Success of short implants in patients who are partially edentulous


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**Clinical question.** Are short implants a reliable option for patients who are partially edentulous?

**Review methods.** One author and one database expert independently searched MEDLINE and Embase databases for articles published from January 1980 through October 2009. Included were randomized controlled trials (RCTs) and prospective cohort studies of human participants who were partially edentulous and who had been followed up for more than one year. The authors excluded alumina-reinforced zirconia implants and mini-implants used for orthodontic anchorage, as well as those with cantilever substructures. By using two tools developed by the Dutch Cochrane Centre, the authors independently generated scores for each study that they used as a basis for study selection. The authors assessed survival rates of short implants after two years in patients who had partially edentulous maxillae and mandibles. The authors also evaluated survival rates of short implants in patients who smoked versus patients who did not, of implants with rough and smooth surface topography and of implants that were placed concurrent with bone augmentation procedures.

**Main results.** The initial search yielded a total of 1,353 publications, from which the authors selected 29 for the systematic review, including 28 prospective cohort studies and one RCT. A total of 2,611 short (< 10-mm) implants were involved, and the mean follow-up time was 3.7 years. Short implants placed in the maxilla had a significantly higher failure rate than did those placed in the mandible. There was a positive association between success rate and implant length; longer implants had a significantly higher survival rate. The two-year survival rate for 5-mm implants was 93.1 percent; for implants between 6.0 mm and 9.5 mm in length, the two-year survival rate consistently met or exceeded 97.4 percent. In studies that included patients who smoked, the number of implant failures was higher than that in studies involving only patients who did not smoke. Implant surface topography and bone augmentation did not affect the survival of short implants significantly in this review.

**Conclusions.** The survival rate of short implants in partially edentulous patients is similar to that of standard implants, with two-year survival rates generally increasing with implant length and being greater for implants placed in the mandible.

**Systematic review conclusion.** Short implants (< 10 millimeters) can be used successfully in patients who are partially edentulous. Greater survival rates are associated with implants in the mandible, with implants in patients who are non-smokers and with implants of at least 6 mm in length.

**Critical summary assessment.** The survival rate of short implants in partially edentulous patients is similar to that of standard implants, with two-year survival rates generally increasing with implant length and being greater for implants placed in the mandible.

**Evidence quality rating.** Good.
**COMMENTARY**

**Importance and context.** Implant prosthodontics rapidly is becoming routine practice for replacement of missing teeth, and practitioners are looking for effective ways to restore to full function their patients who are partially edentulous, particularly those who have atrophic alveolar ridges. With smaller implants, surgeries are less invasive, healing time is decreased and patient satisfaction may be improved.

**Strengths and weaknesses of the systematic review.** The authors used accepted search methods with well-defined inclusion and exclusion criteria. They independently assessed selected studies for risk of bias, and they studied sources of heterogeneity by using stratified analyses for the determinants of surface topography, jaw arch, smoking status and bone augmentation procedures. The authors included only studies that met their risk-of-bias criterion, thereby limiting the number of studies available for analysis. An alternative would have been to include patient data from all RCT and prospective cohort studies and perform subgroup analyses according to risk of bias. Implant failure data included implants that had been removed for psychological reasons, which could affect the reported survival rates negatively.

**Strengths and weaknesses of the evidence.** Of the 29 publications selected for data analysis, only one was a randomized controlled trial; the other 28 were prospective cohort studies. Most of the studies included in this review were not limited to short implants, and the authors made no distinction regarding the prosthetic rehabilitation of the implants (for example, short implants could be splinted to longer implants). Each participant had at least five short implants, which may have skewed results negatively because implant loss tended to cluster within the same patients. In addition, some short implants were used to support single-tooth restorations, whereas others were used in combination to support multiple-tooth restorations. Thus, the results of this review may not necessarily pertain to any specific clinical situation.

**Implications for dental practice.** Consistent with results from other systematic reviews,¹⁻³ the authors found that the survival rate for short implants was similar to that of standard implants. Short implants are a predictable treatment modality for partially edentulous patients, and they tend toward an increased survival rate when placed in the mandible and in patients who do not smoke.

**Disclosure.** Dr. Gray did not report any disclosures.

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