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Prosthodontics Newsletter™

Focusing on Dental Implants

The One Abutment–One Time Protocol

Frequently disconnecting and reconnecting healing abutments, impression copings, provisional abutments and definitive abutments is believed to compromise the peri-implant mucosal barrier, move the connective tissue zone apically and increase bone remodeling at the implant platform. Based on this reasoning, the "one abutment–one time" protocol[1,2] *was developed, placing the definitive restorative abutment concurrently with the implant to reduce marginal bone loss over time. Does this protocol truly lead to a significant reduction in marginal bone loss in the short and long term? Are other factors involved? This issue of* Prosthodontics Newsletter *considers these questions.*

[1]*Canullo L, Bignozzi I, Cocchetto R, et al. Immediate positioning of a definitive abutment versus repeated abutment replacements in post-extractive implants: 3-year follow-up of a randomized multicentre clinical trial.* Eur J Oral Implantol *2010;3:285-296.*

[2]*Degidi M, Nardi D, Piattelli A. One abutment at one time: non-removal of an immediate abutment and its effect on bone healing around subcrestal tapered implants.* Clin Oral Implants Res *2011;22:1303-1307.*

One Abutment–One Time and Bone Loss

Because repeated placement and removal of transmucosal abutments may compromise the soft tissue barrier and may lead to inflammation and an apical shift of the connective tissue attachment and underlying bone, the one abutment–one time protocol—placing the definitive restoration abutment at the time of implant surgery—eliminates the removal and reconnection of the abutment during healing. Moreira et al from the University of Coimbra, Portugal, conducted a prospective, controlled, randomized, double-blind study to determine whether the use of the one abutment–one time protocol affected the change in peri-implant hard tissue after 6 and 12 months.

The researchers randomized 53 patients (two-thirds women) into 2 groups:

- **test group:** definitive abutments placed at the time of implant surgery and never removed
- **control group:** healing abutments placed at the time of implant surgery, then disconnected and reconnected 3× during the study

All patients received from 1 to 4 platform-switched implants; all implants achieved primary stability before randomization. In each group, definitive abutments of 3 different heights—1, 2 and 3 mm—were used, depending on the mucosa height. At 6 and 12 months, clinical examination

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recorded modified plaque index and modified bleeding index, along with implant mobility and stability; radiographic examination evaluated interproximal bone levels and compared them with presurgery images.

At the 12-month follow-up, both groups reported a 100% implant and prosthetic success rate. At 6 and 12 months, neither plaque nor bleeding index showed any significant difference between the groups. Mean bone loss was significantly different in both groups between baseline and 6 months as well as between baseline and 12 months, but not between 6 and 12 months. No significant difference in bone loss was found between the 2 groups (Table 1), nor was there a difference in bone loss between groups defined by abutment height.

Comment

The use of the one abutment–one time protocol in this study failed to have an impact on marginal peri-implant bone loss at 12 months compared with the use of a conventional protocol.

Moreira F, Rocha S, Caramelo F, Tondela JP. One-abutment one-time effect on peri-implant marginal bone: a prospective, controlled, randomized, double-blind study. Materials *2021;doi:10.3390/ma14154179.*

One Abutment–One Time: A Meta-analysis

The theory behind the one abutment–one time protocol involves the concept that avoiding abutment removal creates less disturbance to the surrounding tissue, allowing for improved bone density and architectural preservation while minimizing peri-implant bone remodeling. Because the effectiveness of this approach appears inconsistent in the literature, Nunes et al from the Catholic University of Portugal reported on a systematic review and meta-analysis of randomized controlled trials involving the one abutment–one time protocol.

The authors searched 3 major databases for studies published between 2010 and January 2024 that met their inclusion criteria for the systematic review:

- randomized controlled trial
- published in English
- one abutment–one time protocol compared with conventional protocol for dental implant treatment
- clinical and radiographic outcomes reported
- ≥4-month follow-up

Eleven randomized clinical trials with 505 patients (821 implants) met the inclusion criteria of the studies. Most excluded heavy smokers (>10 cigarettes daily) and patients with untreated or uncontrolled periodontal disease. Follow-up periods ranged from 4 to 36 months after implant placement.

Five studies found no statistically significant difference in bone level changes from surgery to 6 months, 12 months and 36 months postoperatively. Three other studies, however, found a statistically significant difference at the 3-year follow-up, showing less bone loss among the definitive abutment placement group. Ten studies were included in the meta-analysis; the results at 6 and 12 months showed a consistent decrease in bone loss in the test group compared with the control group, indicating that this positive outcome could be attributed to the one abutment–one time protocol; it was accompanied by a reduction of treatment time and patient discomfort.

Comment

Larger and longer-term studies of the one abutment–one time protocol are needed to understand the effectiveness, potential complications and suitability for different clinical scenarios and patient demographics. This systematic review and meta-analysis strongly suggest that the protocol may result in less bone loss during healing after rehabilitation with dental implants.

Nunes M, Leitão B, Pereira M et al. Final prosthetic abutment insertion time (one-time abutment insertion protocol versus conventional protocol) and related outcomes: a systematic review of randomized controlled trials with meta-analysis. Int J Oral Maxillofac Implants *2025;40:162-170.*

Table 1. Mean total bone level changes (mm).

	Control group	Test group
0 months	0.05 ± 0.08	0.03 ± 0.06
6 months	0.23 ± 0.29	0.14 ± 0.18
12 months	0.21 ± 0.27	0.14 ± 0.21

No significant differences between groups at any time point.

Prosthetic Factors In Marginal Bone Loss

Many prosthetic factors may play a role in peri-implant marginal bone loss, including screw-retained vs cement-retained implant prostheses, nonsplinted vs splinted implants, platform-switched vs platform-matched abutments, external vs internal abutment connections, crown-to-implant ratio, abutment height, frequency of abutment disconnections, and emergence angle and profile. Lin et al from the University of California, San Francisco, undertook a systematic review and meta-analysis to analyze the effect of multiple prosthetic design concepts on the likelihood of developing peri-implantitis and marginal bone loss.

The authors searched 3 major databases for randomized clinical trials and prospective or retrospective cohort and case control studies published in English from 1980 through 2023 that met the following criteria:

- patients with ≥1 dental implant
- follow-up of ≥12 months after prosthesis delivery
- ≥10 implants in each study group
- comparison of prosthetic design impact on clinical outcomes

The primary outcome was the difference in marginal bone loss between 2 different prosthetic designs. After full-text evaluation, 85 articles were included in the meta-analysis.

The meta-analysis found that comparisons of crown-to-implant ratios and screw-retained vs cement-retained prostheses showed no significant difference in marginal bone loss. Yet nonsplinted implants, platform-switched abutments, abutment heights ≥2 mm and the one abutment–one time protocol all showed a significant reduction in marginal bone loss compared with their respective groups. Additionally, emergence angles <30° and concave/straight emergence profiles resulted in a decreased risk of peri-implantitis.

Comment

This meta-analysis showed that the one abutment–one time protocol significantly reduced marginal bone loss compared with a standard protocol that entailed repeated abutment disconnections. The authors, however, questioned whether the observed reduction of 0.22 mm was clinically significant and noted potential challenges employing the one abutment–one time protocol, especially with regard to emergence angle and profile. They urged clinicians to "carefully consider the risks and benefits" when choosing a treatment protocol.

Lin G-H, Lee E, Barootchi S, et al. The influence of prosthetic designs on peri-implant bone loss: an AO/AAP systematic review and meta-analysis. J Periodontol *2025;96:634-651.*

One Abutment–One Time and Implant Height

Although the one abutment–one time protocol was developed more than a decade ago, evidence suggested that the thickness of the peri-implant mucosa significantly affected bone loss, while the choice to employ platform switching adds another wrinkle to evaluating the success of the one abutment–one time protocol. Ríos-Santos et al from Universidad de Sevilla, Spain, designed a multicenter, prospective, controlled, randomized study to evaluate the impact of the one abutment–one time protocol and its interaction with the height of implants placed at the crestal level on peri-implant bone loss and implant stability at 6 and 12 months after implant placement.

The study enrolled 160 patients recruited from 20 centers with no signs of periodontal disease. All patients had sufficient bone height to accommodate an implant with a length of 8, 10, 12 or 14 mm and a minimum bone tissue thickness of 2 mm around the implant contour. After the implant was placed, patients were randomly allocated to 1 of 2 groups:

- **definitive abutment group:** a permanent 1- or 2-mm abutment was placed on the day of surgery (test group).
- **healing abutment group:** a 5-mm-high conical healing abutment was placed on the day of surgery; it was removed twice before replacement with a permanent 1- or 2-mm abutment at 16 weeks (control group).

At 6- and 12-month follow-up visits, patients underwent intraoral radiographs and an analysis of resonance frequency; periodontal health was also monitored.

During the first 2 months postsurgery, 4 implants failed, for a survival rate of >98%. Among the 147 patients (231 implants) who attended the 12-month follow-up, no significant differences in modified plaque index or modified bleeding index were seen between the groups. Mean bone level at surgery and 12 months did

not differ significantly between the 2 groups; however, patients receiving a 2-mm abutment had significantly less bone loss than did the patients receiving a 1-mm abutment, regardless of the restoration protocol employed.

Comment

This study suggested that the use of the one abutment–one time protocol did not reduce peri-implant bone loss. Instead, the study discovered that the prosthetic abutment height significantly affected bone loss, with higher abutments leading to better results.

Ríos-Santos JV, Tello-González G, Lázaro-Calvo P, et al. One abutment one time: a multicenter, prospective, controlled, randomized study. Int J Environ Res Public Health *2020;doi:10.3390/ijerph17249453.*

One Abutment–One Time: 5-Year Outcomes

Placing the definitive abutment during surgery (the one abutment–one time protocol) to reduce subsequent marginal bone loss has been suggested. Evidence from clinical studies and systematic reviews lends some support to the effectiveness of this protocol in limiting early marginal bone loss. Evidence of the impact of the one abutment–one time protocol on long-term outcomes, however, remains inconclusive. To address this issue, Sanz-Sánchez et al from University Complutense of Madrid, Spain, conducted a prospective, single-blind, randomized controlled clinical trial to compare clinical and radiographic results from the one abutment–one time protocol and those of the standard protocol after 5 years.

Table 2. Mean distances from the implant shoulder to the first visible bone-to-implant contact (mm).

	Control group	Test group	*p* value
Loading	0.89	0.58	.168
12 months	1.21	0.59	.121
36 months	0.82	0.48	.070
60 months	0.97	0.53	.063

A total of 39 patients receiving 1 to 3 implants in the posterior maxilla or mandible to support fixed partial dentures were recruited from a university postgraduate periodontal clinic. After randomization, patients in the test group received definitive abutments, while patients in the control group received conventional healing abutments. After a healing period during which the conventional healing abutments in the control group were disconnected and reconnected once, clinical and radiographic measurements were taken at the time of functional loading (baseline) and at 6, 12, 36 and 60 months. Patient-reported outcomes of comfort, appearance, masticatory function, taste and overall satisfaction were assessed at baseline and at 12 and 60 months.

At all time points, interproximal bone loss was nearly twice as great in the control group than in the test group, although the differences did not reach statistical significance (Table 2). Both groups reported a statistically significant increase in modified plaque index, modified sulcus bleeding and probing depths, while approximately one-quarter of patients in both groups developed peri-implant mucositis at 60 months. All patients reported satisfaction with their restorations, with mean scores in all areas >4.5 on a 5-point Likert scale.

Comment

The lack of a significant difference in bone loss levels between the groups could be attributed to patient attrition between the 36- and 60-month visits. The authors concluded that employing the one abutment–one time protocol had limited clinical or radiographic benefit at 5 years after loading; they suggested the need for further research to control for factors that have a direct effect on initial bone remodeling.

Sanz-Sánchez I, Molina A, Martin C, et al. The effect of one-time abutment placement on clinical and radiographic outcomes: a 5-year randomized clinical trial. Clin Oral Implants Res *2024;35:609-620.*

In the Next Issue

The use of dental implants in children and adolescents

Our next report features a discussion of this issue and the studies that analyze them, as well as other articles exploring topics of vital interest to you as a practitioner.

Do you or your staff have any questions or comments about **Prosthodontics Newsletter**? Please write or call our office. We would be happy to hear from you.