
Sung-Kiang Chuang, DMD, MD, DMSc, Chun-Teh Lee, DDS, MS

The purpose of this study was to evaluate whether there was a significant difference in the survival of short implants (≤8.5 mm) and longer implants for the management of posterior partial edentulism.

Information not available (The authors declared no conflicts of interest in the acknowledgment section)

Systematic review with meta-analysis of data

Level 2: Limited-quality, patient-oriented evidence

Grade B: Inconsistent or limited-quality patient-oriented evidence

This systematic review included studies of short implant placement with length ≤8.5 mm in posterior partially edentulous patients. All restorations were fixed prostheses, including single or multiple crowns. No patients in these studies were medically compromised. The study types included in this review could be randomized clinical trials or prospective or retrospective controlled or non-controlled clinical trials providing data about short implant length, diameter, surgical site, surface texture, and survival rate. The studies with unclear data of short implants were excluded. A total of 1354 articles were found in the initial electronic and manual searches. Of these, 33 articles fit the criteria. These final articles documented the results with 3573 short implants. In different types of statistical analysis or comparison, various numbers of implants were included from these studies.

The systematic review was designed to evaluate the implant survival outcome of short implants placed in posterior partially edentulous patients with fixed restorations. Other factors in short implants were also evaluated, for example, implant diameter and length. The survival results of short implants were compared with those for long implants.

Life table analysis with interval survival rate (ISR) and cumulative survival rate (CSR) was done for short and long implant groups. The survival rates were also analyzed in subgroups: short implants (diameter < 4.8 mm); wide-short implants (diameter ≥ 4.8 mm); and short implants of different lengths (5-8.5 mm). Risk ratios of implant failure in short and long implant groups were analyzed.

The results demonstrated an ISR of 98.5% to 100% and a CSR of 97.9% to 98.5% in short implants with 1 to 5 years of follow-up. The majority (71%) of implant failures occurred before loading. The life table analysis demonstrated similar survival rate between short implants (length ≤ 8.5 mm) and long implants (length > 8.5 mm) and short (diameter < 4.8 mm) and short-wide (diameter ≥ 4.8 mm) implants. Meta-analysis was performed to analyze risk ratio of failure in short and long implants from studies, including a comparison of short versus long implants as the objective (6 of 33 studies). The risk ratios were also analyzed by the frost plots in the other 24 studies. There was no statistical heterogeneity in the two risk ratio evaluations (p = 0.07 and 0.30, respectively). Short implants with varying lengths (5-8.5 mm) had ISRs and CSRs higher than 95% over 1 to 4 years of follow-up except 5-mm short implants, which had 89.9% CSR with 2 to 4 years of follow-up.
Conclusions
The survival rate of short implants in posterior partial edentulism was high and not related to implant surface, design, or width. Short implants might be a predictable alternative to long implants, which often require additional augmentation procedures.

COMMENTARY AND ANALYSIS
Several reviews demonstrated high survival rates of short implants (length < 10 mm). This review also demonstrated high ISRs and CSRs until 5 years and concluded that the short implant was a predictable alternative to long implant treatment. However, the study types included in this review varied and excluded case report. In the abstract of this review, 5 randomized clinical trials were included. However, the discussion section mentioned only one randomized clinical trial. The characteristics of these included studies were unclear. All were of relatively short duration. The authors did not perform any quality assessments of the included studies. The uncontrolled quality of these studies might skew the results, since it was an important factor in the systematic review assessment. Thirty-three articles were included in the review, but one study was excluded in life table analysis without a stated reason. There were many drop-out cases over different time intervals in the life table analysis. Therefore the results would be biased by missing data, drop-out effects, and few studies having longer follow-up times.

The risk ratio analysis in short and long implant failure was performed in two groups (Tables 9 and 10). It stated that one group included 6 studies having short and long implant comparison as objectives and another group included the other 24 studies. However, only one of the 6 studies actually had a primary objective of comparing short and long implant survival rates.

The conclusion of the review stated short implant failure was not related to implant surface texture and design. However, there was no statistical analysis of these factors, but only a demonstration of the proportions of different short implants.

It might be clinically meaningful to evaluate the success rates of short implants because success rate could be more important for patients than survival rate. Moreover, other outcomes, such as complications or bone level changes, might be reasonable to evaluate. In conclusion, the systematic review generated a primary outcome by the broad inclusion of studies and was not limited to randomized controlled clinical trials. Although the conclusion was similar to that of other studies, the results might be of questionable validity and should be interpreted with caution.

Short dental implants have many advantages that facilitate implant prosthesis reconstruction. The bone grafting augmentation procedures to increase the available bone height at the crestal region of the bone can be avoided by placing short implants. The expansion of the sinus before implant placement will also be minimized. Usually, shorter implants are easier to place when osteotomy site preparation is simplified. This shortens treatment time and minimizes morbidities such as pain and discomfort. Because of the short length, the angulation or tilting effect of the mechanical load might be improved relative to the long axis of the missing tooth.

REFERENCES

REVIEWERS
Sung-Kiang Chuang, DMD, MD, DMSc
Assistant Professor of Oral and Maxillofacial Surgery
Massachusetts General Hospital and the Harvard University School of Dental Medicine
Department of Oral and Maxillofacial Surgery
Boston, MA, USA. P.O. Box 67376
Chestnut Hill Station, Chestnut Hill, MA 02467, USA
Tel.: +1 617 527 4981
sungkiangchuang@gmail.com
Chun-Teh Lee, DDS, MS
Postdoctoral Research Fellow in Periodontology, Harvard University School of Dental Medicine, Boston, MA, USA