12-1-2016

Short Implants Had Lower Survival Rates in Posterior Jaws Compared to Standard Implants

Gary L. Stafford
Marquette University, gary.stafford@marquette.edu

Accepted version. *Evidence-Based Dentistry,* Vol. 17, No. 4 (December 2016): 115-116. DOI.

Short implants had lower survival rates in posterior jaws compared to standard implants

Gary L. Stafford

Department of General Dental Sciences, Marquette University
Milwaukee, Wisconsin

Abstract: Data sources PubMed/Medline, Embase and Cochrane Library databases supplemented by searches of the journals; Clinical Implant Dentistry and Related Research, Clinical Oral Implants Research, International Journal of Oral and Maxillofacial Implants, International Journal of Oral and Maxillofacial Surgery, Journal of Clinical Periodontology, Journal of Dentistry, Journal of Oral and Maxillofacial Surgery, Journal of Oral Implantology, Journal of Oral Rehabilitation, Journal of Periodontology, Periodontology 2000.

Study selection Randomised controlled trials (RCTs) and prospective studies with at least ten patients, published in the last ten years that compared short and standard implants and published in English were considered.

Data extraction and synthesis A single author abstracted data with checking by a second reviewer. Methodological quality was assessed using the Jadad Scale and the Cochrane risk of bias tool. Risk ratios (RR) were calculated for implant survival rates, complications and prostheses failures and marginal bone loss was evaluated using mean difference (MD).

Results Thirteen studies consisting of ten RCTs and three prospective studies were included. The ten RCTs were considered to be of high quality. Two thousand six hundred and thirty-one implants were placed in 1269

[Evidence-Based Dentistry, Vol 17, No.4 (December 2016): pg. 115-116. DOI.

patients (981 short and 1650 standard implants). Thirty-eight short implants failed (3.87%) and 45 standard implants (2.72%). Random effects meta-analysis found no statistically significant difference between standard implants and short implants placed in the posterior regions; RR =1.35 (95% CI; 0.82-2.22: P=0.24). Marginal bone loss was evaluated in nine studies and no differences in marginal bone loss were observed. Complications were reported by seven studies and no significant difference was seen between standard and short implants; RR= 0.54 (95% CI; 0.27-1.09: P = 0.08). There was also no significant difference in prosthesis failures between standard and short implants; RR= 0.96 (95% CI: 0.44–2.09: P = 0.92)

Conclusions Short implants showed marginal bone loss, prosthesis failures and complication rates similar to standard implants, being considered a predictable treatment for posterior jaws, especially in cases that require complementary surgical procedures. However, short implants with length less than 8 mm (4-7 mm) should be used with caution because they present greater risks for implant failures when compared to standard implants.

Commentary

Several factors, such as implant geometry, preparation technique and quality and quantity of local bone1 influence primary stability, and primary implant stability is one of the main factors influencing implant survival rates. Reduced residual alveolar bone and the decrease in bone quality in the posterior maxilla and mandible present a variety of challenges for those preparing a site for future implant placement. Due to these anatomic realities, bone augmentation via block bone grafting and/or sinus lift procedures are routinely performed as a way to create the vertical height of bone necessary to accommodate a standard implant. The higher cost, increased risk of post-surgical complications and lengthening of overall treatment time may lead to a decrease in patient acceptance when considering standard implants2 in the posterior maxilla and mandible.

In recent years, there has been an increase in interest in short implants in the posterior maxilla and mandible as clinicians seek more conservative alternatives. Bicon® first introduced an 8.0 mm 'short' implant in 1985 when most implants were at least 12-14 mm long, and were originally designed to negate the need for some of the preparatory surgical procedures that are often necessary with standard implant placement. As stated in the systematic review, there appears

[Evidence-Based Dentistry, Vol 17, No.4 (December 2016): pg. 115-116. DOI.

to be little consensus as to what implant length would be considered 'short', but current thinking would suggest that ≤7.0 mm falls within the definition a short implant.

In seeking to answer their primary outcome question, which was survival, the authors chose to use a random effects model. The assumption that is made in this model is that the independent variables are not correlated with the individual specific effects. No mention was made in the systematic review as to whether or not the authors conducted a Durbin-Watson test to verify the consistency of the random effects model. Their results indicated that there was not a statistically significant difference between survival rates of standard and short implants placed in the posterior region. Due to the lack of consensus about the length that constitutes a short implant, the authors chose to perform a sub-analysis and discovered that while there was no significant difference at 8.0 mm, implants shorter than 8.0 mm showed lower survival rates than standard implants; a key finding.

This systematic review and meta-analysis had a focused clinical question and clearly described the inclusion/exclusion criteria. The authors, based on Kappa scores, showed a high degree of inter-investigator reliability, and through the use of the Jadad scoring system, ten of the thirteen included studies were deemed to be of high quality. The authors were clear in noting that the results of this study might be directed towards higher survival rates due to the fact that each of the studies evaluated used implants whose surfaces had been treated. Implant surface modification is a key factor in the performance and survival rate of short implants.4 The most notable limitation however, was that most of the included studies used splinted crowns for the final restoration for both the short and standard implants.

Given that splinted implant supported crowns show statistically significantly more crestal bone loss than single tooth implant supported crowns,3 non-splinted restorations may be considered more desirable in most circumstances. With only three of the included studies focusing on non-splinted crowns, this would indicate that the results of this systematic review and meta-analysis would not be applicable in many clinical situations, as single tooth implant restorations are more the norm.

[Evidence-Based Dentistry, Vol 17, No.4 (December 2016): pg. 115-116. DOI.

Practice Point

- Short implants with lengths < 8mm (4.0–7.0 mm) should be used with caution in the posterior jaw because the survival rates are reduced significantly when compared to standard implants.

- If short implants are used, implant surface modification is a big factor in the performance and survival rate of short implants.

References

Turkyilmaz I, McGlumphy EA. Is there a lower threshold value of bone density for early loading protocols of dental implants? J *Oral Rehabil* 2008; 35: 775–781.

Esposito M, Felice P, Worthington HV. Interventions for replacing missing teeth: augmentation procedures of the maxillary sinus. *Cochrane Database Syst Rev* 2014; 5: CD008397.

Cochran DL, Jackson JM, Bernard JP, et al. A 5-year prospective multicenter study of early loaded titanium implants with a sandblasted and acid-etched surface. *Int J Oral Maxillofac Implants* 2011; 26: 1324–1332.

Deporter D. Short dental implants: what works and what doesn't? A literature interpretation. *Int J Periodontics Restorative Dent* 2013; 33: 457–464.