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Contact: **Dr Manoj Shetty**, Department of Prosthodontics , A B Shetty memorial institute of dental sciences.Deralakatte.Mangalore 575018
email: drmanojshetty@gmail.com, Mob: 9845267087

Technical Support: **A1 Logics,** # 5-4-172/2, 1st Floor, 'Takshila', Near Hotel Janatha Deluxe Pathumudi, MG Road, Mangalore, Karnataka, India-575003, Ph:0824 4252005

Editorial

Trends of Research

Research is a systematic approach to attain answers to the unknown.It is imperative that results of those studies must be disseminated to the fellow colleagues and general public. And as the editor of this research journal ,I find it important to uphold our publications at the utmost integrity and ethical standards.

However, there is a recent upsurge in unscrupulous predatory publications which unequivocally diminishes the quality of the knowledge attained by the learners.

Self citations ,plagiarisms, dilution of the research and pay-to-publish concepts are rising to unprecedented levels. Such research with *v*iolation of core values of scholarly conduct effects the authors but also the readers perception. This would hamper the current as well as future research application. As a researcher let us not get reeled in to this line of publishing ruse.

Lets work together to update and promote our knowledge stores with the changing needs of the society ,scientific trends and technology.

Dr. Manoj Shetty (MDS, Prostho)
Professor & Head-Department of Oral Implantology
AB Shetty Memorial Institute of Dental Sciences
Nitte Deemed to be University, Mangaluru, India

COCKTAIL IMPRESSION TECHNIQUE: A DEFINITIVE APPROACH TO RESORBED MANDIBULAR RESIDUAL RIDGE

[1]Dr Nitesh shetty, [2]Dr Shrinidhi Patla, [3]Dr Arya R, [4]Dr Haifa B, [5]Dr Amritha Sandhu

[1] Professor & HOD, Department of Prosthodontics, Srinivas Institute of Dental Sciences, Mukka, Mangalore, Karnataka, India

[2] Post Graduate Student, Department of Prosthodontics, Srinivas Institute of Dental Sciences, Mukka, Mangalore, Karnataka, India

[3] Post Graduate Student, Department of Prosthodontics, Srinivas Institute of Dental Sciences, Mukka, Mangalore, Karnataka, India

[4] Professor, Department of Prosthodontics, Srinivas Institute of Dental Sciences, Mukka, Mangalore, Karnataka, India

[5] Assistant Professor, Department of Prosthodontics, Srinivas Institute of Dental Sciences, Mukka, Mangalore, Karnataka, India

ABSTRACT: Residual ridge resorption process is the reduction in size of the bony ridge under the mucoperiosteum. The management of highly resorbed ridge has always posed a challenge to the prosthodontist for years. In particular, Atwood's Order V and Order VI pattern of bone resorption is associated with difficulties in providing successful dentures. The objective of a complete denture prosthesis is restoring aesthetics, comfort, and function by the replacement of missing dental and alveolar structures employing a stable prosthesis. This clinical case report outlines the use of one different impression technique to improve mandibular denture stability in an atrophic mandibular ridge.

Keywords: Impression technique, Atrophic mandibular ridge, Cocktail impression technique, Functional impression technique, Dynamic impression technique.

INTRODUCTION:

Prosthodontists often struggle with an atrophic resorbed ridge while dealing with complete dentures, which results in a lack of stability and retention of the denture. Residual ridge resorption is a complex biophysical process and a common occurrence following extraction of teeth [1]. Ridge atrophy is most aggressive during the first year after tooth loss followed by a slower but more progressive rate of resorption thereafter. Severely atrophied ridges are a more common finding with the mandibular residual ridges than the maxilla because the mandible resorbs at a faster rate than the maxilla. Achieving maximum stability and retention may be especially important for older patients with resorbed mandibular residual ridges. Atwood categorized ridge form into six orders ranging from pre-extraction state (Order I) to the atrophic depressed mandibular ridge (Order VI) [2, 3].

For resorbed ridges, an accurate impression is crucial to creating peripheral contours that accommodate normal muscle function and ensure peripheral adaptation without allowing air to penetrate between the denture base and the mucous membrane to overcome dislodgment of lower denture. The dislodgement of the denture occurs due to the muscle attachment which lies closer on crest of ridge. A good impression holds the key to a successful treatment in cases of resorbed mandibular ridges. No matter how good the prosthesis is constructed, it will not function as intended if it was not made using an accurate impression. The journey towards successful denture fabrication for such resorbed ridges begin with an accurate impression that will help to ensure that the complete denture is stable which provides physiological comfort to the patient.

The use of ridge augmentation and implants is generally advocated for such patients. However, it may not always be possible. Therefore, conventional dentures can have an equivalent positive impact on the health-related quality of life. In this clinical case report, a definitive impression technique is used to ensure better reproducibility and stability in a resorbed mandibular ridge which is referred as Cocktail Impression Technique.

CASE REPORT:

A 70-year-old female patient reported to the Department of Prosthodontics and Crown and Bridge and Oral Implantology at Srinivas Institute of Dental Sciences, Mukka, Mangalore with a chief complaint of loosening of lower denture. Dental history revealed that she lost all her teeth due to periodontal reasons. Medical history was insignificant. The patient was apparently in good health and did not report any systemic disease. Patient was a denture wearer for 10 years but not satisfied with the prosthesis due to poor stability. On intraoral examination, a highly resorbed mandibular ridge was observed. There was no hypermobile tissue on palpation [Figure 1]. Various treatment options were explained to the patient such as ridge augmentation procedures followed by conventional complete dentures, implant-supported prosthesis, and conventional complete dentures following different impression technique. Advantages and disadvantages were also discussed with the patient. Due to patient's compliance, cost factor, and surgical procedure involved, the patient decided to go for conventional complete denture as a treatment option. The patient was informed about the study and an informed consent was taken.

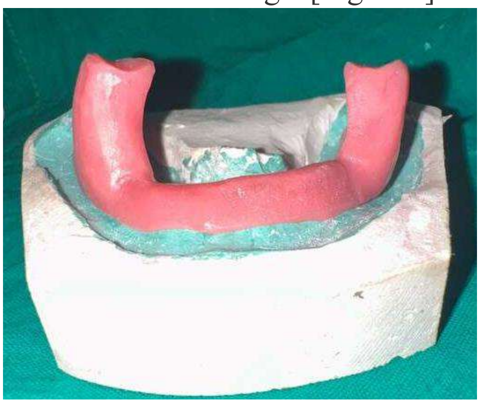
Figure 1: Resorbed mandibular ridge.

PROCEDURE:

1) Primary Impression of the maxillary arch and mandibular arch was made using Irreversible Hydrocolloid material [Figure 2].

Figure 2: Conventional Alginate impression

2) The custom tray was fabricated with auto polymerizing acrylic resin for secondary impression. One-millimetre wax spacer and cylindrical mandibular rests in the molar region were made at a tentative vertical height where impression compound can be added later on to increase the vertical height [Figure 3].



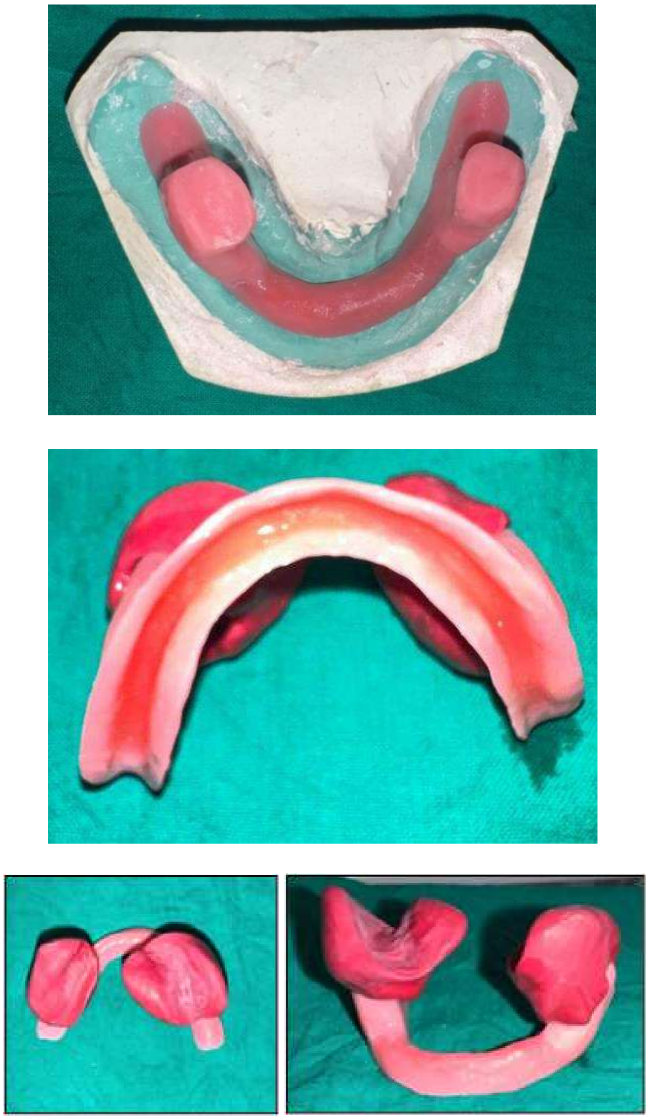


Figure 3: Custom tray fabricated with mandibular rests at increased vertical

3) The custom tray was inserted into the patient's mouth and the patient was advised to close her mouth so that the mandibular rests fit on the maxillary alveolar ridge which helps in stabilization of the tray for impression making procedure [Figure 4].

Figure 4: Custom tray with mandibular rest in patient's mouth

4) Mccord and Tyson's technique for flat mandibular ridges is followed for definitive impression. Impression compound (DPI Pinnacle, The Bombay Burmah Trading Corporation, Mumbai, India) and green tracing stick (DPI Pinnacle Tracing Sticks, The Bombay Burmah Trading Corporation, Mumbai, India) in the ratio of 3:7 parts by weight is placed in a bowl of water at 60°C and kneaded to a homogenous mass that provides a working time of about 90s [4]. Wax spacer is removed, this homogenous mass is loaded and patient is guided to close his mouth on the mandibular rests [Figure 5].

Figure 5: Definitive impression using Mccord and Tyson's technique

5) For recording the functional state, patient is instructed to run his tongue along his lips, suck in his cheeks, pull in his lips and swallow by keeping his mouth closed, as in closed mouth impression technique, till the impression material hardens [Figure 6].

Figure 6: Patient performing functional movements with custom tray in position.

6) On removal from the mouth, impression is chilled and reinserted to check the denture bearing area for pressure sensibility by applying heavy finger pressure on the impression to simulate functional loads [Figure 7].

Figure 7: Impression is chilled and reinserted

7) The operator should place the thumbs on the underside of the patient's mandible and squeeze. If the mucosa has been properly loaded, the only discomfort that the patient should report is where the thumbs press on the lower border of the mandible.

8) Reheating the impression in whole or part, or adding more material to deficient areas should not be done as this will result in flow of material which in turn will result in differential loading of the tissues.

9) The retrieved impression is visually inspected for surface irregularities, disinfected and poured [Figure 8].

Figure 8: Final impression (McCord and Tyson)

10) Maxillary and Mandibular Master cast obtained after beading and boxing of the secondary impression [Figure 9].

Figure 9: Maxillary and Mandibular Master cast

11) Denture base with occlusal rims fabricated on the master cast [Figure 10a]. Maxillomandibular relations were recorded and mounted on an articulator [Figure 10b].

Figure 10a: Denture base with occlusal rims

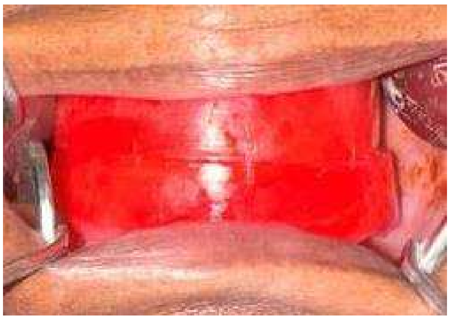


Figure 10b: Jaw relation

12) The trial denture was verified in the patient's mouth [Figure 11a] and the denture was processed and finished Figure 11b].

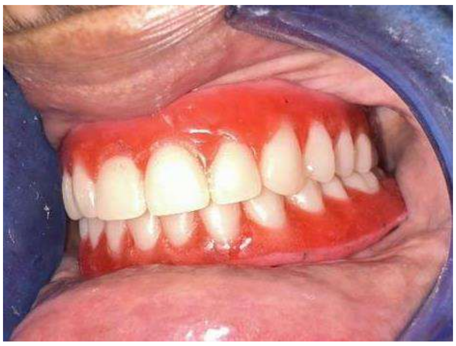


Figure 11a: Try in

Figure 11b: Processed and finished complete denture

13) Complete denture insertion and occlusion checked [Figure12]

Figure 12: Complete denture insertion.

14) Patient recalled after 2 weeks [Figure13].

Figure 13: Recall

15) Pre-treatment and Post- treatment photographs [Figure14].

FIGURE 14: Pre and Post treatment photographs.

DISCUSSION:

Every patient needs unique treatment planning. Fabrication of stable lower denture is strenuous procedure for any dentist especially in the compromised ridge cases. The journey to achieving a successful denture fabrication starts with their precise impression that will provide more retention and stability to final complete denture. Following extraction residual ridge will show diminished quantity and quality due to ridge resorption. In atrophic mandible, problem arises from inability of residual ridge and its overlying tissue to withstand the masticatory forces [6]. The muscle attachment which are located near to crest of ridge have greater dislocating effect of muscle.

A considerable emphasis is placed on impression technique, as recent studies indicate that flawed impression count for the majority of the dental problems. Two principle forms that must always be considered are lower impression tend to be short of retromolar pads and do not accurately record the functional forms of the floor of the mouth and the retro mylohyoid fossae [7]. The technique described here utilizes the customized tray fabricated according to Dynamic impression technique described by Tryde et al., impression material recommended by McCord and Tyson's technique for atrophic mandibular ridge [4] followed by functional impression as in closed mouth impression technique.

The word "Cocktail" refers to the combination of different impression techniques to obtain a definitive impression [5]. Custom tray that is fabricated in this technique has the advantage of avoiding the dislocating effect of the muscles on improperly extended denture borders, and complete utilization of the possibilities of active and passive tissue fixation of the denture. (Brill et al., 1965). Mandibular rests that are fabricated at an increased vertical height will fit against the maxillary alveolar ridge which offers the advantage to stabilize the custom tray by preventing horizontal displacement of the tray during definitive impression. These features of the tray directly result in the impression material being shaped by the functional movements of the muscles and muscle attachments that border the denture base by the patient. For recording the functional position of the muscles, impression material recommended by McCord and Tyson for atrophic mandibular ridges was used [4]. This homogenous material permits to mould an impression of sufficient viscosity to obtain the definitive impression in a single step. The working time of 90 s is sufficient to allow the patient to perform all the functional movements. Combination of impression compound with green stick is used as recommended by McCord and Tyson for definitive impression, because this has better body, requires less chair side time and economical as compared to tissue conditioner or reline material. During the entire procedure, custom tray is stabilized by mandibular rests to obtain an accurate, stable, single step, functional impression. This technique helped in stabilization of the tray while recording the functional impression which resulted in better reproducibility, retention, and stability of the final prosthesis [5]

CONCLUSION:

To attain the patient's aesthetic and physiological needs, the impression techniques must be modified to gain desired outcome. This article highlights the impression technique to achieve effective retention, stability and support for Atwood's Order VI ridge deformities. Moreover, necessary steps to prevent further damage to patient's already vulnerable residual ridge are taken into consideration. It is an economical and effective way of rehabilitation in a patient with compromised ridges, thereby improving the function.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient (s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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DIGITIZATION IN DENTISTRY: REVOLUTIONS AT CROSS ROAD

Dr Rony T Kondody[1], Dr. Nagaraj E[2], Dr. Rashmi P Karschi[3], Dr. ManjushaNambiar' Dr Bhavya Shetty[5*]

1. Department of Orthodontics and Dentofacial Orthopedics, Sri Rajiv Gandhi College of Dental Sciences, Bangalore. Email:ronykondody55@gmail.com **ORCID:** 0000-0002-4382-8428
2. Department of Prosthodontics. PMNM Dental College and Hospital. Bagalkot. Email id:dr_nagaraj_e@yahoo.co.in
3. Department of AI and ML. Nagarjuna college of Engineering and Technology, Bangalore. Email:rashmikarchi@gmail.com
4. Department of Periodontics. Sri Rajiv Gandhi College of dental sciences, Bangalore. Email id: drmanjushanambiar@gmail.com **ORCID ID**: 0000-0002-9791-0558
5. Department of Periodontics. Faculty of dental sciences. Ramaiah university of applied sciences. Email:bhavyashetty123@gmail.com

*Corresponding Author
Dr. Rashmi P Karschi. Department of AI and ML. Nagarjuna college of Engineering and Technology, Bangalore.
Email:rashmikarchi@gmail.com

Abstract

Over the past few decades, the field of dentistry has faced varying challenges which has paved the way for the emergence of a digital world that has revolutionized the way dentist practitioners address their practice and patient care. This has changed the focus of dentists in handling the latest technologies in diagnosis and treatment planning which encompasses a range of technologies such as CAD/CAM, 3D printing, artificial intelligence and web-based communication technologies, etc. However, with the technologies replacing human involvement, questions still arise about the potential risks associated with these applications concerning the privacy of patients' information, ethical considerations, and others. This review focussed on providing overall information regarding benefits, limitations, and recent advancements that have happened as a part of dental digitization and also its influence on dental education as well as its effects on the overall practice of dentistry

Introduction

Today's digitization is reshaping every aspect of our daily lives and is also having a wide range of effects on the fields of medicine and dentistry, from electronic data-keeping and analysis to the latest diagnostic tools, cutting-edge prevention strategies, and ground-breaking treatment options.[1] While practice management tools and web-based education programs have also recently had a favorable impact along with newer virtual reality (VR)-based dentist instruction program has also made significant progress thanks to simpler human-computer interfaces.[2]

Another significant development that has been made has to do with machine learning and artificial intelligence. Future dental applications and restorations are anticipated to be automated through the use of artificial intelligence (AI), and these technologies' image analysis capabilities are anticipated to continue to advance.[3] On the other hand, the creation of dental appliances using computer-aided design and manufacturing is becoming more and more commonplace globally.[4]

Along with this development, web-based communication technologies are becoming more and more prevalent, especially in rural as well as in underdeveloped areas where there may be a lack of dental practitioners or limited access to oral healthcare, as a result of the expanding availability of high-speed internet and mobile devices. This can lead to reduced inequities in dental treatment and an improvement in the general oral health of the population. Therefore, by enhancing treatment outcomes, cutting down on treatment time, and increasing access to care, these developments have the potential to transform dental care.[5]

Additionally, the socioeconomic impact of research in digital dentistry may be substantial, enhancing patient outcomes, lowering costs, and increasing access to care.[6] By offering more precise and tailored therapy recommendations, cutting down on treatment time, and raising patient awareness, digital technology can assist in enhancing treatment outcomes.[7]

With the advancement of technology, procedures that were once thought to be too difficult to complete are now a routine aspect of dental care. Along with more personalized and comfortable treatments, recent years have seen a considerable improvement in overall patient satisfaction. Given these advantages, previously irrational upfront investments in cutting-edge technology become a practical substitute for analog techniques or manufacturing offshore. This review's main goal was to comprehend contemporary developments in digital technology related to dental practice.

Artificial intelligence in Dentistry

Over the last few years, AI-based technologies have become a mainstay of dental practice. Recent developments in computing infrastructure, machine learning, and digitized data collecting have allowed AI applications to spread into fields previously regarded to be the domain of human knowledge. AI can significantly enhance patient care and transform the medical and dental industries. AI is also being researched in dentistry for several uses, applications include making more accurate and efficient diagnoses, decision-making, treatment planning, and prediction of treatment outcomes thus reducing workload in day-to-day practice.[8]

Nowadays, dentists depend more on digital programs to make their routine choices in their patient management.[9,10] On the other hand, dental computer programs are improving in intelligence, accuracy, and dependability. All areas of dentistry are now engaged in AI research.

Even though there are many advantages, there remain some limitations. The main issues faced by AI systems include the limitations in administration and also sharing of clinical information. The initial training of AI algorithms as well as ongoing training, validation, and enhancement require personal data from patients.

Also, the development of AI will promote data sharing across multiple institutions and, in some circumstances, across international borders. AI must be integrated into healthcare operations while modifying systems that protect patient confidentiality and privacy.[11] So, before thinking about a wider distribution, personal data must be anonymized.[12] Even if these protections are technically possible, the medical community is dubious about secure data sharing.

Web based communication/ Teledentistry

The healthcare system is evolving quickly in the age of technology and connectivity where hospitals have incorporated several communications methods which are called telemedicine".[13] As a subset of telehealth, telemedicine uses communications networks to deliver medical facilities and education, particularly to address issues like unequal access, a lack of infrastructure, and a shortage of human resources. Together with telemedicine, teledentistry is a branch of telehealth that focuses on dentistry and was created by combining interactive tools, telecommunications, and dentistry.[14]

Consultation between a dentist, specialized specialists, and a patient can happen in real-time via video calling or conferencing. For diagnosis, they can swiftly analyze clinical and general data, medical history, radiographic images, and laboratory results. Real-time visuals and improved comprehension between the patient and the doctor are made possible by this interactive method.[15,16,17]

This field recently included remote patient management. With this approach, dentists or other medical professionals can simply send patients to clinical facilities after receiving precise information about their medical conditions directly from the patients' homes. The primary benefit of this approach is that it lowers healthcare expenses.

Dental Education

Dental education and patient care have been completely transformed by digital technology, ushering in a new era of accuracy, effectiveness, and patient-centered treatment. One of the most important developments is digital radiography, which substitutes digital images for conventional X-rays to reduce radiation exposure and improve diagnostic capabilities.[18] In the case of dental education here are three key elements: simulated training courses, clinical skills training, and lectures/tutorials and problem-based learning (PBL) interactions.[19]

While one of the most significant advancements in dental education is the use of virtual and augmented reality (VR/AR) in training. These technologies provide a unique learning experience that allows students to practice dental procedures in a simulated environment without the risk of causing harm to patients.[20]

Limitations and challenges in Digital Dentistry

Cybersecurity risks and patient privacy violations could be a drawback of digital dentistry. Dental professionals must make sure that they have sufficient security measures in place to secure patient information because digital photographs and patient data are susceptible to cyberattacks.[21] Finally, due to worries about job loss and automation, some dental professionals may be reluctant to accept digital technologies. It is crucial to understand that digital dentistry does not aim to replace dental professionals, but rather to improve patient care and their capabilities.[22] But digital dentistry is a discipline that is continually changing. AR, VR, and ML will all be used in the future of digital dentistry.[23,24]

Although the use of digital technologies can increase the precision of diagnoses and treatment planning, an overreliance on these tools could result in incorrect diagnoses or subpar treatment results. To produce the greatest patient outcomes possible, dental professionals must combine the use of digital technologies with clinical judgment and knowledge.[25]

Conclusion

Dental professionals now have more precision, efficiency, and accessibility because of the advancements in digital dentistry. The dental industry has changed as a result of developments in imaging, CAD/CAM technology, 3D printing, and regenerative dentistry. Digital dentistry's capabilities could be improved in the future by technologies like teledentistry, augmented reality, and artificial intelligence. With breakthroughs and technology constantly being developed, it is true to say that the future of digital dentistry is exciting and bright. It is also critical for dental practitioners to keep up with the most recent developments and moral considerations as the use of digital technologies in dentistry expands.

BARIUM SULFATE STENT FOR PREOPERATIVE ASSESSMENT FOR PLANNING OF OPTIMAL CLINICAL OUTCOME.

Dr. Rakshith Hegde [1], Dr Deepa balwani [2 *]

1 Professor, Department of Prosthodontics and crown and bridge, A.B Shetty Memorial Institute of Dental Sciences, Mangalore.

2 PG student , Department of Prosthodontics and crown and bridge, A.B Shetty Memorial Institute of Dental Sciences, Mangalore.

* Corresponding Author

ABSTRACT:

Implant restorations need detailed presurgical planning before implant placement for successful clinical outcome. Now a day CBCT are used extensively in clinical practice to evaluate the underlying bone substrate.
Radiopaque markers are used to identify specific areas. Radiopaque template allow imaging of the restoration contour in related to bone substrate.In this article we added barium sulfate in acrylic resin to make diagnostic template.

INTRODUCTION:

On the examination of the reconstructed cross section images of cbct, the radiographic markers can be identified in the specific areas for preoperative assessment purpose before implant placement. In this way using radiographic template the desired implant axis can be correlated to the existing bone substrate and the contour of the planned restoration that may contribute significantly to the treatment planning and provide the clinician with valuable information.
Implant restorations need detailed presurgical planning before implant placement for successful clinical outcome. CT-Dental scan and Cone Beam Computer Tomography (CBCT) are used extensively nowadays in the clinical practice, in order to investigate the bone substrate, bone anatomy before implant surgery.
The most common types of diagnostic templates are constructed from autopolymerizing resin with radio-opaque materials used as markers to determine specific anatomical areas. As radio-opaque markers various materials have been used, including **metal rods, titanium rods, guttapercha, barium sulfate etc.** [(1)]

Need for presugical implant planning:
Computer-Aided Examinations (CBCT or CT Dental Scan) offer great help in presurgical planning for successfully implant treatment.Detailed imaging is necessary in order to determine the desired implant axis related to the bone substrate.
The representation of the restoration contour offers also valuable information as the implant axis can be determined (or modified) according to the contour of the planned restorations.The insertion of implants in prosthetically favorable position may prevent later problems and complications during the clinical function of the implants. [(1)]

Various material used as radiopaque markers:

Various materials have been proposed as radiopaque markers in the drill holes as guttapercha, titanium rods and silicone. Other materials have also been used as radiopaque coverage for the outer surface of the template as zinc foil or guttapercha diluted in chloroform. [(2-4)]
Barium sulfate has also been proposed as radiopaque material added in the mass of acrylic resin. Amalgam powder is also used for sharpening the CT-Scan image. [(5,6)]

Advantages of radiopaque template

-The presented technique is simple, cost- and-time effective and requires no additional equipment.

-It is dimensionally stable and rigid. [7]

-Barium sulfate is nontoxic, tastless, white in color and odourless material. [7]

Case report
Screening of the patient:
Clinical examination: A 18 year old male with a chief complaint of partial edentulism in the upper region. On clinical examination hypodontia with two rudimentary teeth was noticed in the maxillary region. Mandibular region had full complement of teeth. Patient medical history did not reveal any syndromes neither was it suggestive of any family inheritance.
On **radiographic examination** impacted teeth were evidenced with poor radiographic densities. The bone height and bone width were compromised Before planning the treatment modality ,a comprehensive outlook of the architecture of the bone is imperative.
A tentative maxillomandibular relationship was recorded. Trial was done with the existing dentition. A single maxillary tooth supported overdenture was fabricated .This denture was then duplicated for a radiographic stent which was planned in order to demarcate the precise locations of Implant placements.

Methodology:
Barium sulfate was incorporated in different proportions in the denture base and acrylic teeth for easy differentiation of densities during pre-surgical implant planning. A recommended mixing ratio of 22.5 gm polymer: 10 ml monomer for heat cure for conventional heat polymeralization process. [8]

Barium sulfate is used to identify the teeth from the diagnostic wax-up in a 20% $BaSO_4$ solution. If a soft tissue (flapless surgery) template is to be made, teeth are ideally identified with a 20% $BaSO_4$ solution, and the base (soft tissue) uses a 10% mix. This allows for differentiation of the teeth from the soft tissue. Poor mixing will result in a nonhomogeneous mixture that exhibits areas of high radiolucency. [9]

A choice was made for the use liquid barium sulphate.

Proportion for acrylic teeth- 2ml of Barium sulfate, 22.5 gm of powder and 8ml of monomer
Proportion for denture base-1ml of barium sulfate ,22.5 gm of powder and 9 ml of monomer.

Discussion:
In this case, Radiographic stent made with liquid barium sulfate so that it should mix easily without any clumps of powder left in mixture otherwise it results into nonhomogeneous mixture that exhibits areas of high radiolucency.
After curing and processing, in the radiopaque stent minimal distortion was seen. It fits in patient mouth with minimal occlusal adjustment.
Retention was good with the template. Patient was comfortable.
But color stability was compromised because barium sulfate was little pinkish whitish in color,after incorporating it in acrylic powder, its color got changed, looks like a porous denture but its texture was smooth.
Proportion of barium sulfate added in acrylic resin powder is different for different authors. According to Fondriest JF et al The Ratio for acrylic teeth is 1 part of Barium sulfate and 10 parts of acrylic resin powder. [10]But according to Basten CH et al 1 part of barium sulfate and 2 parts of acrylic resin
Barium sulfate is used in medical field specially in radiology as contrasting medium in fluoroscopic examinations of the gastrointestinal tract and instestinal radiology
It is biocompatible,non toxic and tastless material. If it incorporated in acrylic resin powder in proper proportion it will give us excellent detailing of tooth contour, underlying mucosa and bone substitute. It can be used as a blueprint of planned restoration. The full-contour radiopaque template enables the clinician to visualize the outline of the planned restoration in relation to the bone structures.
So this method can be used for regular radiographic presurgical assessment purpose in full mouth implant rehabilitation cases.

CONCLUSION:
The digital technology has made tremendous progress allowing not only a precise pre-surgical evaluation of the bone substrate but also offering the possibility of a completely digital planning and guided surgery. On the other side it is not

always affordable for the patient to undertake the cost of guided implant placement and an accurate presurgical examination using CBCT with a radiographic template may offer valuable information for the further treatment. [1]

Using Full contour radiopaque template to relate the planned implant position to the bone substrate of the patient and also it enables the clinician to visualize the outline of the planned restoration in relation to the bone structures to minimizes the complication during implant placement.

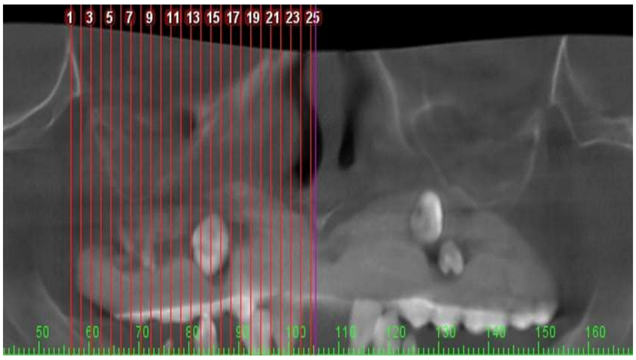

Fig1 : Panoramic view- Radiopaque template made of barium sulfate

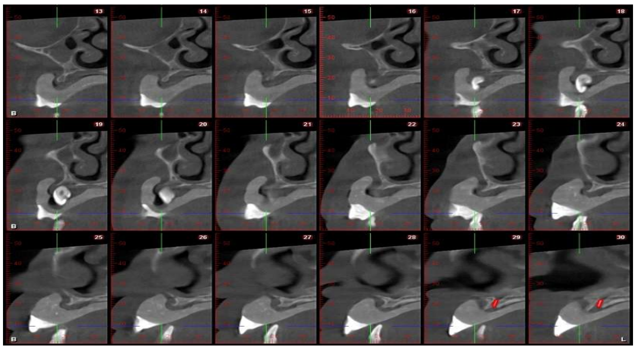

Fig 2: Cross section images of patient's 1st quadrant using Radiopaque template

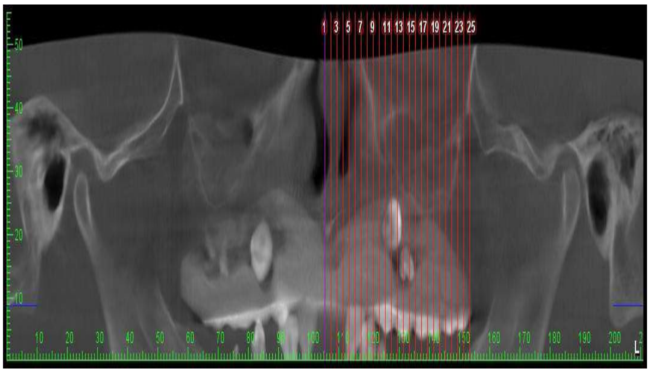

Fig 3: Panoramic view of patient wearing barium sulfate stent.

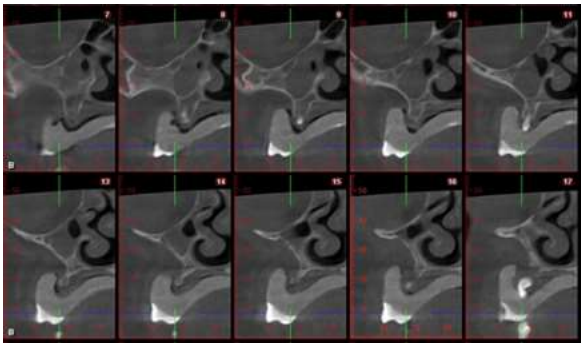

Fig 4 : In these cross section images ,We can appreciate teeth contours, denture base, underlying mucosa and bone substitute and anatomical landmark

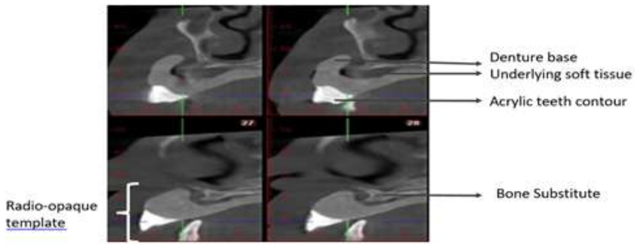

Fig 5: Cross section view, where we can appreciate all specific areas before implant placement

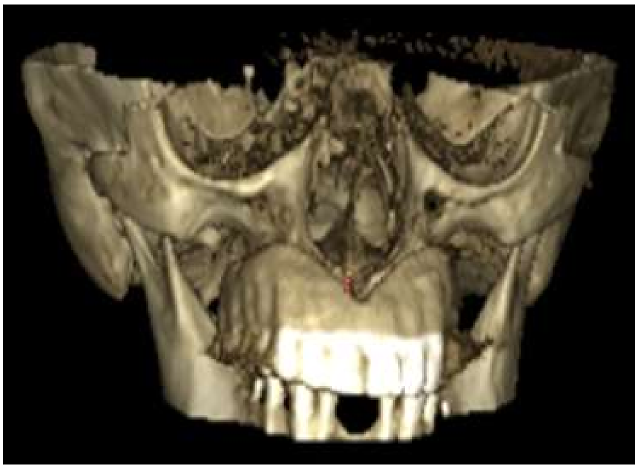

Fig 6 & 7 : 3-D views of patient wearing Radiopaque template

Photographs of Radiopaque template made of acrylic resin in which barium sulfate was added in proper ratio

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FABRICATION OF A SPECTACLE RETAINED HOLLOW ORBITAL PROSTHESIS - A CASE REPORT

Dr Midhila Madhusudanan Kareepadath [1], Vidya K Shenoy [2], Mayuri V Kamath [3], Blessy Bangera [4], Mithun Upadhya [5], Miranda Glynis Anita [6]

1. Consultant Maxillofacial Prosthodontist, Dentocraft multispeciality dental clinic, Mumbai.
2. Professor and Head, Department of Prosthodontics and Crown and Bridge, A.J. Institute of Dental Sciences, Mangalore. Karnataka. India.
3. Assistant Professor, Department of Prosthodontics and Crown and Bridge, A.J. Institute of Dental Sciences, Mangalore. Karnataka. India.

4. Reader, Department of Prosthodontics and Crown and Bridge, A.J. Institute of Dental Sciences, Mangalore. Karnataka. India.

5. Reader, Department of Prosthodontics and Crown and Bridge, A.J. Institute of Dental Sciences, Mangalore. Karnataka. India

6. Reader, Department of Prosthodontics and Crown and Bridge, A.J. Institute of Dental Sciences, Mangalore. Karnataka. India

Corresponding author:
Dr. Vidya K Shenoy,
Professor and Head, Department of Prosthodontics Crown and Bridge,
A.J. Institute of Dental Sciences, Mangalore. Karnataka. India.

Abstract

Malignant lesions involving orbit often necessitates radical surgical excision resulting in orbital defects followed by radiation therapy and chemotherapy. A conservative, economical technique for rehabilitation of a patient with orbital defect following orbital exenteration and radiation therapy using spectacle retained hollow orbital prosthesis with heat-polymerizing acrylic resin is presented.

Key words: Orbital prosthesis, ocular prosthesis, orbital exenteration, acrylic prosthesis

Introduction

Loss of an eye, the most vital sense organ, causes the afflicted to feel disgraced emotionally and communally[1,2]. Restoring these defects with a prosthesis is a very challenging task[3,4]. Irreversible injury, malignant orbital tumors, severe blindness and sympathetic ophthalmia can cause eye loss[3,6,7,8] The functional and esthetic restoration of the defect depends on the collaborated efforts of the oncologist, prosthodontist and plastic surgeon[9,10,11]. This clinical report describes rehabilitation of an orbital defect using spectacle retained hollow orbital prosthesis.

Clinical report

A thirty-six year old female who underwent radiotherapy post orbital exenteration for soft tissue sarcoma of the left lower eyelid was referred to department of Prosthodontics for rehabilitation of the orbital defect. History revealed that patient was unaware of the prosthetic options available after the initial surgery and was living with the defect for ten years. On examination, a well healed orbital defect lined with split skin graft was observed on the left side (Figure 1). Various prosthetic options were discussed and she opted for a spectacle retained acrylic orbital prosthesis.

A facial moulage (Figure 2) was made using irreversible hydrocolloid impression material (Algitex, DPI, Rudrapur, Uttarakhand). Defect area was boxed with impression compound (Y-Dents, MDM Corporation, Lalkuan, Delhi). Irreversible hydrocolloid was mixed and the entire area to be recorded was covered and wet gauze pieces were placed over it. A thermoplastic sheet was adapted to form a framework for the impression material and a layer of type II dental plaster (White Gold, Asian Chemicals, Rajkot, Gujarat) was applied. The facial moulage was poured with type III dental stone (Goldstone, Asian Chemicals, Rajkot, Gujarat) to obtain a working model.

A single layer of modeling wax (Surana modeling wax, Surana industries, Mangalore, India) was adapted over the defect region on the working model and was tried in the defect region for proper margin adaptation. This formed the intaglio surface of the hollow orbital prosthesis. Using the wax pattern, an acrylic stent was prepared by using tooth colored (DPI, Rudrapur, Uttarakhand) and clear acrylic heat polymerizing resin (DPI, Fort, Mumbai) along with acrylic paints for characterization and tried in the defect area for adaptation.

The wax pattern for the ocular prosthesis was made to simulate the natural eye and was oriented to the center of the acrylic stent using the facial measurements. It was held in place on acrylic stent with modeling wax which was adapted to mimic the anatomy of the orbit around the ocular prosthesis including eyelids (Figure 3). Once the contours were confirmed, a putty-light body index of finished pattern was made (Figure 4).

The iris button was oriented in the ocular wax pattern by using the distance from the center of the pupil of the contralateral eye to the midline as a guide to centre the pupil. The vertical position of the pupil was determined by the distance between the eyebrow and the pupil of the contralateral eye. The margin was made to flush with the pupil and a layer of white mock-up wax (Maarc Mock-Up Wax, India) was applied on top of the modeling wax to make the pattern simulate natural eye.

The wax pattern of the ocular prosthesis was removed from the stent and clear acrylic struts were attached to the iris button to maintain its position after dewaxing. Polymerization was done using tooth colored heat polymerizing acrylic resin to obtain the custom ocular prosthesis. Further scleral characterization was done by incorporating red color threads and stains. To achieve a layer of clear acrylic resin on top of the ocular prosthesis, a thin layer of modelling wax was added.

The ocular prosthesis was positioned in the putty index and molten modeling wax was poured in the remaining area to obtain the orbital portion of the eye. Further detailed modifications in the carving of the eyelids was carried out and tried in the defect area along with artificial eyelashes. The orbital prosthesis was polymerized with equal proportions of heat polymerizing pink and clear acrylic resins with intrinsic acrylic stains. Characterization was done using extrinsic acrylic paints and the prosthesis was tried in the defect area. The completed hollow orbital prosthesis was attached to the nasal buds of the spectacle frames using autopolymerising clear acrylic resin (Figure 5). Home care and maintenance instructions were given and a follow up after 1 week was done.

Discussio

Superior esthetics and function can be achieved by choosing the best maxillofacial prosthetic material and retentive aid. For the success of maxillofacial prosthesis, retention plays a key factor and a variety of retentive modes are employed to keep the prostheses in place.[1,5,6,12,13,14] Spectacle frame and tissue undercut was used in the present case as modes of retention to enable precise and reproducible positioning of the prosthesis. However, due to the weight of the prosthesis, eyeglass frames with prosthesis might slide down when the wearer leans forward[11]. Also, it becomes mandatory to wear them every time the patient wants to use the prosthesis.[10]

Though implants provide greater retention, orbital defects have much lower implant success rates[10]. They are also costly, susceptible to peri-implant tissue reactions and difficult to maintain.

Acrylic resin and medical-grade silicones are commonly used materials for the fabrication of maxillofacial prosthesis. Although silicone offers prostheses a lifelike appearance and a knife edge margin that blends seamlessly with natural skin[2,7], it has drawbacks such as difficulty cleaning, poor margin strength and color fading over time.[3,10] Additionally, they are incapable of forming a chemical or mechanical bond with the optical frame.[10] Acrylic resin is cost effective, readily stainable, biocompatible, color-stable, adheres to optical frames and requires less maintenance.[5,6,10]

Handling and maintenance of the prosthesis are a key to successful prosthesis. [5,8] Follow up was scheduled at regular intervals to evaluate health of the tissue bed, to relieve pressure points, and emphasize maintenance.

Conclusion

This case report describes a cost effective, non-invasive technique for prosthetic rehabilitation of an orbital defect following exenteration with a spectacle retained hollow orbital prosthesis. The prosthesis was tissue tolerant, esthetic, comfortable, and easy to maintain.

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Figure 1. Orbital defect lined with split skin graft

Figure 2: Facial moulage

Figure 3: Wax trial of the ocular and the orbital prosthesis

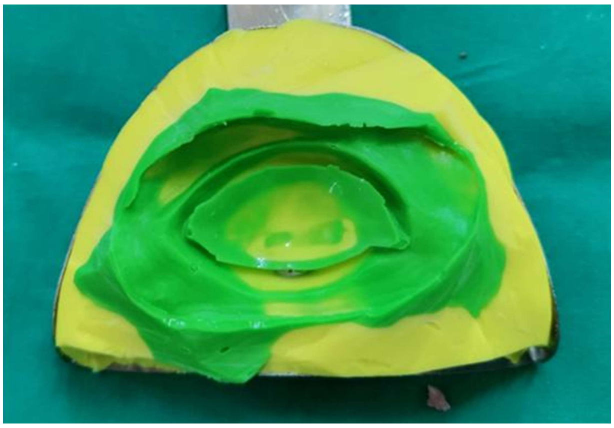

Figure 4: Putty index of the ocular and orbital contours

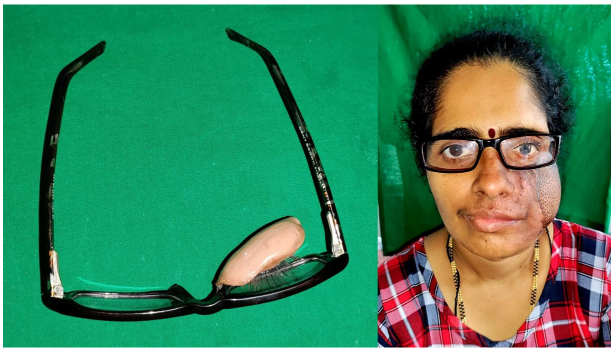

Figure 5: Spectacle retained orbital prosthesis in situ

IMMEDIATE IMPLANT PLACEMENT IN RELATION TO PATHOLOGICALLY MIGRATED UPPER ANTERIOR TOOTH USING GBR TECHNIQUE: A CASE REPORT

Dr. Aneta K Abraham[1], Dr. Jose Paul[2], Dr. Johnson Prakash D'Lima*[3], Dr. Senny Thomas Parackal[3], Dr. Sruthi Nair[4], Dr. Reshma TS[4]

1. Post Graduate Student, Department of Periodontics, Annoor Dental College and Hospital.
2. Professor and HOD,Department of Periodontics , Annoor Dental College and Hospital.
3. Professor, Department of Periodontics , Annoor Dental College and Hospital.
4. Senior Lecturer, Department of Periodontics , Annoor Dental College and Hospital.

Corresponding Author *

Dr. Johnson Prakash D'lima
Professor, Department of Periodontics
Annoor Dental College and Hospital, Muvattupuzha, Kerala, India
Email: johnsonperio@gmail.com

INTRODUCTION.

Dental implants are an effective and predictable treatment to replace missing teeth. Using the survival rate of implants as an indicator of satisfactory clinical results, most clinical studies have shown promising results for dental implants. According to reports, successful implant therapy has a high survival rate of 95% to 99%.[1]

Dental implants have a high success rate and are very durable, but failures can occur. The maxilla has seen the most implant failures, with nearly three times as many implant losses as the mandible.[2]Early failure rates have been reported to range from 1.5 percent to 21%.[3]Mechanical debridement, antimicrobial therapy, and guided bone regeneration can all be used to successfully treat early failing implants (GBR).[4]

GBR is a dental surgical technique that uses barrier membranes to guide the growth of new bone and gingival tissue at locations where the volume or dimensions of bone or gingiva are inadequate for proper function, aesthetics, or prosthetic reconstruction. Ridge augmentation or bone regenerative procedures are often referred to as guided bone regeneration.[5]

GBR promotes alveolar bone gain as well, with predictable and consistent results.[6]GBR is based on the use of a mechanical barrier to separate the surgical site from epithelial and connective tissue cells, allowing osteogenic cells to proliferate and bone formation to occur. The membrane has the additional advantage of protecting the wound from mechanical damage and salivary contamination.[7]

In this case study, a pathologically migrated tooth with a poor prognosis is replaced with an immediate implant following extraction utilizing the GBR approach with Matrix Oss bone graft as a defect filling material and resorbable collagen membrane (Heliguide®) as a barrier membrane.

CASE REPORT

A 39-year-old male patient with nonsignificant medical history, reported to the Department of Periodontics, Annoor Dental College and Hospital, Muvattupuzha, Kerala, with the chief complaint of loose maxillary right central incisor. Clinical inspection revealed that the maxillary right central incisor had grade III mobility and was pathologically migrated. There was adequate amount of soft tissue and vestibular depth (Fig.1). On radiographic examination severe bone loss was present on the mesial aspect of 11 with slight extrusion of the tooth from the socket (Fig.2).

Scaling and root planing was done prior to the procedure to improve oral hygiene.

Procedure

Local anesthesia was administered to the surgical field. Crown portion of the tooth 11 was resected for the fabrication of temporary prosthesis using tapering fissure bur (Fig.3). Crevicular incisions were placed followed by two vertical releasing incisions for flap advancement (Fig.4).Followed by atraumatic extraction of the root, which was carried by the use of screw shaped root extractor (Fig.5). Debridement, irrigation and disinfection of the implant site was carried out. Implant osteotomy was performed by sequential drilling up to 3.65 mm (Fig.6). An implant of dimension 3.75 × 10 mm was placed into the prepared osteotomy site (Fig.7). Adequate primary stability was achieved with an initial torque of approximately 30 Ncm (Fig.8) and Intra oral periapical radiograph was taken immediately after the implant placement (Fig.9). Flap advancement was carried out using periosteal releasing incision. The membrane was tucked in between the palatal flap and was then stabilized using tissue tacks which was plugged on to the alveolar bone (Fig.10). Matrix OSS bone graft mixed with I-PRF was placed onto the defect space to augment the region (Fig.11). The grafted site was then covered with the membrane, tucked into the buccal flap and was stabilized using sutures. Intraoral periapical radiograph was taken after stabilization of the membrane (Fig.12).The flap was approximated using 5-0 vicryl sutures (Fig.13). The patient was reviewed after 1 week (Fig.14). Finally, temporization was done with resected crown using composite and ligature wire (Fig.15).

Following the 6 months review, the OPG revealed sufficient bone around the implant (Fig.16). The screw tags were removed, and the healing abutment was connected (Fig.17). The patient was then referred to the Dept. of Prosthodontics, Annoor Dental College and Hospital, Muvattupuzha, Kerala. Two weeks later closed tray impression was recorded. Jig trial was carried out to verify the impression. Cement retained crown was fabricated in the laboratory and was tried in the patients mouth and finally the prosthesis was cemented (Fig.18). A post operative intraoral periapical radiograph was taken to evaluate the outcome. (Fig.19)

Figure 1: PATHOLOGICALLY MIGRATED 11 WITH GRADE II MOBILITY AND WITH ADEQUATE SOFT TISSUE AND VESTIBULAR DEPTH .

Figure 2: IOPA IRT 11

Figure 3: CROWN RESECTED FOR FABRICATION OF TEMPORARY PROSTHESIS

FULL THICKNESS MUCOPERIOSTEAL FLAP REFLECTED ON LABIAL AND PALATAL ASPECT

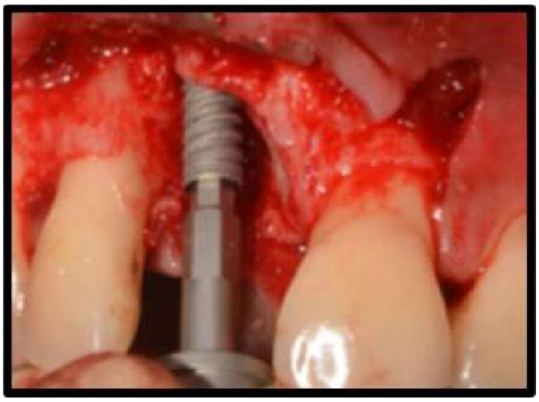

Figure 7:IMPLANT OF DIMENSION 3.75 x10 mm PLACED INTO THE PREPAREDOSTEOTOMY SITE

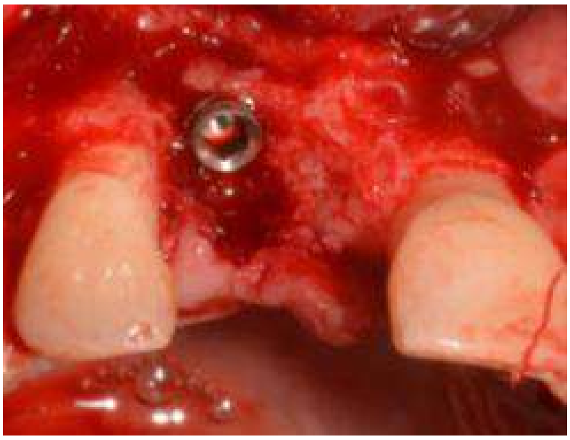

Figure 8: ADEQUATE PRIMARY STABILITY WITH AN INITIAL TORQUE OF APPROXIMATELY 30 Ncm

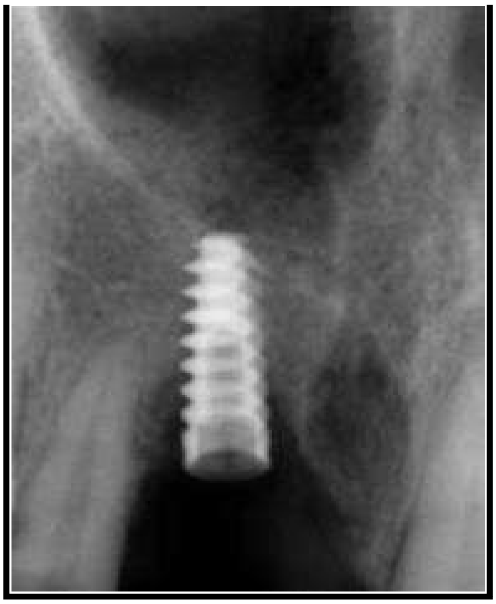

Figure 9: IOPA IMMEDIATELY AFTER PLACEMENT OF THE IMPLANT

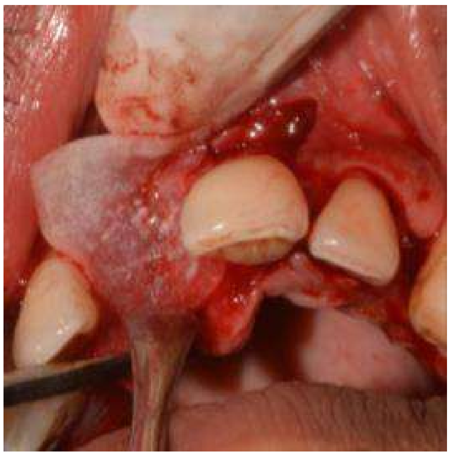

Figure 10: MEMBRANE STABILIZED USING TISSUE TACKS

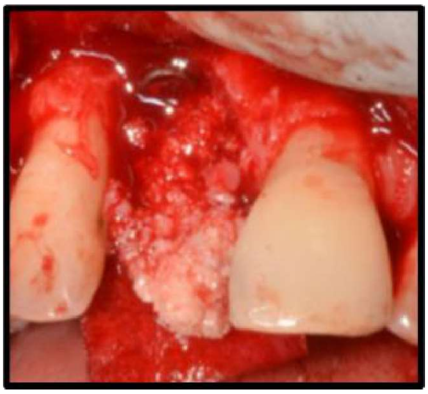

Figure 11: MATRIX OSS BONE GRAFT MIXED WITH I-PRF AND PLACED INTO THE DEFECT SPACE TO AUGMENT THE REGION

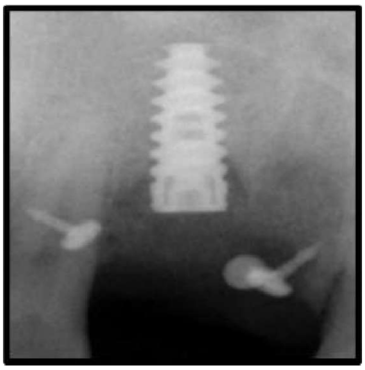

Figure 12: IOPA AFTER PLACEMENT OF IMPLANT AND STABILIZATION OF MEMBRANE WITH TISSUE TAGS

Figure 13: FLAP APPROXIMATED USING 5-0 VICRYL SUTURES

Figure 14: ONE WEEK REVIEW

Figure 15: TEMPORIZATION DONE WITH RESECTED CROWN USING COMPOSITE AND LIGATURE WIRE

Figure 16: SIX MONTHS POSTOPERATIVE RADIOGRAPHIC VIEW-OPG

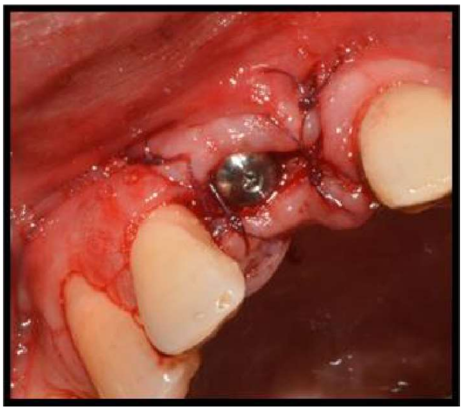

Figure 17: HEALING ABUTMENT

Figure 18: FINAL PROSTHESIS

PLACED IRT 11

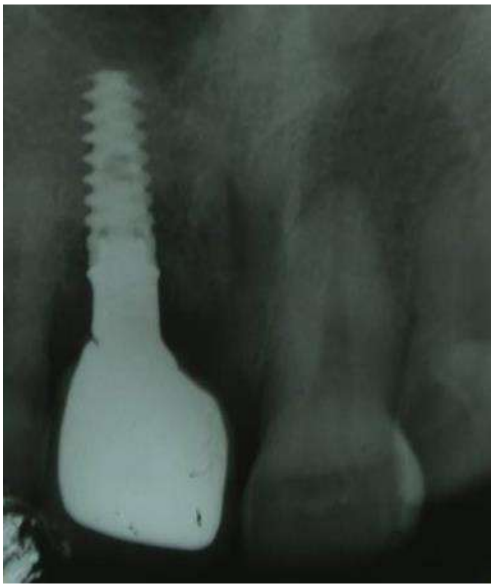

Figure19: IOPA IMMEDIATELY AFTER CEMENTATION OF CROWN

FINAL OUTCOME

BEFORE

AFTER

Discussion

Extraction of the tooth is indicated when a tooth has non restorable condition or cannot be maintained in terms of function or aesthetics over a long period of time. If the tooth is extracted traumatically or if there is a preexisting periodontal disease or endodontic lesion, the risk of bone loss is enhanced. The extraction sockets has been classified by Elian et al in 2007 – into

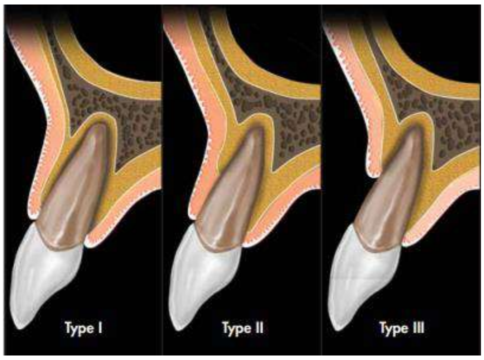

Figure 20: EXTRACTION SOCKET CLASSIFICATION.[8]

- Type I Socket. The facial soft tissue and buccal plate of bone are at normal levels in relation to the CEJ of the pre-extracted tooth and remain intact post extraction .
- Type II Socket. Facial soft tissue is present but the buccal plate is partially missing following extraction of the tooth.
- Type III Socket. The facial soft tissue and the buccal plate of bone are both markedly reduced after tooth extraction.[8]

In the present case , the extraction socket was classified as type II as there was an adequate amount of facial soft tissue present with partial loss of buccal bone . Bone augmentation was indicated for the immediate placement of implant , and guided bone regeneration with the use of membrane (Heliguide®) and bone graft (Matrix Oss)was planned.

Bone augmentation is frequently required to achieve the desired gingival shape and aesthetics. The rationale for socket grafting is to have adequate bone to insert implants in the appropriate location for a successful implant prosthesis[9], and studies have shown that the survival percentage of implants placed in grafted bone is comparable to that of implants inserted in native bone.[10]

Guided bone regeneration is used to promote bone growth of the alveolus for implant placement and around peri-implant defects. Historically, the concept of GBR has been originally developed for treatment of experimental spinal fusion and maxillofacial reconstruction by Hurley et al. (1959).[11] Dahlin et al. in 1983 placed implants in less desirable ridge areas using GBR techniques to gain bone on the exposed threads.[12] Lazzara et al. in 1989 was credited with the first reported use of GBR techniques with implants in immediate extraction sites.[13]

Tenting of the periosteum and soft tissue matrix maintains space improves the efficacy of the bone transplant. Large vertical alveolar defects can be repaired in a predictable functional and cosmetic manner with this approach.

The goal of the GBR technique is to keep non-osteogenic cells in the surrounding soft tissues at bay so that osteogenic cells can proliferate and differentiate.[10] It's usually used for deformities that require vertical bone augmentation of roughly 2 - 7 mm. The entire effectiveness of this surgery is on correct tissue flap design and reflection, thorough degranulation, and tension-free primary closure. Scoring the periosteum results in tension-free primary closure while simultaneously promoting angiogenesis by generating bleeding in to the graft material.[14]

CONCLUSION

Guided bone regeneration is used to promote bone growth of the alveolus for implant placement and around peri-implant defects. GBR with tenting screws is a viable alternative to the gold standard of block grafting. It has been shown to be effective in the regeneration of atrophic extraction sockets. It is a highly predictable, cost-effective operation that results in shorter healing time and morbidity for the patient. It should be regarded as one of the therapeutic choices in extraction socket management.

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OSSEODENSIFICATION- A REVIEW

Dr Naresh shetty[1]*, DR Syed mohamed huzaifa[2], Dr Rajesh shetty[3]

1 Reader, Department of prosthodontics, Yenepoya dental college, Mangalore

2 Poat Graduate, Department of prosthodontics, Yenepoya dental college, Mangalore

3 Head of the department, Department of prosthodontics, Yenepoya dental college, Mangalore

*Corresponding author

Abstract: A dental implant's primary stability is crucial for osseointegration to be successful. Among the most frequent elements that influence primary stability are surgical technique and bone quality. In order to attain primary stability, it is also essential to achieve high-insertion torque. In order to achieve the requisite bone-to-implant contact and acquire a biomechanically stable implant, maintaining adequate bone bulk and density is crucial. Osseodensification, a novel osteotomy concept, has been at the forefront of advancements in surgical site preparation in implantology. To aid in improved osteotomy preparation, bone densification, and indirect sinus lift as well as achieving bone expansion at various sites with variable bone densities, this relatively novel concept with universally compatible drills has been developed.

INTRODUCTION

The subject of oral rehabilitation has been completely transformed by dental implants. Endosseous implants can now be used reliably and predictably to replace missing teeth in the oral cavity, with a success rate of over 90% over the past ten years. The ability of the bone to remodel at the bone-implant contact is necessary for dental implants to survive.[1]

Osseointegration, which is regarded as a need for implant loading[2], is the direct structural and functional connection between living bone and the titanium implant surface.[3]

The absence of movement at the surgery time that is obtained by the friction between the implant and the bone walls is called primary stability, and the biologic stability achieved through the osseointegration process is called secondary stability[4]

The Osseodensification drilling protocol is a new-generation technique able to increase the primary stability in poor-density bone. This procedure had been proposed to increase the quality of the osteotomy, densification of the bone site, indirect sinus augmentation, and bone expansion.[4]

RATIONALAE

The concept of improving the quality/quantity of bone around the implant to increase its stability has been previously explored and mainly focused on achieving improved initial stability in sites where sinus elevation is necessary, The osteotome technique compresses the surrounding bone by gradual expansion using the hand driven devices leading to enhanced insertion torque values that is often perceived by clinicians as an indication of improved primary stability.[1]

The osseodensification drilling technique presented different Outcomes. While interfacial remodeling was observed where primary engagement existed between the bone cortical shell and both implant types regardless of surgical instrumentation, no negative bone response features such as extensive micro-cracks and extensive remodeling left large void spaces between implant and native bone that could potentially compromise the system biomechanical competence was observed, regardless of implant type and surgical instrumentation employed.[10]

BIOMECHANICS

Unlike traditional drills, this drill design creates an environment which increases the primary stability by means of non-subtractive drilling. Densifying burs combine the advantages of osteotomies with the speed and tactile control of the drills during osteotomy.The osseodensification technique generates a layer of condensed autograft surrounding the implant along the surface of the osteotomy making it valuable in clinical settings where there is an anatomic paucity of bone. The logic behind osseodensification concept is that compacted, autologous bone immediately in contact with an endosteal device will not only have higher degrees of primary stability due to physical interlocking between the bone and the device but also facilitate osseointegration due to osteoblasts nucleating on instrumented bone near the implant[5]

A conically tapered body with a maximum diameter adjacent to the shank and minimum diameter adjacent to the apical end. This taper design controls the expansion process, as the bur enters deeper into the osteotomy. [7]The apical end includes at least one tip to grind bone when rotated in the counterclockwise/non-cutting/burnishing direction and cut bone when rotated in the clockwise/ cutting/ drilling direction. [18]Helical flutes and interposed lands are disposed about the body. Each flute has a burnishing face and an opposing cutting face. The burnishing face burnishes bone when rotated in the burnishing direction and the cutting face cuts bone when turned in the cutting direction[12].

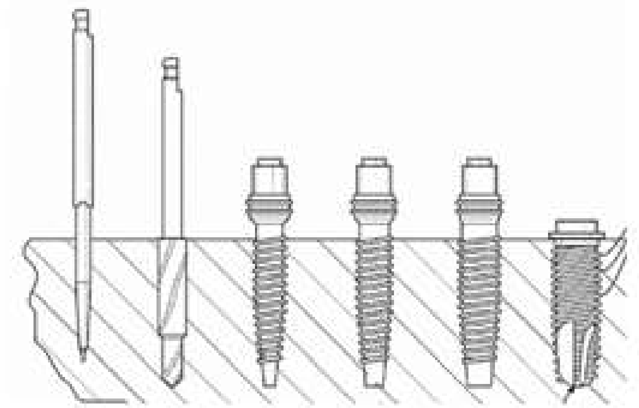
When forcedly advanced into an osteotomy while continuously rotating in a burnishing direction, at least one of the tip and the lands is designed to produce an opposing axial reaction force. Due to the push-back phenomenon created, the user has improved control over the expansion process.[13]

With a conventional surgical engine, densifying burs can be used to densify bone by revolving at 800-1200 rpm in an anticlockwise, non-cutting/burnishing direction (Densifying mode), or in a clockwise, cutting direction (Cutting mode), acting as a drill to cleanly cut the bone if necessary.[14]

BACK GROUND OF THE INVENTION

More recently, a technique has been developed that allows the atraumatic preparation ofimplant sites by eliminating the use of a Surgical mallet. This procedure is based on the use of a ridge expansion system that includes a bur kit and instruments known as motor-driven bone expanders, such as those marketed by Meisinger split control bone management system (Neuss, Germany).[8]

First a pilot hole is drilled at the implant site, then a series of progressively larger expander screw-taps are introduced into the bone by hand or with motor-driven rotation, which decreases Surgical trauma (as compared with hammer taps) while providing Superior control over the expansion site.[8]SeeforexampleFIG.1.



Thus, even though a Surgical motor may be used to drive the expander tap, there is a veryreal possibility that the surgeon will introduce some tilt or wobble inadvertently as theexpandertapisadvanced(orwithdrawn)thusdistortingtheintendedshapeoftheosteotomyor even worseprovokingalateral fracturein thebone.[8]

This inexorable linking of tool rotation rate to bone expansion rate in all prior art rotaryexpander Systems limits Surgical control over the implant process, and in Some cases mayleadto unnecessarypatient discomfort.

INDICATION

- Ridgewith < 3 mm of width
- Poorbone density
- Excessiveboneresorption.
- Posteriormaxilla.
- Inmaxillarysinus, itenhancesexpansion of

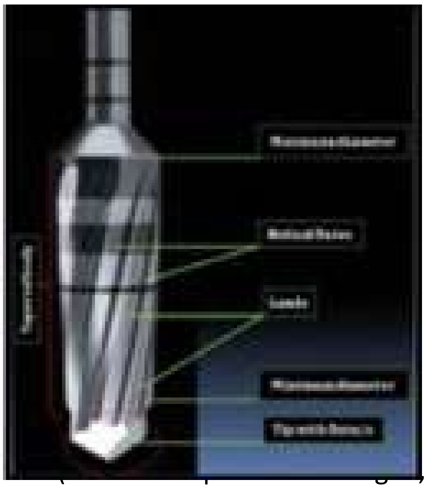
verticalridge.[9]

CONTRAINDICATIONS

- Corticalbone
- Xenografts
- Compromisedimmunesystem
- Bleedingdisorders
- Titaniumallergy.[9]

ADVANTAGES

- Undersized implant site preparationand the use of osteotomes to condense boneare surgical techniques proposed to increase primary implant stability and poor densitybone.
- Narrow ridges are shown to expand in width along with Osseodensification thus facilitating forplacement of large diameter implants and avoiding of fenestration and dehiscencedefect



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www.versah.com)

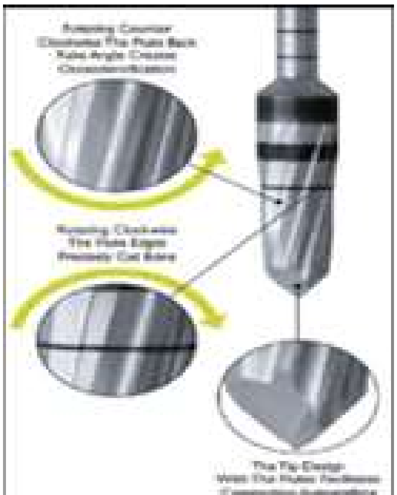

FIG. 3(Versah LLC product catalogue, www.versah.com)

This specially designed bur is termed as Densah bur. Densah burs have more than four lands and a large negative rake angle, work in non-cutting mode, and tapered shank(FIG.3), they enter deeper in the bone they expand the osteotomy.

It creates a layer of compacted bone along the periphery and apex of the implant surface. Bouncing motion of the bur which moves in and out of the osteotomy in counter-clockwise has 800to 1200 rpm.[9]

COMPARISON OFOSSEODENSIFICATION vs CONVENTIONALDRILL

i) REGARDING BONE DENSITY

Poor density bone is commonly seen in the posterior jaw, especially in elderly patients which represents a high percentage of implant treatment seekers. Implant primary stability can be influenced by cortical bone thickness, quality and quantity of trabecular bone and implant geometry, and implant surface roughness. Consequently, satisfactory primary stability in low-density bone is difficult to reach and higher rates of implant failure are usually observed in those cases. Hence, machined implants when combined with osseodensification may experience at least similar osseointegration success rates of textured implants in low bone density.[15]

ii) Regarding primary stability

The osseodensification strategy enhances primary stability by raising the density of the osteotomy site walls by non-subtractive drilling, unlike conventional technique.[16]

The osseodensification technique provided better primary stability in the low-density bone cases thus, it can be considered as a trustworthy treatment for speeding up the healing processwhile also maintaining marginal bone integrity following loading by using a specialized bur.[17]

iii) Regarding to crestal bone loss

Osseodensification showed enhancement of bone density by the novel Densah bur that works safely in low-density bone and decreases the possibility of creating bone dehiscence.osseodensification technique is a reliable method to enhance rapid healing and maintain the marginal bone integrity after load.[18]

CONCLUSION:

Osseodensification is a specialized procedure for osteotomy preparation that is inherently bone preserving. Unlike conventional osteotomy, it uses specialized high-speed densifying burst o prepare osteotomy and autograft bone in the phase of plastic deformation.

This results in an expanded osteotomy with preserved and dense compacted bone tissue that helps maintain ridge integrity and allows implant placement with superior stability.[19]

Use of versah drills in osseodensification led to the formation of undersized osteotomy when compared to conventional drills. It helped to improve the bone density and also increased the percent of Bone volume and increased bone-to-implant contact, thereby improving implant stability.

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Editor

Dr. Manoj Shetty
Editor, Annals of Clinical Prosthodontics
Professor and Head, Oral Implantology
A.B.Shetty Memorial Institute of Dental Sciences,
Deralakatte, Mangalore – 575018
Email: drmanojshetty@nitte.edu.in

Secretariat Address
A1 LOGICS
5-4-172/2, 1st Floor,
'Takshila', Near Hotel Janatha Deluxe
M.G.Road, Mangalore-575003
Karnataka, India