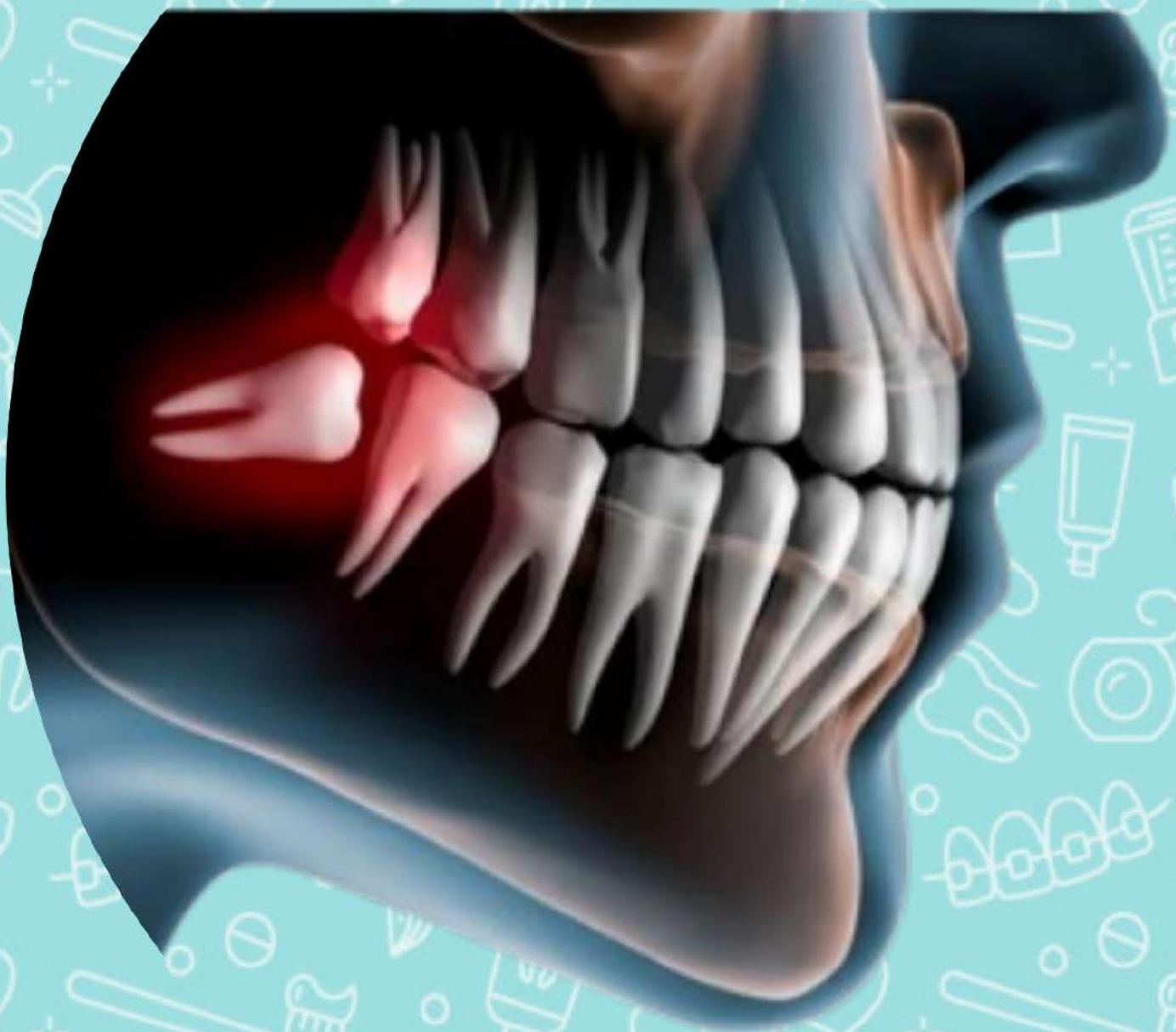
TAPER



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TAPER

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28.09.2024
തീയതി.....

സന്ദേശം

ഇന്ത്യൻ ഡെന്റൽ അസോസിയേഷൻ തിരുവല്ല ബ്രാഞ്ച് ഒരു സുവനീർ പുറത്തിറക്കുന്നു എന്നറിഞ്ഞതിൽ സന്തോഷം. ദന്താരോഗ്യ മേഖലയിൽ ശ്രദ്ധേയമായ പ്രവർത്തനങ്ങൾ നടത്തുന്ന സംഘടനയിലെ എല്ലാവർക്കും ആശംസകൾ നേരുന്നു.

വീണാ ജോർജ്

PRESIDENT'S MESSAGE

Dearest Members, Human Beings are fascinated by the concept of new. The reason being the possibility of the revitalisation and rebirth it offers. Dental journal Taper in this context functions as a sort of historic document chronicling different aspects of dentistry viewed from different angles by various authors. We will find our friends musing and expressions in these pages, it will never cease to amaze us to find so many creative minds in our midst. Each issue of Taper is a milestone that marks our growth, unfolds our imagination and gives life to our thoughts and aspirations. Our activities include:- CDH-Dental Health Care for Transgender Community CDE-STATE CDE-Fearless Dentistry- Mastering Nitrous Oxide inhalation sedation (IDA THIRUVALLA, IDA PATHANAMTHITTA, IDA ADOOR) CULTURAL, WDC- ONAM FAMILY GETTOGETHER - DEJAVU-2.0 SPORTS-ALL KERALA INDOOR TURF CRICKET TOURNAMENTELITE TURF- MUTHOOR, EDEN TURF- NALUKODI I thank Editor in charge Dr Prameetha Ittycheriah for bringing life into these pages and also for unleashing wide spectrum of skills ranging from editing to even designing the journal. All applause to those who contributed the articles - an embodiment of their brilliance. As the Saying goes God honours faith, because faith honours him; and when we bring out our best its our gift to him.

Happy Reading,

Dr Sunil Roy Koshy

President

EDITOR'S NOTE

As dental practitioners, we are constantly exposed to potential viral infections due to the nature of our work, which involves close contact with patients' oral cavities, respiratory secretions, and aerosols. Protecting both ourselves and our patients requires a strict adherence to infection control protocols. In light of global health challenges, here are essential measures to minimize the risk of viral transmission in a dental clinic:

Personal Protective Equipment (PPE): Use disposable gloves, surgical masks, face shields, protective eyewear, and gowns to create a physical barrier against pathogens.

Hand Hygiene:Perform thorough hand hygiene before and after every patient interaction using alcohol-based hand rubs or soap and water.

Disinfection and Sterilization:Ensure proper sterilization of instruments and regular disinfection of surfaces and equipment between patients..

Patient Screening: Screen patients for any symptoms of viral infections before their appointments to identify potential risks early. Postpone non-urgent dental procedures for patients showing signs of illness.

Aerosol Control: Minimize aerosol production during treatments.Incorporate air purification systems with HEPA filters or UV sterilization in your clinic to improve air quality.

Ventilation: Ensure that your clinic is well-ventilated, as fresh air circulation reduces the concentration of airborne pathogens.

Vaccination: Keep vaccinations up-to-date, including for seasonal flu, hepatitis, and other relevant viral diseases. Stay informed about new vaccines, including those for COVID-19 or other emerging viruses.

Training and Protocol Updates: Regularly update your knowledge on infection control guidelines issued by health authorities. Provide continuous training for your staff to ensure that everyone in the clinic understands and follows these protocols diligently.

By integrating these safety measures into daily practice, we can help ensure the health and safety of both dental professionals and patients, creating a safer clinical environment for all. Adhering to these protocols will not only protect against viral infections but also enhance the overall quality of care we provide.

Stay vigilant, stay protected.

Editor

Dr.Prameetha George Ittycheria

AN INSIGHT IN TO CLEFT LIP AND ITS REPAIR

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Abstract

Orofacial clefts comprise a range of congenital deformities. Cleft lip repair is imperative for a child's physical appearance and function. This article delineates our experience in cleft lip repair in restoring form and function.

Keywords: Cleft lip, Unilateral, Bilateral, Millard's technique

Introduction

Cleft lip deformity is one of the most common congenital malformations. Cleft lip is a gap or intendation in the lip or split continued to the nostil due to failure of fusion of maxillary and median nasal process. Global prevalence of cleft lip is estimated to be per 1000 live birth [1] . The most widely accepted attributing factors were hereditary and environmental factors

The goal of **cleft lip surgery** is to restore normal appearance and function to the upper lip. Cleft lip surgery is usually recommended at three to four months of life. In most cases, the tissue in the area around the cleft is rearranged to close the opening. An important part of the surgery involves detaching and repositioning the muscle of the lip to recreate the circular muscle around the mouth.

Detection

Prenatal diagnosis of cleft lip can be detected during 11-13 week of gestation

Classification [2]

1. Microform unilateral cleft lip - a minimal discrepancy between the heights of cleft and non-cleft side lip observed. Difference between two distances <3mm

2. Incomplete unilateral cleft lip-partial or total clefting of the skin, muscle, and mucosa of the upper lip sparing the underlying skeletal structures
3. Complete unilateral cleft-clefting of the skin, muscle, mucosa, and underlying skeletal framework (primary and/or secondary palate
4. Microform and incomplete bilateral cleft lip
5. Incomplete bilateral cleft lip
6. Complete bilateral cleft

Timing of surgery

Millard's rule of 10 [3] : widely accepted surgical protocol for cleft lip repair

1. Ten pounds of height (around 5–6 kilograms)
2. 10 gram of hemoglobin per deciliter
3. 10 weeks of life (around 3 months old) are the criteria for cleft lip surgery

Surgical technique:

Unilateral cleft lip repair

Millard's technique is one of the most widely accepted technique. Millard's technique requires a complete under- standing of the defect and the goals of cleft lip repair. The primary goals are to reconstruct normal lip anatomy and restore lip function. The secondary goals are closure of the nasal floor and correction of nasal tip asymmetry. The main advantage of this technique is its flexibility in application. Although other methods of cleft repair adhere to strict geometric principles, the millard technique allows continuous modifications during the design, incisions, and execution of the repair. Closure of the cleft lip is performed so that the eventual incision and scar line creates a new philtral column. The design of the flaps is performed so that the incision line (the new philtral column) is the mirror image of the philtral column on the non cleft sid

The following landmarks are marked[4]; center (low point) of cupid's bow-noncleft side (ncs), peak of cupid's bow-lateral ncs, peak of cupid's bow-medial ncs, alar base-ncs.,columellar base-ncs, x. Back-cut point-ncs , commissure-ncs , commissure-cleft side (cs),.

Peak of cupid's bow-cs ,medial tip of advancement flap-cs ,. Midpoint of alar base-cs . Lateral alar base-cs. Following the determination of measurements from cleft and non cleft side.incisons are given using 15 c blade. Curvilinear incision is made from the cleft side's

cupid's bow peak on the medial cleft margin towards the base of the columella. Skin scoring is performed with a no. 15c blade and deeper plane dissection is accomplished with a no. 15 blade.

The plane of dissection is different for each flap. The rotation-advancement flaps are in the submuscular plane along the face of the maxilla. The plane of the c flap is subcutaneous and this dissection is carried into the columella superficial to the medial crura. This begins the nasal dissection. On completion of the deep dissection, the aberrantly directed fibers of the orbicularis oris should be completely separated from their alar base and columellar attachments.Muscles are also separated from subcutaneous and deep muscle attachements. Rotation and advancement is checked for tension and closure starts in layers. Medial and lateral orbicularis oris muscles are transposed in an overlapping form. Marginal fascicle of the orbicularis oris is sutured in a border to border form.

Cleft Rhinoplasty[5]

Cleft rhinoplasty is performed by actively placing the ala in an aesthetically pleasing position.A peri- alar incision is made just above the alar-facial groove to allow for later migration of the scar into the eventual alar crease. The extent of the alotomy is related to the width of the lip cleft and the extent of the nasal deformity. Marginal incision , inter cartilaginous incison can be employed.

Bilateral cleft lip repair

Bilateral cleft lip repair is often done in two stages due to its complexity. A widely displaced lateral lip segment, deficiency of lip tissue in anterior segment and displaced premaxilla attribute to hurdles in achieving desired outcome[6] . Lip adhesions, nasoalveolar mouldingwere popularised prior to surgical repair to achieve optimal results [7.8] . .Our centre uses a single staged surgical technique for achieving a very good outcome without the use of NAM in all cases of bilateral cleft lip ranging even the severe ones.

Premaxillary setback

The procedure begins with vomerine osteotomy wherever indicated. The extent of the setback is usually decided before surgery. Straight incision marked over the crest of the premaxillary stalk and anterior vomer followed by reflection of mucoperiosteal flaps to expose the vomerine bone. VPS is then identified and osteotomy cuts marked and placed as planned anterior or posterior to the VPS.

Surgical setback

Surgery begins with placing incisions on the philtrum with columella retracted using double hook and prolabium stretched using two single hooks at the vermilion below philtral flap markings. Dissection is carried out to develop a philtral flap. Incisions are then placed on the lateral segments and a L mucosal flap is developed till the base of alveolus along the cleft edge and dissection is continued on the maxilla[9]. Lateral labial segment dissection is then done to release the abnormal attachments of the orbicularis muscle. Orbicularis marginalis flap is raised with adequate bulk of muscle which aids in central tubercle reconstruction. On the mucosal side, abnormal insertion of muscles to maxilla are released in a supraperiosteal plane keeping the dissection limited.On the cutaneous side, dissection can be extensive to separate the muscles from its abnormal attachment to the alar base and skin [10,11] . The muscles are released enough to ensure adequate medial mobilization of lateral segments for tension free closure [12] . The septal flap is incised and a septal dissection is done to release the nasal septal attachment from the ANS. Nasal dissection is also done through the base of the alar flap to free the lower cartilages of its attachments. [13-14]

Post Operative Care

In the immediate post-op period wounds are covered by antibiotic ointment and surgical site dressing is done regularly.

Sutures that require removal are done at the OPD under oral sedation. Lip scars are supported by micropore tapes and silicone sheets as well as by massaging for 6-9 months post-surgery. Customized silicone nasal stents were given to bilateral cleft patients for maintaining nostril shape.

Discussion

Stigma around cleft still exist in society. The incidence of cleft in world population is rising owing to external factors and genetic mutations. Even though the incidence is rising, modifications in cleft lip repair adhering to basic priniciples enables cleft surgeons to drastically transform the esthetic appearance as well restoring function thus increasing the quality of life in cleft children.Treatment of cleft requires a multidisciplinary protocol. Prenatal counselling, Feeding instructions to awareness of surgery protocol should be emphasised. Society needs to be sensitised that cleft is not a stigma and there are many international organisations which fund their entire treatment with excellent surgeons in their team. In our

experience all of our patients had no significant postoperative events. All of our patients healed with excellent esthetic and functional outcome thus emphasising on improved quality of life

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HOW TO TREAT TEMPOROMANDIBULAR JOINT DISORDER IN YOUR CLINIC

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Abstract: An effective temporomandibular disorder(TMD) management can be performed only if the causal factors are accurately detected. TMDs are a group of orofacial pain conditions, which are the most common non-dental pain in the maxillofacial region. Due to the complexity of the etiology, diagnosis and management of TMD remains a challenge to all clinicians. At present, there is a paradigm shift in treatment modality of TMD ie, a shift from surgical procedures to conservative approach. The aim of this article is to evaluate the TMJ using clinical examination and imaging and to identify the challenges and to treat a TMD patient in our clinic using pharmacologic, non-pharmacologic and occlusal splint therapy. The primary objective of every dentist should be to regain patient comfort and occlusal stability using new multimodal approach which includes dental treatments (occlusal adjustments, stabilization splints)relaxation techniques, physical therapy (electrotherapy techniques, low-level laser therapy, acupuncture) cognitive behavioral therapy and anti-inflammatory medication.

Keywords :temporomandibular disorders, temporomandibular joint, occlusal splint.

INTRODUCTION

Temporomandibular joint (TMJ) disorders occurs when the muscles and the TMJ fail to work in coordination with each other.[1] Causes for temporomandibular disorder (TMD) might be due to clenching, bruxism, malocclusion that puts muscles under stress, accidents that affect facial bones and jaw and occasionally diseases such as arthritis. A combination of dental and medical therapy is most effective in the treatment of TMJ disorders.

Epidemiologic studies report that approximately 75%of the population have at least one sign of TMJ dysfunction and approximately 33% have at least one TMD symptom.

Women are affected four times more than men and TMJ dysfunction is found infrequently in the pediatric population.[2] Signs and symptoms of TMD usually increase in frequency and severity from the second through the fourth decade of life.[2]

Prosthodontic management of TMDs has been a controversial topic. Earlier clinicians used to believe that occlusion is the main etiologic factor, but now there have been an increasing number of clinicians considering occlusion as only a minor factor and thus irreversible occlusal therapy should be performed only if absolutely necessary. This article summarizes the etiology, diagnosis and the current trends in prosthodontic management of TMDs in a conservative approach. **Temporomandibular Joint**

The TMJ is the most unique joint in the whole body as one joint may influence the function of the other joint. It is a synovial joint of condylar variety.[3] TMJ is the area where the mandible articulates with the temporal bone of the cranium. Because the mandible is fused in the midline, one joint cannot be moved without moving the other. The two joints can differ in their properties and even a problem in one joint can have the symptoms expressed in the other.

The second factor making this joint unique is that the teeth dictate its function. The teeth are passive members of the maxilla and mandible, but they have a specific way they must occlude and interrelate. Figure :1 ,shows the anatomy of temporomandibular joint and the structures responsible for movement of the joint

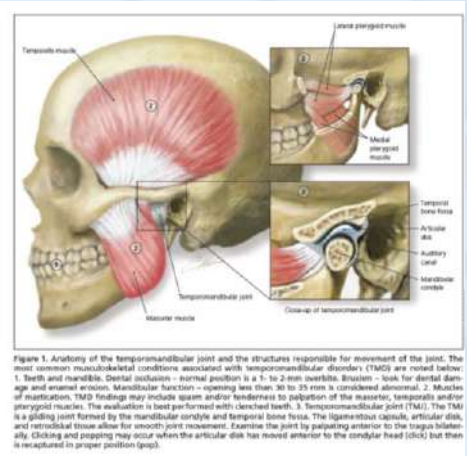


Figure 1. Anatomy of the temporomandibular joint and the structures responsible for movement of the joint. The most common musculoskeletal conditions associated with temporomandibular disorders (TMD) are noted below: 1. Teeth and mandible. Dental occlusion - normal position is a 1- to 2-mm overbite. Bruxism - look for dental damage and enamel erosion. Mandibular function - opening less than 30 to 35 mm is considered abnormal. 2. Muscles of mastication. TMD findings may include spasm and/or tenderness to palpation of the masseter, temporalis and/or pterygoid muscles. The evaluation is best performed with clenched teeth. 3. Temporomandibular joint (TMJ). The TMJ is a gliding joint formed by the mandibular condyle and temporal bone fossa. The ligamentous capsule, articular disk, and retrodiskal tissue allow for smooth joint movement. Examine the joint by palpating anterior to the tragus bilaterally. Clicking and popping may occur when the articular disk has moved anterior to the condylar head (click) but then is recaptured in proper position (pop).

Temporomandibular Disorder

According to the American Academy of Orofacial Pain, TMD is defined as "a collective term embracing a number of clinical problems that involve the masticatory musculature, TMJ and associated structures or both."[4]TMDs are one of the most common causes of facial pain after odontogenic origin. The TMDs are of multifactorial etiology and characterized by multiplicity of clinical signs and symptoms, making its diagnosis and management very difficult for the clinician. TMD should be considered in the differential diagnosis of headache and orofacial

pain in the absence of specific attributable organic cause. Non-invasive methods are preferred in the management of TMD.

These include occlusal, behavioural, physical, and pharmacological treatment. Medical and dental practitioners should consider TMJ disorders as a possible cause in the diagnosis of orofacial pain including headaches, shoulder and neck pain, vertigo and associated pain, blurring of vision, disorders of hearing, nausea, vomiting, and disturbances in concentration, in the absence of any specific, attributable, or organic cause.[5] Orofacial pain and headache related to jaw muscle function and dental structures should be ideally managed by dentists, while those which are unrelated to it should be referred to an appropriate medical care specialist for management. Treatment of occlusal-related disorders is often a challenge for both the dentist and the patient as the diagnosis is often quite complex.

DIAGNOSTIC CLASSIFICATION OF TEMPOROMANDIBULAR DISORDERS

Temporomandibular joint disorders [5[

Congenital or developmental disorders:

- Aplasia
- Hypoplasia
- Hyperplasia
- Neoplasia.

Disk derangement disorders:

- Disk displacement with reduction
- Disk displacement without reduction.

Joint dislocation Inflammatory conditions:

- Capsulitis/synovitis
- Polyarthritides.

Noninflammatory (osteoarthrosis):

- Osteoarthritis: Primary
- Osteoarthritis: Secondary.

Ankylosis:

- Fibrous
- Bony.

Signs and symptoms

It is characterized by the signs such as tenderness and stiffness of the joint and the muscles, increasing dull pain on mouth opening, reduced and deviated mouth opening, referred pain to the angle of mandible and muscles of the neck. Otologic symptoms such as fullness of the ear and tinnitus, cervical pain and head ache are also commonly associated with TMDs.[6]

Etiology

The etiology of TMD is considered as multifactorial. The TMJ is forced by the muscles to move so that the teeth will occlude properly. This can potentially cause a malalignment within the joint capsule. If this happens, the muscles are put in a compromising situation causing them to spasm and resulting in pain. Many of the problems that patients may be experiencing are the result of muscle spasm, but the cause is not a muscle problem. This is due to the occlusal interferences or high contact with teeth which induce muscle pain.

Differential diagnosis

Clinician should be vigilant in diagnosing TMD in patients who present with pain in the TMJ area. Conditions that mimic TMD are dental caries or abscess, oral lesions (e.g., herpes zoster, herpes simplex, oral ulcerations, lichen planus), conditions resulting from muscle overuse (e.g., clenching, bruxism, excessive chewing, spasm), trauma or dislocation, maxillary sinusitis, salivary gland disorders, trigeminal neuralgia, postherpetic neuralgia, glossopharyngeal neuralgia, giant cell arteritis, primary headache syndrome, and pain associated with cancer.[5,6]TMD symptoms can also manifest in autoimmune diseases, such as systemic lupus erythematosus, Sjögren syndrome, and rheumatoid arthritis.[5]

Evaluation

Diagnosis

The diagnosis of TMD is largely based on history and physical examination findings. The symptoms of TMD are often associated with pain while jaw movement (e.g., opening and

closing the mouth, chewing) and pain in the preauricular, masseter, or temple region. Another source of orofacial pain should be suspected if pain is not affected by jaw movement.

Adventitious sounds of the jaw (e.g., clicking, popping, grating, crepitus) may occur with TMD, but also occur in up to 50% of asymptomatic patients. A large retrospective study (n = 4,528) conducted by a single examiner over 25 years noted that the most common presenting signs and symptoms were facial pain (96%), ear discomfort (82%), headache (79%), and jaw discomfort or dysfunction (75%).[7] Other symptoms may include dizziness or neck, eye, arm, or back pain. Chronic TMD is defined by pain of more than three months duration.

Physical examination findings that support the diagnosis of TMD may include—but are not limited to— abnormal mandibular movement, decreased range of motion, tenderness of masticatory muscles, pain with dynamic loading, signs of bruxism, and neck or shoulder muscle tenderness. Clinicians should assess for malocclusion (e.g., acquired edentulism, hemifacial asymmetries, restorative occlusal rehabilitation), which can contribute to the manifestation of TMD.

A clicking, crepitus, or locking of the TMJ may accompany joint dysfunction. A single click during opening of the mouth may be associated with an anterior disk displacement. A second click during closure of the mouth results in recapture of the displaced disk; this condition is referred to as disk displacement with reduction. When disk displacement progresses and the patient is unable to fully open the mouth (i.e., the disk is blocking translation of the condyle), this condition is referred to as closed lock. Crepitus is related to articular surface disruption, which often occurs in patients with osteoarthritis.[8]

Reproducible tenderness to palpation of the TMJ is suggestive of intra-articular derangement. Tenderness of the masseter, temporalis, and surrounding neck muscles may distinguish myalgia, myofascial trigger points, or referred pain syndrome. Deviation of the mandible toward the affected side during mouth opening may indicate anterior articular disk displacement.[8]

IMAGING

Imaging assist in the diagnosis of TMD when history and physical examination findings are uncertain. The initial study should be plain radiography (transcranial and transmaxillary views) or panoramic radiography.

Acute fractures, dislocations, and severe degenerative articular disease are often visible in these images. Computed tomography is superior to plain radiography for evaluation of subtle bony morphology. Magnetic resonance imaging is the optimal modality for comprehensive joint evaluation in patients with signs and symptoms of TMD. Magnetic resonance imaging is typically reserved for patients with persistent symptoms, those in whom conservative therapy has been ineffective, or in those with suspected internal joint derangement. Ultrasonography is a noninvasive, dynamic, low-cost technique to diagnose internal derangement of the TMJ when magnetic resonance imaging is not readily available.[9]

Diagnostic injections

Injections of local anesthetic at trigger points involving the muscles of mastication can be a diagnostic adjunct to distinguish the source of jaw pain. This procedure should be performed only by physicians and dentists with experience in anesthetizing the auriculotemporal nerve region. In trigger point therapy,the use of 1% procaine is recommended owing to its low toxicity,but 1%lidocaine acceptable and commonly used;the use of epinephrine in trigger point injections is always contraindicated to prevent vasoconstriction in areas where circulation may already be compromised because of chronic muscle contraction or spasm and presence of an on-going inflammatory process. Persistent pain after appropriate nerve blockade should alert the clinician to reevaluate TMD symptoms and consider an alternative diagnosis.[9]

Management of TMD

The goal of treatment of TMD include reduction of pain and improvement of jaw function. Symptoms of TMD should be addressed promptly as chronic pain becomes more difficult to manage due to psychological deterioration and somatization.[10,11]

Treatment methods generally are of two types:

- Definitive treatment refers to modalities that are directed toward managing or eliminating the etiologic factors that have created the disorder
- Supportive therapy refers to treatment methods that are directed toward reducing patient symptoms.

The initial phase of treatment protocol consists of Non-pharmacologic management, pharmacologic management and splint therapy.

This phase has achieved pain relief and dysfunction reduction in most cases and it can be practised by all dentist in their own clinicTreatment with intraoral appliances is often used in patients with advanced TMD. Selective grinding can be done in "occlusally sensitive" patients with symptoms. Replacing the lost posterior teeth by prostheses in some cases results in unloading of the joints. When displaced discs are part of the diagnosis, anterior repositioning splints can be used which are specifically designed to achieve a healthy condyle-disc-fossa relation.[12]

NONPHARMACOLOGIC MANAGEMENT

Supportive patient education is the recommended initial treatment for TMD.[13.14] Adjunctive measures include jaw rest, soft diet, moist warm compresses, and passive stretching exercises. TMJ immobilization has shown no benefit and may worsen symptoms as a result of muscle contractures, muscle fatigue, and reduced synovial fluid production.[15]

***Physical Therapy*.**

It is considered for patients with impaired mobility,joint sounds,head and neck pain,or chronic back pain associated to TMD. Physical therapy can be performed in our clinic by active or passive techniques (e.g., scissor opening with fingers, use of medical devices) with the goal of improving muscle strength, coordination, relaxation, and range of motion.[16] Specialized physical therapy options such as ultrasound, iontophoresis, electrotherapy, or low-level laser therapy have been used in the management of TMD, despite the lack of evidence to support their use.[17]

The most common electrotherapy technique which can be used in our clinical practice for TMD patients is transcutaneous electrical nerve stimulation(TENS).

TENS is performed using controlled exposure of electrical current to the surface of skin ,aiming to produce hyperactive muscles relaxation and the decrease of masticatory pain. [18] Studies show that there is decrease of facial pain, deep pain sensitivity and the improvement of masticatory muscle EMG activity after TENS therapy in TMD patients.[19]

Low-level laser therapy (LLLT) is also reported to be effective in reducing the levels of TMD pain. Laser assisted TMD treatment is performed between 1 and 20 sessions, in daily or weekly sessions, using energy density ranging from 0.9 to 105J/cm^2, and power density ranging from 9.8 to 500Mw.

Acupuncture. Acupuncture is used in treatment of myofascial TMD. Sessions typically last 15 to 30 minutes, and the mean number of sessions is six to eight.[20] Two systematic reviews suggested that acupuncture is a reasonable adjunctive treatment for short-term analgesia in patients with painful TMD symptoms.[21,22]

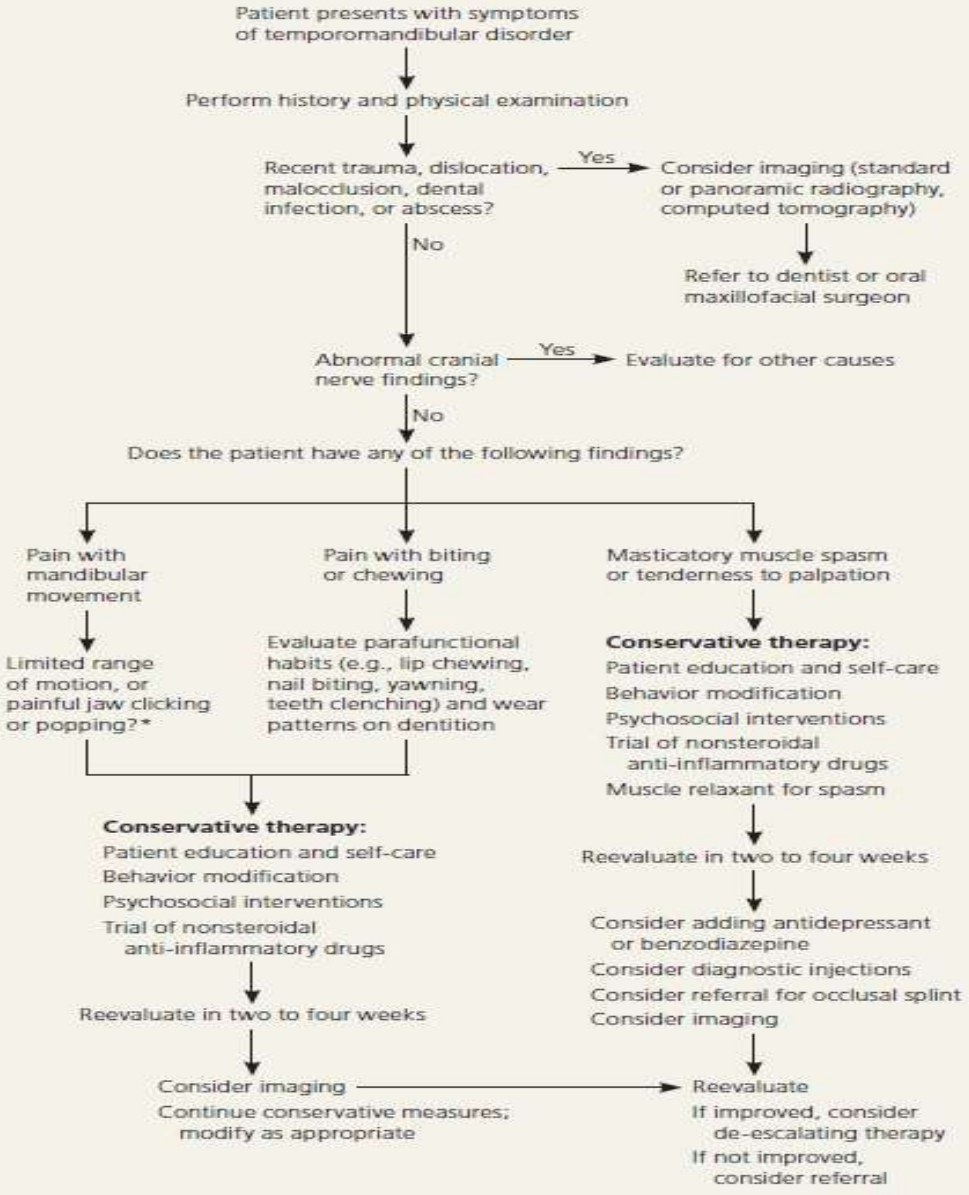
Biofeedback. Patients should be counselled on behavior modifications such as stress reduction, sleep hygiene, elimination of parafunctional habits (e.g., teeth grinding, pencil or ice chewing, teeth clenching), and avoidance of extreme mandibular movement (e.g., excessive opening during yawning, tooth brushing, and flossing).

PHARMACOLOGIC MANAGEMENT

Pharmacologic treatments for TMD are largely based on expert opinion. Several classes of medication are used to treat the underlying pain associated with TMD. NSAIDs are first-line agents typically used for 10 to 14 days for initial treatment of acute pain.[23,25,26] Patients with suspected early disk displacement, synovitis, and arthritis benefit from early treatment with NSAIDs. Despite the multiple choices of NSAIDs available, only naproxen (Naprosyn) has proven benefit in reduction of pain.[25] Muscle relaxants can be prescribed with NSAIDs if there is evidence of a muscular component to TMD.[24]Tricyclic antidepressants—most commonly amitriptyline, desipramine (Norpramin), doxepin, and nortriptyline (Pamelor)—are used for the management of chronic TMD pain. Benzodiazepines are also used, but are generally limited to two to four weeks in the initial phase of treatment.[23]Longer-acting agents with anticonvulsant properties (i.e., diazepam [Valium], clonazepam [Klonopin], gabapentin [Neurontin]) may provide more benefit than shorter-acting agents. Opioids are not recommended and, if prescribed, should be used for a short period in the setting of severe pain for patients in whom nonopiate therapies have been ineffective. Even with these parameters, opioids should be used cautiously because of the potential for dependence.[26]

Medications that have limited or no effectiveness for the treatment of TMD include tramadol (Ultram), topical medications (e.g., capsaicin [Zostrix], lidocaine, diclofenac),[27] and newer antidepressants (e.g., selective serotonin reuptake inhibitors, serotonin-norepinephrine reuptake inhibitors, monoamine oxidase inhibitors).[28]

Management of Temporomandibular Disorders



*—*Suggests articular disk abnormality.*

Occlusal splint therapy

Splint therapy is one of the most commonly proposed conservative treatments for TMD pain associated with bruxism and internal derangements.

Types of splints

According to Okeson:[7]

1. Muscle relaxation appliance/stabilization appliance used to reduce muscle activity
2. Anterior repositioning appliances/orthopedic repositioning appliance.

Other types:

a. Anterior bite plane

b. Pivoting appliance

c. Soft/resilient appliance.

Indications for the use of splints

• Improving neuromuscular coordination

• Treatment of myogenic pain

• Improving function of the TMJ

• Treatment of pain arising from the joints

• Increasing the vertical dimension

• Securing a definite mandibular position

• Altering the pattern of mandibular movement

• Testing the planned occlusal scheme in centric and eccentric positions

• Splinting of loose teeth

• Distributing the load in bruxism

• Clarifying occlusal etiological factors while making a differential diagnosis.

The stabilization splints are used as a primary treatment for TMD pathologies particularly in TMD arthralgia cases. Figure2: shows stabilization splint in the upper arch.They provide even occlusal contacts and can be constructed for upper and lower jaw. The stabilization splint must be used during night time or at most two-thirds of the day to avoid occlusal changes. Soft splints are as effective as hard splints but are difficult to adjust and repair. Anterior repositioning splint is used extensively to treat internal derangements of the TMJ and to recapture the disc. The appliance should be evaluated regularly for alterations to avoid adverse consequences.

The need for occlusion adjustments is controversial as stomatognathic system has the potential to adapt to changes including tooth eruption and tooth loss. The removal of occlusal interferes is done for patients with parafunctions and those with reduced adaptability to adapt occlusal changes.

Clinicians should be aware of the temporary effects of the appliances, which are not miraculous devices that position the mandibles ideally but are instead responsible for transient shift in joint and muscle loading. Management of tmd is summarized in fig :3

Conservative options are less likely to cause any harm,and it is indicated in the early stages of treatment. Nowadays there is a paradigm shift from surgical procedures which were once popular, to minimally invasive options like arthoscopy, arthrocentesis and Intra-Articular Injections.

Referral

Referral to an oral and maxillofacial surgeon is recommended if the patient has a history of trauma or fracture to the TMJ complex. severe pain and dysfunction from internal derangement that does not respond to conservative measures, or pain with not identifiable source that persist for more than 3 to 6 months. Surgery is rarely required for treatment of TMD and is usually reserved for correction of anatomic or articular abnormalities.

Referral to prosthodontist can be done in case of correction of occlusal interferences and management of acute myofascial TMD and for fabrication of stabilization splint and for prosthetic rehabilitation of missing teeth. .

Referral to Orthodontists is adviced for treatment of malocclusion or correction of deep bite cases.

Referral to dentist is indicated for patients with poor oral health, dental caries and removal of infectious teeth

Conclusion

Management of TMD may be simple or may require multidisciplinary approach. Occlusion is one of the factor contributing to TMDs. Hence dentist, physician, psychologist and physical therapist work together to cope with condition afflicting the patient. Prosthodontist play a vital role as it is imperative that a healthy asymptomatic TMJ is a mandatory requisite to start any rehabilitation procedure.

Hence as a clinician ,it is important to identify the cause of orofacial pain ,and to keep in mind that ORAL SPLINTS do not cure ,but they contribute to patient's well-being just like crutches, which are useful as a nonspecific "healing aid" during a patient's orthopedic rehabilitation phase. Also splints are not regarded as a primary or definite treatment modality until the primary cause is identified and treated.

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DAILY REGIMENS - HEALTHY LIFESTYLE THROUGH AYURVEDA

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ABSTRACT

Ayurveda is a holistic system of medicine. Ayurveda has always emphasized maintaining the health and prevention of diseases by following a proper diet and lifestyle regimen such as *Dinacharya* (daily regimen practices) *Ritucharya* (seasonal regimen practices) along with medicine. A balance between *dosha* (body humors), *dhatu* (tissues), *mala* (waste), and *agni* (power of digestion) is needed for a healthy, long life. Classic Ayurveda textbooks like *Charaka Samhitha, Susrutha Samhitha, Astanga Hridaya* and *Astanga Sangraha* explained different aspects of daily regimens. One should follow proper *Dincharya* to prevent lifestyle diseases and protect health.

KEYWORD- daily regimens, health, prevention, *ahara* (food)

INTRODUCTION

The main objective of Ayurveda is "*Swasthsya Swatha Rakshnam Aturasya Vikara Prashmnam Cha" which* means to maintain the health of a healthy individual and to cure the disease. According to Ayurveda, there are three fundamental states of a being, such as the physical, mental, and spiritual. Health is a balance of all these three states and their relationship with the outside world of a person. It takes a natural approach to all aspects of the health and well-being of humans. Ayurveda not only utilizes medications to cure diseases but also employs *Anupana (*the one which is taken along with or after medicine), *Ahara* (diet), *dinacharya* (daily regimens), *ritthucharya* (seasonal regimen), and other techniques to preserve a person's health and manage diseases.

The daily routine is known as *dinacharya* in *Ayurveda. Dinacharya* is a *Sanskrit* word, '*Dina*', meaning day and '*Acharya*', meaning activity/behavior. It is the collective information of all the practices for promoting health and preventing disease that followed from ancient time. Even though *Acharyas* have some difference in the sequence of regimens, most of them follow the same regimens like *Bramha Muhruta-Jagrana* (awakening early in the morning), scraping one's tongue, *Anjana* (taking collyrium), *nasya, gandhusha,* etc

Bramha-muhurta uttistha: One should wake up early in the morning, 45 min before the sunrise. Research evaluates that glucocorticoid is at its peak in 30 minutes post-awakening in Brahma muhurta, which carries anti-stress activity, immune modulation, and metaboli. [4] Acharyas mentioned that one should always get up after doing a self-assessment to see if the food he has taken for dinner is digested or not.

Ushna panam (drinking lukewarm water) [5]: A person should drink lukewarm water in the morning after waking up. Water kept in a copper vessel overnight is considered beneficial for health. It improves digestion, body detoxification, and circulation of blood by dilating blood vessels.

Shauchavidhi (evacuate waste): Evacuation should be done after getting the urge of urine and faces. Urge should not be suppressed.

Mukha-netra prakshalana (Washing face and eyes): washing eyes with decoction of *lodra* (BN: Symplocos racemode, Pachotti in Malayalam), *triphala kashaya*, etc.

Danta Dhavana (brushing teeth): brushing the teeth with herbal twigs or tooth powders with bitter, astringent, pungent-tasting drugs like *arka* (Erikku), *nyagrodha* (Peral), *khadira* (Karingalai), *karanja* (Ponna), etc. According to *Vagbhatacharya,* practice brushing teeth a day in the morning and after every meal. *Danta dhavana* removes *nihantigandham* (foul smell), *Vairasyam (tastelessness), and Jihwa Danta-Malam* (dirt from the tongue and teeth). As a general measure, one can use tooth powder consisting of an equal quantity of *Shunthi* (chukku), *Maricha* (black pepper), *Pippali* (pippali), *Twak* (karuvapatta), *Lavanga* (clove), *Triphala, Khadira* (karingalai), and *Saindhava* (rock salt), which should be used as a paste after mixing it with *Tila Taila* (sesame oil) [6].

Pratisarana (application): After the brushing, powder of *Kushtha* (costus), *Trikatu* (sunthi/ ginger, black pepper, and long pepper), *Triphala* (amla, v*ibhitaki, and haritaki),* and *Trijataka* (Tvak, Ela, and patra) mixed with honey should be applied to tooth and gum on tooth surface and gingiva for cosmetic and sanitary purposes.

Jihva-nirlekhan (Cleaning of Tongue): Tongue cleaning regularly after brushing is mandatory to remove surface impurities responsible for foul breath. A thin, soft plate of gold, silver, copper, or leaf may be used for tongue cleaning. It removes *durgandha nashak* (foul breath),

increases *annaruchi* (interest in food), and *Laghuta* (activeness of speech) decreases the probability of *jivharoga* and *mukharoga* (tongue and mouth diseases). Individuals perform tongue scraping every day; this will not only clean the mouth but also stimulate the whole digestive tract and improve digestion. [7]

Kavala (Gargling), ***Gandusha*** (medicated oil pulling): Filling the mouth with oil or medicated water and holding for a few minutes without moving it inside the oral cavity is called *Gandusha.* As per *Charakacharya,* it enhances the senses, brings about a feeling of freshness, and maintains clarity in the voice. Research studies evaluate that the oil pulling has the ability to reduce plaque and gingivitis [8]. According to *Ashtanga Hridaya,* oil or meat soup is used for oil pulling. Researchers agree that the microbiological action of sesame oil in plaque-induced gingivitis [9]. *Kavala* is a procedure of holding a small quantity of liquid in the mouth, making it move briskly inside and spitting out.

Anjana (Collyrium): Application of medicine in the form of gutika (tablet), Raskriya (semisolid state of decoction), or Churna (powder) to the inner side of the lower lid either by fingertip or by *Anjana shalaka*. It cures *daha* (burning sensation), *kandu* (itching), *mala* (eye debris), *ruk* (pain), *klinnata* (watery eyes), *etc. Research has* proven that vernal kerato conjunctivitis can be better managed with simple safe, non-toxic Ayurveda formulation Triyushnadi anjana [10]. Elaneeer kuzhambu anjana and triphaladi ghana tablets can reduce and control the progress of immature cataract, and combined therapy was found to be more effective [11].

Nasya (nasal instillation): It is one of the *pañcakarmas that* delivers drugs directly to the brain, as the nasal passage is the gateway of the head. It plays a role in the majority of the conditions arising due to pathologies of *the ūrdhvāṅga* (supraclavicular region). During the process, the medicated oil is administered through the nose, followed by steam inhalation, which is used in order to melt and relieve the mucus from the sinus passage. Research appraises the effect of A*yurveda nasya* medicine *Anu taila* in COVID 19. It is useful in limiting both viral load and severity in severe acute respiratory syndrome coronavirus 2 [12]. Benefits: It helps in removing the toxins from the body, provides proper blood circulation, removes the spasm in the nose, prevents aging before aging, and provides strength to sensory organs.

Dhumapana (inhalation of fumes): The procedure in which medicated smoke is inhaled through the nose and exhaled through the mouth. On the basis of mode of administration, there

are two varieties: one is internally given to a patient as a part of inhalation therapy called Dhumapana, and the other is Dhupana, which is fumigation of the environment. It cures Galagraha (Pharyngitis), Danta dourbalya (weak teeth), Dantashoola (tooth ache), Arochaka (Anorexia), Hanu-Manyagraha (TMJ pain and stiffness), Shleshma praseka (excessive salivation), Vaiswarya (hoarseness of voice), Galashunti (uvulitis), etc.

Abhyanga (oil massage): The procedure of applying warm oil to the body as a daily routine to promote health. Vagbhata acharya explains *abhyanga* with an analogy that proper oleation and sweating procedures given to an inanimate dry stick will help to regain its original condition. Regular practice of oil massage is advised to maintain the physical fitness; exceptionally early morning hours are ideal for *Abhyanga Karma*. It should be done specially to *shiras* (head), *karna* (ear), and *paada (foot).* Benefits: *Jara* (premature aging). *Srama* (exertion) and pacifies *Vata dosha, Drusti Prasada* (good for vision), *Pusti Prasada* (nourishes the body), *Ayu Prasada* (increases longevity), *Swapna* (induces good sleep), and Good for Skin (complexion and firmness).

Shiro abhyanga: oil massage of the upper body involving the head, neck, and shoulder region, which eliminates diseases of the head. Studies reveal that premature graying can be managed by oil massage, and it increases the thickness of hair [13, 14]. It removes facial wrinkles, nourishes the sense organs, and increases face complexion. Research shows that the scalp massage decreases the stress hormones and thereby regulates the blood pressure and heart rate by the action on norepinephrine and cortisol [15]. **Pada abhyanga:** Foot massage is considered as *drashtiprasadnam* (clear visions), *nidra sukha* (get good sleep), *deha sukha* (pleasure to the body), removes *srama* (fatigue) and *supti* (numbness of feet).

Vyayama (Exercise): *Vyayama* is an important preventive, curative, and rehabilitative measure. It stimulates the digestive process and thereby prevents the formation of toxins *(ama)*. Benefits of vyayama are *laghavam* (lightness of body), *karma samarthyam* (improves work capacity), *agni deepthi* (increases digestion), and reduction of fat deposit. Research shows that *vyayama* reduces HbA1c levels of patients with type 2 diabetes [16] and decreases the cardiovascular risk [17]. The WHO estimates that physical inactivity is the fourth-leading risk factor for global mortality [18].

As stated by *Acharya Sushruta, Vyayama* or physical exercise, causes physical development, lustre, compactness of body parts, stimulation of digestive power, absence of idleness,

firmness, lightness, cleanliness, tolerance to fatigue, exhaustions, thirst, heat, cold, etc., and provides optimum immunity. Yoga therapy also enhances immunity and reduces the extent of infection and inflammation in the body. Research establishes the efficiency of yoga therapy along with Ayurveda in COVID 19 [19]. It also reduces the burnout in health care workers [20].

Snana (bathing): Ayurveda considers *snana* as a holistic practice, and the morning time is considered best. It also promotes strength and endurance in our body. One who bathes with sour fruit-soaked water will surely get free from wrinkled skin and grey hair and live hundreds of years. Bathing with cold water improves eyesight and also stimulates the process of digestion if it is taken at the proper time. Pouring warm water improves the strength of the body, but the same over the head results in loss of strength of the hair and eyes. Examples of cleansing powder used for bathing are *Rakta Chandana* (sandalwood), *Manjishtha* (manjetti), *Haridra* (manjal), and *Panchvalkala kvatha choorna* (barks of five trees).

Udvartana (powder massage). It is a form of *abhyanga* that involves rubbing/scrubbing the body with herbal powders to clear the impurity of the skin. *Udvartana* as a part of daily regimens, destroys s*harira dourgandhya (body* odor), *gurutva (heaviness*), *tandra (drowsiness*), *kandu (itching*), *arochaka (anorexia),* and *sweda (sweating).* The treatment liquefies the fat, removes excess cholesterol and toxins from the body. The researchers agree that udwartana is effective in the management of obesity [21] and dyslipidemia [22].

Nidra (sleep): The physiological stage of rest for body, mind, and sense organs is termed nidra. *Nidra,* along with *Ahara* (food) and *Brahmacharya* (celibacy), gives vital physiological effects. It helps to attain longevity, youthfulness, luster, complexion, etc. and also provides memory and intelligence and helps the body and mind to remain healthy.

After having dinner, one should walk for hundred steps before going to sleep, then one should lie down in bed, taking 8 times breaths, and change the posture to right lateral till taking 16 times breath and thereafter to left lateral, taking 32 times breath, and then one can sleep in any posture. The left lateral position is more preferred for easy digestion of the food

BHOJANA VIDHI:-*Ahara* is one of the three pillars of life according to Ayurveda; the other two being sleep and regulated sexual life. . Proper diet, taken in the proper amount and manner, can lead to better health or else can lead to disease. *Pathya* (wholesome) refers to carefully

prepared, calculated, ripe, or cooked food that is beneficial to one's health. In Ahara Vidhi Vishesa Ayatanani, there are some rules regarding diet given; it said that a person should consume food by considering the terms *prakriti* (indicates the nature of the diets and drugs) , *karana* (processing food like heating, washing, etc. causes the transformation of the properties of the substances), *Samyoga* (a mixture of two or more food substances), *Rashi* (the amount of substance taken), *Desha* (the variations of the qualities of the substances occur according to their territory due to different soil, etc.), *Kala* (denote time, one pertains to daily and seasonal variations, while the other deals with an individual's conditions of age and disease), *Upayogstha* (according to the rules like food taken should be hot, unctuous, in proper quantity, after the digestion of previously taken food etc), *Upayakta* (considering the habit of an individual).

The food that is wrong in combination, has undergone wrong processing, is consumed in an incorrect dose, or is consumed at the incorrect time of the day and in the wrong season can lead to *Viruddha Ahara* (incompatible food). It interrupts the metabolism of tissue, which inhibits the process of formation of tissue and has the opposite property to the tissue. Some of the combination and processing methods of food that are mentioned under the concept of virudhahara in Ayurveda are scientifically proven. Some of the examples are Deep frying of potatoes can develop toxic substances, such as acrylamide, which can prove to be carcinogenic. Milk and yogurt - Consuming both together can precipitate milk inside the stomach that may irritate and induce vomiting.Pomegranate juice and grapefruit juice, are both known to block the cytochrome P450 3A4 enzyme systems in the intestines and increase blood levels of many medications you are taking. Taking these two juices together may synergize the above action.

Sequence of food intake: foods such as heavy, sweet, and unctuous should be consumed first, followed by sour and salty food. For appropriate digestion, it is advised to take rest for *Mahurta Matra* (48 min) after eating.

Conclusion

Healthy lifestyles have been found to lower the risk of diseases and delay the aging process. If *dinacharya* is practiced properly by considering its contraindications, it will lead to good health. Thus attain physical, mental, and spiritual wellbeing. Nowadays, poor lifestyle choices, eating habits, poor sleep, a disturbed biological clock, and harmful effects of the environment affect the health of a person. It can be managed significantly with the practice of daily regimens.

It also prevents the lifestyle disorders. As we know, when the body is lost, everything else is lost. So follow proper dinacharya to create uniformity in the body and in the mind.

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Orthodontics in Kids: Why Early Intervention Matters?

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Abstract:

Early orthodontic intervention, also known as interceptive orthodontics, is crucial for managing potential dental and jaw issues in children before they develop into more severe conditions. The American Association of Orthodontists advises that children undergo their first orthodontic evaluation by age seven. This early assessment can identify problems such as severe overcrowding, bite issues, and jaw discrepancies, allowing for timely intervention. Early orthodontic treatment offers several key benefits: it prevents more severe problems from developing, guides the growth and alignment of the teeth and jaws, reduces the need for complex future treatments, and improves the child's self-esteem by enhancing their smile.

Common orthodontic issues that can be addressed early include crowding, spacing, overbite, crossbite, open bite, thumb sucking, pacifier use, and the presence of extra teeth. Treatments may involve using appliances like palate expanders, space maintainers, and myofunctional devices to correct these issues. Addressing these problems early not only facilitates proper development but also reduces the likelihood of needing more invasive procedures later on.

Dentists play a critical role in early orthodontic intervention by identifying signs of potential issues and referring children to orthodontists as needed. Proactive evaluation and treatment can simplify future orthodontic care and prevent more complicated procedures. Early intervention is a valuable investment in a child's long-term dental health and confidence, promoting a healthier and more aesthetically pleasing smile as they grow.

Key Words: Interceptive Orthodontics, **Preventive Orthodontics, Serial Extraction**

Why Early Orthodontic Intervention?

Early orthodontic treatment, also known as interceptive orthodontics, is designed to address potential issues before they become more severe.

The American Association of Orthodontists recommends that children receive their first orthodontic evaluation by the age of seven. At this stage, a dentist can identify problems and decide whether early treatment is necessary. Many of the procedures are common in preventive and interceptive orthodontics but the timings are different. Preventive procedures are undertaken in anticipation of development of a problem. Whereas interceptive procedures are taken when the problem has already manifested.

Early intervention can:

1. Prevent Severe Problems: Early treatment can help manage problems such as severe overcrowding, jaw discrepancies, and bite issues before they develop into more complex conditions. [1]
2. Guide Growth and Development: Children's jaws and teeth are still growing, making it an ideal time to influence their development. Orthodontists can guide the growth of the jaw and incoming permanent teeth to ensure proper alignment. [6]
3. Reduce the Need for Future Treatment: Addressing issues early can sometimes eliminate the need for more extensive treatment later. For instance, correcting bite issues early can prevent the need for jaw surgery in the future. [4]

Improve Self-Esteem: A child's smile can significantly impact their confidence. Early treatment can improve the appearance of their teeth and boost self-esteem, especially during crucial developmental years.

Common Orthodontic Issues in Children

Several common orthodontic issues can be identified and treated early:

1. Crowding: Early intervention of crowding can create space in the arch and guide the proper alignment of teeth by expanding a narrow arch or by the concept of serial extraction.[6] Proper care of the deciduous teeth can help them act as natural space maintainers until the eruption of permanent tooth. [3]
2. Spacing: Gaps between teeth can be a sign of missing or misplaced teeth. Addressing spacing issues early can help ensure that teeth come in correctly and align properly. [3]
3. Overbite: Overbite refers to a vertical misalignment of your teeth. Left untreated, overbite can cause oral health issues like jaw pain, tooth erosion and gum disease.
4. Crossbite: An anterior crossbite due to skeletal reasons will involve a deficient maxilla and a more hyperplastic or overgrown mandible which can be intercepted during the

growth period of a child. Correction of dental crossbites in the mixed dentition is recommended, because it eliminates functional shifts. The most common etiologic factor for non-skeletal anterior Crossbites is lack of space for the permanent incisors. It is important to focus the treatment plan on management of the total space situation, and not just the crossbite. If the developing crossbite that is discovered before eruption is complete and overbite has not been established the adjacent primary teeth can be extracted to provide the necessary space. [2]

5. Open Bite: An open bite happens when space remains in the upper and lower jaw in the anterior region when the back teeth are closed. Mostly the reason can be due to a habit or an airway obstruction which needs an early intervention. [7]
6. Thumb Sucking and Pacifier Use: Prolonged thumb sucking or pacifier use can affect the alignment of the teeth and the development of the jaw. Mouth breathing as habitual respiration through the mouth instead of the nose. Usually seen in people with nasal obstruction may also occur as a habit. If persists, Vestibular Screen / Oral Screen can be used. [4]
7. Over-Retained Primary Teeth: A permanent tooth should replace its primary predecessor when approximately three fourths of the root of the permanent tooth have formed. Once the primary tooth is out, if space is adequate, moderately abnormal facial or lingual positioning will usually be corrected by the equilibrium forces of the lip, cheeks and tongue. A primary tooth that is retained beyond this point should be removed because it leads to Gingival inflammation, Hyperplasia that causes pain and bleeding. [4]
8. Supernumerary & supplemental teeth: They can interfere with eruption of nearby normal teeth. They deflect adjacent teeth and erupted teeth in abnormal positions. They should be identified and extracted before they cause displacement of other teeth.

Early Treatment Options for Children

Early orthodontic treatment might include:

1. Interception of Skeletal Malrelation with Myofunctional Appliances: Intercepting skeletal malrelations orthodontically involves early treatment to correct abnormal jaw growth patterns, guiding the development of the skeletal structure to prevent more severe issues later. E.g.: Functional Appliances such as Twin-Block, Activator, Facemask, etc. Myofunctional Appliances focus on strengthening and retraining the

oral and facial muscles to improve dental alignment, jaw function, and overall orthodontic outcomes.

2. Interception of Habits: Intercepting orthodontic habits, such as thumb sucking or prolonged pacifier use, early can prevent potential misalignments and ensure proper dental and jaw development. [4]
3. Space Maintainers: These are used to keep space open for permanent teeth if a primary tooth falls out too early. [4]
4. Palate Expanders: Devices that widen the upper jaw to create more space and correct crossbites. This also helps in increasing the tongue space and airway resulting in better respiration for the patient. E.g.: Rapid Maxillary Expander and Slow Maxillary Expander devices. [2]
5. Fixed Mechanotherapy/Clear Aligners: Traditional braces/Clear Aligner may be used in early treatment to correct alignment issues and guide the growth of the teeth.
6. Retainers: Used after initial treatment to maintain the new position of teeth and ensure that they stay aligned until the bone growth in completed.

The Role of Dentists in early intervention

Dentists can identify early signs of misalignment or bite problems and recommend a timely referral to an orthodontist. Early intervention can simplify future orthodontic treatments and, in some instances, reduce the necessity for more complex procedures.

Conclusion

Orthodontic treatment for children is more than just about creating a beautiful smile; it's about ensuring proper oral health, guiding proper jaw growth, and preventing more severe issues down the line. Early intervention can make a significant difference in the ease and effectiveness of treatment, making it a valuable investment in a child's long-term health and confidence.

By being proactive and seeking evaluation early, parents and dentists can help their children avoid more complicated treatments later on and set them on a path to a healthier, more confident future.

VTO for a 13year old patient with retrognathic mandible.
Treatment Plan: Phase 1 Twin Block Appliance

12-year-old male patient with Class III Skeletal base, Anterior and Posterior Crossbite, multiple missing teeth and constricted maxillary arch.

Treatment Plan: Phase 1 – Rapid Maxillary Expander with Protraction Facemask.

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Plant-Based Collagens for Periodontal Regeneration: A Comprehensive Review

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Abstract

The use of plant-based collagens in periodontal regeneration signifies a pivotal progress towards ethical and sustainable alternatives in the field of regenerative dentistry. This article provides a thorough examination of the historical progression, present advancements, and future potential of plant-derived collagens, with a particular focus on recent research conducted in 2024. The article highlights the potential of plant-based collagens to transform periodontal therapy by examining important studies and emerging technology. This article presents a comprehensive examination of about 25 important studies, offering a strong foundation for comprehending the development and utilization of plant-derived collagens.

1. Introduction

Collagen is the protein that is found in the highest abundance throughout the human body. In the field of tissue engineering and regenerative medicine, collagen-based biomaterials have experienced significant growth in recent decades. Periodontal disorders are chronic inflammatory illnesses caused by multiple factors. The main source of these alterations is dysbiotic ecological shifts in dental biofilm, which can be influenced by many risk factors [1]. Periodontal regeneration encompasses a range of interdisciplinary methods aimed at restoring the periodontal ligament, cementum, and alveolar bone that surround the teeth [2]. Conventional regenerative therapies have predominantly depended on collagen-based substances obtained from animal origins, specifically bovine and porcine tissues. Collagen-based scaffolds have demonstrated significant potential in the field of hard and soft tissue engineering, as they may create an environment that closely mimics the natural extracellular matrix [3].

Conventional regenerative therapies have predominantly depended on collagen-based substances obtained from animal origins, specifically bovine and porcine tissues [4,5]. The animal-derived collagens have been preferred due to their biocompatibility, biodegradability, and capacity to facilitate tissue regeneration, all of which are crucial for periodontal regeneration [6]

Nevertheless, the utilization of collagens derived from animals is linked to many issues. The ethical dilemmas associated with utilizing animal tissues, particularly in light of the rising popularity of veganism and heightened concerns over animal well-being, have resulted in an urgent need for alternative materials. In addition, the possibility of zoonotic disease transmission, exemplified by bovine spongiform encephalopathy (BSE) in the 1990s, has generated safety apprehensions[7,8] . Moreover, the inconsistency in the quality of animal-derived products, which is affected by aspects including animal diet and health, has made their utilization in clinical practice more complex[9]. To address these issues, researchers have increasingly concentrated on the development of plant-derived collagens. These materials offer several benefits, such as the elimination of the risk of transmitting diseases from animals to humans, reduced likelihood of causing an immune response, and compatibility with ethical and environmentally sustainable practices. In addition, progress in biotechnology has facilitated the creation of plant-derived collagens that closely imitate the structure and function of real collagen. This makes them feasible substitutes for periodontal therapy. [10 ,11, 12].

This review records the progression of plant-derived collagens from their initial phases of investigation to the latest breakthroughs, encompassing notable developments achieved in 2024. This review seeks to offer a thorough overview of the potential of plant-based collagens in revolutionizing periodontal regeneration. It accomplishes this by analyzing the historical context, present innovations, and future possibilities. The review additionally highlights pivotal research showcasing the effectiveness of plant-based collagens in different regenerative applications, paving the way for their wider acceptance in clinical practice.

2. Structure of collagen

Collagen consists of three chains that are tightly coiled together in a triple helix formation (Fig. 1.). This robust structure is formed by a recurring sequence of three amino acids. Glycine, a tiny amino acid, is present at every third position in the sequence, allowing it to fit precisely within the helix. The chain is predominantly occupied by two unexpected amino acids: proline and a derivative form of proline known as hydroxyproline. The glycine residue

adopts a compact conformation within the helix, whereas the proline and hydroxyproline residues facilitate a smooth curvature of the chain around the helix [13]. Collagen-based scaffolds show great promise in the field of hard and soft tissue engineering, as they may generate an environment that closely resembles the natural extracellular matrix.

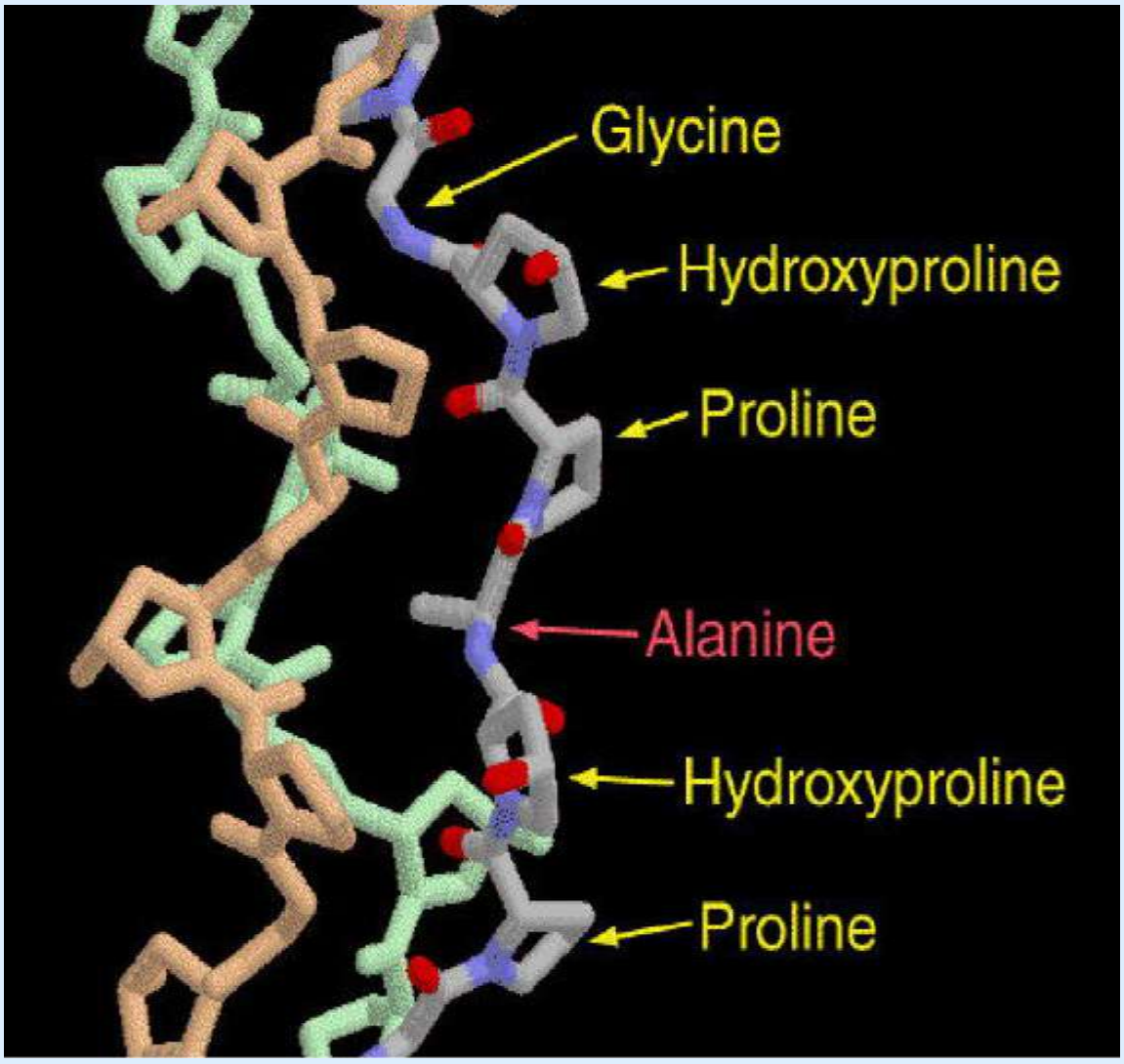

Figure 1: Structure of Triple-Helix Collagen (reproduced under creative common attribution 2.0 generic from)

3. The concept of Periodontal regeneration

Regeneration is defined as a therapeutic method in which damaged human tissues and cells, including organs, are replaced or regenerate in order to restore and re-establish their normal physiological functioning[14]. It has been shown that periodontal tissue contains stem cells

known as periodontal ligament (PDL) cells in the tissue that surrounds teeth. These cells may be involved in periodontal tissue regeneration PDL is made up of several different parts, such as mesenchymal stem cells (MSC), type I collagen fibre bundles, fibroblasts, a subset of bone cells on the surface of the alveolar bone, cementoblasts on the cementum, and a group of bone cells[15]. Although mesenchymal stem cells in the periodontal ligament (PDL) have the ability to transform into fibroblasts, osteoblasts, and cementoblasts, the injured periodontal tissue does not effectively heal by natural regeneration mechanisms following standard treatment. Endogenous regeneration frequently occurs as a consequence of healing through the creation of long junctional epithelium. Hence, it is imperative to investigate and advance techniques that can effectively stimulate the growth and specialisation of PDL stem cells, while also enhancing their ability to safeguard against the infiltration of soft tissues[2]. Figure 2 summarized the Periodontal regeneration mechanisms

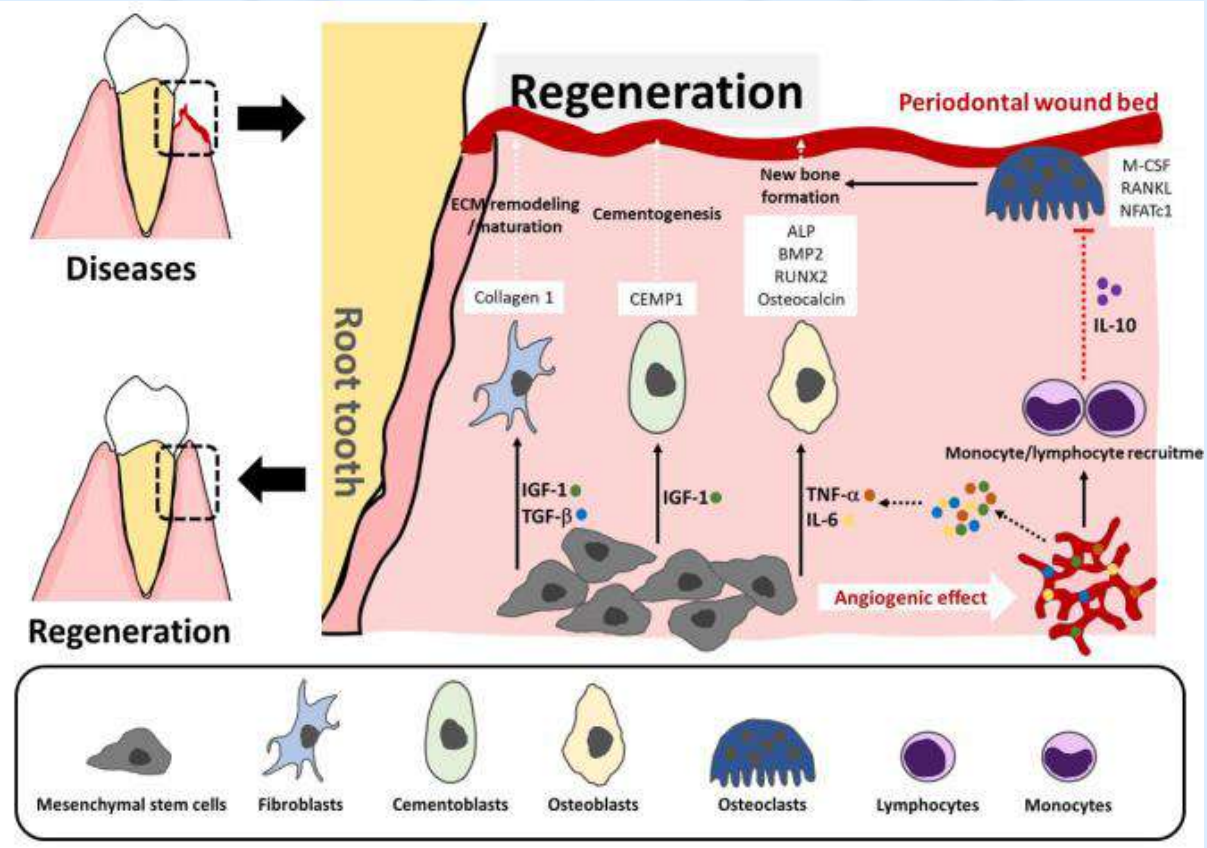

Figure 2: Periodontal regeneration mechanisms. MSCs in the vicinity of the damaged tissue stimulate the formation of new blood vessels, a process known as angiogenesis. This leads to the release of inflammatory cytokines (TNF-a and IL-6) and growth factors (IGF-1 and TGF-b), as well as the attraction of immune cells such as monocytes and lymphocytes. These inflammatory substances stimulate the growth and specialisation of MSCs into fibroblasts,

cementoblasts, and osteoblasts, which in turn leads to the restructuring of the extracellular matrix, the development of cementum, and the creation of new bone. Immune cells secrete IL-10 to inhibit the activation of osteoclasts in order to maintain the balance of new bone growth. (reproduced under creative common attribution 4.0 from **[**2])

4. Historical Developments

The utilization of collagen in the process of periodontal regeneration can be traced back to the 1980s. The initial research showed that collagen membranes can successfully facilitate the regeneration of periodontal tissues by acting as a barrier that hinders the movement of epithelial cells, thus enabling the specific repopulation of the damaged area by periodontal ligament cells. The effectiveness of these collagen membranes generated from animals in clinical applications has solidified their status as a benchmark in regenerative periodontal therapy[16]. Nevertheless, the dependence on collagens derived from animals has prompted numerous concerns, namely about safety and ethical consequences. The emergence of Bovine spongiform encephalopathy (BSE) and other zoonotic diseases brought attention to the possible dangers linked to animal-based goods, resulting in an increased focus on finding alternate sources of collagen. Researchers initiated investigations on plant-derived proteins that could imitate the structural and functional characteristics of collagen. Nevertheless, the dependence on collagens derived from animals has prompted numerous concerns, namely about safety and ethical consequences. The emergence of Bovine spongiform encephalopathy (BSE) and other zoonotic diseases brought attention to the possible dangers linked to animal-based goods, resulting in an increased focus on finding alternate sources of collagen. Researchers initiated investigations on plant-derived proteins that could imitate the structural and functional characteristics of collagen [7,8,17]. Initial endeavours in the advancement of plant-based collagens centred around the identification of plant proteins exhibiting collagen-like characteristics. Soybeans have been identified as a potential source, as indicated by research conducted by Knani D et al(2017), which showed that soy proteins may be manipulated to create structures similar to collagen. The aforementioned investigations established the foundation for the advancement of plant-based collagens by demonstrating that plant proteins may be altered to imitate the triple-helix structure that is distinctive of collagen, and is crucial for its biological function[18]. Further studies broadened the scope of plant sources being investigated for collagen-like proteins. In their study, Jahangirian H r et al. (2008) examined pea proteins and discovered their potential to produce materials that possess comparable qualities to collagen. This study showcased the capability of plant-based collagens to function

as replacements for materials produced from animals in a range of biomedical uses, such as periodontal regeneration [19].

During the 2010s, progress in genetic engineering greatly sped up the growth of plant-based collagens. Manipulating the genetic composition of plants to generate collagen-like proteins has provided fresh opportunities for developing customized materials with precise characteristics. Ruggiero F et al. (2000) & Hashizume F et al (2008) conducted studies that investigated the utilization of genetically modified tobacco and rice plants for the production of collagen-like peptides. These peptides exhibited enhanced bioactivity and mechanical qualities.[20,21].

The shift from using collagens originating from animals to those generated from plants is a fundamental change in the field of periodontal regeneration. This change is motivated by both ethical concerns and breakthroughs in scientific knowledge. The progression of plant-based collagens throughout history demonstrates a rising awareness of the necessity for ecological and ethical alternatives to conventional components, paving the way for their increased utilization in therapeutic settings. Figure 3 summarized the evolution of naturally derived collagens in periodontal regeneration.

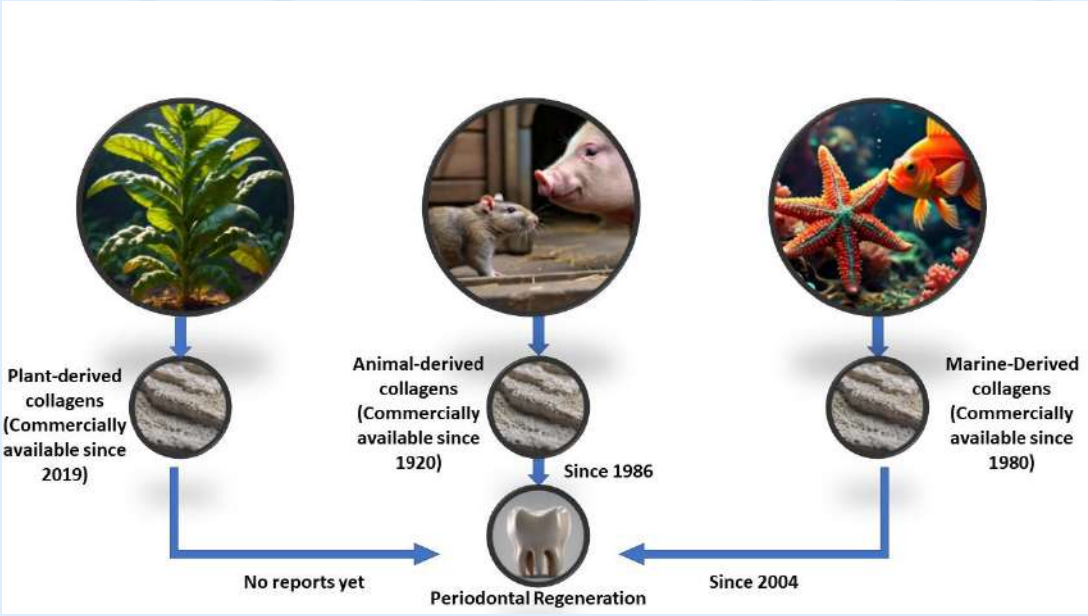

Figure 3: Evolution of natural collagen sources in Periodontal therapy (reproduced under creative common attribution 2.0 generic from [13])

5. Current Developments

The application of plant-based collagen technology has been greatly improved in periodontal regeneration due to recent breakthroughs. One significant advancement entail utilizing genetic engineering to create plant-derived collagens that possess enhanced characteristics. Rahman A et al (2024) utilized CRISPR technology to genetically modify algae in order to produce collagen-like peptides that exhibit improved bioactivity [22]. Moreover, there has been a notable focus on incorporating plant-based collagens into biopolymers and hydrogels. Rekulapally R et al. examined the use of collagen generated from plants in composite hydrogels. They found that these hydrogels had better mechanical properties and were able to release growth factors in a regulated manner[23]. The adoption of plant-based collagens has also been motivated by apprehensions regarding the ecological consequences of materials obtained from animals. The manufacturing of collagens obtained from animals entails resource-intensive procedures and contributes to the release of greenhouse gases. Large scale production of these collagens may also result in deforestation, overfishing and emergence of antibiotic-resistant bacteria**[**2**]**. This is summarized in figure 4. Plant-based collagens, in contrast, are obtained from sustainable sources and possess a markedly reduced ecological impact.

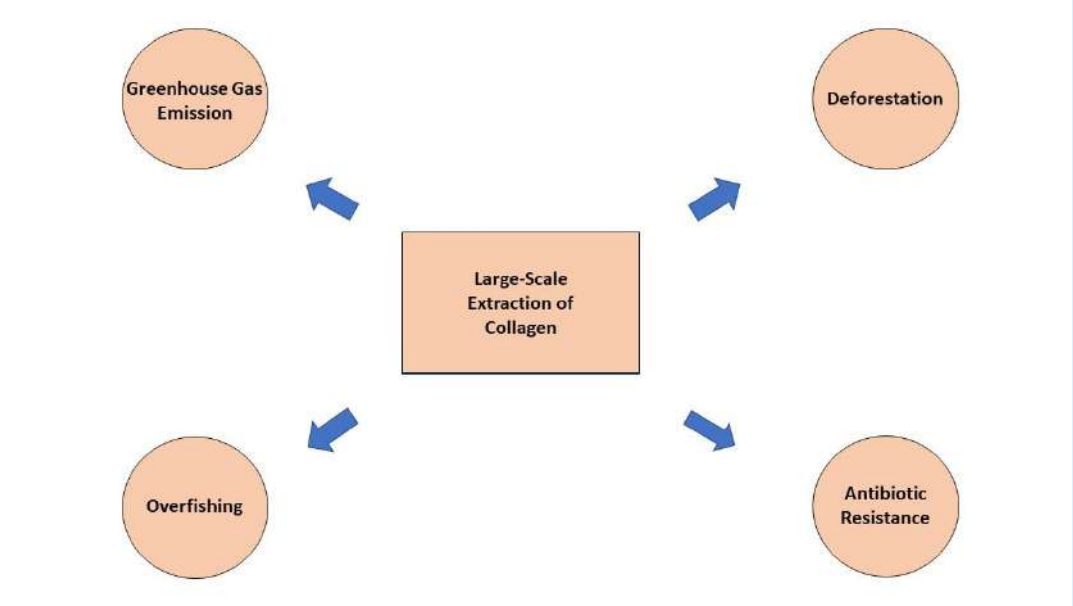

Figure 4: Environmental Impact of animal and aquatic derived collagen production

In recent years, there has been research into the practical use of collagens derived from plants, and the findings have shown great potential. .

In a clinical investigation, Alkhursani SA et al. (2022) evaluated the effectiveness of a hydrogel created from soybeans collagen in promoting periodontal tissue regeneration. The

study revealed that the hydrogel outperformed conventional collagen membranes derived from animals in enhancing tissue regeneration. The study also found that patient outcomes improved, and inflammation decreased when using plant-based collagens. This highlights the potential of plant-based collagens to not only provide ethical and environmental benefits, but also to deliver superior clinical performance [24]. In a similar manner, Sayin S et al. (2020) performed an experiment where they compared plant-based collagen membranes obtained from algae with traditional collagen products. The study observed enhanced tissue integration and patient tolerance with the plant-based materials, providing further confirmation of their suitability for application in clinical practice [25]. The results align with previous research conducted by Iravani S et al. (2019), who examined the compatibility and effectiveness of different plant-based collagens in treating periodontal diseases. They concluded that these collagens offer a feasible substitute for materials obtained from animals [26]. Table 1 compares the efficacy of plant-based and animal-based collagens

Property	**Plant-Based Collagen**	**Animal-Derived Collagen**
Biocompatibility	High	Very High
Ethical Considerations	Favourable	Less Favourable
Risk of Allergic Reactions	Low	Moderate
Cost of Production	Lower	Higher
Sustainability	High	Low
Regenerative Efficiency	Comparable	High

Table 1: Comparative Efficacy of Plant-Based vs. Animal-Derived Collagens

6. Recent Developments (2024)

In 2024, there have been significant advancements in the synthesis and utilization of plant-derived collagens. Weitkamp JT et al. (2024) have made a noteworthy advancement by introducing algal-derived collagens that possess improved regeneration characteristics. These materials exhibited a higher resemblance to real collagen compared to earlier plant-based substitutes, leading to enhanced integration and regeneration of tissues [27]. Moreover, there has been significant emphasis on combining plant-based collagens with sophisticated drug delivery systems. Cai C, Li W et al. (2024) created a drug-releasing framework employing collagen generated from plants, which has the ability to distribute growth factors in a regulated manner. This innovation not only improves the ability of the scaffold to regenerate tissue, but

also decreases the likelihood of complications related to uncontrolled drug release. This is a noteworthy progress in periodontal therapy [28].

In 2024, there is a significant advancement in the application of nanotechnology to improve the characteristics of collagens derived from plants. Takallu S et al. (2024) investigated the incorporation of nanoparticles into collagen matrices generated from plants, leading to the development of materials that possess enhanced mechanical strength and bioactivity. This technique mitigates the constraints of plant-based collagens, such as their inferior mechanical qualities relative to collagens obtained from animals and expands the potential for their utilization in load-bearing applications [29].

A summary of recent findings in plant-based collagen applicationsis shown in table 2.

Innovation	Description	Key Studies
CRISPR-Engineered Algae	Enhanced bioactivity, high yield	Rahman A et al(2024)
Hybrid Collagen-Polymer Materials	Improved mechanical strength, tissue integration	Rekulapally R et al(2021)
Drug-Eluting Scaffolds	Controlled release of growth factors	Cai C, Li W et al. (2024)
Nanotechnology-Enhanced Collagens	Improved mechanical properties, bioactivity	Takallu S et al. (2024)

Table 2: Summary of Recent Innovations in Plant-Based Collagen Applications

7. Future Directions

As we consider the future, we may identify numerous interesting directions for further research in the field of plant-based collagens. An important focus is the optimization of production procedures. Continued research should prioritize improving the productivity, performance, and cost-effectiveness of plant-derived collagens. The progress made in genetic engineering and synthetic biology offers potential for creating plant-derived collagens that may be customized to have specific properties for specific application. Advancements in CRISPR technology and other genetic tools have the potential to result in plant-based collagens that

possess superior mechanical strength for load-bearing tissues or greater bioactivity for aiding tissue regeneration.

Another promising avenue of exploration involves the advancement of hybrid scaffolds. The combination of plant-based collagens with other biopolymers or synthetic materials has the potential to create hybrid materials that possess enhanced characteristics. These hybrid scaffolds have the potential to provide greater mechanical strength, improved biocompatibility, and enhanced integration with host tissues. This could potentially overcome some constraints associated with using plant-based collagens alone

The incorporation of plant-derived collagens into customized medicine strategies also offers an interesting area of exploration. Researchers can develop personalized collagen-based materials for specific patients by employing sophisticated genetic and molecular methods. The implementation of this individualized strategy has the potential to greatly enhance treatment results in the field of regenerative medicine, as it offers materials that are tailored to meet the precise biological needs of every patient.

Furthermore, it is essential to investigate and develop new uses for plant-based collagens that go beyond periodontal therapy. Possible areas for exploration encompass orthopedic regeneration, wound healing, and cosmetic applications. Increasing the range of applications for plant-based collagens could have a substantial influence on multiple medical disciplines, providing inventive remedies for a diverse array of clinical obstacles .

8. Conclusion

Plant-based collagens are a notable breakthrough in regenerative dentistry, providing a sustainable, ethical, and potentially superior substitute for conventional materials generated from animals. Plant-based collagens are expected to have a growing significance in regenerative therapies due to ongoing advancements in production methods, hybrid materials, and wider uses. Plant-based collagens have the capacity to significantly transform periodontal regeneration and other medical fields as research advances. This has the ability to enhance patient outcomes and propel the science of regenerative dentistry forward.

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MEDICAL CONTRAINDICATIONS IN IMPLANT THERAPY: AN OVERVIEW

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ABSTARCT

Implantology is gaining popularity in the field of dentistry. Dental implants are the most advanced option for the prosthetic rehabilitation of missing tooth. From 1970 a lot of studies are devoted for the development of dental implants. Most essential factor determining the implant success is depends upon the case selection. Patient related local factors and systemic conditions has bad influence on the survival rate of implants. Certain diseases like recent myocardial infarction and cerebrovascular accidents, valvular prosthesis surgery, immunosuppression, bleeding disorder etc. concluded as absolute contraindications hamper the outcome of the treatment, such conditions should be avoided prior to the treatment planning. Relative contraindications like aging, diabetes, osteoporosis, smoking etc, when controlled can forward to implant therapy and achieve success as in normal healthy patients. This review paper summarizes medical contraindications including absolute and relative contraindications of implant therapy.

Keywords: Dental implants, Medical contraindications, Absolute contraindications, Relative contraindication

INTRODUCTION

Dental implants are the most advanced and popularized treatment modality in the rehabilitation of missing teeth either in partially edentulous or completely edentulous dentitions. Biocompatible implant materials such as Titanium/Zirconium, enhances its beneficial effect and they Osseointegrated with the bone making the implant as a most promising treatment.[1] However, it is not ideal in every condition.

Alveolar bone quality and quantity around the implant site along with patient systemic and local status affects with the treatment outcome. Bone grafting socket preservation, bone

expansion methods can be used to improve the bone quantity and sinus lift procedure in the maxillary arch can also be done for the implant placement.[2] It is tenacious to enhance the quality of the bone as it depends on the patient health status. In order to achieve a positive treatment outcome, the patient should be selected after proper clinical, systemic and radiographic examination, thereby eliminating the chances of implant failure. A retrospective analysis of Veterans Administration registry result shows that surgical and healing complications, as well as patient medical status, correlated with implant failure.[3] Smith et al, on the other side, conducted a study and concluded that no significant association between compromised medical status with perioperative morbidity or failure of implants in 104 patients.[4] Implant failure can be emerged by three main factors such as, infection, defective host wound healing, disruption of a weak bone to-implant interface after abutment connection. The cardinal feature determining the success of the treatment depends on the Osseointegration property, so any factors such as patients' systemic disease and conditions and local factors which will negatively influence and result in the failure should be ruled out in patient selection.[2] Such cases can be effectively managed by other prosthetic rehabilitation options like FPD, RPD. The objective of this review is to summarize the medical contraindications in dental implant therapy.

MEDICAL CONTRAINDICATIONS FOR IMPLANT THERAPY [5]

There are certain contraindications for the placement of endosseous implant for the rehabilitation one or more missing teeth. It is imperative for the clinician to identify the possible conditions which may result in the failure of implant therapy, as they are less predictable to some extent. Hence it is the responsibility of the professional to make decision as to when the implant therapy is not indicated. Medical contraindications of implant therapy can be categorized in to;

i. **Absolute contraindications:** conditions or situations that completely prohibit the placement of dental implants due to potential risks or complications.

ii. **Relative contraindication:** conditions or situations that don't necessarily prohibit the implant placement but may affect with long-term outcomes.

Conditions involving absolute and relative contraindications for implant therapy are summarized below (Table -1,2,3,4) [6]

Table -1: Medical and systemic health related issues

Recent myocardial infarction and cerebrovascular accident	Absolute
Valvular prosthetic placement	Absolute
Bleeding disorders	Absolute
Bisphosphonate therapy (Intravenous)	Relative /Absolute
Active anti-cancer therapy	Relative/absolute
Bisphosphonate	Relative
Immunosuppressive medication	Relative
Immunocompromising diseases (HIV, AIDS)	Relative

Table -2: Psychological and mental conditions

Psychiatric syndromes (schizophrenia, paranoia)	Absolute
Mental instability (neurotic, hysteric)	Absolute
Mentally impaired: Uncooperative	Absolute
Irrational fears: Phobias	Absolute
Unrealistic expectations	Absolute

Table-3: Habits and behavioural considerations

Substance abuse (alcohol, drugs)	Absolute
Smoking; tobacco use	Relative
Parafunctional habits	Relative

Table-4: Intraoral examination findings

Atrophic maxilla	Relative
Current infection(endodontic)	Relative
Periodontal disease	Relative

ABSOLUTE CONTRAINDICATIONS

1.RECENT MYOCARDIAL INFARCTION(MI)OR CEREBROVASCULAR ACCIDENT

Hypoperfusion to the cardiovascular and neurovascular system to a period of time results in the necrosis of the heart and brain which will also leads to the functional deterioration. Patient's with history of recent Myocardial infarction should be given 6-12 months period of intervention and healing from the primary care and patient stabilization occurs.3 to 6 months after the primary stability and during the interval times between the incidents, stress of any form should be avoided which could trigger the post ischemic complications .With in hours or days after the incident,75% of patients with MI goes through the post ischemic complication like cardiogenic shock or pump failure, arrythmias(e.g.: sinus bradycardia, premature ventricular contractions, ventricular tachycardia, ventricular fibrillation, asystole),myocardial rupture, pericarditis ,chronic ischemic heart diseases, which results in progressive failure of heart.[7]15% of patients with history of cerebrovascular accidents, or ischemic stroke were found to be deceased within the first 3 months. Functional repair and recovery may take up to one year and complications were reported during that time includes recurrent events of stroke, seizures, bleeding in aneurysm cases, cerebrovascular spasm, hydrocephalus and hyponatremia.[8]

Dental needs should pursue only after the primary stabilization time period in patients with MI or cerebrovascular incident because of the increased chances of complications. It's the duty of the dental professionals to make them aware of the treatment complications and only proceed with the elective treatment procedures after a minimum of 6 months and he or she obtain a medical consent from their doctor. It is important to obtain a proper history regarding their anticoagulant or thrombolytic therapy to plan with the treatment and the desire for oral implants does not necessarily justify interruption of a therapeutic international normalized ratio (INR).[5]

2.VALVULAR PROSTHEIS PLACEMENT

In cardiovascular conditions like systemic emboli, progressive congestive heart failure, endocarditis, prosthetic valves are used to restore the function but they have high chances of microbial infection.[9] Three forms of prosthetic valves are available: bio prostheses, mechanical valves and homografts or autografts. Except autograft all others are prone to endocarditis as well as regurgitation, stenosis and degenerative changes. Autografts are completely covered in endocardium or endothelium with in the first month, making them sealed

to the bacterial entry. Not all are covered (e.g.: polyethylene terephthalate), based on the site, physical characteristics, and possible risk from exposure include endocarditis or endarteritis. Prevalence of 1%to 3% of prosthetic valve endocarditis are reported with in the first 3 months.[10] Moving to 6 months a percentage drop of 0.4% noticed. Microbial seeding can be seen during the early stages of prosthetic valve placement, as the fibrin and platelet thrombi aggregate at the surgical site which attracts the microorganisms from the intraoperative contamination. As time progress endothelial proliferation occurs and sealing of prosthesis away from the microbes lowers the risk. Early reported prosthetic valve endocarditis is mainly caused by the Staphylococcus epidermidis, other coagulase -negative staphylococci, Staphylococcus aureus, and Fungai, while Staphylococcus viridians and its haemolytic streptococci brethren were reported in cases of native valve endocarditis and late onset prosthetic valve endocarditis.[5]

Invasive dental procedures are strictly avoided during 6 months to 1 year after the valve placement to ensure the safety from the microbial contamination by bacteraemia and subsequent loss of valve. Anticoagulants and plasma volume elevators are recommended depending on the valve selected and dental treatment should be followed after the proper considerations of the drug effects.[9,10]

3.BLEEDING

Uncontrolled haemorrhage can be noted in conditions like platelet and clotting factor disorders and in use of drug therapy like aspirin, warfarin, clopidogrel etc. Dental surgical approach should only be performed if haemostasis can be achieved effectively. Blood loss of 500mL needs volume replacement. Blood examination for bleeding time and International Normalized Ratio (INR) must be examined before the procedure to evaluate the effect of oral Anticoagulant Therapy (OAT). Topical haemostatic agents can be used to effectively control the post operative bleeding in patients with INR 2-4 and on OAT without discontinuation. Prothrombin time of 1.5-2 are associated with a risk of bleeding after the surgical procedures considered to be normal.[11] Fazio and [12]Fang suggested an INR of 2.2 or lower can be taken for the surgical procedures. INR of 3 or lower can be taken for treatment including extractions as described by the medial literatures; tranexamic acid or epsilon amino caproic acid are effective with the residual bleeding.[13] Dental implant treatment can be performed in patients with INR of 3.5 or lower.[14]

Normal platelet count is 1,00,000-5,000, 000/mm^3.Abnormal operative haemorrhage can be seen if the platelet count is reduced to50,000-1,00,000/mm^3 such as in mild thrombocytopenia. Major post operative bleeding is reported in cases where the platelet count is reduced to <50, 000/mm3.Below 20,000/mm3 spontaneous bleeding from the mucous membrane occurs and such patients require blood transfusion before the invasive treatment.[15]

4.ACTIVE CANCER THERAPY/RADIATION THERAPY

Total dose of radiation therapy for anticancer treatment ranges from 50-80 Gy, it is given as 1-10 Gy per week in order to the effective management of neoplastic cells and reduces the host cell injury. Both host defence action and haematopoiesis were deranged during the radiation as well as chemotherapy and wound healing is also affected negatively so the implant placement is prohibited. If necessary Hyperbaric oxygen therapy can be an option to four different levels and ultimately cells death occurs from necrosis and apoptosis. Several studies documented poor success rate of implant in patient with history of radiation therapy. [16] Sennerby and Roos[17]state from a study that high failure rates are associated with the irradiation history, same as in Esposito and colleagues [18] review. Beumer and colleagues [19] reported lower success rate of 60.4% in irradiated maxillary arch. Granstrom and colleagues [20] found an improved success rates in implant patients treated with Hyperbaric oxygen. But in a systemic review done by Coulthard and colleagues [21] stated that there are less evidences to prove the beneficiary effect of hyperbaric oxygen in irradiated implant patients.

osteoclastic and osteoclast independent resorption occurs as the bone loses the osteocytes.[22] Cell injury reported to progress even after the cessation of radiotherapy. Hypocellularity, reduced vascularity and hypoxic conditions emerges after the 6months of post radiation time period.[16]

Periodontal tissues are less sensitive as compared to the those with more turnover rate such as bone marrow, skin, GIT. Head and neck radiation causes injury to periodontium results in the loss of osteocytes in the outer lamellar bone and haversian canals, obliteration of blood vessels in the haversian canal can also be seen. Radiation induced mucositis and xerostomia results from the damages to salivary glands and mucosa, soft tissue dehiscence may follow surgical manipulation osteoradionecrosis of the posterior mandible along with less vascularity and less, larger trabeculae were reported .[23]Cytotoxic anticancer drugs taking patients are contraindicated in implant placement as they induce granulocytopenia, followed by

thrombocytopenia. Anticancer agents may cause gastrointestinal toxicity, and reactions in skin in addition to the bone marrow toxicity and immunosuppression eventually causes infection, haemorrhage, mucositis and pain. Hence the prescription of the anticancer drugs is contraindicated in implant rehabilitations. A very limited number of investigations has been conducted on chemotherapeutic effects on implant survival. Case reports on subjects with dental implants who then undergo cancer chemotherapy show conflicting, though mostly adverse, results.][24,25,26]

5.PSYCHIATRIC DISORDERS

The patients with psychiatric disorders are contraindicated for the implant therapy as they were not able to comprehend and anticipate the dental treatment logically. Blomberg identified several conditions as incongruous with implant placement. These include psychotic disorders (e.g., schizophrenia), severe character disorders (hysteroid and borderline personalities), dysmorphophobia, cerebral lesions, and presenile dementia, as well as alcohol and drug abuse.[27] There is no biologically accepted reason for the above disorders to negatively affect the implant, but various case reports accuse the psychiatric disorder for the failure of osseointegration.[28] Poor oral hygiene status can be occur from alcohol addiction ,drug abuse as they reduce the defence mechanism and impairs the wound healing ,increases the possibility for infection ,ultimately leads to the implant failure.[5]

6.INTRAVENOUS BISPHOSPHONATE TREATMENT

They inhibit bone resorption, thus used in the treatment of osteoporosis, hypercalcemia of malignancy and Paget's disease. [5] There is no clear evidence of bisphosphonate treatment effect on implant therapy. Mechanical stability of implants is enhanced when they use locally but they also reported cases of osteonecrosis of the jaw if they administered systematically. Holzinger et al, conducted a study and found that the accelerated development of bisphosphonate induced osteonecrosis of jaw (BRONJ) at the implant site when they are administered after or during the treatment time.[29] From this it was concluded that the surgical interventions are not contraindicated when they are applied orally, but the dental professionals should be in caution and in IV bisphosphonate patients the treatment is prohibited. When a patient is recommended for IV bisphosphonate therapy, he or she should undergo thorough oral

examination and eliminate any active infections before the drug administration. If any issue warrants oral surgery, healing must be complete prior to bisphosphonate use.[30]

7.SUBSTANCE USE

Drug and alcohol abuse should be considered as a contraindication as they can be irresponsible and noncompliant with the treatment options. In such patients either they are malnourished or even have impaired organ function, hence they might be not be a good candidate for implant placement because of poor healing capacity. Until the addictions are managed and controlled all the elective treatment including implant placement should not be performed.[6]

RELATIVE CONTRAINDICATIONS

1.ADOLESCENCE

According to World Health Organization adolescence is the time period between 10-19 years of age.[31] Implants are not recommended during this growing time because the sequalae follows like an ankylosed tooth shown in pig model.[32]As the teeth are unable to erupt into more vertical direction along with the growth, they might end up submerged. So, the most complication in placing adolescence will be displacement or relocation with time as the growth progress. Along with this the invasive placement of the dental implant prosthesis may hamper with the growth activity.[33]

Maxilla can change in three direction and it can't be expected or predicted.so it's better to plan the implant placement in young adults after the cessation of growth occurs. Girls have growth activity until the age of 14-15 while in boys its ranges 17-18years of age.[34] Most diagnostic method to assess the growth status is by skeletal film over time like hand wrist or lateral cephalometric analysis instead of using the chronological or dental age. Thilander et al[35] placed 27 implants in 15 adolescents in the late dental stage (fully erupted permanent teeth) and achieved a 100% success with 3-year follow-up.

2.AGING

Above 65 years of age groups are considered as the elderly or geriatric population. In this stage they are either concerned with increased prevalence of local diseases like xerostomia and ridge resorption etc and with systemic diseases like osteoporosis, diabetes etc., those will result in

poor muscular adaptation to the prosthesis.[5] As the age advances there will be altered mineral composition, collagen, bone morphogenic protein content along with delayed wound healing and tissue regenerations are seen.[36] In majority of clinical evaluation, they fail to correlate the age-related implant failure. In a retrospective study conducted by the Smit et al,[37] he failed to significantly correlate the implant failure in 313 implants in 104 patients up to 88 years of age. Failure reported with age alone was not able to prove effectively. MericskeStern and Zarb [38] detected more than 90% success for implants after 5 years in a group of 59 elderly subjects with an average age of 65.6 years. Zarb and Schmitt [39] reported a success rate of 94% in 20 patients (age 60-74 years; 89 implants) 2-10 years after loading. Roynesdal et al [40] achieved a 100% success rate in 15 elderly edentulous patients and 96% of success rate obtain in 48 patients after 1to 4 years of follow up,10% experiences problem with adaptation and muscle control.

3.OSTEOPOROSIS

It is the condition where reduction in bone mass occurs with bone resorption rates overtake the bone deposition with no other abnormality. It is progressed along with increasing age; post-menopausal women's are in a risk for bone loss and both men and women's are reported with decreasing bone density as they enter in the third or fourth decade of life. Major effect of osteoporosis is by their deleterious effect in osseointegration as the disease can change bone quality, formation and healing, making the patients to less likely proceed with the implant placement. There will be reduced mechanical strength, trabecular architecture alterations, decreased mineral density and crystallinity and higher carbonates to phosphate ratios are reported with the osteoporotic bone. On the other side osteoporosis reveals a mild effect in implant success, atleast in the mandibular arch.[41] In a retrospective study conducted by August et al [42] concluded that mandibular implant failure did not vary between the premenopausal and post-menopausal women, but there is an increased rate of maxillary implant failure in post-menopausal women than the premenopausal women. Johnson et al [43] from a study stated that either of the jaws are not affected by osteoporosis due to oestrogen changes. Maxillary and mandibular jaws function in much related view when compared with the weight bearing bones. Becker et al [44]revealed that there is no significant relation between peripheral dual energy x ray absorptiometry scores at the ulna or radius and dental implant failure. In implant therapies Minsk and polson [45] did a study in postmenopausal women of above 50 years 450 maxillary and mandibular implants placed in 116 women's shows an overall success rate of 92%. Friberg

et al [46] placed about 70 implants in 14 patients with osteoporosis After 3-year follow-ups they achieved a success rate of above 97%.

4.**SMOKING**

Byproducts of smoking like nicotine, carbon monoxide, and hydrogen cyanide elicit toxic responses in tissues.[47] Hypoperfusion and defective wound healing is produced by nicotine induced impairment of red blood cells, fibroblast, macrophage proliferation, increased platelet adhesion, epinephrine induces vasoconstriction. Hydrogen cyanide is responsible for the inhibition of enzymes required for the oxidative metabolism and cell transport. Smoking induces enhanced expression of inflammatory mediators like tumour necrosis factor-α and PGE2, impairs the chemotaxis of polymorphonuclear neutrophil, phagocytosis, and oxidative burst mechanism. Smoking can result in implant failure. In a retrospective study ,2.5 times of implant failure are noted with smoking. Surface modified implants instead of traditional implant shows less failure rate. Smoking cessation prior to implant therapy shown to be effective, stoppage for 1 week before surgery results in reversal of platelet adhesion, blood viscosity, and the short-term effect of nicotine. It is recommended to avoid smoking for at least 8 weeks after the implant placement.[33]

5.HYPOTHYROIDISM

Bone metabolism is affected with thyroid diseases. Several homeostatic processes are regulated by thyroxine (T4) and to some extent T3. These hormones regulate the wound healing in soft tissue and bone fractures. Osteoblastic maturation recruitment and action are affected by reduced production of insulin like growth factor-1, suppresses the bone formation and bone resorption. Healing of fracture is therefore inhibited. Hence in patients with thyroid disease they should be treated with caution as it may cause the failure of implants due to defective osseointegration.[33]

A retrospective study by Attard and Zard [48]done on 27 female patients with 82 implants and hypothyroidism on replacement medication matched them with 29 controls with 81 implants.

Total success rate was shown as 95% and 97% after one year. Another study was conducted to correlate the hypothyroidism and implant failure in a small sample population. Thus, in control groups hypothyroidism fails to influence the implant survival.[33]

7.CARDIOVASCULAR DISEASE

There are five forms of cardiovascular disorders which includes hypertension, atherosclerosis, vascular stenosis, coronary artery disease and congestive heart failure, may cause the impairment in healing process, depends on the oxygen delivered from normal blood flow. Increased rates of arterial degeneration can be seen with edentulous mandibular arch. As degeneration progress periosteal stripping followed by the necrosis of bone happens. When hypoxia occurs fibroblast activity, collagen synthesis, capillary growth, actions of macrophage decline which trigger the chances of infection.[33]

Cardiovascular diseases were seeming to not to affect with the implant success, only cause physiological alterations. Khadivi et al,[49] in a retrospective study involving 246 patients, with 39 of cardiovascular disease of interest assess the initial osseointegration rate. Result shows 13% failure in both the cardiovascular disease group and control group. Van Steenberghe et al[50], fails to show any relation with the cardiovascular disease and implant failure. More studies with functional implants are needed for better assessment, previous studies demonstrated that the cardiovascular disease does not have any deleterious effect t in initial implant survival.

8.HUMAN IMMUNODEFECIENCY VIRUS

Very few studies are done in the topic of HIV and implantology. Harrison et al [51] conducted a prospective, blind controlled study in HIV negative and positive patients on the wound infection and orthopaedic implants. With no preoperative contamination, the incidence of wound infection failed to differ between patient group. Fielding et al,[52] presented a case in which he achieved a successful osseointegration after 4 years in patient with HIV positive with CD4+ count of less than 200 cells/mm3in a partially edentulous case. There is also a case report shows 18 months of functional success of immediate implant placement in HIV positive patient with CD4+ count less than 200 cells/mm3.In such cases patients were administered with amoxicillin post operatively.[53] If there is any bleeding disorder or extreme immunosuppression the implant success is not affected in case of HIV patients.

9.INTERLEUKIN -1 GENOTYPE

Interleukin -1(IL-1) composite genotype shows to be in association with periodontal diseases as per the past literatures.

Kornman et al[54] is the one who first developed a periodontal susceptibility test for IL-1 genotype detection, done in northern European population. The positive test for IL-1 composite includes at least one copy of allele 2 at each of the specific polymorphism of IL-1 gene groups on chromosome 2, that is allele 2 at the IL-1A (889) locus plus allele 2 at the IL-1B (3954) locus. As another, easier-assayed polymorphism at IL-1A (4845) is in 99% linkage disequilibrium with IL-1A (889), it is used to test for the variant IL-1 allele A homozygous allele 2 at the IL-1B (889) position appeared to increase the IL-1B response to inflammation.[55] Nonsmokers are associated with high odds ratio for moderate to severe periodontitis and tooth loss. Current reports shows that there is no influence of positive genotype in implant survival. In a Japanese population study, they seem to couple with nontraditional IL-1 polymorphism (IL-1B-511) to early bone loss.[56] So as of now there is no enough evidence are available to demonstrate the IL-1 composite genotype positivity in implant failure.

10.DIABETES

It is considered as a relative contraindication for implant placement as the advanced glycation end products reduces the quality and quantity of extracellular matrix components such as laminin, collagen, osteocalcin and vitronectin. Diabetes creates a less favourable condition of tissues for implant placement.[5] In a retrospective study on 34 controlled diabetic patients with 227 implants ,they achieve an implant success rate of 94.3%before loading .[57]Another study in 782 patients with controlled diabetes rehabilitated with 38 implant supported bridge ,after 1 year of post-surgery obtain a success rate of 94.1%[58].Morris et al[59] ,from a dental implant clinical research database found a success rate of 93% and 92%in patients who are non-diabetic and with type II diabetes respectively, after follow-up period of 3 years .Fiorellini et al [60],from a retrospective analysis shows a 86% success rate in 40 controlled type I and II patients after a period of 4 years. Olson et al [61] performed a 178 implant in the mandibular symphysial region in well controlled type II diabetic patients of 89 cases and acquired a success rate of 88% from a 60 month follow up. While Peled et al [62], obtain a success rate of 94% from 141 implants in well controlled diabetic patients after a 5 year follow up. These two prospective studies are differed in their result. First one shows that implant failure is associated with the time period while the other study expresses that there is no correlation between the diabetic level and implant failure. However, with a good glycaemic control together with other measures shown to improve the implant survival rates in diabetic patients.[33]

1. IMMUNOSUPPRESSION AND IMMUNE COMPROMISE

Immune suppression can be caused by the corticosteroid therapy when they used for the hormone replacement, cancer treatment or other chronic conditions. The wound healing capacity during the post-surgical period is mainly depends on the host immune system action. Total white blood cells (WBC) count range between 5000-10000 cells/mm^3 and absolute white blood cell count of 3500 -7000cells/mm^3 considered as normal, absolute white blood cell count includes polymorphonuclear neutrophils and bands, renders the patient unable to combat an immediate antigenic burden. When the count falls below 1500-3000cells/mm^3, such patients are contraindicated from surgical approach as they are prone to infections and defective repair and regeneration capacity. [63]A person with 1000-3000cell/mm^3 requires antibiotic coverage and when the count falls below 1000cells/mm^3, requires medical consultation and are contraindicated from the implant placement.[64]

CD4+T cells count of 600cells/mm^3 or above are needed to sustain the health and homeostasis. When it decreases to 500 cells/mm^3, they considered as immunosuppressed and they are highly susceptible for infections especially from candida. Lower the CD+ $4:CD8$ ratio, more immune compromised is the patient. [64] Duttenhoefer et al[65], proposed in a systematic review that a few evidences are only available which shows the damaging effect of immunosuppressive conditions on the survival of the implant. Crohn's disease has a major effect on early implant failure and resulted in increased implant loss. There was no significant effect on implant survival in the remaining immunocompromised conditions such as HIV/AIDS, organ transplantation, autoimmune disease, and Morbus Crohn.[66]

2. PRAFUNCTINAL HABITS

Increased rate of implant failure (fracture of implants, failure of integration, loss of integration) is noted in patients with parafunctional habits such as clenching or grinding of teeth either consciously or subconsciously. During early healing period the effect of parafunctional habits in the form of lateral force on to the implants will have a deleterious effect in osseointegration process. Patients should be informed about all the complications. Bruxism is contraindicated in case of short span, fixed partial denture or a single tooth implant. Protective measures should be employed if treatment is planning such as producing a narrow cusp table with flat cusp angle, protected occlusion, regular use of occlusal guards.[6]

CONCLUSIONS

As the most advanced option for rehabilitation of missing teeth, implant success is solely depending on the proper osseointegration. Quantity and quality of bone in the implant site is a major factor to determine the prognosis of the treatment along with the other patient related local and systemic factors. A thorough case history along with clinical systemic and radiographic examination is essential prior to the case selection and treatment planning. Medical contraindications should rule out before the procedure. Dental professionals must carefully deal with the absolute contraindications of dental implant placement. Relative contraindications should be stabilized as early as possible without hampering the treatment. By the effective management of risk factors along with the strict follow up procedure dental implants can be successfully place and produce better prognosis.

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I have been using Palodent V3 – Sectional matrix system designed by Triodent in my practice for the last 5 years. It comprises of anatomically contoured thin matrices, NiTi Bitine rings with V shaped groove to accommodate plastic wedges of different sizes, Wedge Guards, Pin Tweezer & Forceps. It is an ideal matricing system for class 2 preparations of posterior teeth for resin composites.

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- Helps in isolation
- Prevention of overhangs thereby promotes periodontal health.
- Bitine ring holds the matrix in position as wel as bring about the tooth separation.
- Wedge guards protects the adjacent tooth from damage if used while cavity preparation.

All over it's a good product for all clinicians who wants excellence in the direct composite posterior restorations. I highly recommend it to all clinicians.

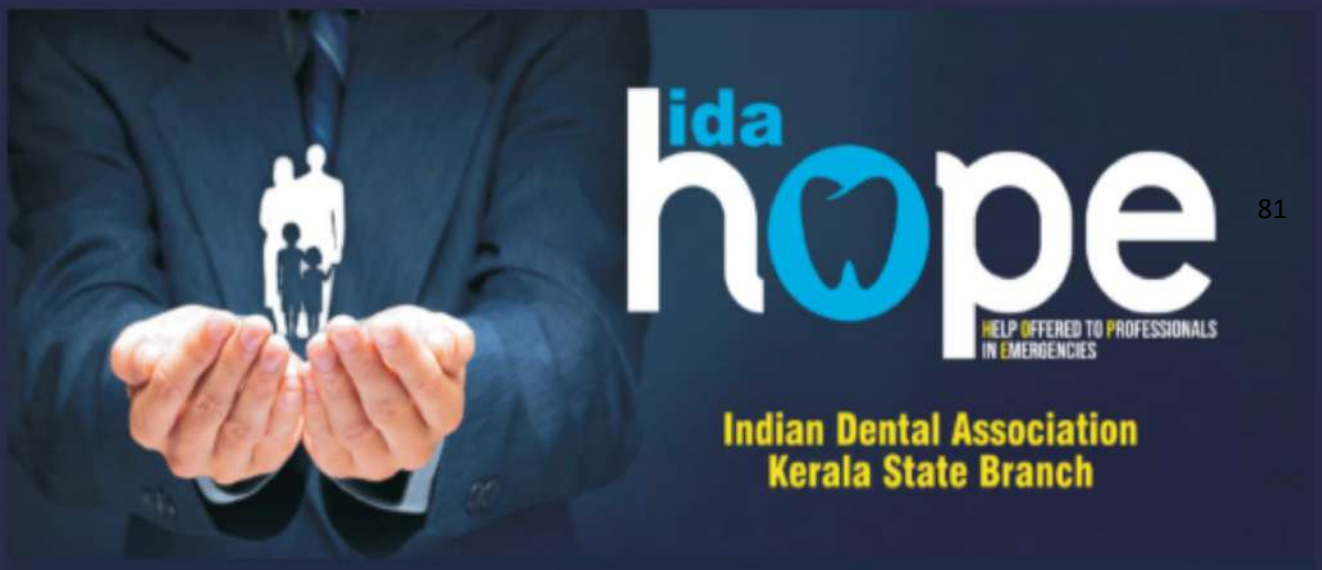
Dr. Minimol K Johny MDS

Asso.Professor

Dept of Consevative Dentistry & Endodontics

Pushpagiri College of Dental sciences

Chief Endodontist in Crown & Roots Multispeciality Dental Clinic



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6. Age and Address proof

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- Valid membership in any local branch in IDA Kerala State certified by Branch Secretary.
- Bachelor Degree in Dentistry from any recognised institution in the Indian union.
- Valid registration in any state Dental Council in India.
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● All HOPE members are automatically eligible ● Tailor-made policy for US, 4th term running with minimum glitches and complaints ● No age limit for joining ● No medical checkups prior to joining ● All pre existing illness covered for members and after one year for family ● No additional premium for pre existing illnesses ● Newborn baby cover from day 1 without any additional premium* ● Cashless treatment facility available* Standard treatment charge reimbursed* ● Premium subject to revision each year in accordance to cash out flow ● Policy premium in shared and hence the lowest figure quoted ● Minimum exclusion applicable for payment denial ● Premium paid is eligible for income tax exemption under section 80D.

RENEWAL-30th SEPTEMBER

Getting Hospitalised??
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IDA HOPE - FORMATION

HOPE is the unique scheme, driven as a FREE professional indemnity for its members

Started as PPS in 2002
Formed as HOPE in the year 2007 merging the two schemes

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MEMBERSHIP STRENGTH

3750+ MEMBERS

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Professional protection
compensations up to Rs. 4 Lakhs (with co-pay of 25% for 2 lakhs)

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RENEWAL - JULY 10

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Takes up Dento - Legal cases of HOPE members from the first stage itself - Lawyer's Notice.

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For Legal Assistance Contact **Dr. Satheesh K Joseph**, Vice Chairman-Legal Cell **Mob 9447141008**

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- The coverage for the new members Starts **one year** after the acceptance of the complete documents including membership fee by the Hon. Secretary.

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Ethical consideration: manuscript submitted for publication must comply with the following ethical consideration. Written informed consent must be obtained from the subject before their data included in the study. Any data from the patient must be submitted by hiding their identity. All research should be carried out with prior approval from institutional or national ethic committee and should be in accordance with Helsinki declaration of 1964. If animals are used for research, the authors must follow the institutional or national guidelines for the care of use of laboratory animals
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Tables should be self-explanatory, numbered in roman numbers, according to the order mentioned in the text.
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