

Controversies in Implant Surgery



Tara L. Aghaloo, DDS, MD, PhD*, Martin Mardirosian, DDS, MD, Brando Delgado, BS

KEYWORDS

• Implants • Mini implants • Short implants • Growing patients

KEY POINTS

- Dental implants are a mainstream treatment protocol to replace missing teeth; because they enjoy a high survival and success rate, patients and clinicians continue to increase the demand for more economical, less time consuming, and less complicated surgical procedures.
- These patient and clinician demands have led to shorter length and narrower diameter implants, immediately placed implants into infected sites, and the use of implants in children.
- With all new techniques and procedures, case reports and case series are the first publications to appear in the literature, and there are many favorable reports to justify their use; however, appropriate well-designed, long-term studies are not always available to support clinical practice.
- Because long-term studies are often not available, especially for implants in infected sites, mini implants, and implants in the growing patient, the field continues to evolve.

INTRODUCTION

Implant therapy is an effective and desirable treatment option for fully and partially edentulous patients. With implant survival rates greater than 95% in many studies, and a plethora of long-term data, it is not surprising that the dental profession has truly been transformed by the concept of osseointegration. There are still, however, difficult clinical situations for which a true consensus has not been reached in the literature. Furthermore, many newer protocols, less invasive techniques, and procedures that do not follow conventional implant therapy are often performed in clinical practice without extensive literature support. Therefore, it is important to address some of these controversial topics and review the available publications that may or may not justify altering diagnostic, treatment planning, surgical, and prosthetic principles. Atrophic alveolar bone represents a major obstacle to implant success and ideal implant placement in the mandible and

maxilla. Often, extensively atrophic regions of bone require large and complex bone augmentation procedures that require lengthened healing periods, increase the rate of complications, and ultimately increase implant failure. Many implant options have been developed and publicized to circumvent these augmentation procedures to decrease the complexity of treatment and increase patient comfort and potential for implant success. Other points of contention within implant dentistry include the use of implants in growing patients, which has traditionally been avoided entirely; use of mini implants; and the new concept of immediate implant placement in actively infected extraction sockets. These controversial topics are discussed in this article, and evidence in support and in opposition is presented.

SHORT IMPLANTS

Conventional length dental implants have extremely high and predictable survival rates in

Section of Oral and Maxillofacial Surgery, UCLA School of Dentistry, 10833 LeConte Avenue, CHS Rm. 53-076, Los Angeles, CA 90095-1668, USA

* Corresponding author.

E-mail address: taghaloo@dentistry.ucla.edu

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many long-term studies with few complications.¹⁻³ When faced with a vertically deficient ridge, options available to facilitate successful implant placement include various bone augmentation procedures and placement of a traditional length implant or placement of a short implant. First, defining short implants is important for discussion. Classic short implant length was considered less than 10 mm, but many authors and clinicians consider a short implant as less than or equal to 8 mm or less than or equal to 6 mm.⁴⁻⁷ Obvious advantages exist for short implants, especially in the posterior maxilla and mandible.⁶ Reduced treatment time, less invasive surgery, and decreased morbidity from lack of a bone augmentation procedure, and lower overall cost are major driving forces for the use of short implants.⁸ In addition, other potential advantages include easier removal if complications occur, more possible implant sites, and less surgical skill needed for placement.⁶ For some patients, particularly with advanced age, decreased healing ability, or complex medical history, a more complicated treatment plan including bone augmentation and subsequent placement of standard length implants presents difficulties and potentially a greater risk of implant failure. However, some complications have been reported with short implants including an increased crown-to-implant ratio, occlusal overload, and failure in the posterior maxilla (Table 1).^{6,9}

Short implants have high success rates in areas with less than ideal bone height. Although previous studies report higher failure and complication rates for short implants in the maxilla and

mandible,^{4,8,10-12} short-term^{8,13,14} and long-term studies¹⁵⁻¹⁷ have shown success rates approaching those for traditional length implants. Considering that short implants are used in mostly atrophic regions of the jaw, these positive results are impressive. A recent study directly compared 6-mm with greater than 10-mm implants with sinus augmentation, which demonstrated 95% to 100% implant survival without a significant difference between groups after 1 and 3 years. Mean implant stability was similar at placement and 1 year, but significantly higher in the grafted group after 3 years. Although patient satisfaction was high in both groups, treatment cost and overall treatment time was significantly lower in the short implant group.⁷ One of the most important considerations when discussing the longevity of short implants is their ability to withstand consistent, long-term crestal bone loss. A longer implant provides more bone-to-implant contact, and therefore, may provide increased longevity if crestal bone loss continues over many years. In addition, finite element studies demonstrate increased stress distribution around the crestal bone with short implants and increased crown height.¹⁸ However, the development of enhanced or roughened surface implants has increased survival and success of short implants in more complex patients and situations. Furthermore, newer implant designs that decrease the amount of force transferred to the crestal bone because of a decreased coronal implant diameter may also provide improvements to facilitate shorter implant placement.⁴ A recent study demonstrated similar crestal or marginal bone loss between short and standard implants, or less bone loss around short implants,^{7,19} and other comparisons showed more favorable patient morbidity, cost, and treatment time with short implants.¹⁹⁻²² Even though more studies are available to demonstrate the high survival and success rates of short implants, the definition of short implants is inconsistent, minimal long-term studies exist, and few direct comparative studies are available.

A Cochrane systematic review by Esposito and colleagues²³ evaluated the need for augmentation versus placement of short implants. They reviewed articles evaluating prostheses failures, implant failures, and complications and concluded that there were more statistically significant implant failures and complications in the vertically augmented group versus short implant group.^{17,24} Because vertical augmentation, especially in the posterior mandible, is less predictable than other bone grafting techniques, and is associated with complications, these issues may be avoided entirely with the use of short implants.²⁴⁻²⁶ The

Table 1
Short implants

Advantages	Disadvantages
<ul style="list-style-type: none"> • Avoidance of Bone Augmentation Procedures • Decreased healing time • Decreased treatment morbidity • Less invasive placement procedure • Less surgical skill required for implant success • Lower surgical and materials cost • Simplified Implant removal 	<ul style="list-style-type: none"> • Increased crown to implant ratio • Decreased success rates in posterior maxilla • Less ability to withstand occlusal overload

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