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Review Article

ANATOMICAL AND POSITIONAL CONSIDERATION IN IMPLANT SELECTION- A LITERATURE REVIEW

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ABSTRACT

The shape, quantity, and quality of bone in the mandible and maxilla are significant factors in deciding which implant options are possible. An understanding of the importance of each of these factors is necessary for the successful diagnosis of edentulous and partially edentulous arches and for optimum use of the many devices and concepts being promoted to the profession and the public. This article will discuss about the various anatomical consideration between the bone of the mandible and the maxilla and how these affect implant treatment.

INTRODUCTION

In our present day, management of missing teeth has a wide array of options. With the introduction of dental implant there is a new option in restoration of missing teeth. Nowadays the placement of implant has higher success rate. This has also resulted in increased amount of neurosensory and haemorrhages along with many other complications. It is very essential to have a sound knowledge of the anatomy and its variation prior to implant placement. Appropriate selection of the implant to provide an ideal platform to restore esthetics and function is a must.

Anatomical consideration for Implant placement

A thorough knowledge and information about the adjacent anatomical structure is essential for planning and placement of dental implants[1]. Availability of bone is important for placement in both the maxilla and mandible. In addition to this, a balance between the cortical and trabecular bone is equally desired[2].

Presence of bony undercuts may result into perforation of the cortical bone. Spacing of the implant is another important factor to be borne in mind. Close proximity of the proposed osteotomy site to the apices of the adjacent roots can add to the complications.

Maxillary Arch

Important anatomical structures in the maxilla that can pose for complications following implant placement include the nasal floor anteriorly and the maxillary sinus posteriorly. Sinus perforation is the main consideration. This has been found to be a main cause of failure in posterior implant[3]. If resorbtion of bone is seen in maxillary sinus, in such cases sinus lift procedure may be needed before implant placement to prevent penetration or perforation of the sinus wall[4,5].

The sinus lift procedure was developed in1970s. A rectangular osteotomy is cut into the lateral antral wall. The membrane at the inferior aspect of the osteotomy is dissected from the floor of the maxillary sinus and elevated upward to create a space in the floor of the sinus for the bone graft material. Bone graft is then packed into the space and finally, the mucoperiosteal flap is repositioned and the mucosa is suture closed.

Mandibular Arch

The most important anatomical consideration while placing an implant in the mandibualr arch is the location of the inferior alveolar canal which contains the neurovascular bundles.

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Iatrogenic abuse of the vital structures like inferior alveolar nerve and artery can result into loss of sensation, altered sensation, pain, excessive bleeding etc. following implant placement. Hence, it is important to determine the location as well as the configuration of the mandibular canal prior to implant placement[6]. Kim *et al*[7] classified the location of the mandibular canal in the buccolingual location into three types:

- ***Type 1:*** Canal follows the lingual cortical plate at the mandibular ramus and body (70%)
- ***Type 2:*** Canal follows the middle of the ramus behind the 2nd molar and the lingual plate passing through the 2nd and the 1st molars (15%)
- ***Type 3:*** Canal follows the middle or the lingual 1/3rd of the mandible from the ramus to the body (15%)

Presence of large mandibular tori may give a false impression of the amount of available bone as well as hinder the outline of the mandibular canal[8].

Complications in the anterior implant may arise due to implant impinging on the mental nerve or an inferior perforation of the cortical plate. Hence, the amount of bone resorption and the location of the mental nerve in the inter foraminal region of the anterior mandible should be considered prior to implant placement.

Less frequent anatomical considerations include the anterior looping of the mental nerve, accessory mental foramina and bifid mandibular canals.

Implant Selection

Appropriate diagnosis and a thorough treatment plan aids in the selection of the implant. A common idea has been to place an implant as long as possible because a larger implants offer a greater bone to implant interface and a wider prosthetics platform and increase stability. But in posterior regions, the available bone height is very less and the implant cannot engage the dense opposing cortical bone either because it does not exist, as in the posterior maxilla or its beyond the anatomical limits, as in the mandible due to the presence of the neurovascular bundle. Placement of longer implants in these regions requires advanced surgical procedures, such as bone grafting and nerve repositioning procedure which adds to the complications. Hence, it is often not indicated, especially when other implant options are available[9].

Shorter implants provide with a much less complex and invasive treatment option in clinical sites which require prior adjunctive procedures, such as ridge augmentation, grafting, sinus elevation or nerve repositioning. Although studies have recommended 7mm as a minimum requirement for implant length[10] implants as short as 6mm are now available and successfully placed.

Tawil *et al*[11] in their study on shorter implants with a crown to implant ratio of less than 1 and greater than 2, stated that short implants were a practicable option as long as the force orientation and load distribution were favourable. It is wise to select an implant with a smaller diameter of 4mm is must when placed in the posterior maxilla.

DISCUSSION

Success of implant therapy depends on how well the implant is osseointegrated. Implant has become one of the most important treatments for missing teeth. Sometime implant fails to integrate or fail to survive for long term function. Placement of implant should follow a careful diagnosis and treatment planning. One should take CT or CBCT as they provide accurate information regarding the topography and location of the anatomical structures. Appropriate implant selection ensures achievement of predictable results. Mandibular implant, if impinges on the neurovascular bundle that lies in inferior alveolar canal, can cause pain, paresthesia, numbness and excessive bleeding in case of injury to the artery. In the posterior maxilla, perforation of the sinus lining may occur, if the implant length is more than desired, leading to implant failure.

The length and diameter of the implant must be selected keeping in mind the available height and width of the bone. Shorter implants are a tangible option in clinical situations with insufficient available bone and should be considered whenever suitable.

CONCLUSION

The anatomical configuration and position of the implant plays an important role in success of implant therapy. Appropriate selection of the implant to provide an ideal platform to restore esthetics and function is a must.

Reference

1. Pullen G, Debenham C. Short implants: Reality and Predictability, Acad Dent Therap Stomato 2011 jan 1-15.
2. Wood MR, Vermilyea SG. A review of selected dental literature on evidence – Based treatment planning for dental implants: Report of the committe on research in fixed prosthodontics of the academy of fixed prsothodontics. *J Prosthodontics Dent* 2004; 92: 447-62.
3. Khoury F. Augmentation of the sinus floor with mandibular bone block and simultaneous implantation: A 6 year clinical investigation. *Int J Oral Maxillofac Implants* 1998; 14:557-64.
4. Raghoebar GM, Vissink A. Treatment for an endosseous implant migrated into the maxillary sinus not causing maxillary sinusitis: Case report *Int J Oral Maxillofac Implants* 2003;18(5):74.
5. Chappuis V, Suter VG, Boranstein MM. Displacement of a dental Implant into the maxillary sinus. Report of unusual complication when performing staged sinus floor elevation procedures. *Int J Periodontics Restorative Dent* 2009; 29(1): 81-87.
6. Juodzbalys G, Wang HL, Sabalys G. Anatomy of mandibular vital structures. Part I: Mandibular canal and inferior alveolar neurovascular bundle in relation with dental implantology. *J Oral Maxillofac Red* 2010 (Jan - Mar); 1(1):e2.
7. Kim ST, Hu KS, Song WC, Kang MK, Park HD, Kim HJ. Location of the mandibular canal and the topography of its neurovascular structures. *J Craniofac Surg* 2009 May; 20(30): 936-39.

8. Juodzbalys G, Wang HL. Guidelines for the identification of the mandibular vital structures. Practical clinical applications of anatomy and radiological examination methods. *J Oral Maxillofac Res* 2010 (Apr-jun); 1 (2):el.
9. Oikarinen K, Raustia AM, Fratikainen M. General and oral local contraindications for endosteal implants: An epidemiological panoramic radiographic study in 65 year old subjects. *Comm Dent Oral Epidemiol* 1995; 23:114-18.
10. Wennstrom JL, Bengazi F, Lekholm U. The influence of the masticatory mucosa on the peri-implant soft tissue condition. *Clin Oral Implants Res* 1994; 5: 1-8.
11. Tawil G, Aboujaoude N, Younan R. Influence of prosthetic parameters on the survival and complication rates of short implants. *Int J oral maxillofac Implants* 2006 Mar- Apr; 21 (2): 275-82.

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