Outcomes of one-stage versus two-stage implant placement


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Systematic review conclusion. The authors found no significant differences in measured outcomes between one- and two-stage implant placement techniques. Critical summary assessment. A review of limited evidence from randomized controlled trials of one- and two-stage implant placement protocols showed no advantage for either protocol. Evidence quality rating. Limited.

Clinical question. Are there any differences in outcomes between one-stage (nonsubmerged) and two-stage (submerged) surgical implant placement protocols in adults?

Review methods. The authors searched four electronic databases for studies in which researchers compared one-stage versus two-stage implant placement through Jan. 21, 2009; they used no language restrictions. They also completed a hand search of printed journals. Their review included randomized controlled trials (RCTs) of adults that involved a minimum follow-up period of six months after prosthesis placement. They assessed the following outcomes: prosthesis failure, implant failure, radiographic marginal bone level, patient preference, esthetics and complications. Two independent reviewers screened the full reports, extracted data and independently assessed each report’s validity and risk of bias.

Main results. The investigators selected five studies involving 239 patients and a total of 761 implants (four brands). Three trials involved parallel group designs, one a split-mouth design and one a hybrid design. All but one trial had a high risk of bias. Trials involved different oral locations and restorative scenarios. The 761 implants were divided nearly evenly in terms of placement protocol: 375 were placed by means of a one-stage procedure and 386 by means of a two-stage procedure.

Twenty-three implants failed in 11 patients in the one-stage group, and nine implants failed in eight patients in the two-stage group. Meta-analysis showed no statistically significant differences (P < .05) between the two procedures in terms of prosthesis failure in three trials (relative risk [RR], 1.87 [95 percent confidence interval (CI), 0.33-10.40]) and implant failure in four trials (RR, 1.39 [95 percent CI, 0.59-3.27]). The one trial in which investigators accurately compared bone levels showed no significant dif-

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ferences between the two protocols. Investigators in two trials reported complications; one trial showed no significant differences ($P < .05$) between procedures in terms of complications and another trial indicated a trend toward more complications arising with the one-stage procedure. Investigators in one trial reported esthetic outcomes in terms of soft-tissue recession and found no significant differences between the two protocols.

**Conclusions.** There were no significant differences between outcomes for one-stage and two-stage implant placement. Large, well-controlled RCTs may prove the noted trend that one-stage placement may be more appropriate for partially edentate patients, whereas two-stage placement may be more suitable for patients in circumstances in which initial stability of the implant is an issue or in which barriers are used.

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**COMMENTARY**

**Importance and context.** Clinicians may place implants so that they penetrate through the mucosa (one-stage protocol) or are submerged under the mucosa (two-stage protocol). Two-stage placement minimizes the risk of unwanted direct loading of the implant during healing; however, it requires a minor subsequent surgical procedure and precludes early implant loading. Although clinicians use both placement protocols, survival data associated with each might aid clinicians in selecting the appropriate one for their patients.

**Strengths and weaknesses of the systematic review.** This is a sound systematic review in which the investigators used accepted methods to identify and select studies addressing the clinical question. It may have been more informative if the Cochrane Review methods had permitted the inclusion of studies other than RCTs, as the results of such studies might have confirmed some trends noted in the included RCTs. Although clinicians use both placement protocols, survival data associated with each might aid clinicians in selecting the appropriate one for their patients.

**Implications for dental practice.** The early protocol for implant placement was specific in its requirement of a two-stage procedure. Across time, clinicians also have adopted a one-stage approach.

The results of this review show no difference in outcomes between one- and two-stage implant placement, although the data were limited. As suggested, each technique may have advantages in different oral situations.

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32 JADA Middle East vol 2 No 1 January-February 2011