towards awareness of aesthetics has challenged dentistry to look dental aesthetics in a more organized and systematic manner, so that the health of patients and their teeth is still the most important underlying objective.[1] The demand for all-ceramic restoration has increased substantially because of their aesthetics and biocompatibility. All-ceramic crowns were used to be made up of single layer glass ceramic-Dicor (Dentsply/ Caulk), IPS Empress (IVOCLAR) etc.[2] Their failure rate was high in certain cases. A new system was developed to overcome these failures, utilizing a bilayer design, where an Alumina base core, either glass infiltrated (Inceram, Vivadent) or densely sintered (Procera, Novel Biocare),[3] support the veneering porcelain applied over this core for aesthetic reason. These systems have shown a lower failure rate for single crown[4] and can also be used for 3-unit fixed dental prosthesis.

Recently, densely sintered zirconia based cores have become available (Lava, 3MEspe; DCS Smart-Fit, Austenal; Ceron Smart Ceramics, Dentsply Ceramco; procera Zirconia, Nobel Biocare; Vita in Ceram YZ, Vident).[2] These ceramic systems utilize yttrium-tetragonal zirconia polycrystal (Y-TZP or partially stabilized zirconia) for the fabrication of anterior and posterior crown and fixed partial dentures. "Transformation toughening" where the presence of stabilizing oxide yttrium oxide holds the material in a stable tetragonal state which provides a unique toughening mechanism to enhance the ceramic properties for load-bearing application,[5] Y-TZP has a flexural strength of 900 to 1200 Mpa which is considerably higher than that reported for densely sintered alumina & glass infiltrated alumina / zirconium dioxide material. In addition, Y-TZP does not seem to be as sensitive to moisture-induced strength degradation as are other ceramics.[6] The following case report describes the restoration of spaces in respect to maxillary lateral incisors and canines on both sides and illustrates a successful aesthetic and functional application of this exciting digital zirconia-based system for a smile makeover.

Case Report

A 19-year-old female patient reported to the Department of Prosthodontics, KMCT Dental College & Hospital, Calicut with a chief complaint of missing teeth in the upper front region. Detailed case history was recorded and no contributory medical history was observed. Dental history revealed that the patient had undergone extraction of retained deciduous right and left maxillary lateral incisors and canines two years back. Patient was rehabilitated from elsewhere with a removable partial denture in relation to lateral incisors and canines. On intra oral examination it was observed that permanent maxillary right and left lateral incisors and second premolars were missing. Canines of both sides have been found distally drifted towards the first premolar position and the corresponding first premolar was drifted towards the second premolar position. This created excessive space between the distal surface of central incisor and mesial surface of canine. This space was found to be excess than the mesio-distal width of replacing lateral incisor. The treatment plans considered were replacing the missing teeth with either implant or fixed partial denture.

The excessive space created by the distal drifting of maxillary canine and 1st premolar was more than the mesio-distal width of replacing lateral incisor. So, it required replacement of two anterior teeth instead of lateral incisor alone. But there was not sufficient space for the placement of two implants in the edentulous space. Therefore the treatment plan was placement of a fixed partial denture in relation to the edentulous space on both sides. The central incisor and canine was decided to be taken as abutments for the fixed partial denture. Canine will be modified as 1st premolar as it is drifted towards the first premolar position while the lateral incisor and canine will be the pontic. The mesio-distal dimensions of three anterior teeth on both sides was planned as per the golden proportion ratio. As IOPA of central incisor revealed the positioning of the pulp horns were higher

and planned for root canal treatment in relation to 11 and 21.

Treatment plan

The primary impression was made with irreversible hydrocolloid (Hydrogum5, Zhermack) and type II dental stone was poured to make diagnostic cast. Pre-operative photograph was taken (Fig 1).

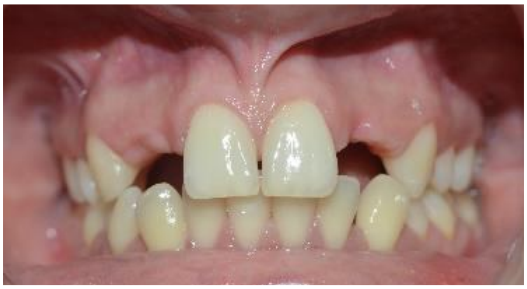

Fig 1: Preoperative view

After full mouth oral prophylaxis and root canal treatment the abutment teeth were prepared. Before tooth preparation, occlusion was analysed. Tooth preparation was done in relation to maxillary central incisors and right and left canine. The tooth preparation of canine was modified for receiving a premolar crown. The burs used for the preparation were diamond points. After breaking the contact with a needle diamond, 1.5-2 mm incisal reduction was done using depth cutting tapered fissure diamond, 1.0-1.5 mm lingual reduction, 1.0-1.5 mm labial reduction, and 1.0-1.5 mm mesial and distal axial wall reduction was done using taper fissure diamond. Care was taken to give rounded internal line angles with no sharp edges or undercuts. 1.0 mm chamfer with rounded internal angle was given as finish line using a torpedo diamond. Taper of 5 to 15 degree was given. The occlusal clearance of 1.5 to 2 mm was done which was checked with the help of modelling wax sheet. Gingival retraction cords were placed for proper marginal impressions. After gingival retraction, impression was taken by putty wash technique with addition silicone material. Shade selection was carried out in a properly lighted environment to match the adjacent normal teeth using Vitapan Classic shade guide (Fig 2).

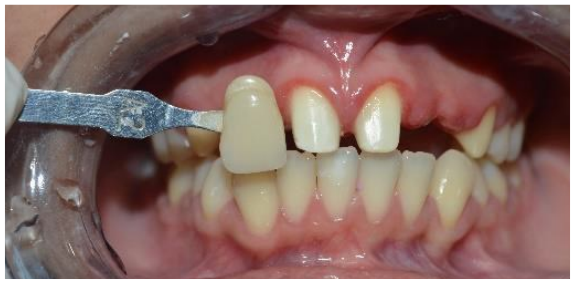

Fig 2: Shade selection using Vitapan Classic shade guide

Temporary FPD were cemented using non-eugenol temporary cement (Freegenol temporary pack). The die preparation was done from the prepared casts. Then dies were made from final impression and dies of prepared crowns were scanned and the dimensions and shape of zirconia copings on 3D images of maxillary central incisors and right and left canines were finalized with the help of CAD/CAM system. The saved data was then sent to the milling machine for fabrication of copings for prepared teeth.

After 2 weeks, temporary FPD were removed and internal fit of the all-ceramic restoration (Zirconia Lava Premium) was evaluated intra-orally and occlusion was assessed in inter cuspal & excursion position. The crowns were cemented with

self-adhesive resin luting cement (3M ESPE Rely XTM U 200). Patient was satisfied with the crown length, width, and aesthetics which was improved and equal to adjacent natural teeth (Fig 3).

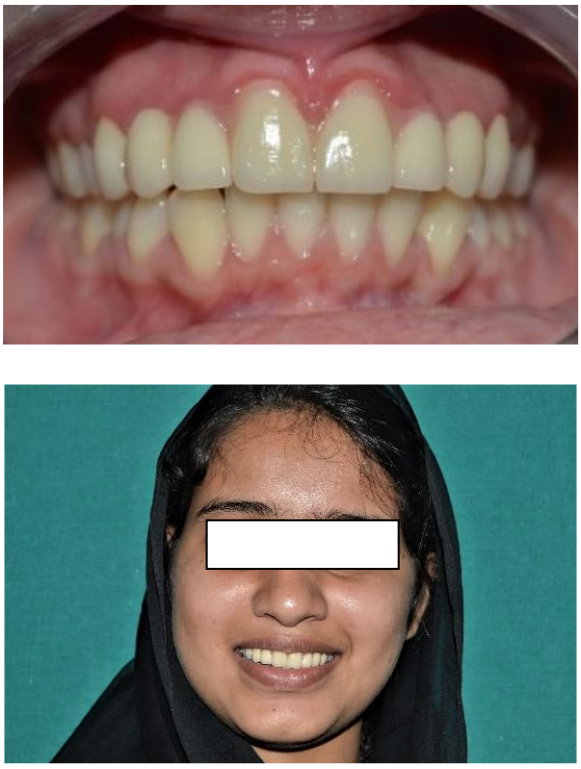

Fig 3: Post- operative photograph

Discussion

In this case report, as the edentulous space from the distal margin of the central incisor to the mesial margin of the canine is excess to restore a lateral incisor, the excess space was utilized to restore lateral incisor along with canine considering the golden proportion of aesthetics.[7] The morphology of the premolars was adequately reproduced by the canine abutments on both sides without an excessive reduction during tooth preparation of the abutment. In this case Lava Premium Zirconia was used to for restoring the missing teeth. Zirconia has high biocompatibility and no local (cellular) or systemic adverse reactions to the material were reported.[8] Zirconium dioxide appears as a monoclinic, cubic or tetragonal polymorph. At room temperature, only the monoclinic ZrO2 exists. This phase is stable up to 1170°c when it inverts to a tetragonal, metastable phase, whereas above 2370°c it turns into a cubic. It has high flexural strength of more than 1000 MPa, Hardness of 1200–1400 Vickers.[9]

During the manufacturing process, a stabilising agent, yttrium oxide (Y2O3) is added to zirconium oxide and the resultant Y-TZP exhibits excellent material properties for clinical application by resisting fracture by a process termed 'transformation toughening', whereby any stress fractures created within the material cause a transformation of configuration of the zirconia to another one of its three forms, thereby minimising crack propagation [10]. Although the Zirconia ceramic is chemically similar, once processed, it can exhibit different mechanical and optical characteristics. Working with Zirconia, one can experience the differences in machinability (e.g. wet milling and dry milling) and in sintering (e.g. temperature for Vita™ YZ-Cube ➔ 1530°c; temperature for 3M™ ESPE™ Lava™ frameworks ➔ 1500°c; temperature for Cercon™ ➔1350°c).[11] Zirconia based ceramic restorations are widely used for anterior and posterior fixed partial denture. Tooth reduction is less than that for PFM or traditional all-ceramic crowns because zirconia is very strong (>1000 MPa) and no opaque layer is required. Self-adhesive resin

cements offer less technique sensitivity than traditional cements, making them excellent choices for the cementation of zirconia-based ceramic restorations. When additional retention is required adhesive resin or dual-cured aesthetic resin cements are recommended. Based on the exceptional mechanical properties of zirconia, Y-TZP is the most recent framework material for the fabrication of all-ceramic FPDs either in anterior or posterior sites. The load bearing capacity of Y-TZP FPDs was found to be significantly higher than other conventional all ceramic systems, such as lithium-disilicate glass ceramics and zirconia-reinforced glass-infiltrated alumina and it has been reported that fracture resistance was further increased after veneering.[12]

In dentistry, the rule of the golden proportion should not be used for treatment planning without observing individual modifying factors. The mean ratio of the relative widths of the central incisors, lateral incisors, and canines was 1.6:1:0.85 on both sides. In this case zirconia has been indicated and used for making fixed partial denture. The introduction of stabilized zirconia has created a real possibility and promise for the application of ceramics in dental reconstructions. Several positive characteristics of zirconia, such as biocompatibility, color and mechanical properties, make the material suitable for use in modern dentistry. The performance of zirconia-based systems depends on several factors such as selection of patient cases, clinician's skill and adherence to technological protocols, which when coupled together results in a successful treatment outcome. Further research to overcome the shortcomings of this zirconia-based material and long-term evaluation of the same is recommended to ensure a perfect treatment option for patients seeking oral health care.

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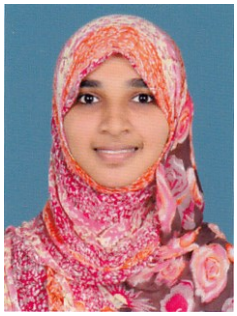
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