Clinical Update

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# Decision making when referring for dental implant evaluation

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Dental implants are a popular subject and treatment modality in dentistry. The success of implant retained or supported restorations have been documented for over 30 years[1,2]. Therefore the public is becoming more aware of this option and may to the dentist requesting implants. In the Navy, specialists can become overwhelmed with referrals for implant treatment. For this reason, it is imperative the referring dentist be knowledgeable in the patient selection for dental implants. If the command is going to offer implant based restorations, the dentist need to understand when an implant is an appropriate recommendation. Some patients do not fit the Navy's criteria for the implant programs. The purpose of this Clinical Update is to improve the referring dentist's knowledge on dental implants and proper evaluation of a patient before referring to a specialist, thereby, avoiding unnecessary referrals.

The first consideration is the patients time left on station. If the patient is scheduled to leave in 12 months it may not be practical to complete the case given the time needed for implant board approval, implant integration, and fabrication of the final restoration. Second is the patient's medical history and profile. Their medical history must support implant placement[2]. Success rates of implants in non-controlled diabetic patients are decreased.[3,4,5] These individuals should be considered for conventional fixed or removable prosthesis. Success rates for controlled diabetics are similar to non-diabetic patients.[6,7] Any other medical condition (i.e. blood disorders, immunocompromised, etc.) that impair healing or doesn't allow for the implant placement procedure must be evaluated[2]. If this individual is a smoker and being treated in a Navy facility, they are immediately disqualified for implant placement until smoking cessation is documented for 6 months. Studies have shown that placing implants in individuals who are active smokers reduces their success rate by 10-15 % (80-85% success).[8-14]

The restoration of the edentulous area needs to be discussed with the patient. Is it a concern for the patient? Not every form of edentulous space must be restored. If the patient has a need, then how can that need be satisfied? The restorative or prosthetic dentistry alternatives are: 1) provide no treatment, 2) a removable prosthesis (either tooth or implant supported) or 3) a fixed prosthesis (either tooth or implant supported). There are many decisions to be made and a consult may be indicated. The following will present a sound set of parameters to allow successful decision-making before referring for dental implant evaluation.

The first parameter is restorative space. The restorative space requires the implant be within the confines of the restoration, if natural contours are desired. The implant must be in the correct location to allow for the proper thicknesses of materials composing the restoration. If a cement-retained restoration is used, then the space for the abutment must be added to that of the restoration. The general rule for all space is 7mm. The occluso-gingival restorative space is 7mm for cement retained. This breaks down as follows: .5-1mm for metal, 1.5-2mm for a porcelain occlusals and 4mm for resistance and retention form of the intermediate abutment. 5mm is needed for screw-retained restoration. The guide for mesio-distal space is 7mm or (the diameter of the implant plus 3mm to the adjacent teeth.

Examples: Regular Platform (RP) 3.75 or 4.00mm =7mm
Narrow Platform (NP) 3.25 = 6.25mm
Wide Platform (WP) 5.00 or 6.00 = 8 or 9mm

Second, there must be adequate bone dimension in which the implant will be placed bucco-lingually. The minimum recommended bucco-lingual bone dimension around the implant is 1.5mm beyond the diameter of the implant.

Radiographic images (periapicals and panoramic films) along with diagnostic casts are used to evaluate anatomic landmarks and available space below the gingiva. When evaluating dimensions the dentist must consider the inherent magnification in any of the imaging sources. Correctly exposed PA's have very little magnification. Panoramic films possess 20-25% magnification. Use this % when applying information from the respective images to and from casts. Vertical bone dimensions should be 1mm more than the implant. What are the anatomical limitations? In the maxilla there is the sinus. A minimum amount of 5mm is needed from the crest of the ridge to the sinus for stability. Any amount of bone deficiency should be grafted with a sinus lift. In the anterior mandible, it is the mental foramen; here a "halo" of 5mm around the foramen is observed for protection of the mental nerve. The area between the foramen is a very successful location. Posterior to the foramen is the inferior alveolar canal complex, so evaluate the bone height from crest to inferior-alveolar canal. It is also important to observe the angulations of the adjacent roots for any convergence that would impinge on the needed space. If convergence or "root proximity" is a challenge the implant may not be indicated or the use of a tapered implant form may be a consideration. The two current designs available to the Navy are: 3i's NT and Nobel Biocare Replace Select tapered.

When using casts to evaluate space, understand the casts contain dimensions that also represent soft tissue, which is not bone. This can present as much as 4mm more than the actual bone dimension. Take the information from your casts or intraoral measurements and radiographs to determine if there is adequate space for an implant. When evaluating the edentulous space, Seibert's bone classification is used to describe the type of alveolar bone loss. Type I is lateral bone loss, type II is vertical bone loss and Type III is a combination of the two.

If there is not enough bone, a consultation with a Prosthodontist and, a Periodontists or Oral Surgeon is indicated for evaluation for bone grafting. Again, if the patient's medical history and profile support it, grafting may be a consideration. The biggest consideration for grafting is the additional time added to the treatment to allow for healing. The following are the sources for grafting: Autograft (from the patient), Heterograft (human source) either Freeze-dried Demineralized Bone (FDBA) or

Demineralized Freeze-dried Bone (DFDBA), Allograft (Animal source), and an Alloplast (synthetic). All of these will require 4-8 months for assimilation. This time is added to the 4-6 months for implant integration

The success of an implant is not only determined by the success of integration, but also appearance of the gingival tissue. To paraphrase Tarnow "The tissue may be the issue, but the bone sets the tone." To have a chance at maintaining papilla height between the implants or implants and teeth, the horizontal space between them is should be 3mm.[4] The distance from the height of interseptal bone to the interproximal of the crown and tooth contact should be $\leq$5mm.

The key to a successful implant placement is to have it placed at a level and angle that allows you to achieve success. In a screw retained restoration the angle will determine where the screw access channel will emerge through the crown. Screw access channel of the anteriors should exit through the cingulum and posteriors through the center of the occlusals. When there is an abutment to which the crown is cemented, the screw access channel should be just lingual to the incisal edge for anteriors and the center of the occlusals for posteriors. Implants placed off the intended angle may not be restorable, or corrected restoratively without an undesirable compromise.

The success of an implant begins with proper knowledge and understanding. Early education is the key to success. Knowing the criteria for an implant candidate will allow the general dentist to guide the patient in meeting their dental needs as well as facilitate the proper management of time and resources.

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