

Dental Implants



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KEYWORDS

- Cumulative survival rate
- Bone augmentation
- Implant design
- Platform switching
- Implant abutment
- Surface roughness
- Surface coatings
- rhBMP-2

KEY POINTS

- The actual failure rates of dental implants are likely to be higher than the rates published in the clinical literature.
- Roughened implant collars, microthreads, and platform switching are all effective in bone maintenance.
- Bone augmentation is effective at increasing functional surface area but does not significantly increase implant success rates.
- Reduced-diameter implants have higher probability of failure, especially when the diameter is 3.75 mm or narrower.
- Implant bodies made from zirconia have performed well clinically when their surfaces were smooth, but this material may not be able to withstand the application of roughened surfaces or sharp structural features.

INTRODUCTION

The literature on dental implants has advanced tremendously over the past 10 years. **Fig. 1** shows the results of a search in Scopus using the Boolean phrase (“dental implant” OR “dental implants”) AND (failure OR replaced OR survival OR success OR fracture). The annual publication rate on success/failure of dental implants suddenly accelerated beginning in 1988, and it continued to increase at a rate of 22 manuscripts/year/year almost up to the present. **Fig. 2** shows the types of publications in the dental implant literature. It consists of 11.0% review articles, a proportion that remains unchanged to the present. The recent rate of publication has provided a wealth of systematic reviews. This search captured 748 reviews between 2008 and the present. After screening their abstracts, 599 of them were subsequently excluded on the basis of being studies of superstructures, studies limited to interventions for previously failing implants, studies that were concluded before abutment placement, in vitro studies, and studies regarding complex facial reconstruction (such as the placement of implants in a mandible constructed from the fibula). The remaining publications

Conflicts of Interest: None.

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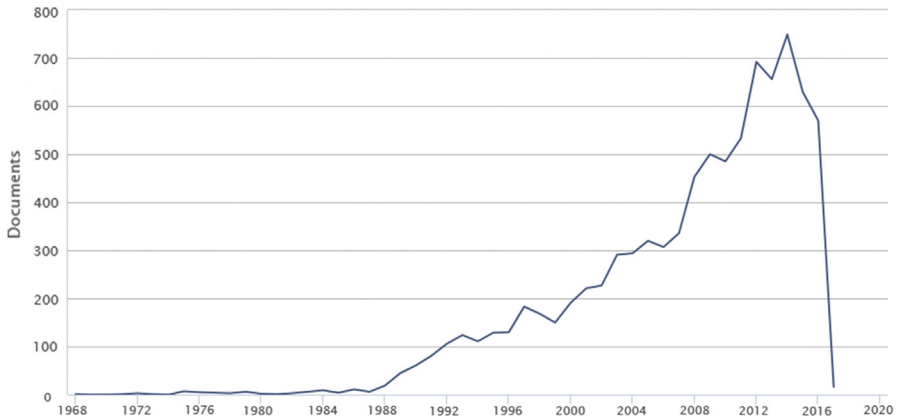


Fig. 1. Publication rate over time of manuscripts related to the success/failure of dental implants.

were analyzed in detail, and their results were compiled to produce the guidance in later discussion. This guidance is based on evidence from clinical studies whenever possible, although for some topics the earliest systematic reviews included only animal models.

INFLATED SUCCESS RATES

A word of caution is needed before reviewing the dental implant literature. Recent clinical studies regularly report success rates upwards of 95%. These reports provides the appearance that the challenges in dental implantology have mostly been resolved, but that is a false impression. The “cumulative survival rate” (CSR) for those studies is often much lower than the reported “success rate.” There is an important difference between these 2 measures of success.¹ If 60 implants are followed over a 2-year period and 5 of them fail (**Fig. 3**), then the typical study would report a 92% success rate. However, some of those implants should probably be censored data points (dropouts, deaths, relocations, and so forth). A simple success rate would erroneously

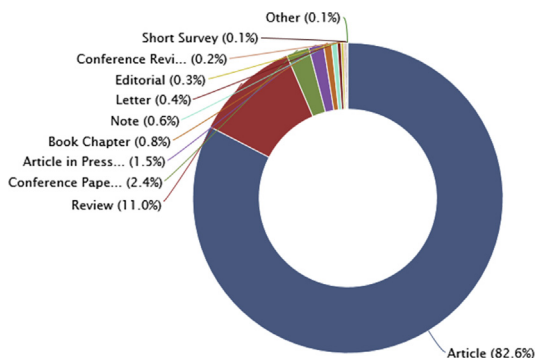


Fig. 2. Proportions of different types of publications related to the success/failure of dental implants.

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