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Young, Lindsey; Brown, Timothy; Lamont, Thomas J.

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Evidence Based Dentistry

Title:

A comparison of techniques for the explantation of osseointegrated dental implants.

Authors:

Lindsey Young, DCT 1, Restorative Dentistry, Aberdeen Dental Hospital, Aberdeen, UK

Timothy Brown, DCT 2, Restorative Dentistry, Aberdeen Dental Hospital, Aberdeen, UK

Thomas J Lamont, Hon. StR Restorative, Dundee Dental Hospital & School, Dundee, UK

A commentary on:

Roy, M., Loutan, L., Garavaglia, G. et al. Removal of osseointegrated dental implants: a systematic review of explantation techniques. *Clin Oral Invest* (2020) 24: 47

Data Sources:

A search of electronic databases (EMBASE and PubMed) was carried out along with manual and grey searches of published and unpublished journals. Publication year was from first available until August 23, 2018.

Study Selection:

Titles and abstracts from the original search were reviewed by two authors. Studies were chosen for full text analysis and data extraction after inter-reviewer agreement. Disagreement was resolved by discussion and Cohen's kappa was used to measure inter-reviewer agreement. An initial search gave 2197 articles and following screening, 18 publications were included in the study. 5 articles were case series, 10 were case reports describing 1 to 9 cases. 3 publications reported on comparatively large sample sizes, one prospectively and two retrospectively. None of the studies had control groups or blinding. The QUADAS-2 tool was used for quality assessment. Studies were deemed to have high, low or unclear levels of bias by two examiners. All were considered high risk of bias. Publications included fulfilled the following criteria: English language, human studies, endosseous osseointegrated dental implants, explantation technique described, and reason for explantation clearly reported.

Data extraction and synthesis:

Data extraction followed the Preferred Reporting Items for Systematic Review and Meta-analysis (PRISMA) guideline process. Studies chosen for analysis were examined and the following data parameters were included: study design, number of patients, number of implants removed, implant system, reason for explantation, explantation technique and its success or failure, complications, flap access, socket grafting and immediate implant placement.

Results:

The following 5 techniques for explantation of dental implants were identified: reverse torque, trephines, piezosurgery, burs and laser assisted explantation. Reverse torque was the most commonly described technique (284 implants) with 87.7% success. Burs were used to remove 49 implants with 100% success, while trephines were used for explantation of 35 implants with 94% success. Piezosurgery and Er:Cr:YSGG laser removed 11 and 1 implants respectively with 100% success. One study reported perforation of the maxillary sinus floor following the use of a trephine

technique while another reported the fracture of 3 implants using reverse torque. The quality of the studies and lack of available data prevented further analysis. Results were presented in a narrative format.

Conclusion:

The authors recommend reverse torque as the first choice for explantation. Despite its inferior success rate it is the most conservative technique in terms of bone removal and flap access meaning there is a greater opportunity for immediate implant placement.

Grade rating:

Very low

Commentary:

With the increasing provision of dental implants, the absolute number of implant failures is likely to increase. It is therefore important for practitioners to be aware of methods of implant removal, possible complications and effects on possible subsequent immediate implant placement.

This review was predominantly based on case series. It compared different methods of implant removal, the primary outcome was success rates of implant removal and the secondary outcomes were complications and immediate implant placement. The success rates for implant removal were given for each of the following techniques assessed in the study: reverse torque, trephines, piezosurgery, burs and laser assisted explantation. However, due to the lack of available data there was not always information recorded regarding complications and immediate implant placement.

The study presented different methods of implant removal along with a suggested implant removal protocol for practitioners to follow. However, the case series included in this study had very small sample sizes. There was significant variation in the data reported for the different explantation techniques described. This greatly limited the level of data analysis that could be carried out and the results had to be presented in a narrative style. Only English language studies were included, meaning relevant studies in another language may have been missed. The authors recommend that a randomized control trial be carried out to allow for direct comparison between techniques. We note it would be useful to report on time taken for technique, level of operator skill required, patient comfort and pre/post-operative bone levels to be included in future studies, in addition to success rate, complications and whether immediate implant placement was possible.

When considering risk of bias, the authors use the QUADAS-2 tool. This tool is aimed at assessing risk of bias in primary diagnostic accuracy studies. As this review did not include diagnostic studies, this risk of bias tool was likely not the most appropriate. We suggest the Newcastle-Ottawa scale may have been better suited to this review, as it is used to compare case series and case control studies.

From the limited evidence, reverse torque is the most conservative approach to implant removal as a flap is not always required and bone levels are preserved. However, further research with direct comparison is required.

Practice point

There is currently insufficient evidence to show the superiority of any of the explantation techniques included. Patient selection prior to implant placement and careful operator technique to avoid implant malpositioning is important to attempt to prevent implant failure and the need for explantation.

