What's new for the clinician?

Summaries of and excerpts from recently published papers

SADJ April 2016, Vol 71 no 3 p136 - p138

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1. Clinical efficacy of oxalate-based desensitizing agents in restorations of non-carious cervical lesions – a randomized clinical trial

Nadine Luísa Guimarães Albuquerque NLG, de Souza AMB, de Moraes MDR, Mendonça JS, Rodrigues LKA, Santiago SL. Four-year randomized clinical trial of oxalic acid pretreatment in restorations of non-carious cervical lesions. Clin Oral Invest 2016; 20: 199-205

As more people retain their teeth for longer periods of time and more people undertake daily brushing as part of their daily routine, non-carious cervical lesions (NCCLs) are becoming more common in the mouth. The presence of these lesions is related to many factors including erosion, abrasion, gingival recession, periodontal surgery, and abfraction.[1] They are significantly more prevalent in older people, with premolars being the most affected teeth. Whilst some of these lesions are asymptomatic, a significant number are usually associated with dentin hypersensitivity due to the exposure of dentin in the oral environment.[1]

In an attempt to reduce this discomfort, several desensitizing agents such as calcium hydroxide, stannous fluoride, arginine, glutaraldehyde, and oxalates have been used.[1] Oxalate-based desensitizing agents, derived from oxalic acid, were introduced as an optional treatment for dentin hypersensitivity in the 1980s. These agents are being increasingly used because they act not only by obliterating the dentin tubules, with the precipitation of calcium oxalate crystals on the surface and inside the dentin tubules, but also by depolarizating the nerve endings preventing the conduction of current which leads to pain.[1] Due to this, there have been laboratory based studies that have sought to include oxalate-based desensitizing agents in the adhesive bonding process when placing resin composite restorations. The rationale of this is that these agents will enhance the adhesive bond and also reduce the sensitivity of the dentine. Albuquerque and her colleagues in Brazil (2016)[1] reported on a RCT that sought to evaluate the longevity and clinical success of restorations in non-carious cervical lesions with or without the application of oxalic acid. The null hypothesis tested was that both techniques have similar effectiveness after four years of clinical service.

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MATERIALS AND METHODS

Twenty volunteer patients of both sexes (16 female, 4 male), ranging in age from 24 to 55 years old, underwent clinical evaluations, using a mouth mirror, an explorer, and a periodontal probe. Anamnesis, photographs, and radiographic examinations were also performed.

The following were the criteria for inclusion of a patient in this study: appropriate oral hygiene; absence of caries, periodontal disease; bruxism and traumatic occlusion; no wear facets; the presence of at least two non-carious cervical lesions with a depth equal to or greater than 1mm, independent of their location in the dental arcade, and which were to be restored.

The degree of hypersensitivity was determined according to the Verbal Rating Scale (VRS) from 0 to 3, in which:
0 = no discomfort;
1 = minimum discomfort;
2 = mild discomfort; and
3 = intense discomfort.

Each tooth received air blast stimuli with an air syringe for one second at a distance of one cm from the tooth surface, and the presence of sensitivity was used as evidence to enrol the patient in the study.

A total of 90 restorations in 20 patients were performed by one calibrated operator using a standardized protocol, and 45 of these had a prior treatment with oxalic acid

(Bisblock-BISCO) after etching. The remaining 45 were used as control. Allocation of treatment per tooth was randomly selected using a table.
The restorative procedure included cleaning of all lesions with pumice and water in a rubber cup, rinsing and drying, preparation of lesion, acid etch and rinse, application of bond adhesive (XP Bond) with or without oxalic acid, light cure, application of resin composite (Durafill), light cure and then finish.

The restorations were evaluated at baseline and at four years by two experienced and calibrated examiners other than the operator. The clinical evaluation was performed using a mirror and a double-ended probe after tooth prophylaxis with water and pumice in a low-speed hand piece. Modified United States Public Health Service criteria were used to evaluate retention, marginal integrity, marginal discoloration, postoperative sensitivity, anatomic form, and caries at the baseline and fouryear periods. Alfa (A) and Bravo (B) scores were classified as clinically acceptable and Charlie (C) as clinically unacceptable. The baseline rating was carried out one week after restoration, immediately after the finishing and polishing procedures.

RESULTS

At the recall, five restorations from the control group and nine from the experimental group were found to have been lost. Therefore, retention rate in the control group was 85.3 % (%A + B) and 70.9 % (%A + B) for the experimental group (p = 0.2288). For all other evaluated clinical criteria (marginal integrity, marginal discoloration, postoperative sensitivity, anatomic form, and caries at the four year periods), the rate (%A + B) was 100 % in both groups (p = 1.000).
Regarding retention rate, the intragroup (within group) comparisons demonstrated no statistically significant difference between the baseline and four year recall in the control group (p = 0.06), while there was a statistically significant difference in the experimental group (oxalic acid group) (p = 0.003). For all other evaluated criteria in both groups, no statistically significant differences were found (p= 1.000).

CONCLUSION

The researchers concluded that after four years of service, the use of oxalic acid did not influence the clinical performance of retained restorations when it was used under composite resin restorations.

IMPLICATIONS FOR PRACTICE

This trial demonstrated that dentin pretreatment with oxalic acid was an additional step in the etch-and-rinse adhesive technique and although being effective in reducing dentinal hypersensitivity it significantly affected the retention of adhesive restorations over time [the within group retention rate from baseline to four years was statistically significant in the oxalic acid group).

Reference

1. Nadine Luísa Guimarães Albuquerque NLG, de Souza AMB, de Moraes MDR, Mendonça JS, Rodrigues LKA, Santiago SL. Four-year randomized clinical trial of oxalic acid pretreatment in restorations of non-carious cervical lesions. Clin Oral Invest 2016; 20: 199-205

2. Short dental implants versus standard dental implants placed in the posterior jaws: a systematic review and meta-analysis

Lemos CA, Ferro-Alves ML Okamoto R Mendonça MR, Pellizzer EP. Short dental implants versus standard dental implants placed in the posterior jaws: A systematic review and meta-analysis. J Dent. 2016; 47: 8-17.

Implants are often used as a treatment option for partially or totally edentulous patients. Tooth loss in the posterior jaws favours the resorption process of bone tissue, causing greater proximity to the inferior alveolar nerve and maxillary sinus, limiting the use of longer implants.[1] To overcome these problems, bone grafts or maxillary sinus lifting have been used to re-establish the height of restored bone tissue and allow for placement of standard implants.[1] However, these techniques are associated with increased postoperative morbidity, higher costs, and higher risks of complications during patient rehabilitation.[1] Thus, short implants are used, which are considered to be simpler and more effective for subsequent rehabilitation of atrophic ridges. Lemos and colleagues (2016)[1] undertook a systematic review with meta-analysis to evaluate the survival rate of short implants (equal to or less than 8 mm) compared with standard implants (larger than 8 mm) in the posterior jaws. The null hypotheses were: (1) there are no differences between short implants and standard implants with regard to survival rates of implants and (2) there are no differences in marginal bone loss, complications, and prosthesis failures when short implants and standard implants are used.

ACRONYMS

CI: 95% confidence intervals
MD: mean Difference
RR: risk ratio

MATERIALS AND METHODS

Electronic searches were conducted at the selected databases PubMed/Medline, Embase, and Cochrane Library for articles which met the eligibility criteria and had been published before 10 September 2015. The keywords used in this study were: “short implant AND dental implant OR short dental implants OR short dental implants posterior OR short dental implants maxilla OR short dental implants mandible. Hand searching was also

carried out in selected journals and the grey literature was also checked for unpublished studies.

Eligible studies in the English language that were considered for inclusion were:
(1) randomized controlled trials,
(2) prospective studies,
(3) trials with at least ten patients,
(4) studies published within last 10 years,
(5) trials that compared short implants and standard implants in the same study.

The exclusion criteria used were:
(1) *in vitro* studies,
(2) animal studies,
(3) case series or case reports,
(4) retrospective studies,
(5) computer simulations,
(6) patients or data repeated in other included articles, and
(7) studies that showed only short implants without a comparison group,
(8) studies that considered short implants larger than 8mm.

The PICO approach (population, intervention, comparison, outcomes) was used to address the question: do short implants have similar survival rates compared with standard implants? In this process, the population comprised patients rehabilitated with dental implants in the posterior jaws (maxilla and mandible). Intervention was short implants in the posterior jaw, and the comparison was made with patients who received standard implants in posterior jaws. The primary outcome evaluated was the survival rate of implants in the posterior jaws. The marginal bone loss, complications, and prosthesis failures were the secondary outcomes.

One of the authors collected relevant information from the articles, and a second author checked all of the collected information and a third author settled all of the disagreements between the investigators through discussion until a consensus was obtained. Two authors assessed the methodological quality of studies according to the Jadad scale, which ranges from 0 to 5, with scores of three considered high quality. The Cochrane collaboration criteria for judging risk of bias was used to assess the quality of the studies included for review.

The meta-analysis was based on the Mantel–Haenzel (MH) and Inverse Variance (IV) methods. Survival rates of implants, complications and prostheses failures were the outcome measures evaluated by risk ratio (RR) and marginal bone loss, the continuous outcomes were evaluated by mean difference (MD) and the corresponding 95% confidence intervals (CI). The RR and MD values were considered significant when $P < 0.05$. The software reviewer Manager 5 (Cochrane Group) was used for meta-analysis.

RESULTS

The search identified 1460 references, and, after inclusion criteria were applied, 13 studies were assessed as eligible. A total of 1269 patients, who had received a total of 2631 dental implants were assessed in the included trials. The studies showed that 83 out of 2631 implants placed had failed (3.15%), which included 45 standard implants (2.72%) and 38 short implants (3.87%). A random-effect model found no statistically significant difference between standard implants and short implants placed in the posterior regions (P = 0.24; RR: 1.35; 95% CI: 0.82–2.22)-Significant differences for the longer implants were not observed when compared with short implants in the maxilla (P = 0.28; RR: 1.50; 95% CI: 0.72–3.09)-, and similarly, no differences were observed in the mandible (P = 0.34; RR: 1.52; 95% CI: 0.64–3.63)-. There was no significant difference for 8 mm implants (P = 0.34; RR: 0.50; 95% CI: 0.12–2.07), but the short implants with length less than 8 mm showed lower survival rates than standard implants (P = 0.02; RR: 2.05; 95% CI: 1.12–3.74).

Nine studies evaluated the differences in length concerning marginal bone loss around the implants through means (mm), which were evaluated by the same studies in different follow-up periods. For the meta-analysis, only the final follow-ups of the studies were used. The overall analysis of studies that evaluated marginal bone loss showed no significant difference between short implants and standard implants (P = 0.06; MD: _0.20; 95% CI: _0.41 to 0.00) and no differences were observed between the maxillary and the mandibular arches.[28,31–33] (P = 0.09; MD: _0.19; 95% CI: _0.41 to 0.03), (P = 0.39; MD: _0.23; 95% CI: _0.76 to 0.30).

Complication rates were reported by seven studies, which considered any biological or mechanical complication. Although there were higher rates of complications for the standard implants, these were not statistically significant (P = 0.08; RR: 0.54; 95% CI: 0.27–1.09). The mandibular arch had the highest prevalence of biological complications. It is noteworthy that most of the studies in this review that reported complication rates performed bone grafting procedures for the installation of standard implants

Prosthesis failure rates were evaluated by seven studies. The analysis considered prostheses failures that could not be repaired or that failed together with the implant. No significant differences were observed (P = 0.92; RR: 0.96; 95% CI: 0.44–2.09) in relation to prosthesis failure rates.

CONCLUSION

Short implants showed marginal bone loss, prosthesis failures and complication rates similar to standard implants, being considered therefore a predictable treatment for posterior jaws, especially in cases that require complementary surgical procedures. However, short implants with length less than 8mm (4–7mm) should be used with caution because they present greater risks for implant failures when compared with standard implants (P = 0.02; RR: 2.05; 95% CI: 1.12–3.74).

IMPLICATIONS FOR PRACTICE

This high quality systematic review with meta-analysis has provided compelling evidence that short implants show equivalent performance when compared with standard implants for the outcomes assessed in the posterior jaws.

Reference

1. Lemos CA, Ferro-Alves ML Okamoto R Mendonça MR, Pellizzer EP. Short dental implants versus standard dental implants placed in the posterior jaws: A systematic review and meta-analysis. J Dent. 2016; 47: 8-17.