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IMPLANT SUPPORTED FULL MOUTH REHABILITATION: AN OVERVIEW

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ABSTRACT

The goal of modern dentistry is to return patients to oral health in a predictable fashion. Partial and complete edentulous patients may be unable to recover normal function, esthetics, comfort, or speech with a traditional removable prosthesis. Full Mouth Rehabilitation implies the restoration of missing teeth or impaired occlusion, preservation, and maintenance of underlying structures. Modern dentistry has changed tremendously with implant therapy. For the successful implant therapy, making a proper treatment plan considering both surgical and prosthetic part in mind is the key to success. Often dentists tend to create a treatment plan overlooking the basic principles of prosthetic part. In this manuscript we have discussed various prosthetic consideration of implant-supported prosthesis. A step-by-step detailed prosthetic option with their indications to help all dental implant practitioners in making of an optimal treatment plan for each case.

KEYWORDS: Diagnosis, implant supported prosthesis, treatment planning, full mouth rehabilitation.

INTRODUCTION

Oral Rehabilitation is the discipline within dentistry which deals with diagnosis, treatment planning and restoration of larger tooth defects, congenitally or acquired missing teeth and other oral tissues.[1] The main role of prosthodontics is the rehabilitation of patients after loss of teeth and oral function.[2] Modern dentistry has changed tremendously with implant therapy. Dental implantology is a term used today to describe anchoring of alloplastic material into the jaws to provide support and retention for prosthetic replacement of teeth that has been lost.[3] The patient's function when wearing a conventional complete denture prosthesis may be reduced to 60% of that formerly experienced with natural dentition. Implant prosthesis offers a predictable treatment course than the traditional restorations. For the successful implant therapy, making a proper treatment plan considering both surgical and prosthetic part in mind is the key to success.[4]

Treatment planning: a sequential analysis

Over the last decade, reconstruction with dental implants has changed considerably. Rather than merely focusing on the tooth or teeth to be replaced, today's implant practitioner considers a broad and complex set of interwoven factors before formulating a treatment plan. The treatment planning phase is divided into three stages.[5]

Initial consultation

The initial consultation is the first step in determining whether a patient qualifies for a reconstructive procedure. A preliminary treatment plan based on chief complaint of the patient, history of present illness, medical history, and clinical and radiographic examination, to be made. Diagnostic impressions should be made to obtain accurate study models. Bone mapping procedures may be carried out to assess the available bone volume. Based on this clinical examination, an appropriate imaging modality is selected to attain information about the proposed implant site. The patient's facial appearance should be documented with preoperative extraoral and intraoral photographs. The initial consultation should also serve to educate and orientate the patient. Visual aids (such as educational models, photographs, and videos) and printed literature are useful in this regard.

Joint treatment planning

The next phase in the treatment planning process involves the entire implant team including the oral surgeon, prosthodontist, and other specialists. The hygienist or laboratory technician may also be included. The planning conferences provide opportunities for the team to review the patient's chief complaints, expectations, history, and current medical and dental status. Based on all this information, team members can formulate a detailed treatment plan.

Final treatment considerations

Various treatment options can be presented to the patient for approval. The patient should be informed to the anticipated number of implants and whether any ancillary procedures are required. If a grafting procedure is indicated, the patient must also be aware of the various materials available for the graft. There should also be full disclosure as to whether these procedures will be performed under local anesthesia, local anesthesia supplemented with intravenous sedation, or general anesthesia. The benefit–risk ratio of all these procedures should be presented. The postoperative course should be carefully described to patients. Written consents should be secured for both the surgical and restorative procedures. A full disclosure of potential complications is essential. The best course for the implant practitioner is to present the patient with global and domestic statistics for implant success rates as documented in the literature.[6]

Patient selection: oral and systemic considerations

The bone and soft tissue response following endosseous dental implant placement is controlled by wound healing factors, biomechanics, and mineral metabolism. Due to the complexity of the tissue response, osseointegration and maintenance of endosseous dental implants may be influenced by many factors including age, diet, drugs, systemic disease, and oral disease. In general, endosseous dental implant may be considered for any patient in reasonable health who desires the replacement of missing teeth and has enough bone in the area or can undergo a bone augmentation procedure.[7] Various factors and their influence on dental implant therapy are physical status and age of patient, hypohidrotic ectodermal dysplasia, smoking, osteoporosis, diabetes mellitus, scleroderma, multiple myeloma, Parkinson's disease, etc.[8]

Radiographic assessment: decision-making criteria

An acceptable clinical examination and an appropriate radiographic examination are mandatory before every implant surgery. Diagnostic imaging and techniques help develop and implement a cohesive and comprehensive implant treatment plan.[9] The purpose of implant imaging is to provide accurate and reliable diagnostic information on the patient's anatomy at the proposed implant sites. Current radiation protection regulations are based on justification and the as low as reasonably achievable principle. This implies that every radiographic examination must be carried out to the benefit of the patient by application of the lowest possible dose. Therefore, the selection of imaging technique is already part of radiation protection measures.[10]

Imaging modalities are categorized as being essentially analogue or two-dimensional and three-dimensional in view:

1) Analog or Two-Dimensional

- Periapical radiography
- Occlusal radiography
- Cephalometric radiography
- Panoramic radiography

2) Three-Dimensional

- Conventional tomography
- Computed tomography
- Magnetic resonance imaging

Diagnostic casts

Diagnostic casts or study models are essential to help guide both the preimplant and treatment phases of implant therapy.[4] Many patients have been partially edentulous for an extended period of time. The combination of continued bone loss and dentition changes related to missing teeth greatly increases the factors that must be considered for oral rehabilitation with implants. Diagnostic casts enable these prosthodontic factors, for example, maxillomandibular relationships, existing occlusion, and potential future occlusal schemes to be evaluated in the absence of the patient.

Diagnostic templates

Computed tomography

Although computed tomography (CT) procedures can identify the available bone height and width accurately at a proposed implant site, the exact position and orientation of the implant (which many times determine the actual length and diameter of the implant) often are dictated by the prosthesis. A diagnostic template is most beneficial with this imaging technique.[4,11]

Types of diagnostic templates

Vacuform template - This is produced by a vacuform reproduction of the diagnostic cast and has a number of variations:

- The proposed restoration on the diagnostic wax-up is coated with a thin film of barium sulphate. This coating should be done before the fabrication of template. Due to this, on CT examination, restorations become evident, but exact position and orientation of proposed implant cannot be identified.
- Blend of 10% barium sulphate and 90% cold cure acrylic are used to fill proposed restoration sites in vacuform of diagnostic wax-up. This leads to radiopaque appearance on CT examination at the proposed restorations. However, the precise position and orientation of proposed implant cannot be identified.
- The previous design is modified by drilling a 2 mm channel through the occlusal surface of the proposed restoration using a twist drill. This corresponds to the ideal position and orientation of the implant and is identified on CT examination.

Acrylic templete - Diagnostic wax-up provides an template.[12] This is modified by a thin coating of barium sulphate, and a hole drilled the occlusal surface of proposed restorations followed by filling this hole by

gutta-percha.[4] This provides radiopacity of the proposed restoration on CT examination, and precise position and orientation of proposed implant may be identified by radiopaque plug of gutta-percha.

Template fabricated with radiopaque denture teeth - These radiopaque denture teeth are specifically manufactured for implant imaging purposes and are used for the diagnostic wax–up and subsequently are incorporated into the template. If acceptable, it may be modified into a surgical template at a later stage. This serves to transfer these findings to the patient at the time of surgery.

Complex tomography

Diagnostic templates of CT examination are generally more precise than tomography examination.[4] The simple method to produce tomography template is by placing 3 mm ball bearing at proposed implant positions in vacuform of diagnostic cast. Ball bearing can serve as a measure of magnification of the image.

Panoramic radiography

A diagnostic template can be used with panoramic radiographs to assess the amount of magnification. Five millimetres ball bearings or wires are incorporated around the curvature of the arch while fabricating the template. The amount of magnification can subsequently be determined in the radiograph which helps in offsetting the inherent inaccuracy in this technique.[10]

Prosthetic options in implant dentistry

Implant dentistry is unique because additional foundation units may be created for a desired prosthodontic result. Thus, a range of treatment options are available to most partially and completely edentulous patients. In the past, greater emphasis has been placed on the bone available for implant insertion which determines the position and number of implants and consequently, the final prosthesis design.[13] However, the implant treatment plan of choice is both patient and problem centered and requires a shift in this traditional approach. The benefits of implant dentistry can be realized only when the full range of available options for the final prosthesis is first evaluated by the practitioner and then presented to the patient. Thus, it is important to first visualize the intended final prosthesis based on which the existing bone is evaluated to determine the type and number of implants necessary to support the intended prosthesis.[14] In 1989, Misch proposed five prosthetic options FP-1, FP-2, FP-3, RP-4, and RP-5.

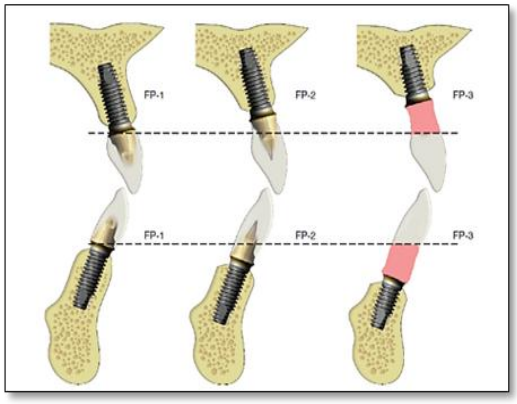

Fig 1: a) Fixed restorations have three categories: FP-1, FP-2, and FP-3.

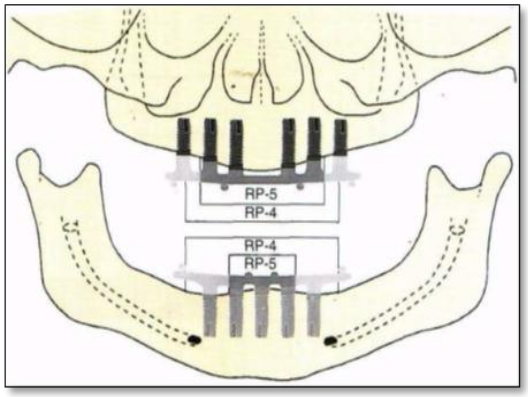

Fig 1: b) Removable restorations have two categories based on implant support. RP-4 prostheses have complete implant support in both the anterior and posterior regions. An RP-5 restoration has primarily anterior implant support and posterior soft tissue support in the maxilla or mandible.

Prosthodontics options

Available bone: influence on prosthetic treatment planning

Different bone volume requires treatment plan approached dental implant placement. Misch and Judy (1985) given a classification system for the available bone with treatment options for all categories.[15,16]

Prosthetic options available in division a bone

- FP-1 restorations: For ideal implant placement and natural esthetic appearance of final prosthesis require Division A bone.
- FP-2 or FP-3 restorations: These prosthetic options may be considered depending on amount of bone loss and lip positions.
- RP-4 or RP-5 restorations: These conditions may require osteoplasty considering interarch space to accommodate denture teeth.

Prosthetic options available in division b bone

FP-2 or FP-3 restorations are indicated in this condition to compensate increased clinical height.[17] Osteoplasty to get Division A ridge is mostly indicated in anterior

mandible because of fewer esthetic concerns in this region.

Prosthetic options available in division c bone

More number of implants are required to expand implant-bone surface area. In edentulous patients, RP-5 prosthesis may be considered. Recent studies have advocated the use of shorter textured implant more suitable option in posterior maxilla and mandible with compromised bone height.[18]

Prosthetic options available in division d bone

Autogenous with bone grafts is indicated to upgrade the division. Endosteal or subperiosteal implants may be inserted depending on the division of bone attained.[19]

Bone density: Influence on prosthetic treatment planning

Besides its external architecture, bone also has an internal architecture represented by its density.[4] The strength of the bone supporting the endosteal implant is directly related to its density.[20,21] Therefore, bone density exerts a significant influence on the clinical success of implant therapy. A range of implant survival has been found relative to location. The anterior mandible has greater bone density than the anterior maxilla. The posterior mandible has poorer bone density than the anterior mandible. The poorest bone density exists in the posterior maxilla and is associated with dramatic failure rates.[22]

As the bone density decreases, the biomechanical loads on the implants must be reduced. This can be accomplished in several ways by considering the following prosthetic design.[23,24,25]

1. Angle of load on the implant body should be more axial and offset loads minimized
2. Narrower occlusal tables should be designed
3. Splinting the crowns of adjacent implants with relatively stiff
4. Restorative materials may be considered
5. Cantilever length may be shortened or eliminated in case of full-arch restorations for edentulous patients
6. RP-4 rather than FP prosthesis may be considered in edentulous patients to reduce nocturnal parafunctional forces
7. RP-5 prosthesis may be considered to permit the soft tissue to share the occlusal force
8. Night guards and acrylic occlusal surfaces distribute and dissipate the parafunctional forces on an implant system
9. By considering progressive bone loading.

Force factors related to patient conditions

Various patient conditions exert different amounts of force in terms of magnitude, duration, type, and direction.[25] These factors such as parafunction (bruxism, clenching, and tongue thrust), direction of load forces, and nature of opposing arch influence the stress environment of the implant and prosthesis.[26] The treatment plan may need to be modified depending on the force factors pertaining to the individual patient.

Influence on prosthetic treatment planning

Elimination of premature contacts- An occlusal analysis should be carried out to identify any premature contacts during mandibular excursions. An elimination of eccentric contacts may allow recovery of the periodontal ligament health and muscle activity within 1–4 weeks.[27]

Night guard -A night guard should then be given with even occlusal contacts around the arch in centric occlusion and posterior disocclusion with anterior guidance in all excursive movements. The patient is advised to wear the device for a period of 4 weeks at night. The night guard is then refabricated with 0.5–1 mm of coloured acrylic resin on the occlusal surface.[28]

Implant considerations in the posterior region

- Additional implants – increased implant dimensions are often necessary in the bruxing patient
- Occlusal considerations – the anterior teeth may be modified to recreate the proper incisal guidance to avoid posterior interferences during excursions.[29]

Implant considerations in the anterior region

- Additional implants preferably of greater diameter are indicated.
- In the presence of natural, healthy canines, a canine-guided occlusion is the occlusal scheme of choice.
- If the canine is absent and is restored, then a mutually protected occlusion is indicated.

Clenching Alteration of the anterior occlusal scheme is not as critical due to the absence of detrimental horizontal forces. A soft night guard with a hard acrylic outer shell and inner soft resilient liner, with slight relief over the implants, is often beneficial in reducing the impact of the forces during parafunction.

Additional occlusal considerations

- Centric vertical contacts aligned with the long axis of the implant whenever possible.[4]
- Narrow posterior occlusal tables prevent inadvertent lateral forces, decrease the forces necessary for mastication, and leave greater space for the tongue. Adjacent implant crowns may be splinted together.
- Enameloplasty of the cusp tips of the opposing natural teeth is indicated to help improve the direction of vertical forces, within the guidelines of the intended occlusion.

Completely edentulous patients

If anatomical conditions do not permit the placement of additional implants in the presence of parafunction, a removable overdenture (RP-4 or RP-5) should be considered. The prosthesis may be removed during periods conducive to noxious habits.

Prosthetic options in fixed full-arch restorations

Porcelain-metal restoration

The main problem encountered with this restoration is related to the added bulk of metal used in the substructure to keep porcelain to its ideal 2 mm thickness. This amount of metal acts as a heat sink during casting procedures which results in porosities and increases the risks of fracture after loading.[30]

Hybrid prosthesis

An alternative option in such situations is the hybrid prosthesis. Because acrylic acts as an intermediary between the porcelain teeth and metal substructure, the impact force during dynamic occlusal loading also may be reduced. Hence, hybrid prostheses are indicated for implant restoration in large crown height spaces as a general rule.[4,30]

Maxillomandibular arch relationship: prosthetic consideration

Arch relationships often are affected in edentulous ridges due to the faciolingual direction of resorption. As a result, implants often need to be placed more lingual in comparison to the original incisal tooth position. The final restoration is subsequently overcontoured facially to restore the incisal two thirds for improved esthetics. This results in a cantilevered force on the anterior implant body. The maxilla is affected more often than the mandible because the incisal edge position cannot be modified and is dictated by esthetics, speech, lip position, and occlusion. Furthermore, the hygiene of the prosthesis is compromised due to the overcontour.[31]

Treatment considerations

Anterior cantilevered crowns often require additional implants splinted together and an increase in the anteroposterior (A-P) distance between the most distal and most anterior implants to compensate for the increased lateral loads and moment forces, especially during mandibular excursions.[4,31]

Class II relation

An anterior cantilever on implants in the mandibular arch may correct an Angle's skeletal Class II jaw relationship.[32] To counteract this force multiplier, the treatment plan is modified by:[4,33]

- Increase in implant number, size, and surface area of design
- Increase in A-P distance between splinted implants
- A RP-4 restoration may be indicated, rather than a FP-3, to prevent food impaction and to facilitate daily care.

Class III relation

Because the edentulous premaxilla resorbs toward the palate, a Class III relationship is often observed. However, these patients often do not exhibit Class III mandibular mechanics (primarily vertical chewers with little to no anterior excursions during mastication or parafunction). To the contrary, these patients have a full range of mandibular excursions. This exerts significant lateral forces on the maxillary restoration, which is cantilevered off the implant base to obtain a Class I esthetic restoration.

Additional splinted implants in the maxilla are advocated with the widest A-P distance available. This usually requires sinus graft procedures to be incorporated into the treatment plan.

Arch form: prosthetic consideration

The edentulous arch form is described as ovoid, tapering, or square. The ovoid arch form is the most common, followed by the square, then the tapered form. The tapering arch form is most often found in skeletal Class II patients. The presence of a square arch form is more common in maxillary edentulous patients due to resorption of the premaxilla region. The arch form is a critical element when anterior implants are splinted with posterior implants to minimize cantilever forces. The distance from the center of the most anterior implant to a line joining the distal aspect of the two most distal implants is called the anteroposterior distance or A-P spread. A greater A-P spread is required in the presence of anterior cantilevers. Thus, a square arch form provides a poorer prognosis than a tapered arch form in this regard. When five anterior implants in the mandible are used for prosthesis support, it has been recommended that the ratio of the distal cantilever to the A-P spread should not exceed 2:5. The other arch form to be considered is that of the replacement teeth which may be cantilevered off position for esthetic reasons. In this regard, a tapered arrangement of teeth offers the poorest prognosis due to the greater offset forces applied. The worst combination of these two arch forms is observed in the edentulous maxilla when a square arch form of bone is used to restore a tapered arch form of teeth.

The cantilever of the bone is greatest in this combination.[34,35] The most ideal biomechanical arch form depends on the restorative situation.

- The tapering arch form of residual bone is favorable for anterior implants supporting posterior cantilevers due to a greater A-P spread
- The square arch form of residual bone is preferred when canine and posterior implants are used to support anterior teeth in either arch
- The recommended anterior cantilever dimension in the maxilla is less than that of the posterior cantilever in the mandible because the bone is less dense and forces are directed outside the arch during excursions.

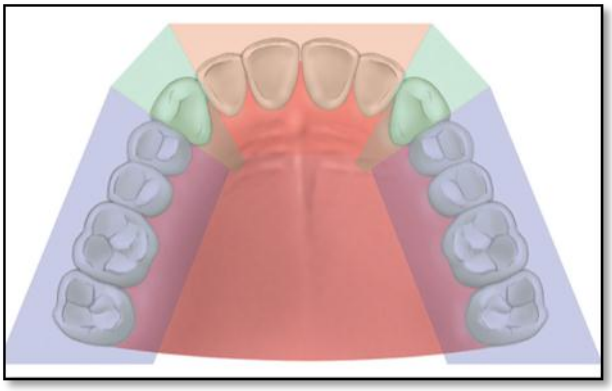

Fig 2: The maxillary arch may be treated as an open pentagon, with five straight-line segments. When teeth are missing in multiple segments, at least one implant is required in each section.

Implant permucosal position: prosthetic consideration

An implant placed in the improper position can compromise the final results in terms of esthetics, biomechanics, and maintenance. The most compromising position for an implant is too facial because no prosthetic "trick" exists to mask it, resulting in compromised esthetics, phonetics, lip position, and function. The permucosal position of the implant abutment is of particular importance for FP-1 prostheses. The ideal position is directly under the incisal edge position of the anterior natural tooth and under the central fossa of posterior natural teeth to be replaced.

Number of missing teeth: prosthetic consideration

Replacement of three adjacent missing teeth in the posterior regions of the mouth with a fixed bridge also usually is contraindicated due to the greater span between abutments. The deflection or bending of a fixed prosthesis varies directly with the cube of the length. Therefore, a fixed prosthesis with one pontic deflects 8 times <1 with two pontics and 27 times less than a restoration with three pontics, all other factors being equal. This greater movement increases the occurrence of porcelain fracture, cement breakage, or screw loosening in the restoration.[4,22]

The number of implants used to support a completely implant-supported restoration in the edentulous mandible usually ranges from 5 to 9 in the mandible, with at least four of these implants inserted between the mental foramens.

A greater implant number in the completely edentulous maxilla is indicated to compensate for the less dense bone and more unfavourable biomechanics and ranges from 6 to 10.[22] At least two or three of these implants should be placed in the premaxilla, depending on the arch shape and other force factors.

- For a square maxillary arch form (most favorable), implants may be placed in the canine position, whereas in an ovoid arch form, additional implants in the anterior region should be planned.
- A tapered anterior maxillary arch form combined with other force factors may require the placement of four implants from canine to canine.

All implants in either arch should be splinted together when fewer implants are used. The final restoration may be segmented (canine to canine and two posterior segments) when the number of implants permits so. Posterior cantilevers in the fixed prosthesis should be limited in the maxilla and rarely extend more than one tooth. However, posterior cantilevers in full arch mandibular restorations are not uncommon, but the cantilever length rarely extends more than two teeth. Of course, the number of cantilevered pontics in both arches depends directly on overall stress conditions.[36,37,38,39]

Recent advances in Implant supported full mouth rehabilitation

The All-on-4 & 6 are such concepts which enlightens us for its use in the completely edentulous patients, which also leaves behind the routine treatment alternative of conventional dentures with successful outcome in the long term.[40]

In full arch fixed implant-supported prostheses, patients achieve the comfort, aesthetics, phonetics and functional chewing effectiveness in their natural teeth. The clinical and hygiene controls can be easily performed especially in full arch screw-retained fixed prostheses.[41]

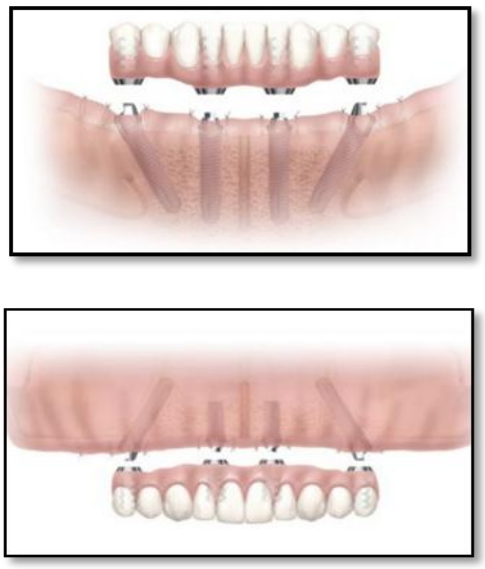

Fig : 3 All on 4

All on 4[42]

The design of the "All-on-4" immediate-function concept was developed in 2003 by Malo and colleagues. The approach to rehabilitate the fully edentulous mandibular jaw by placing only 4 implants in the following combination: 2 anterior implants placed axially and 2 posterior implants placed distally tilted

within the mandibular parasymphyseal region. These implants were immediately loaded with a full fixed acrylic prosthesis within 2 hours of surgery**.** Building on the mandibular "All-on-4" success, Malo and colleagues replicated the same design for the maxilla in 2005.

Implants are positioned in the pre-maxillary region in the maxilla as median and in the inter-foraminal region in the mandible. Implants are placed in different regions related to anterior and posterior implant sites. Anterior implants are placed to the lateral incisor sites or canine/first premolar region, posterior implants are placed to the second premolar or first molar region.[41]

All-on-4 variations[42,43]

All-on-4: zygoma implants and quad zygoma

- Branemark initially developed zygoma implants for 3 primary reasons as his treatment modality for (1) maxillary defect with post cancer (CA) resection, (2) trauma, (3) severe maxillary atrophy.
- The apex of the implant gets engaged to the body of the zygoma, transversing the maxillary sinus and emerging from the first molar position at a 45^0 angle (Parel., 2011.
- (Bedrossian., 2008) categorizes the maxilla into 3 zones radiographically: zone 1 = premaxilla, zone 2 = premolar and zone 3 = molar
- The zygoma implants are indicated where there is insufficient bone in the premolar and molar regions, leaving only the anterior premaxilla available.
- The implant configuration will be 2 axial implants in the anterior position and 2 zygoma implants in the posterior region. If there is absolutely no available bone in the maxilla, the Quad Zygoma uses 4 zygomatic implants to support full arch prosthesis (Bedrossian., 2011).

All-on-4 "V-4"

- All-on-4 "V-4"is indicated for patients with severe mandibular atrophy typically with 5 to 7 mm of remaining native bone (Cawood & Howell 1988-Class IV-V). These 4 implants are placed at a 30^0 angle all directed towards the symphysis where the bone mass remained to help support a full-arch prosthesis.

All-on-4 Shelf; Maxilla

- Maxilla can be a treatment option for mild, moderate, and severe maxillary resorption cases whereby the alveolus topography is re-created by bony reduction, allowing implants to be placed strategically within the premaxilla in an "M" configuration when viewed from the frontal aspect.
- The anterior and posterior implants converge apically in a 30^0 angulation using the native bone for maximal anchorage. The posterior site "S point" denotes the most anterior point of the anterior wall of maxillary sinus, and the "M point" denotes the maximum bone available at the pyriform rim just above the nasal floor.
- The divergence of these implants toward the alveolus ridge helps increase the A-P spread for better prosthetic load distribution.
- The only contraindication for the All-on-4 Shelf: Maxilla is if there is an indistinction between the nasal fossa and the maxillary sinus, making it 1 continuous cavity in which zygomatic implants can be the alternative treatment option (Jensen et al., 2010).

All-on-4 shelf: Mandible

- Jensen and colleagues in 2011 followed with their previous All-on-4 Shelf: Maxilla with the All-on-4 Shelf: Mandible with the same strategy in which bone reduction rather than bone augmentation is used to rehabilitate the edentulous arch.
- Flat alveolus ridge and proper interarch space, a minimum of 20 mm, are required for the mandibular arch.
- The implant configuration is identical to Malo's "All-on-4" design, with 2 exceptions in regards to the posterior implants.
- First, the 1:1 ratio represents the available bone height from alveolar bone to mental nerve (N point) and the number of millimeters of distance gained by tilting the posterior implant in a 30 angle.
- The second key point is that the posterior implant can be positioned behind the mental foramen when sufficient bone is present, unspecified by the authors, above the inferior alveolar nerve via a transalveolus fashion from buccal to lingual with engagement to the lingual cortex for better A-P spread.

All-on-4 transsinus technique

- In 2012, Jensen and colleagues described an alternative surgical technique to zygomatic implants using a combination of sinus floor grafting bone morphogenic protein (BMP)-2) with simultaneous transsinus implant placement and immediate function.
- The indication for this type of procedure is for patients with either atrophic maxilla, post-All-on-4 Shelf: Maxilla horizontal bone reduction, or pneumatized sinus traversing the canine/lateral and sometimes the central incisor region
- These implants are placed in an "M" configuration with engagement to the "M point," where the pyriform rim has good-quality bone.

ALL-ON-6 CONCEPT[44]

- The "All-on-6" protocol involves less stress when compared to the All-on-4 implant concept. In All-on-6 concept (6 straight axial implants), two additional implants are placed in the second molar region. The addition of these two implants provides additional support to anterior four implants, i.e., two implants in the lateral incisor region and two in the second premolar region; this will avoid the distal

cantilever and allows fixing complete arch prosthesis.

- Since bone in the posterior maxilla is very soft, trabecular and has poor density, additional factors like sinus pneumitization and residual ridge resorption lead to implant failure due to poor osseointegration.
- To overcome such disadvantages, ALL TILT technique was developed.
- In this technique, tall (16–25 mm) and tilted implants (with angulations of 30°–45°) are used. Tall implants provide more surface area for osseointegration and are also engaged in the cortical bone (bi- or multicortical anchorage).

Fig:4 All on 6.

CONCLUSION[45]

Implants have become the treatment of choice in many, if not most, situations when missing teeth require replacement. Studies of the interaction between implant-supported restorations and the surrounding oral environment appear, fortuitously, to support the conclusion that the human host response to oral implants is favorable. The treatment planning for an implant restoration is unique regarding the number of variables that may influence the therapy. Of prime importance is the recognition of the fact that a definitive treatment plan should be developed sequentially to ensure the best possible service. With appropriate diagnosis and conscientious treatment planning, the use of endosseous oral implants enjoys good prognosis. The future of implant dentistry is very exciting with unlimited expansion via technology and development. Implant dentistry has become the ideal and primary option for tooth replacement.

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