Hydroxylapatite coated dental implants

A 3 to 4 year study of single tooth hydroxylapatite coated endosseous dental implants C. J. Watson, D. Tinsley, A. R. Ogden, J. L. Russell, S. Mulay, and E. M. Davison, Br Dent J 1999; 187: 90–94

Objective
To evaluate the clinical effectiveness, common complications and maintenance associated with hydroxylapatite (HA) coated cylindrical implants when used to support single crowns.

Design
A prospective medium term clinical study of the Calcitek HA-coated implant.

Setting
Implant placement, crown fabrication and follow-up procedures were carried out at the Leeds Dental Institute, between 1990 and 1998.

Subjects and method
26 patients (33 implants) participated in the trial. They were referred from general dental practitioners because of their suitability for single tooth implant placement.

Main outcome measures
The implants were assessed using recognised clinical review procedures eg radiographs and soft tissue assessments.

Results
At exposure there was 100% implant integration. The cumulative survival rate over 4 years was 100%. In five implants there was cervical bone loss of more than 4 mm and these were classified as failing. This gave an overall cumulative success rate of 58% by year 4.

Conclusion
The Calcitek HA-coated single tooth implant shows exceptionally high initial integration. However, the longer term results suggest that the cervical bone level adjacent to the implant failed to establish a steady state. Doubts remain regarding the long-term prognosis of these cylindrical HA-coated implants.

In brief

- Several methods of clinically evaluating single tooth dental implants are reviewed, only serial radiographs were found to be a useful indicator of implant success or failure.
- Several studies have shown that hydroxylapatite coated dental implants have a high initial success rate but long-term survival still remains in doubt, as progressive bone loss seems to be a common finding in this type of implant.
- Previous reports have shown a high incidence of crown loosening and emergence profile problems with single tooth restorations. This paper shows a similar range of problems.

Comment

This prospective study throws further light on the debate surrounding hydroxylapatite (HA) coating of implants. It also highlights important restorative maintenance issues. Interestingly, of all the collected clinical data conventional radiographs were found the most reliable method of assessing implant failure. Despite the high rate of integration the research team expressed concern at the progessive nature of cervical bone loss throughout the study. A 2.8 mm cumulative bone loss (at year 4) is likely to have significant restorative and aesthetic implications. Although patients with periodontal disease did not exhibit increased bone loss there was some concern that four out of the five implants (that were classified as failing) were restored with angulated abutments. However, all the implants continued to support restorations at the end of the study.

Significantly, 73% of the implants developed restorative problems throughout the study. Twelve (36%) of the crowns became loose, with screw loosening a common problem, and five (15%) of the crowns required remake.

From personal experience the re-positioning of a prepared abutment and crown to a recessed (and often subgingival) octagon is difficult without the guidance of a location stent. In addition, such maintenance can be time consuming, expensive and may involve localised gingival surgery to re-locate the octagon. Time will tell whether manufactured modifications will improve this problem.

In view of the issues raised regarding access to the abutment and floating screw, it would seem difficult to support the routine use of a *'hard'* (definitive) cement. However, patients must accept that crown de-cementation, when using *'soft'* (temporary) cement, is a real possibility and appropriate strategies must be arranged.

Some feel that the excursive occlusal relationships can precipitate anti-rotational problems and thus promote the risk of screw loosening and crown decementation. Unfortunately, it is often diffcult to eliminate excursive contacts without modifying natural teeth or shortening the prosthesis.

This study clearly highlights the problem of restorative maintenance. Historically, claims of success for implant-supported restorations have often *'over-focused'* on the high success of the osseo-integrated fixtures. It is important therefore, that the details and implications of restorative maintenance are clearly understood by both clinicians and patients planning implant therapy. It should not be forgotten that other forms of single tooth replacement, eg a resin bonded bridge, may be associated with simpler and less costly maintenance.

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