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Mini Review

Can Short Implants Substitute Maxillary Sinus Lift?

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Abstract

Endosseous dental implants have become a predictable treatment option for applicable patient. However, it is not always possible to place dental implants in all patients as the bone quality and quantity matters the most. One such situation exists in maxillary posterior teeth region where the bone quality is poor as well as the presence of maxillary sinus makes it difficult for a clinician to place implants. Advancements in science and technology makes the impossible possible. One such advancement is the application of short implants in posterior maxillary region where pneumatization of maxillary sinus is considered to be a major concern in placing dental implants. This review focuses on the use of short implants in posterior maxillary region.

Keywords: Short Implants; Maxillary Sinus; Dental Implants

Introduction

Replacement of missing tooth could be done with a removable partial denture (RPD)/fixed partial denture (FPD)/dental implant. However, the use of RPD reduces the chewing capacity and taste perception. The drawbacks of using RPD and FPD have led to the development of dental implants. Implants have become an integral part of treatment option in replacing the missing tooth. In cases with adequate vertical bone height, standard implants could be used with high success rates and predictable prognosis [1]. However, it is not always possible to place dental implants in all patients as the bone quality and quantity matters the most. One such situation exists in maxillary posterior teeth region where the bone quality is poor as well as the presence of maxillary sinus makes it difficult for a clinician to place implants. Sinus or bone augmentation could be a consideration to achieve better bone quality and increase implant height for long term success of dental implants. However, complications such as sinus floor perforation, local infection, swelling, hematoma, post-operative morbidity exists [2]. Hence, short implants are introduced recently as an option in regions such as posterior maxilla to prevent damage to vital structures.

What are short implants?

Generally, Implants of length more than 10mm is considered to be long implants whereas implants of length less than 10mm are short implants. Recently it has been defined that a length of less than 8mm implant is a short implant [3]. A study comprised of 431 edentulous patients showed that around 38%of population had only 6mm of available bone height in maxillary posterior region [4]. This demonstrates the necessity for short dental implants. In addition, short implants do not necessarily need CT imaging as it's required only for long implants. The failure rate of short implants is not higher than long implants.

Benefits of short implants

- Feasible in areas with less available bone height
- Prevents damages to adjacent vital structures
- Less contact possibility with adjacent tooth roots
- Lower risk for surgical parasthesia
- Lower bone heating
- Reduced surgical time
- Affordable cost
- Reduced post-operative discomfort

Literature reviews

An electronic search was performed on PubMed and MEDLINE databases for relevant studies involving short implants. The factors assessing the success rate of short implants include length and diameter of implant, bone to implant contact ratio, occlusal load, systemic factors as suggested by Romeo., *et al*. [5]. The amount of bone to implant contact ratio is of significant importance than the overall length of the implant. Monje., *et al.* published a meta-analysis including a number of clinical trials and examined 914 short implants and 1041 standard implants [6]. They demonstrated that the success rate of short implants was higher than standard implants being 88% for short implants and 86% for standard implants. The failure rate of standard implants was less than short implants. However, short implants were as predictable as standard implants in long term management. Atieh., *et al.* concluded that there were no significant differences found between long and short implants in posterior axillary region based on their survival rate [7].

Tawil., *et al.* suggested that shorter implants could be a better replacement option in areas with reduced bone height and there was no correlation found between crown implant ratio, peri implant bone loss or occlusal table width [8]. Misch., *et al.* evaluated 745 short implants and suggested that few cases of implant failures occurred between stage 1 and 2, whereas no failure occurred after the completion of the final prosthesis [9]. Mertens., *et al*. advocated the long-term success rate of short implant. They found that almost all implants survived even after 10 years of their placement. The criteria used for implant's success rate assessment is Albrektsson's criteria [10]. Again the crown to implant ratio did not seem to influence the success rate of short implants. Anitua., *et al.* evaluated the influence of crown to implant ratio on the margial bone loss around short implants. 128 short implants were assessed in this study. According to the results achieved from their study, marginal bone loss was not significantly influenced by crown to implant ratio [11]. Thoma., *et al.* conducted a systematic review and found that short implants were similar to long implants in posterior maxilla after or simultaneous to sinus grafting and short implants could be an effective alternative in posterior maxillary region [12].

It is often thought that implants of short height are known to have poor success rate and seems to fail soon. However, no significant evidence exists to show a relation between implant length and success rate. Many studies exist to show that no additional risk of failure exists when shorter implants are used. Achieving primary stability is of significant importance when implant success rate is considered. Primary stability is determined by many factors including implant length, diameter, taper, surface roughness. Hence an implant of shorter length with increased diameter and improved surface roughness could be used to achieve the desired primary stability. To further improve the survival rate of short implants, splinting the implants together is a reasonable option to be considered. Bergkvist., *et al.* suggested that the stress around the splinted short implants was significantly less compared to the unsplinted short implants in posterior maxillary region [13].

Risk factors to be considered while using a short implant are as follows

- More crown height
- High biting force
- Dense bone

Conclusion

The overview of this article supports that short implant in posterior maxilla is a reasonable alternative option to conventional implants. This makes implant applicable even to patients with reduced available bone height. Advancements in science and technology makes the impossible possible. One such advancement is the application of short implants in posterior maxillary region where pneumatization of maxillary sinus is considered to be a major concern in placing dental implants. the survival rate of short implants is not dependent on a single factor; it is a multifactorial thing to be considered while placing it. The success rate and survival rate mentioned in this article is applicable only when it is placed under ideal conditions with a precise treatment protocol.

Declaration of Interest

None

Acknowledgement

None

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