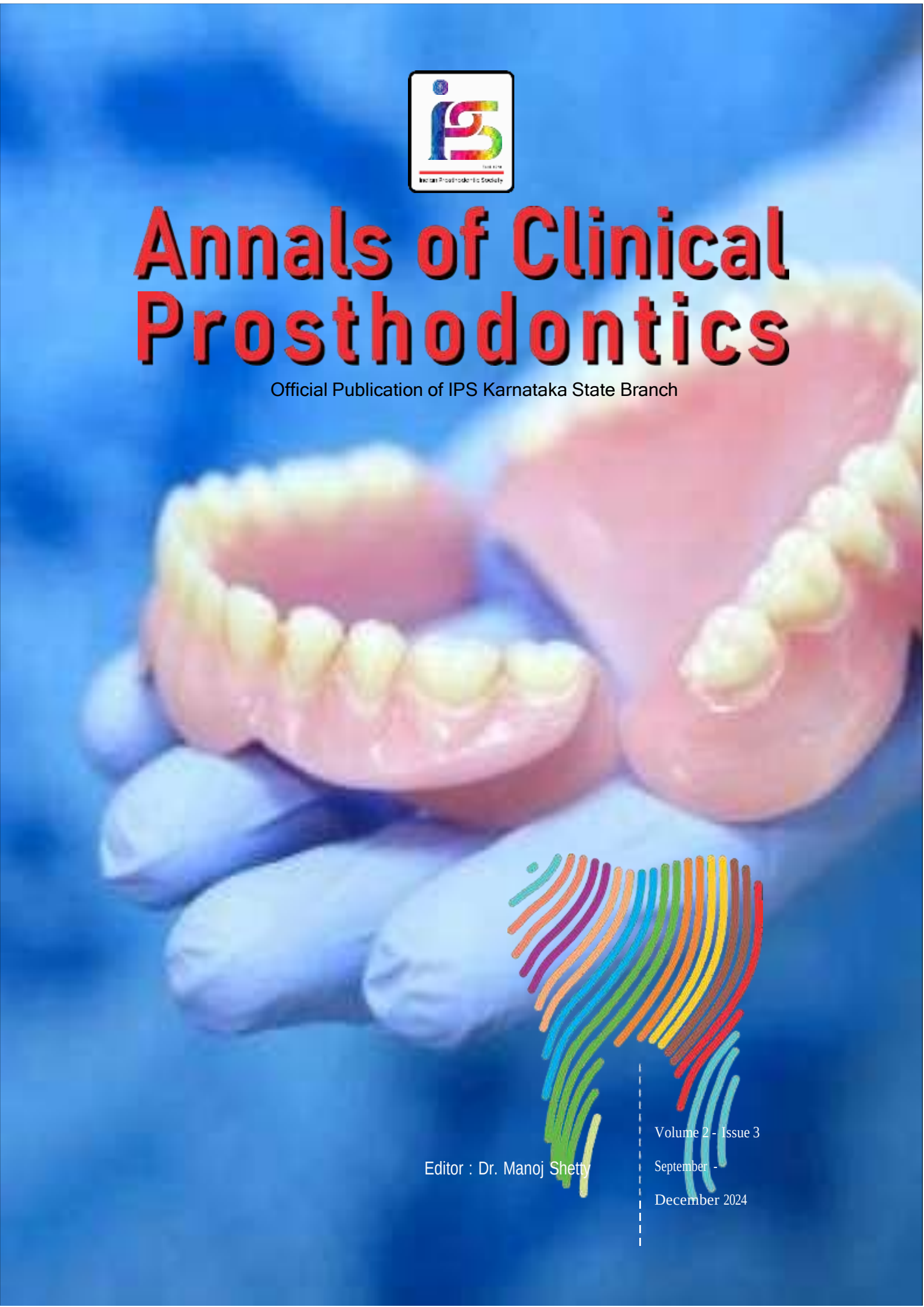

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ENHANCING FUNCTION WITH TOOTH SUPPORTED OVER DENTURE: A CASE REPORT

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Abstract:
The primary aim of prosthodontics is to deliver a functional prosthesis that restores aesthetics, functionality, and masticatory efficiency. Among the treatment options for removable dentures, tooth-supported overdentures stand out as a viable choice. Overdentures are a widely preferred treatment for elderly patients who retain two or more teeth in their dental arch. By utilizing copings or attachments over the remaining tooth structures, the roots help preserve the alveolar ridge, enhance sensory perception, and improve the stability and retention of the denture compared to traditional complete dentures. This article describes the rehabilitation of a 55-year-old partially edentulous male patient who presented with concerns about poor aesthetics and difficulty in chewing due to missing teeth.

Conclusion: Tooth-supported overdentures retained with extra-radicular attachments enhance the stability and retention of the denture. This approach improves chewing efficiency, ensures greater patient comfort, and minimizes residual ridge resorption.

Keywords: Attachment, tooth-supported over-denture, resorbed ridge, extra-coronal ball attachment, conventional complete denture, retention, stability

Introduction:

Preventive Prosthodontics focuses on procedures aimed at delaying or preventing future prosthodontic challenges. Overdentures serve as a significant treatment option in this context. Patients transitioning to complete dentures often face a series of issues, including the loss of tooth proprioception, gradual resorption of alveolar bone, and the shift of occlusal forces to the oral mucosa. These changes can lead to psychological impacts, such as diminished self-confidence [1].

Overdentures are particularly beneficial for individuals with a few retainable teeth remaining in an arch. They are also suitable for cases with malaligned ridges, patients requiring a single denture, or those with challenging anatomical conditions such as unfavorable tongue positions, high palatal vaults, or muscle attachments that complicate prosthesis stability and retention [2-5].

The use of overdentures helps reduce bone resorption, enhances the denture foundation area, and improves chewing efficiency. Compared to traditional removable complete dentures, which come with certain limitations, overdentures are a superior alternative. A study by Renner et al. showed that 50% of roots used as abutments for overdentures remained stable after four years [6]. In overdenture therapy, the retained teeth contribute to the residual ridge structure, and an essential periodontal requirement is an adequate zone of attached gingiva for the abutments [3, 7, 8]. The treatment possibilities with tooth-supported overdentures are extensive, offering a variety of options tailored to different clinical scenarios.

Case Report:

A 55-year-old male patient presented to the Department of Prosthodontics with a

primary complaint of missing upper front and back teeth for the past six months. His medical history revealed multiple decayed teeth, which had been extracted without complications over the previous year. The patient reported difficulty chewing and expressed concerns about his appearance, requesting replacement of his missing teeth.

Intraoral examination showed a partially edentulous maxillary arch with only two remaining teeth, 13 and 23, along with normal alveolar ridge mucosa. The mandibular arch exhibited generalized attrition and decay around tooth 36. Following a comprehensive evaluation of the patient's dental condition, a tooth-supported overdenture was planned for the maxillary arch.

Tooth preparation was carried out for teeth 13 and 23. Diagnostic impressions were taken using irreversible hydrocolloid (Tropicalgin, Zhermack) for the mandibular arch and impression compound for the partially edentulous maxillary arch. A custom tray for the maxillary arch was fabricated with autopolymerizing resin on the diagnostic model.

Post-space preparation was performed on both teeth, and a 21-gauge stainless steel wire loop was used to record the post-space impression. Border molding was completed with green stick compound, followed by a wash impression using monophase impression material.

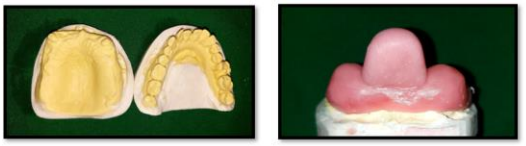
A master cast was obtained and sent to the laboratory for wax pattern fabrication. Metal copings with ball attachments were fabricated and cemented on teeth 13 and 23. An elastomeric wash impression was taken with the copings seated intraorally. This was followed by the fabrication of a denture base. Jaw relation records were obtained, and a trial denture setup was evaluated.

The final denture was processed with nylon housing incorporated for the ball attachments. It was inserted into the patient's mouth after occlusion verification, along with detailed post-operative

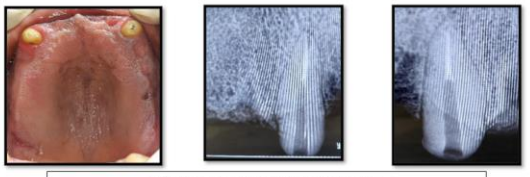
instructions.The patient was recalled after 24 hours for evaluation of esthetics, phonetics, function, and overall comfort. Follow-up appointments were conducted at 1 week, 1 month, and subsequently every 6 months. The patient reported a satisfactory clinical outcome.

PRE-OPERATIVE INTRORAL VIEW

TOOTH PREPRATION- 13,23

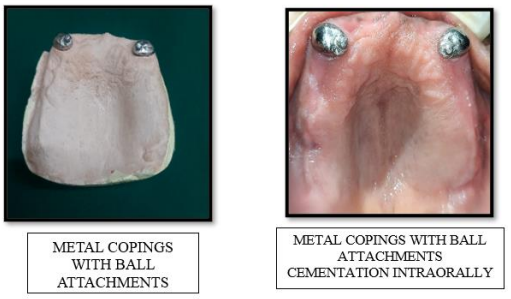


PRIMARY CASTS | CUSTOM TRAY



POST SPACE PREPERATION IRT 13,23

S-S WIRE LOOP FOR POST SPACE IMPRESSION | BORDER MOLDING AND SECONDARY ELASTOMERIC IMPRESSION WITH MASTER CAST



METAL COPINGS WITH BALL ATTACHMENTS | METAL COPINGS WITH BALL ATTACHMENTS CEMENTATION INTRAORALLY

JR AND TRY IN

ACRYLIZED DENTURE

OVERDENTURE INSERTION

Discussion:

Losing all natural teeth can be a distressing experience for patients, often affecting their confidence as it symbolizes increased dependence on others and aging. In such scenarios, an overdenture serves as a valuable preventive prosthodontic treatment option and should be routinely

incorporated into dental practices due to its numerous benefits. Crum and Rooney [1], in a five-year study, illustrated using cephalometric radiographs that the average vertical bone loss in the anterior mandible of overdenture patients was 0.6 mm, compared to 5.2 mm in patients with complete dentures.

Overdentures minimize bone shrinkage, reduce pressure on the alveolar ridge, and preserve proprioception [9]. They offer advantages such as directional sensitivity, dimensional discrimination, canine response, and tactile feedback [4]. Research shows that denture wearers experience a sensitivity threshold to load that is 10 times greater than that of individuals with natural dentition [5, 6]. A study conducted by Rissin et al. in 1978 compared the chewing efficiency of patients with natural teeth, complete dentures, and overdentures, finding that overdenture wearers exhibited a masticatory efficiency one-third higher than complete denture users [7].

Attachments for overdentures can help redirect occlusal forces, either away from weaker abutments to the soft tissue or toward stronger abutments, resulting in improved retention [8, 9]. These attachments are classified as studs, which connect the prosthesis to individual teeth, or bars, which link the prosthesis to splinted abutment teeth. Additionally, attachments can be rigid or resilient. Since edentulous ridges and remaining roots are often compromised, prostheses with resilient attachments are better suited to distribute occlusal forces effectively, reducing stress on weaker abutment teeth.

Conclusion

While this technique involves additional costs and requires more appointments, tooth-supported overdentures offer a significantly better prognosis compared to conventional complete dentures. Removable overdentures equipped with extra-radicular attachments enhance retention, stability, support, occlusal balance, and proprioception. These benefits contribute to improved chewing efficiency and phonetics. Furthermore, they help slow

the resorption of the residual ridge by transforming compressive forces into tensile forces, thereby optimizing stress distribution. Although implant-supported overdentures have gained popularity, tooth- or root-supported overdentures remain a highly effective and reliable treatment option.

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NOVEL RADIATION BARRIER DEVICE FOR ORAL CANCER PATIENTS WITH LIMITED MOUTH OPENING: A CASE REPORT

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Abstract-
This case report discusses the development and application of a novel radiation barrier device designed to enhance the effectiveness and safety of radiation therapy for oral cancer patients experiencing trismus (limited mouth opening). The report presents two clinical cases, highlighting the challenges faced and the innovative solutions implemented to protect healthy tissues during radiation treatment.
Keywords: oral cancer, radiation therapy, custom barrier devices, squamous cell carcinoma, trismus.

Introduction: Oral cancer remains a significant global health issue, with India experiencing a high prevalence due to factors like tobacco use, betel quid chewing, and alcohol consumption. Commonly affecting the tongue, floor of the mouth, and palate, it greatly diminishes patients' quality of life, leading to challenges such as difficulty in swallowing, speech impairment, and persistent pain. Treatment options typically include surgery, chemotherapy, and radiotherapy, with radiotherapy being essential for addressing residual cancer cells.

Radiotherapy (RT) has been an established modality for managing head and neck cancers, aiming to effectively treat the malignancy while preserving organ functionality [1]. External beam radiation therapy (EBRT) is utilized as a standalone definitive treatment, in conjunction with chemotherapy, or as an adjuvant therapy following surgical tumor resection [2]. Recent advancements in technology and alternative therapeutic strategies have focused on personalizing radiation dose delivery and refining target volume delineation to enhance therapeutic outcomes while minimizing adverse effects. [3].

Trismus in oral cancer is defined as a tonic contraction of the muscles of mastication resulting from any abnormal condition or disease with mouth opening of ≤35 mm.[5] It may be a result of tumour growth, infection, surgery or radiation. Occurence of trismus complicate the delivery of radiation, risking damage to

healthy tissues. To assist in the treatment delivery to patients undergoing radiotherapy dental clinicians can fabricate positioning stents. Positioning stents or Intraoral radiation stents (IRS) are prosthetic devices that assist in the effective delivery of radiation to tumor tissues and aim to avoid unnecessary radiation to adjacent healthy tissues thus limiting post-radiotherapy toxicities. They are used to protect or displace vital structures, assist in positioning of the treatment beam for effective administration of radiotherapy, carry a radioactive material, shield healthy tissues of the oral cavity, and/or maintain the desired mouth opening during radiotherapy.

This case report describes the use of positioning stents fabricated using thermoplastic sheets with a bite block in patients undergoing radiation therapy for oral cancer and their effectiveness in reducing the dosage of radiation to the adjacent vital tissues thus aiding in improving the overall quality of life of the patient.

Case 1:

Patient Information: A 62 year old patient presented to the department of oncology with a well differentiated mucoepidermoid carcinoma of the retromolar trigone extending to the tongue. The patient presented with grade III trismus (mouth opening of 11 mm) significantly limiting mouth opening, complicating the placement of conventional bite blocks for radiation therapy. The treatment plan proposed for the patient was palliative therapy

Device Development: A custom device was created by pressing a sheet to act as a barrier, protecting surrounding healthy oral tissues from unnecessary radiation exposure. This innovative solution allowed for safe and effective radiation therapy administration.

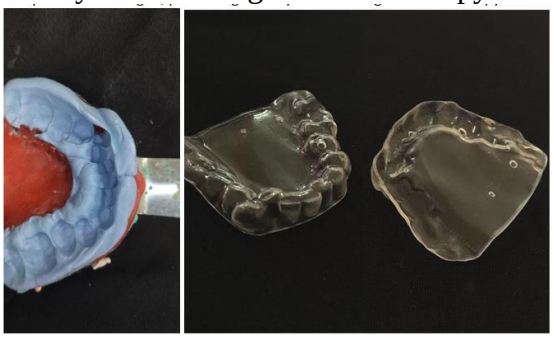
Results:

The mean radiation dose to surrounding tissues was reduced from over 30 Gy to 24Gy, demonstrating a 25%reduction in radiation exposure.

Case 2:

Patient Information: A 46 year old patient presented to the department of oncology with a Well-differentiated squamous cell carcinoma of the hard palate, extending into the soft palate. The patient presented with grade III trismus (mouth opening of 10 mm) The limited mouth opening posed significant challenges, as the tongue was in contact with the lesion site on the palate. The treatment plan proposed for the patient was radiotherapy and surgical therapy.

Device Development: A mandibular impression was taken, and the tongue area was modified using modeling wax. A plastic sheet was pressed to create a barrier that compressed the tongue, preserving healthy tissue during radiation therapy.



Results: The patient underwent radiation therapy of 70 Gy over 35 fractions. The mean radiation dose to normal tissues was reduced from 70 Gy to 35 Gy, achieving a 50% reduction in exposure.

Discussion: Through mouth opening, tongue depression, and tongue deviation, positioning stents are utilized to move and shield normal tissues such as the lips, tongue, buccal mucosa, and soft palate from the high dosage radiation field. These placement stents can also be utilized to confine the implicated mandible within the radiation field, raise the jaws' vertical height, or move the mandible out of the radiation field. Positioning the tongue or mandible away from the radiation source may help reduce mucositis, which can otherwise result in delayed osteoradionecrosis, poor nutrition, and weight loss.

The cases presented demonstrate the effectiveness of the novel radiation barrier devices in protecting healthy tissues while allowing for precise radiation delivery. The innovative solutions developed in prosthodontics address the complex challenges faced by oral cancer patients with limited mouth opening, ultimately improving treatment outcomes and quality of life.

Conclusion: In order to meet patient-specific treatment goals, the radiation oncology team and the oral health care practitioner should both have a thorough

understanding of the clinical application of IRS for head and neck tumors. In order to improve the immediate and long-term quality of life for patients with head and neck cancer receiving radiation therapy, general dentists and maxillofacial prosthodontists can work as members of a multidisciplinary team to help fabricate these straightforward yet practical prosthetic devices. The safety and effectiveness of radiation therapy have been significantly improved by the specially designed radiation barrier devices created for these patients. These incidents highlight how crucial prosthodontic innovation is to addressing clinical issues and enhancing patient care.

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ATRAUMATIC SINUS LIFT ELEVATION PROCEDURE USING DYNAMIC MAGNETIC MALLET: A CASE REPORT

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Abstract:
The sinus lift procedure is a well-established technique in dental Implantology, commonly performed to augment the posterior maxilla's bone volume in cases of insufficient alveolar height. Traditional sinus lift methods, such as the lateral window approach, may be invasive and carry risks. The use of a magnetic mallet for performing an indirect sinus lift has emerged as a promising, minimally invasive alternative, offering potential advantages in terms of precision and reduced trauma.
This case report describes the successful use of a magnetic mallet for an indirect sinus lift procedure in a 42-year-old patient with insufficient bone volume in the posterior maxilla. The patient presented with a desire for dental implants to restore masticatory function and esthetics. Preoperative imaging confirmed bone deficiency and adequate sinus pneumatization for the procedure. The magnetic mallet was used to gently elevate the sinus membrane without the need for a lateral window approach, thereby reducing surgical time, soft tissue trauma, and postoperative discomfort.

Introduction:
The most important factor in implant placement is the quality and quantity of bone. In the maxillary posterior region, this procedure becomes more complicated due to the limited bone volume and the close proximity of the sinus [1.] The sinus floor is near to the first molar region, the size of the sinus increases with age if the area is edentulous.
The maxillary sinus is a bony cavity lined by the Schneiderian membrane (sinus membrane). In implant placement procedures, it is important to carefully lift the sinus membrane to avoid damaging the maxillary sinus
The posterior region of the maxilla presents a particularly challenging anatomical region for dental implants, especially when there is insufficient residual bone height. In such cases, a sinus lift procedure, also known as residual bone augmentation, is recommended. This surgical technique involves elevating the floor of the maxillary sinus to create sufficient bone height for the successful placement of dental implants. There are various approaches to performing a sinus lift, including the Lateral Antrostomy, the Crestal Approach using Osteotomes, the Balloon Sinus Lift.[1]
The newly introduced Magnetic Mallet is an innovative surgical device that enhances the efficiency of sinus lift and split crest

procedures and also claims to do the routine osteotomy procedures. This ergonomically designed, magneto-dynamic handpiece is powered by a control unit, which regulates the precise timing and application of forces. The device generates a magnetic wave followed by a shock wave, modulating the force's timing to create both axial and radial movements at the tip of the osteotome. One of the key benefits of this device is that it eliminates common patient discomforts such as dizziness, nausea, vertigo, and Benign Paroxysmal Positional Vertigo (BPPV), which are often caused by the displacement of otoliths in the inner ear during traditional procedures.[1]

Case report:

A 42-year-old female patient presented to department of oral implantology with missing teeth in the posterior left maxilla (tooth numbers 25, and 26). The patient had been edentulous in this area for several years, and upon clinical and radiographic examination, it was determined that there was inadequate residual bone height for successful implant placement.
The patient was healthy, with no significant medical conditions that would contraindicate surgery. Her medical history included controlled hypertension, which was monitored throughout the treatment process and has a history of hyperthyroidism which was also in control as patient was taking medication for the same. Upon clinical examination patient had adequate interocclusal height and mesiodistal width. (fig 1)

Figure 1

On radiographic examination, available space with tooth no 25 was 13.8mm and tooth no 26 was 5.6mm, making 26 a sinus lift procedure as residual bone height was not sufficient. (fig 2)

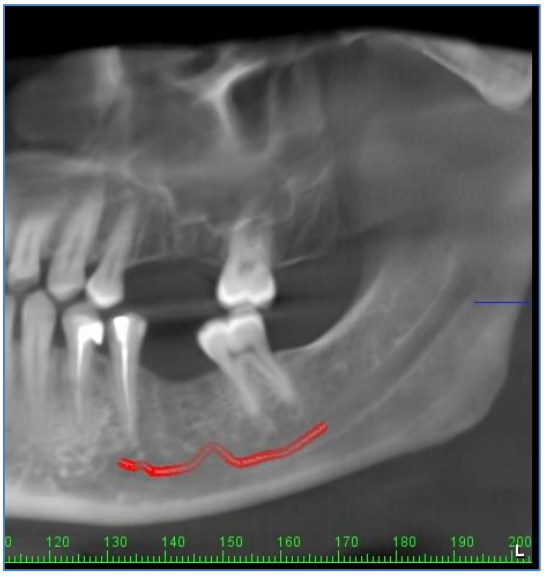

Figure 2

Patients consent was recorded prior to the surgery.
The procedure was performed under local anaesthesia (Septodont, lidocaine

hydrochloride 2% with adrenaline 1:80000 USP), with the patient being fully aware but pain-free throughout the surgery.
A mid crestal incision was made in the gingival tissue over the posterior maxilla, and a flap was reflected. (Figure 3)

The proposed implant site was first clearly marked with a 2 mm round drill (Straumann) followed by 2 mm pilot drill (GM helix aqua Neodent: Straumann).
Initial drilling of the bone at this site was done to confirm the density of the bone at the site, as bone in the posterior maxilla is generally spongy
The Magnetic Mallet (Osseotouch) was used to initiate the sinus lift. The device was connected to a control unit, which modulated the timing of force application. (fig 4)
The osteotome was carefully placed, and the Magnetic Mallet generated controlled magnetic and shock waves to precisely lift the sinus membrane, minimizing trauma to the surrounding tissues (fig 5)

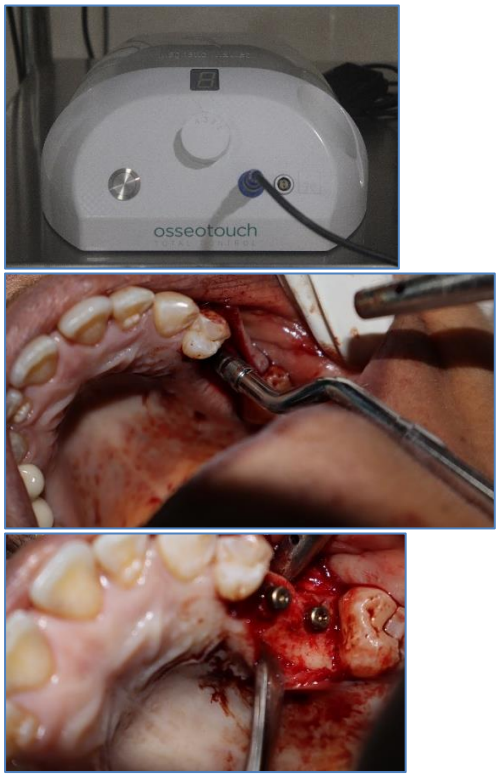

Figure 4, Figure 5 and Figure 6

The shock waves produced axial and radial movements, gently lifting up the sinus floor without creating stress on the bone and at the same time condensing as well as densifying the bone. Following which 3.75/10mm implant (Neodent GM Helix Acqua) was placed. Implant stability quotient was measured using a device using magnetic resonance frequency analysis (Osstell®, A W & H company). The recorded ISQ values were 76.
Cover screws (Height 2mm) for an uneventful healing and second stage surgery was scheduled post 4 months of implant placement. (fig 6)
The buccal flap was apically repositioned and stabilised with resorbable sutures [3- 0 vicryl (Ethicon) Johnson and Johnson Pvt Ltd]
Post surgery instructions were given, patient was prescribed antibiotics (Augmentin 625mg) and Non-Steroidal Anti-inflammatory Drugs (Zerodol SP)
Patient was asked to use mouthwash (Chlorhexidine ADS) for 15 days post-surgery and was also prescribed nasal drops (Otrivin) for 2 weeks post- surgery.

The radiograph was then taken to verify the position of implants. (fig 7)

Figure 7

Patient was recalled after 3 months for second stage and a CBCT was taken which revealed minimal bone loss. Implant stability quotient value obtained was 72. Following which abutment selection was done.

Figure 8

Figure 9

Selection of Abutments:

The choice of abutments included Universal abutments (Neodent: Straumann) of diameters
3.3/6/2.5 /17 degrees for 25 and 4.5/4/2.5 straight for 26. The abutments were selected using the abutment trail kit (Neodent: Straumann). Closed tray abutment level impressions were made with addition silicone impression material (3M ESPE) (Fig 10)

After a week a cement retained prosthesis (porcelain fused to metal) was done and post cementation instructions were given to the patient. (fig 11)

Figure 10 and Figure 11

Discussion:

Alveolar bone resorption is the most common complication post tooth extraction which ultimately influences the placement of implant thus reducing the treatment outcome as well as the prognosis.

Apart from this, there are other local factors such as the condition of the bone, type of the bone, location of the anatomical landmarks and patient systemic factors as well. Extraction technique depends on patient factors as well as clinicians skill and experience.

There have been various tooth extraction techniques i.e. elevators, periotomes and piezo-electric surgeries etc to create an atraumatic surgery thereby preserving the available bone. During extraction if there is bone loss, ridge preservation techniques can be done to achieve better bone during implant placement thus favouring the stability and overall prognosis of the implant. In addition to all these whilst implant placement there may be other complications that may be present in the form of decreased bone height, low lying sinus floor deviating the treatment options. Indirect sinus lift procedures or direct sinus lift procedures are the treatment options for such scenarios.

In indirect sinus lift procedures, there have been various techniques such as summers osteotomy using osteotomes, densification burs using densah burs, densification done with the implant drills, intracrestal lift and direct sinus lift using the lateral approach.

Summers osteotome is a minimally invasive technique which initially used progressively increasing osteotomes to lift the sinus however it was observed that the concave tip was lifting but at the same time tearing the bone resulting in sinus membrane perforation.[2] The concept of transcrestal approach was based on the implant supporting the membrane like a tent thus creating a space with clot which ultimately gets replaced by bone. These techniques are sensitive to variables such as the shape of the sinus floor, presence of sinus septae, Sinus membrane itself and the bone density. Thus, selection of patients is a key factor.[3]

Osseodensification was another technique that prepared the osteotomy by compacting the bone with use of specialized densah drills in a counterclockwise manner (2000 Spring Arbor Rd Suite D, Jackson, MI, USA)[4]. Osseodensification was less invasive and reliable in conserving the bone however some studies have noted a significant reduction is stability after 4 weeks [5]. Due to the limitations and most

commonly post operative symptoms by the patients, magneto dynamic tools are currently in use for such procedures.

The magnetic mallet showed improved precision in comparison to regular techniques simultaneous to preserving the bone and with controlled temperature which reduced the necrosis of bone [6]. Apart from sinus lift elevation these are also used in extractions, ridge splits, and implant site preparation. Since the mallet is designed in such a way that there is superior control which directs the forces in a constant motion thereby reducing post-surgical trauma.

The concept of magnetic mallet is based on generation of forces along the axis longitudinally which radially shifts the internal wall of the osteotomy causing a controlled fracture and break in the cortical bone thus preserving the bone tissue and maintaining the stability [7]. The literature supports the use of Magnetic Mallet as it causes less discomfort to the patient and also does not overheat the bone maintaining the crestal bone [8]. In another study done by Crespi et al it was noted that the implant survival was 96% after 24-36 months of follow up in implants sites placed with magnetic mallet Thus, magnetic mallet reduces the risk of complications and aids in implant survival [9]. However, studies are required with a long term follow up in sinus lift approaches

Conclusion:

Within the limitations of this report, magnetic mallet was shown to reduce the post operative complications experienced by the patients and improved control in complex situations requiring additional procedures such as sinus lift elevation. Patients were comfortable post surgery and had no post operative complaints.

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SINGLE TOOTH REPLACEMENT WITH IMPLANT SUPPORTED PROSTHESIS USING COMPOSITE GRAFTING TECHNIQUE.

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Abstract
Successful dental implant therapy requires adequate three-dimensional bone structure to ensure the implant is cocooned by the surrounding bony wall. However, tooth loss and aging often lead to bone resorption, compromising implant placement. Graft-less techniques like osseodensification and ridge splitting are effective for borderline defects, but additional bone grafting is essential for optimal soft tissue contour and aesthetic outcomes.
Bone graft materials, with osteogenic, osteoinductive, and osteoconductive properties, offer diverse options for bone augmentation. While autografts remain the gold standard due to their osteogenic potential, their high resorption rates and donor site morbidity present challenges. A 50:50 mixture of particulate autogenous and allografts combines the osteogenic potential of autografts with the low resorption rate of allografts, promoting bone growth and ensuring long-term stability.
This case report details the rehabilitation of missing anterior teeth with an implant-supported prosthesis. The treatment involved ridge splitting and lateral augmentation using a particulate autograft-allograft mixture. A one-year follow-up demonstrated sustained bone levels around the implants, highlighting the efficacy of the approach in restoring bone architecture and achieving optimal aesthetics.
Keywords: Dental implants, Bone augmentation, Ridge splitting, Autograft-allograft mixture, Bone resorption

Introduction

For an implant to be successful there must be adequate bone structure surrounding the implant three dimensionally. An implant must be protected by the cocooning effect of the bony wall. Unfortunately tooth loss and aging cause inevitable bone loss.
Graft less procedures such as osseodensification and ridge splitting have been successfully done for cases with border line defects. However, in order to get soft tissue contour, additionalbone grafting would be paramount to achieve the desired results. (1)

Various grafts are available at our disposal with osteogenic (new bone formation), osteoinductive (induction of bone formation) osteoconductive (scaffolding) properties.
Autografts remains the gold standard. However, auto- grafts have higher resorption rates and other drawbacks like donor site morbidity (2,3).

50:50 ratio of particulate autogenous versus allografts have been used successfully. The osteogenic potential of the autogenous grafts and the low resorption rate of the allografts isan ideal combination to promote growth of bone architecture required for optimum aesthetics. (4)

The following case report presents rehabilitation of missing anterior teeth with implant supported prosthesis. A ridge splitting procedure and lateral augmentation with particulate allograft with autograft mixture also was done. A one year follow upshowed sustained bone level around implants.

Case Report:
Preoperative Stage:
A male patient aged 30 years, presented to the department of Oral Implantology with missing upper front tooth due to trauma.

Fig. 1

(fig 1) Preoperative procedures such as facial profile analysis, intra oral examination and radiographic analysis were performed. The following were the findings.

Intra oral examination: 21 was missing ,11 had periapical lesion.

Smile line: The patient had a low smile line and a toothy smile. There was also a marked shift in the midline.

Patient expectations: Patient was co- operative and had moderate expectations of outcome.
Radiographic analysis; (fig 2)
OPG AND CBCT analysis indicated 16 mm bone height and bone width of 4 mm with a bucco- palatal hourglass shaped bone defect wrt 21.
Treatment planning: ridge splitting and immediate implant placement with lateral augmentation

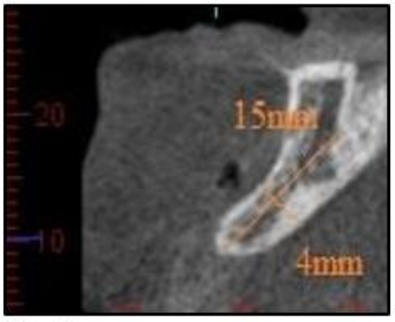

Fig. 2

Patient was advised oral prophylaxis, there after a root canal treatment wrt 11.
Diagnostic impressions were made, occlusion and vertical dimensions were established.

Surgical phase: Antimicrobial prophylaxis was obtained with the use of 500 mg of Amoxicillin thrice daily for 5 days, starting 1 day and 1 hour before surgery. 0.2% Chlorhexidine Gluconate mouth rinse was also prescribed one week and one-hour prior surgery. Perioral disinfection of the patient was done with 5% w/v Povidone Iodine solution.

The surgery began with the administration of local anaesthesia (2% lignocaine hydrochloride). A full thickness flap was elevated A sharp bone chisel was then positioned midcrestally and tapped using a mallet to create a minor split. Care was taken to manoeuvre the instruments as gently and firmly as possiblein order to avoid any inadvertent fractures. Ridge splitting was done using ridge expanders (ankylose set ridge expanders/Dentsply). Sequential splitting resulted in progressive increase of the diameter.

Ankylose straight osteotomes was then used to finalize the split (fig 3). Sequential osteotomy and reaming were done and Implant (ANKYLOS C/X A 11) was prosthetically driven 1mm sub- crestally.

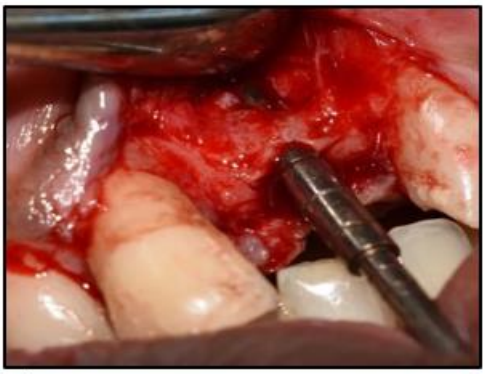

Fig. 3

Lateral augmentation was done with autogenous bone collected from the patient's osteotomy site and mixed with patient`s blood periosteal blood AND Ringer`s Lactate.

Fig. 4

Allograft also was mixed with this to make an osteogenic rich composite graft. A collagen membrane was then placed to cover the graft (fig 4)

A primary closure with everted edges was achieved with Vicryl 3.0 sutures. Immediate post-operative x-ray was taken. (fig 5)

Fig. 5

Post operative care: Postsurgical analgesic treatment was performed using 100 mg of aceclofenac twice daily for five days along with the antibiotics and mouth rinse. Oral hygiene instructions were provided. Patient was advised to return for suture removal and be on soft diet for 6 weeks

Prosthetic Phase: Patient was recalled for second stage surgery four months post-operative. Cover screw was retrieved noninvasively. A 3.0 wide diameter sulcus former was placed for 15 days and a provisional restoration with an ovate pontic design was delivered subsequently.

Patient was recalled for implant level impression. Regular non angulated abutments were selected (Regular C/X 3.0/A0). An orientation jig was used to confirm the placement of the abutment. Finally, the abutment was torqued(15Ncm) and sealed with Teflon and composite. The PFM crown was then cemented using Zinc Phosphate. (Fig. 6)

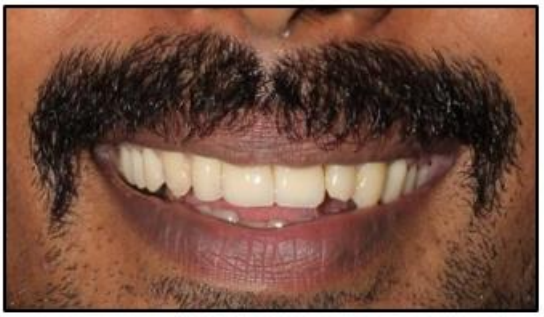

Fig. 6

A post cementation X-ray was taken to evaluate the abutment connection and the presence of excess cement.

Follow up: patient was advice peri implant care and given proper advice on oral health care. A one year follow up x-ray revealed intact crestal bone levels.

Discussion:

Implant placement in the aesthetic area comes with many challenges and is dependent on various factors. Therefore, a thorough diagnosis of the existing factors (anatomic and host response) and customised treatment planning (surgical, materials used and prosthetic

philosophies) is imperative.

In the above-mentioned case, the CBCT revealed 4-5mm of Buccolingual width. Although there was enough bone to place an implant, it would not guarantee an optimal prosthetic placement. It is also crucial to have 1mm of bone surrounding the implant in order to have successful (short and long term) outcome. A 2mm facial bone would be ideal. (5) Ridge splitting and bone expansion methods have been used with wide success rates. Splitting has to be done in cases there is adequate cancellous bone and residual ridge heights. It should be also noted that the thereinto excessive facial inclination of the bone. Inorder to recreate and follow the contour of the adjacent teeth, horizontal augmentation was also done.

Autologous bone is considered to be the gold standard due to its osteogenic, osteoinductive, and osteoconductive properties including lack of immunogenicity(6,7) However, autologous bone grafts may show a number of disadvantages, such as increased operation time, donor site morbidity, post-operative discomfort, limitations in bone quantity and volume, unpredictable bone quality, reduced volume stability, and fast resorption rate.

Furthermore, the intraoral amount of autologous bone collection from an osteotomy site is limited thus allograft are the next best choice. Demineralized freeze- dried bone allografts have osteoinductive properties as well that helps attract bone forming cells and ectopic bone formation. (7)

The combination of collagen membranes with autologous bone and a superficial layer of deproteinized bovine bone mineral (DBBM) is a widely used guided bone regeneration (GBR) technique(8)Thus the choice was made to use a mixture of autograft and allograft in the site.Autogenous bone shavings collected in the reamer was also mixed with the allograft along with the patient `s blood and ringer`s Solution collected from the osteotomy (periosteal blood) site .

In a study done by Aspurahova et al, Significant quantities of TGF-β1 (2.1 ng·mL−1, $P < 0.001$) were measured in BCM prepared with Ringer's solution (RS) within 10 minutes (8)Bone conditioned medium harvested for minutes induces genes encoding bone matrix proteins, but does not contribute to matrix mineralization, whereas BCMs prepared over days contribute to the progression osteogenesis. However, the autogenous bone chips collected were placed in the Ringers solution for 10 minutes.

Meanwhile a slow resorbable membrane was used as barrier membrane was packed against the soft tissue a pocket was created to receive the conditioned composite graft material.

Resorbable sutures were then placed making sure no membrane was impregnated during the procedure. This is done to protect the membrane from contamination.

After four months of healing period, the site showed well-formed soft tissue and sustained crestal

Bone levels. Thus, an if factors like patient expectations, defect morphology, adjacent teeth morphology 3D implant positioning and post operative care are favourable, hard tissue grafting would bring forth a successful outcome.

Conclusion:

Failure to achieve functional and aesthetic results in dental implants can have disastrous effect that could potentiate un necessary and additional waste of surgical and prosthetic interventions.It is therefore vital for a clinician to have proper understanding of the science that deals with implants and also tailor an effective treatment best suited for the individual.

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PROSTHODONTIC REHABILITATION OF A PATIENT WITH ACQUIRED MAXILLARY DEFECTS USING DIFFERENT OBTURATOR PROSTHESIS: A CLINICAL CASE REPORT

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Abstract
Maxillary defects can be congenital or acquired. Congenital defects include trauma, infection or surgical treatment of benign or malignant neoplasm. The maxillary defects affect the swallowing, mastication and speech thereby reducing the quality of life. Prosthodontists play an important role in rehabilitating maxillary defects. These defects can be rehabilitated using simple conventional obturator or by surgical reconstruction. This case report describes step by step clinical lab procedure for fabrication of surgical, interim and definitive obturator prostheses for rehabilitation of a patient with maxillary defects.

Keywords: Delayed surgical obturator, interim obturator, definitive obturator, maxillectomy, rehabilitation, closed hollow bulb obturator.

Introduction

Obturator prosthesis plays an important role in the recovery of oral function in post-surgical maxillectomy patients. [1] It also helps in restoring masticatory function and improving speech, swallowing, deglutition and esthetics. [2-5] The Glossary of Prosthodontic Terms defines an obturator as "A maxillofacial prosthesis used to close a congenital or acquired tissue opening, primarily of the hard palate and/or contiguous alveolar or soft tissue structures". [6] The primary goal of a prosthetic obturator is closure of maxillectomy defect and separation of oral cavity from sinonasal cavities. [7]
Prosthodontic management of patients with acquired surgical defects can be classified into 3 phases based on treatment. [8,9,10]
a) Surgical obturator: Immediate Surgical obturator and Delayed Surgical obturator
b) Transitional obturator or Interim obturator or Post surgical obturator
c) Definitive obturator
Surgical obturator: This prosthesis allows patient to take nourishment without nasogastric tube, enables patient to speak normally and promote healing of the surgical wound. Delayed surgical obturators are prostheses that are placed 6 to 10 days postsurgically. [11]
Interim obturator: This obturator is given after initial healing period and is fabricated from the post surgical impression cast. The patient is recalled every 2 weeks for relining or changing of the prosthesis because rapid soft tissue changes occurs within the defect.
Definitive obturator: It has to be fabricated after complete healing of the surgical wound. Fabrication can be carried out at

around 6 months after surgery. Timing will vary dependent on the size of the defect. This article illustrates a step wise method of rehabilitating a patient with acquired maxillary defect using surgical, interim and definitive single piece closed bulb obturator prosthesis.

Case Report

A 65-year-old female patient, who had undergone surgery for a maxillary tumor (squamous cell carcinoma) on the left side of the maxilla reported to the Department of Prosthodontics, postsurgically after 7 days for rehabilitation. Patient had undergone maxillectomy a week ago and was fed through naso gastric tube (Fig1).

Figure 1: Extra oral pre - treatment photograph: frontal view.

Figure 1: Extra oral pre - treatment photograph: frontal view.

Patient complained about nasal regurgitation of fluids, difficulty in chewing, speaking and compromised esthetics. Extra oral examination revealed the presence of nasogastric tube, depressed philtrum and cheek areas on the left side that restricts mouth opening. On intra oral examination, defect was noticed on the left side of the maxilla involving alveolar ridge, anterior and posterior part of hard palate and some parts of the soft palate (Fig 2).

Figure 2: Intra oral view of the defect

The defect was classified as Aramanys class IV defect. [12] Missing teeth were 11,21,22,23,24,25,26,27 and 28. All the teeth in the right quadrant were intact. Surgical site was inflamed and not healed. OPG was taken (Fig 3).

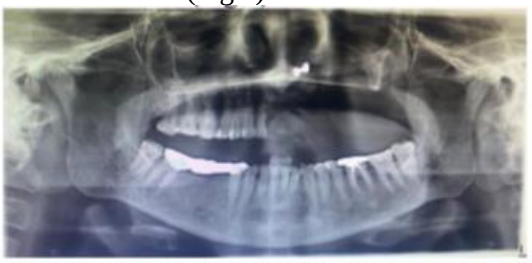

Figure 3: OPG showing the extent of maxillary defect.

A delayed surgical obturator was planned followed by interim and definitive obturator.

Procedure

1) First visit

After thorough clinical examination, Delayed surgical obturator was planned. Surgical defect was closed using gauze piece coated with petroleum jelly and Impression was made using irreversible hydrocolloid. Cast was poured using Type III gypsum product. Undercut areas in the casts were blocked with dental plaster. Circumferential clasp on premolar
and Adams clasp on molars
were given on the non resective side for retaining the prosthesis (Fig 4).

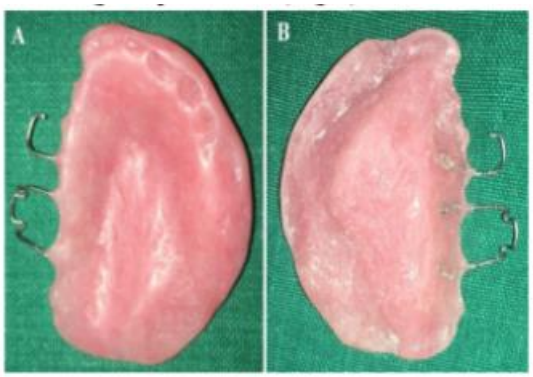

Figure 4: Delayed surgical obturator.

Prosthesis was delivered and post insertion instructions were given to the patient regarding its hygiene and maintenance. Patient referred back to department of Oncology for removal of nasogastic tube and for radiation therapy. Patient was recalled after 10 days.

2) Second visit

Patient reported back after radiation therapy. Surgical defect was examined and healing was satisfactory and was suitable for the fabrication of Interim obturator. Restricted mouth opening was noted (Fig 5).

Figure 5: Restricted mouth opening.

Primary impression of maxillary arch along with defect was made using irreversible hydrocolloid using custom made acrylic tray. A wrap around clasp was adapted on the remaining teeth of the non resective side (Fig 6).

Figure 6: Primary cast with wrap around clasps.

Jaw relation was carried out followed by try in and insertion of interim obturator prosthesis.

Patient recalled every 2 weeks for periodic evaluation and relining.

3) Third visit

Definitive obturator was planned after 6 months. Surgical site was evaluated for satisfactory healing (Fig 8).

Figure 8: Intra oral view of defect after 6 months.

Since restricted mouth opening (23mm) was observed, sectional custom impression tray was fabricated using dowel pin and sleeves and impression was taken using elastomeric impression material (Fig 9).

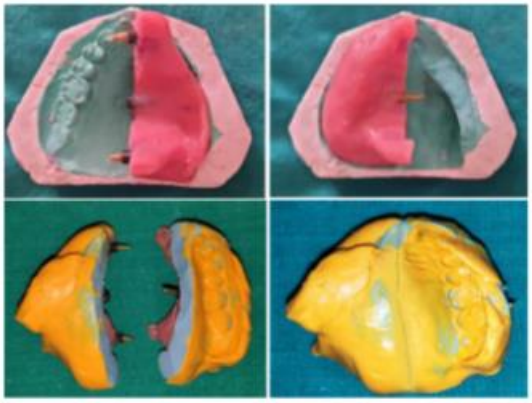

Figure 9: Sectional custom tray with dowel pins and sleeves and custom tray impression.

Master cast was poured and cast partial denture framework was planned using 3D printing technology. Framework was tried in patient's mouth followed by jaw relation (Fig 10).

Figure 10: 3D design of framework & cast partial metal framework

Try in was done followed by insertion of definitive obturator prosthesis.
Post insertion instruction were given and patient recalled for regular check up (Figure 11).

Discussion

In patients with surgically defective maxilla, the most common prosthesis of choice for rehabilitation is the obturator. The degree of obturator extension in to the defect varies according to its configuration, characteristics of lining tissue, and functional requirements for stabilization, support and retention of the prosthesis. [13] Fabrication of prosthesis in case of post surgery of maxillary defect is extremely important for restoring mastication, speech, respiration and esthetic when large amount of oro-facial structures are lost. [14]

It has been reported that patient has undergone maxillectomy, radiotherapy, trauma, burns etc may present with limited mouth opening [15,16] . In this present clinical report patient had restricted mouth opening and it was difficult to make impression using metal stock tray. Sectional custom impression tray with dowel pin attachments were used. [17] Advantage of sectional custom tray is that it can be removed as two separate segments and externally assembled as one. Dowel pins are economical and are easily available.

Mainly two types of obturator prosthesis are available: open and closed hollow bulb. In this present case closed hollow bulb obturator is used as it prevents water retention and food accumulation, it is also easy to clean and has reduced weight. Open bulb obturator tends to accumulate food, debris and mucous inside the hollow part increasing its heaviness and also difficult to clean and polish.

In this present case, delayed surgical, Interim obturator and cast partial denture framework attached definitive obturator were fabricated. Park and Kwon suggested the use of delayed surgical obturator as an alternative to immediate surgical obturator during the initial healing phase after maxillectomy, with out increasing patients discomfort. [18 It was fabricated to create a barrier between oral and nasal cavity, and also enable the patient to start with an oral diet. Major limitation of delayed surgical obturator was lack of esthetics during early rehabilitative phase and this was overcome by the second phase of rehabilitation i.e, Interim obturator. [19] Interim obturator was fabricated 20 days postsurgically. Interim obturator was used to protect post surgical defect from fluid contamination and resultant infection till complete closure of the defect occurs [20]

Definitive obturator was fabricated with cast partial metal framework. The advantages of the cast metal framework are the longevity of the prosthesis and thermal conductivity which made it sensitive to temperature

changes. [21]

Conclusion

The challenges faced in rehabilitating a hemi-maxillectomy patient is to fulfill the basic requirements of adequate retention, stability and support. Prosthodontist play a vital role in complete rehabilitation of the palatal defect. In this present case report deals with oral rehabilitation of palatal defects with delayed surgical, interim and definitive obturator has not only improved the psychological health and esthetic of the patient but also uplifted the quality of life.

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SURVEY OF DEPRESSION STATUS IN DENTAL SCHOOL STUDENTS OF RAJARAJESHWARI DENTAL COLLEGE AND HOSPITAL, BENGALURU.

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Introduction

Depression is categorized by anhedonia, low energy level, worthlessness, insomnia, disturbed appetite, and cognitive problems. It could be chronic or recurrent as it effects and impairs individuals' function at work by weakening the individual abilities to understand and respond to difficult situations[1].

Mental health has a profound effect on individual, interpersonal and institutional aspects of a student's life. It also affects their academic performance, use of effective learning strategies and completion of education.[1,] [2]Behavioural problems in students have a huge impact on peers, faculty, and staff in an institution. These problems also affect the institutional management system in terms of legal challenge that they pose.[1] Mental health problems are known to be highly prevalent among college students. Stress, anxiety, and depression were the three important factors affecting academic performance of the students.[3]

An increasing trend is observed in the prevalence of severe psychological problems in students over past few years. The depressed students may show symptoms such as reduced concentration, loss of interest, loss of energy and disorder in sleep pattern, which could negatively affect students' school performance [4-10]. It is very important to identify the depressed individuals before the depression worsens, so that they may be effectively managed.

This also has important ramifications for meeting the professional requirements of their course.

Materials and Methods:

A cross-sectional study was conducted among the dental undergraduates of Rajarajeswari Dental College in Bangalore during May 2018 to October 2018. All undergraduate students who were present on the day of the survey, were considered eligible to participate.

The Institutional Ethical Committee approved the study. The participating students filled out the questionnaire which was anonymous, and only collected the following socio-demographic data: age, gender and year of study.

Data collection:

The forms were filled in a class room, and collected at the end of the lesson. The Beck Depression Inventory (BDI-II) consisting of 21 items estimates a subject's level of depression scored on a 4-point scale, where for each question the subject circles their current feeling.

The BDI-II is scored as the sum of all the answers to each question. 63 is the highest possible total, with zero being the lowest total. Total scores are compared to the BDI-II Index to determine a subject's "Level of Depression." the levels of depression were classified as;

1-10 these ups and downs are considered normal.

11-16 Mild mood disturbance.

17-20 Borderline clinical depression.

21-30 Moderate depression

31-40 severe depression

Over 40 extreme depression

Results of the study:

A total of 180 students participated and completed the research questionnaire. Of these, 70.68% were females, conforming with the recent trends in dental college demographics in India. Depression levels were normal in 63.3%, mild mood disturbance in 21.1%, borderline clinical depression in 5.6%, moderate depression in 7.2% and severe depression in 2.8% of the study population.

Table 1

Distribution of depression levels among study participants [N=180]		
Depression levels	n	%
Normal	114	63.3%
Mild mood disturbance	38	21.1%
Borderline clinical depression	10	5.6%
Moderate depression	13	7.2%
Severe depression	5	2.8%
Extreme depression	0	0.0%

TABLE II

Gender wise comparison of distribution of Depression levels among the Study Participants using Chi Square Test						
	Males [n=48]		Females [n=132]			
Depression Levels	n	%	n	%	χ^2 Value	P-Value
Normal	33	68.8%	81	61.4%	4.424	0.35
Mild Mood Disturbance	7	14.6%	31	23.5%		
Borderline Clinical Depression	1	2.1%	9	6.8%		
Moderate Depression	5	10.4%	8	6.1%		
Severe Depression	2	4.2%	3	2.3%		

Table 3

Frequency Distribution of Beck's Depression Inventory Symptoms among the study Participants								
Beck's Depression Inventory Symptoms	Score 0		Score 1		Score 2		Score 3	
	n	%	n	%	n	%	n	%
Sadness	91	50.6%	73	40.6%	10	5.6%	6	3.3%
Discouraged	139	77.2%	28	15.6%	7	3.9%	6	3.3%
Failure	147	81.7%	25	13.9%	7	3.9%	1	0.6%
Satisfaction	120	66.7%	39	21.7%	13	7.2%	8	4.4%
Guiltiness	93	51.7%	76	42.2%	10	5.6%	1	0.6%
Punishment	131	72.8%	37	20.6%	6	3.3%	6	3.3%
Disappointment	120	66.7%	52	28.9%	4	2.2%	4	2.2%
Blame	107	59.4%	37	20.6%	27	15.0%	9	5.0%
Suicidal Thoughts	161	89.4%	13	7.2%	3	1.7%	3	1.7%
Crying frequency	130	72.2%	35	19.4%	1	0.6%	14	7.8%
Irritation	94	52.2%	67	37.2%	13	7.2%	6	3.3%
Level of Interest	89	49.4%	66	36.7%	17	9.4%	8	4.4%
Decision making	130	72.2%	25	13.9%	17	9.4%	8	4.4%
Attractiveness	144	80.0%	23	12.8%	10	5.6%	3	1.7%
Ability to work	108	60.0%	53	29.4%	13	7.2%	6	3.3%
Quality of sleep	134	74.4%	38	21.1%	6	3.3%	2	1.1%
Tiredness	92	51.1%	68	37.8%	15	8.3%	5	2.8%
Appetite	124	68.9%	41	22.8%	11	6.1%	4	2.2%

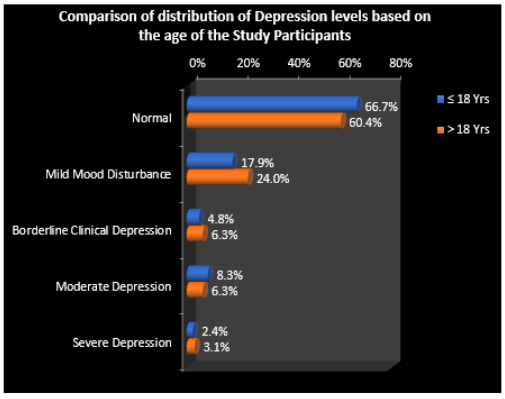
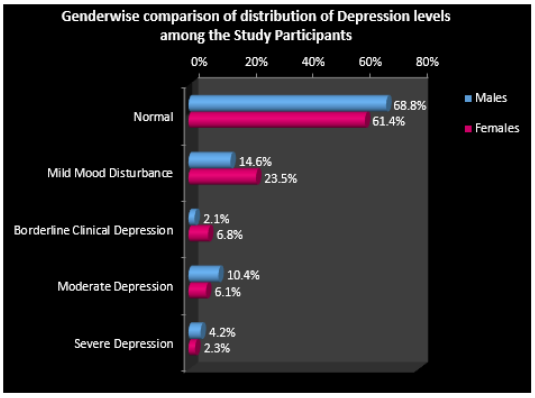


Figure 3:



Discussion:

Depression can be taken as reliable indicator for assessment of mental illness in a community. The emotional status of students during medical school training has been a concern, reported as early as 1956.as it may affect the overall performance of students and lead to cascade of consequence at both personal and professional levels.

Stress levels and perceived sources of stress among dental students were investigated by using various scales such as, MBI, PSSI, BSI and PGWB index.[7.] in this study BDI-11 was used to score the degrees of depression.

The results of this study indicate that 37% of dental students had varying levels of depression. The present findings seem to be in agreement with research among dental students from other countries. Also, a higher percentage of older students rated positive for any mood disturbance, though the differences are not statistically significant. [6,7,8,9]

Table 1 explains the distribution levels among study participants, out of 180 participants: nearly one in 10 dental students had moderate or severe depression. After completion of the study, according to the survey results the symptomatic students were given psychological counselling and few students underwent the ICAGD computer guided coronoplasty.

Table II explains the gender wise comparison of distribution of depression levels among male and female students. Depression levels in female students were more when compared with male

students even between the different levels of depression.

Table III explains about 3 to 8% of the student population had crying tendencies, blaming tendency, level of interest and decision-making deficiencies at severe level. Female students had more issues than male students.

The results of this study cannot ben generalized to all dental students because the study only investigated dental students in one of the dental colleges. Thus, this is the limitation of this study.

Conclusion:

The findings of the present study suggest that the awareness of students and academic staffs about depression and its negative effects should be increased. The dental school administrators should enable counselling service, offering mental health assistance and increased social activities.

Clinical trials are great way to help further research regarding depression symptoms and also to get access to care from experts in the field.

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