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INDICATIONS FOR DENTAL IMPLANT TREATMENT- A CLINICIAN'S POINT OF VIEW

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ABSTRACT

A dental implant is a surgical component that interfaces with the bone of the jaw or skull to support a dental prosthesis such as a crown, bridge, denture, facial prosthesis or to act as an orthodontic anchor. The basis for modern dental implants is a biologic process called osseointegration where materials, such as titanium, form an intimate bond to bone. The present article highlights on the major indications of dental implants from a clinician point of view to clear the major doubts before going for a dental implant treatment.

Key Words: Dental implant, Dental prosthesis, Osseointegration

INTRODUCTION

God gives us two sets of teeth for free, but for the third we have to pay by keeping this in mind patients visit a dental clinic, they often present with a desire to replace missing teeth or are faced with the need to have teeth extracted for a variety of reasons, like trauma, infection, exfoliation etc[1].

Replacement of teeth with fixed implant restorations or the use of implants to support and retain removable dentures are evidence based treatment options with the potential for very high success rates. Often, alveolar bone and soft tissue also require replacement, so implant treatment frequently involves replacement of alveolar tissues using both biological and prosthetic means[1].

We discusses indications for dental implants by considering the following factors

1. Why does the patient wish to replace missing teeth?
2. What are the prosthodontic advantages of implant treatment?
3. What is the problem with an existing fixed restoration or the natural teeth?
4. Is there a denture-related problem the patient wishes to solve?
5. Does the cause of missing or failing teeth have any influence on indication for implants?
6. Does the timing of tooth loss have any influence on indication for implants?
7. What are the main drawbacks of implant treatment?

1. Why does the patient wish to replace missing teeth?

To improve aesthetics?

The wish to replace missing teeth is often understandably driven by a desire to smile with confidence and conform to socially accepted norms of appearance [1, 2].

To improve masticatory function?

Because teeth perform keys roles in mastication of food, their absence often causes compromise in chewing function and may also indirectly affect nutritional status by influencing food choices.

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To improve speech function?

The presence of teeth and alveolar structures is critical in production of certain speech sounds. Their absence can affect speech intelligibility (how an individual is able to communicate through speech) [1, 2].

To enable wind instrument playing?

Some wind instruments require anterior teeth to be present to enable the appropriate embrasure to be formed around the mouthpiece of the instrument.

To regain what has been lost?

Loss of a body part (e.g., a tooth) may be associated with a deep-seated desire to replace what is missing, irrespective of the role played by the anatomical part [1, 2].

2. What are the prosthodontic advantages of implant treatment?

To avoid tooth preparation and possible sequelae

Removal of tooth structure, the inevitable exposure of cut tooth surface to bacteria in saliva, and other procedures involved in attaching bridge retainers to teeth are associated with a risk of pulp necrosis and the need for either extraction or endodontic treatment[3].

No need for connectors between pontic and abutment teeth

Implants are ideally suited to restoring missing teeth where there are interdental spaces, particularly in the aesthetic zone.

Avoids mechanical risks of conventional bridges

The longer the span of a fixed bridge, the higher the risk of mechanical complications such as superstructure fracture or decementation of a retainer. It follows that the longer the edentulous space, the more likely it is that implants are indicated as fixed tooth replacements [2,3].

The deep complete overbite—No need to accommodate a denture connector

When the mandibular incisors contact the palatal mucosa in the intercuspal position, it is difficult to provide a removable denture because the connection to the denture tooth will often produce an occlusal interference. A dental implant as the definitive replacement can circumvent this occlusal difficulty [1, 2].

Concurrent use of an implant as an orthodontic anchor

Dental implants are well suited to use as orthodontic anchors because they do not move through the alveolus when subjected to low-level prolonged (orthodontic) forces. The prosthodontic advantage lies in the ability to use a provisional restoration on an implant as a guide to orthodontic alignment and ultimately to replace the provisional restoration with a definitive one [1].

Linking implant restorations together

Linking natural teeth together for whatever reason is a concern because of the potential for differential tooth movement causing failure at the tooth–restoration interface that can be difficult both to diagnose and to manage. Because implants have negligible differential movement, linking them together is prosthodontically acceptable. A practical advantage of linking implant restorations together is that it reduces the number of interdental contacts that may require adjustment in order to achieve accurate fit. Linking also provides the opportunity to share occlusal loads between a numbers of implants [1, 3].

Retrievability of the restoration

It is common for an implant restoration to be attached to the underlying implant in a way that allows it to be retrieved. This can allow for repair, replacement, or inspection if necessary[1].

Denture retention and support

Removable dentures can be significantly enhanced by implants, which provide both support and retention. This is a particular advantage for a complete denture in the edentulous mandible. Recording the jaw relations can also be facilitated by incorporating attachments into the registration appliances [4].

To take advantage of machined fitting parts

One of the challenges of conventional crown and bridge dentistry is the need to capture accurate impressions of tooth preparations and adjacent gingival margins. Implant dentistry allows for the easy use of machined components to facilitate the impression stages of construction [5].

3. What is the problem with an existing fixed restoration or the natural teeth?

Problematic bridgework

Both conventional and minimal preparation adhesive bridges may fail for a number of reasons, including failure of the cement lute. It may be possible to restore the abutment teeth and improve their prognosis by leaving them as single units, replacing the missing teeth with implant restorations. Metallic retainers have the potential to significantly alter the shade of abutment teeth, particularly if they are thin. This problem is circumvented by using implants [3,6].

Periodontal disease

Periodontal disease may manifest as tooth hypermobility and migration causing discomfort, aesthetic problems, and occlusal difficulties. Alone or in combination, the

latter can complicate the design of fixed and removable restorations. It may be appropriate to remove such teeth when providing dental implants. It is also important to consider the risk of future peri-implant infection arising from pathologic bacteria in the remaining periodontium and disease susceptibility of the individual. Unfortunately, periodontal disease causes loss of alveolar bone, which can severely compromise the volume of bone available for optimal implant placement [2].

Unrestorable teeth

Apart from replacement of missing teeth, decisions are often required about teeth that are badly affected by caries, pulp/ periapical disease, root resorption, and mechanical failure. There are many factors to take into account when making what can be difficult decisions about the predictability of restoring teeth compared with extraction and replacement with implants [1,7].

4. Is there a denture-related problem the patient wishes to solve?

Improved removable denture

By helping to support and retain removable dentures, a number of denture-related problems can be overcome, such as a tendency for loose dentures to stimulate a gag reflex or dentures that are loose and painful because they move in function. Implants give the potential to construct dentures without the need for visible clasps or palatal coverage [8]

Fixed restoration instead of removable denture?

It is not difficult to appreciate the desire patients may have to avoid a removable denture altogether. Not only is there the potential for improved function but also ageing-related perceptions of removable dentures may be avoided. Unfortunately, the pattern of alveolar resorption in the maxilla can make it difficult to construct fixed implant restorations that match the aesthetic and phonetic qualities of removable dentures. Multiple implants and the possible need for bone grafts also make this style of restoration expensive [8].

5. Does the cause of missing or failing teeth have any influence on indication for implants?

In some situations, the cause of tooth loss may have a particular bearing on planning, treatment, and success of implant restorations. Pertinent factors are discussed in the following sections. If the patient is involved with medicolegal proceedings related to the loss of teeth, there may be an expectation that damage payments will fund implants. All parties must be fully aware of the circumstances and claim status [5].

Periodontal disease

Loss of alveolar bone, complications due to further tooth loss, and the risk of future peri-implant disease pose challenges and limitations for this group of patients [2].

Congenital/developmental absence

Failure of development of permanent teeth (and supporting tissues) can result in inadequate alveolar volume for dental implants. Malposition and malformation of the permanent teeth that do develop pose additional challenges. These patients may benefit from specialist multidisciplinary management. Patients in this category may also present at a young age when dental implants may not be advisable. Once integrated, implants will not migrate with the growing alveolus as healthy teeth do, so they can become malpositioned by the time craniofacial growth slows. Ectopic teeth that fail to erupt can pose an obstruction to implant positioning. Removal of ectopic teeth to allow implant insertion may result in an alveolar defect that can complicate implant placement [1].

Caries

Planning for implants is more straightforward if the oral environment is stable. If caries is ongoing, it may mean that further tooth loss will occur with deleterious consequences for a long-term plan involving implants.

Related to treatment for head and neck cancer

Compromised teeth may need to be extracted when radiotherapy is to be used to treat head and neck cancer. Side effects of radiotherapy, such as oral dryness and poor-quality mucosa, can significantly affect the success of mucosa-borne removable dentures, making implant supported restorations a helpful option. However, there is a risk of precipitating osteoradionecrosis if implants are placed in irradiated alveolar bone [7].

Tumour excision may involve dentoalveolar structures leaving a range of anatomical defects that may be amenable to restoration with fixed or removable prostheses. The need for ongoing tumour surveillance must be borne in mind when designing restorations for these patients.

Trauma

Young adults who have lost individual or small numbers of teeth as a result of trauma frequently present seeking replacement with implants. Implants may be particularly desirable if adjacent teeth are intact and would require significant irreversible adjustment to fashion them into bridge abutments. More extensive trauma may be accompanied by loss of alveolar or even basal bone. Resulting defects may require bone and soft tissue grafts to create sufficient alveolus to provide support and aesthetic frame for implants. There will be a limit to what is feasible and realistic in each case. It is important to consider

whether lifestyles that pose a risk of traumatic damage to the teeth could likewise leave implant restorations at risk of damage [9].

Root resorption

Teeth that undergo replacement root resorption during alveolar development may produce alveolar deficiency because a possible effect of tooth ankylosis is to inhibit local alveolar growth. The result may be a challenging vertical and horizontal alveolar volume deficiency. If replacement root resorption takes place after growth has ceased, then there is the potential for more bone to remain for an implant than would be the case after extraction of a nonresorbed root.

Periradicular infection

Residual periradicular infection has the potential to cause infection at an implant inserted in the vicinity. Implant insertion immediately after extraction of a tooth with periradicular infection is likely to carry a greater risk than insertion at a later date when there has been a chance for residual infection to be resolved. Periradicular infection is commonly associated with inflammatory bone resorption. Teeth that have been subjected to root surgery will also either have had periapical bone removed for surgical access or be associated with pathologic inflammatory bone resorption. Residual periradicular bone defects clearly have the potential to complicate implant insertion [1, 4].

6. Does the timing of tooth loss have any influence on indication for implants?

Resorption of bundle bone around a tooth root and further localized alveolar remodelling begins when a tooth is lost. There may be a window of opportunity of up to 3 months following extraction or traumatic avulsion of teeth during which implant insertion can be more straightforward than if the alveolus is left to remodel for longer with likely loss of bone volume. Delaying may run the risk that implantation is not feasible without preliminary bone grafting to augment the alveolus [1].

7. What are the main drawbacks of implant treatment?

The need for surgery

Provision of implants involves some level of surgical intervention, which may be seen as a drawback. The extent of surgery, the risk of damage to neighbouring structures, the likelihood of postoperative side effects and complications, and patient responses will vary greatly depending on numerous patient- and operator-related factors [5].

Cost and duration of treatment

Implant treatment tends to be more expensive than non-implant alternatives. It is also common for treatments to extend over several months or longer because of the need to wait for hard and soft tissue healing.

Lack of implant product standardization

Because there are hundreds of ever-evolving implant systems in use worldwide, patients may have difficulty locating a dentist who is willing and able to maintain and perhaps refurbish or repair restorations made with an unfamiliar implant system. Although not inevitable, mechanical and biological complications do occur, particularly for implant overdentures.

Possible need for a tooth-free period

There are occasions when a patient may not be able to have tooth replacement for short periods (days) during stages of treatment: typically, immediately following surgery to provide bone grafts or place implants. It may also be necessary for a patient to use a removable denture for a period of time during treatment even when fixed implant restorations are the ultimate objective.

Difficulty achieving aesthetic perfection and easy access for oral hygiene

Unless patient expectations are managed effectively, there is a risk of patient dissatisfaction with the aesthetic outcome of implant treatment. The main challenge in this respect is in relation to achieving a perfectly natural-looking gingival frame around an implant restoration in the anterior maxilla (often referred to as the aesthetic zone).

Despite best efforts, the form of an implant superstructure may not be conducive to regular easy access for oral hygiene by the patient. In addition, what may be possible to clean when the patient has good dexterity and eyesight at the outset may prove impossible to clean if these faculties deteriorate with age or illness [1, 2, 6].

CONCLUSION

Dentures and bridges should always be considered as alternative approach for tooth replacement.

Orthodontist can close some spaces. Implants are the treatment of choice for most edentulous spaces. Soft and hard tissue loss will compromise the appearances unless augmentation is considered. Prognosis of individual teeth and the whole dentition needs to be estimated.

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