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What's new for the clinician?
- Excerpts from and summaries of recently published papers

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Compiled and edited by V Yengopal

1. The effect of two different irrigation needles on post-operative pain after pulpectomy in primary molar teeth: A randomized clinical study

G Topçuoglu, HS Topçuoglu, E Delikan, S Çaliskan. The effect of two different irrigation needles on post-operative pain after pulpectomy in primary molar teeth: A randomized clinical study. Int J Paediatr Dent. 2020; 30: 758-63.

INTRODUCTION

Pulpectomy is a conservative treatment approach for preventing the premature loss of primary teeth that can result in loss of arch length, insufficient space for erupting permanent teeth, impaction of premolars, and mesial tipping of molar teeth adjacent to the lost primary molar.[1] Pulpectomy is a procedure which involves removal of the roof of pulp chamber in order to gain access to the root canals which are debrided, shaped, disinfected, and obturated later with a resorbable material. As a result, the tooth can be maintained in the arch without vital pulp tissue, without compromising the function of the tooth.[1] The most common complications associated with pulpectomy, post-operative pain (PP) and/or swelling, commence after treatment. These are always unpleasant experiences for both patients and clinicians. The apical extrusion of infected debris or irrigation solution during the canal preparation or irrigation procedure may worsen the inflammatory response and cause periradicular inflammation and postoperative pain.[1]

It is well-documented that the type of irrigation method affects the amount of apically extruded debris (AED) in permanent teeth. No study has evaluated the effect of different needle types on the intensity and duration of PP after pulpectomy in primary molars. Topçuoglu and colleagues[1] reported on a trial that sought to compare the intensity and duration of postoperative pain after pulpectomy using open-ended needles (OEN) versus side-vented needles (SVNs) in primary upper molars.

Veerasamy Yengopal: *BChD, BScHons, MChD, PhD*, Community Dentistry Department, School of Oral Health Sciences, University of Witwatersrand, Medical School, no. 7 York Road, Parktown 2193, South Africa.
ORCID Number: 0000-0003-4284-3367
Email: veerasamy.yengopal@wits.ac.za

MATERIALS AND METHODS

Fifty participants for each group were selected to participate in this trial. Patients were considered for inclusion if they had an upper primary molar teeth requiring pulpectomy; had no history of taking analgesics and antibiotic 12 hours before the pulpectomy; were cooperative patients in ages ranging from 6 to 9 years; had an absence of internal or external pathologic root resorption; had sufficient coronal tooth structure and had teeth with at least 2/3nd roots remaining. Patients were excluded if they had teeth with greater than grade 1 mobility, systemic disease or special healthcare needs.

Only asymptomatic upper primary molar teeth with a diagnosis of pulp necrosis caused by carious exposure were included in the study. Periapical radiographs was taken to examine the periapical status of the teeth.

One hundred participants were randomized into two groups according to the type of irrigation needle used during pulpectomy by a trained dental assistant who was blinded to the study. The dental assistant recorded the participant number and group number on paper.

Once the patient entered the facility and it verified the fulfilment of the inclusion criteria, the list was checked for verification of the group to which the participant would be assigned. Patient-related factors, such as age and sex, and pre-operative tooth-related factors were registered.

Pulpectomy procedure for all patients was performed by an experienced operator, who was blinded to the aim of the study. The participants were also blinded.

The pulpectomy was carried out using a standardized procedure. After application of a topical anaesthetic, the tooth was anaesthetized with 4% articaine with 1:200 000

epinephrine. Following rubber dam isolation, caries was removed and the endodontic access cavity was opened. The necrotic pulp was ultimately confirmed by the absence of haemorrhage in the canal. The working length (WL) was determined using an electronic apex locator. The WL of each root canal was set at 1 mm shorter than the '0.0' mark on the apex locator.

In both groups, the root canals were shaped using Revo-S files at a speed of 300 rpm, up to size 35. In the open-ended needle (OEN) group, canals were irrigated with 5 mL 1% sodium hypochlorite (NaOCl) using a syringe and a 30-G OEN placed 2 mm short of the WL during the canal preparation.

In the side-vented needle (SVN) group, canals were irrigated with 5 mL 1% NaOCl using a 30-G double SVN placed 1 mm short of the WL during the canal preparation. The canals were then dried and obturated with Vitapex paste. The paste was inserted into the canals using a lentulo spiral at low speed. The quality of the canal filling was evaluated by periapical radiography, and the teeth were then permanently restored. The occlusion was checked.

A questionnaire was given to the participants' parent(s) to note the postoperative (PP) intensity of their children at six, 12, 24, 48, and 72 hours, and finally one week after the pulpectomy. All participants and their parents were trained to use the pain intensity scale by a researcher blinded to the groups.

To ensure standardization, the pain intensity at each time interval was noted by the participant under the supervision of the same parent. In cases of severe pain, the parent was advised to administer the ibuprofen (if contraindicated, paracetamol), which was prescribed at the end of the session. PP was measured using a four-point pain intensity scale (verbal rating scale) where 0 meant no pain; 1-slight pain; 2-moderate pain and 3-severe pain. These were linked to faces which the child has to choose.

RESULTS

The differences between the groups as regards demographic data and quantity of analgesic medication intake were not significant ($P>.05$). Three participants (two participants from the OEN group and 1 participant from the SVN group) were excluded from the study because they did not come to the recall visit.

There was no difference concerning the distribution of treated teeth between the groups ($P>.05$). Over-filling was observed in three participants in the OEN group and in four participants in the SVN group ($P>.05$). The mean postoperative scores at 6, 12, and 24 hours were significantly higher in the open-ended needle (OEN) group than in the side-vented needle (SVN) group ($P<.05$).

At 48 hours, 72 hours, and 1 week, there was no signifi-cant difference between two groups concerning PP intensity ($P>.05$). In both groups, the highest PP intensity was recorded 6 hours after the treatment, with the pain decreasing over time.

CONCLUSIONS

The researchers concluded that Root canal irrigation with a side vented needle (SVN) caused less postoperative pain (PP) compared to the use of an open ended needle (OEN) at the first 24 hours. The intensity of the PP in the SVN group was also significantly less when compared to the OEN group.

Implications of practice

The side vented needle appears to provide better outcomes as regards postoperative pain when compared to the open-ended needle. As this is often a traumatic procedure for the child, any procedure that reduces the risk for adverse events such as postoperative pain should be considered.

Reference

1. Topçuoglu, G, Topçuoglu, HS, Delikan, E, Çaliskan, S. The effect of two different irrigation needles on post-operative pain after pulpectomy in primary molar teeth: A randomized clinical study. Int J Paediatr Dent. 2020; 30: 758-63.

2. Single versus two-implant mandibular overdentures using early-loaded titanium-zirconium implants with hydrophilic surface and ball attachments: 1-year randomized clinical trial

GP de Resende, LM Jordão, JA de Souza, M Schimmel, CR Leles. Single versus two-implant mandibular overdentures using early-loaded titanium-zirconium implants with hydrophilic surface and ball attachments: 1-year randomized clinical trial. Clinical Oral Implants Research. 2021; 32: 359-68.

INTRODUCTION

The mandibular overdenture retained by two implants (2-IOD) has been considered an effective treatment option to improve the retention and stability of a conventional denture. A number of professional bodies and consensus reports in the field of prosthodontics as supported the view that the restoration of the edentulous mandible with a conventional denture is no longer the most appropriate first choice prosthodontic treatment.

There is now overwhelming evidence that a two-implant overdenture should become the first choice of treatment for the edentulous mandible as there was a substantial body of evidence that has demonstrated that patients' satisfaction and quality of life with implant supported mandibular overdentures is significantly greater than for conventional dentures. However, it is also accepted that the two-implant overdenture is not the gold standard of implant therapy but in many setting where resources are available, it should be the minimum standard sufficient for most people, taking into account performance, patient satisfaction, cost and clinical time. In the absence of resources, the conventional mandibular denture remains a viable treatment option to restore chewing function.

Similarly, in the last few years, a series of clinical studies showed that the use of a single midline implant (1-IOD) to retain a mandibular overdenture resulted in positive impacts compared with the conventional denture concerning dental patient-reported outcomes.[1] However there are few published studies that have compared the outcomes of 1- and 2-IODs (implant overdentures).

de Resende and colleagues (2021)[1] reported on a trail that sought to compare the outcomes of the mandibular overdenture retained by one and two implants, by assessing the effects of treatments on patient satisfaction and oral health-related quality of life.

MATERIALS AND METHODS

This was a parallel two-group randomized clinical trial that targeted fully edentulous patients. For inclusion, eligible edentulous participants had to be healthy and have sufficient bone availability in the anterior region of the mandible for placement of an implant at least 8 mm in length.

Exclusion criteria involved any general or local contraindication for implant treatment, presence of oral conditions that demand additional treatments such as the presence of oral lesions and temporomandibular disorders. Non-collaborative individuals or unable to attend the study appointments for longitudinal data collection were also excluded. The targeted minimum sample size was 48 participants, 24 in each treatment group.

All eligible participants received a new set of complete dentures, fabricated according to a conventional clinical protocol that included preliminary impression with stock trays and irreversible hydrocolloid, final impression with custom trays and zinc-oxide eugenol paste, interocclusal record in centric relation and articulator mounting, teeth arrangement in bilateral balanced occlusion, try-in visit, denture delivery and post-insertion visits for adjustments.

Then, after a minimum 3-month period of complete denture use, participants were invited for baseline data collection and randomly assigned to one of the two treatment groups: overdenture retained by one implant (1-IOD group) or two implants (2-IOD group). Randomization was performed by an external collaborator blinded to group assignment identification.

Assessment of bone dimensions in the interforaminal region was performed using panoramic and lateral cephalometric radiographs. Tissue level Straumann® Standard Plus SLActive® Regular Neck implants, 4.1 mm diameter, were inserted in the mandible midline (1-IOD group) or the lateral incisor-canine area bilaterally (2-IOD group), using a single-stage approach. After insertion, the implants received a 1.5mm height healing cap and suture. The denture was milled to prevent stress to the implants and the patient was instructed to have a soft diet and to restrict the use of the lower denture, when possible. Postoperative care included paracetamol 750 mg in case of pain, soft diet, and 0.12% chlorhexidine mouthwash for 1 week.

After a 3-week healing period, a 3.4 mm retentive titanium anchor abutment (Straumann) was connected at 35 N.cm with a torque wrench. The corresponding elliptical matrix (Straumann) was incorporated using a chairside procedure for intraoral pickup with self-curing acrylic resin. Then, the patient was instructed about oral hygiene, proper handling of the overdenture, and need for regular recall appointments. All implants were inserted by a single surgeon and the prosthodontic steps were performed by a single prosthodontist.

Participants were assessed at baseline before implant surgery and after 6 and 12 months of overdenture use. Primary outcomes included two dental patient-reported outcomes-satisfaction with the dentures and oral health-related quality of life (OHRQoL) impacts, and the patient's chewing function.

Chewing function was assessed by means of a mixing ability test using a two-colour chewing gum. The participants were requested to chew for 20 cycles in their preferred chewing side and the chewed specimens were collected, rinsed in tap water, and stored in a transparent plastic bag. Then, the specimens were flattened at a 1 mm thickness, and the two sides of the flattened specimen were scanned using a flatbed image-scanning device at a 300 dpi resolution. The image pairs were analysed using the ViewGum© software to measure the variance of the hue (VOH) as the measure of colour mixing. The VOH value ranges from 0 to 1, and the smaller the VOH value, the greater is the colour mixing, which means better chewing function.

RESULTS

In the first phase of this trial, 65 participants were selected and received a new set of complete dentures. In the second phase, 18 participants (27.7%) were excluded and the remaining 47 participants were assessed at baseline and randomized to the 1-IOD group ($n=23$) or 2-IOD group ($n=24$). The participants' age ranged from 44 to 81 years (mean=65.4; SD=8.5), and 35 (74.5%) were female.

A total of 71 implants were inserted in the two groups (23 in the 1-IOD and 48 in the 2-IOD groups). Implant lengths were 8, 10, and 12 mm, distributed in the 1-IOD group ($n=6$, 12, 5) and 2-IOD group (n = 28, 14, 6), respectively. A significant difference was found between groups ($p=.039$), since greater proportion of 8 mm implants were inserted in the 2-IOD (58.3%) compared with the 1-IOD group (26.1%). After implant surgery, three participants of the 2-IOD group had early implant failure during the healing phase, one implant failure for each participant. These patients had a new implant inserted after 3 months and early implant loading according to the study protocol. There was no implant failure in the 1-IOD group. Therefore, the overall implant survival rate was 95.7%, and no failure occurred after implant loading. There were missing data from one participant (1-IOD group) who failed to attend to the 1-year follow-up. Moreover, the comparison of implant survival rates between groups (1-IOD=100%; 2-IOD=94.1%) was not statistically significant ($z=1.188$; $p=.234$).

Results concerning the changes in overall OHRQoL scores showed that there was a marked improvement after insertion of new dentures in both groups, as well as at the 1-year follow-up compared to the baseline measurements. Similar results were observed for the specific domains in the OHRQoL tool that was used. There was also significant improvement in patient satisfaction with the mandibular denture for all subscales, except satisfaction with aesthetics. A slight decrease in the satisfaction with the maxillary denture was observed for the 2-IOD group after 1 year.

There was also progressive improvement in chewing function in the 1-IOD group after 1-year compared with the baseline ($p<.001$) and 6-month ($p=.002$) assessments. Improvement in the 2-IOD group was observed from the 6-month to the 1-year follow-up ($p=.023$).

CONCLUSIONS

The findings form this trial support the use of both 1- and 2-IOD for complete denture wearers, and also support the conclusion that the 1-IOD is an acceptable alternative as a secondary option for the 2-IOD treatment.

Implications for practice

The results of this trial suggests that treatment outcomes are not fully dependent on the number of implants (1 vs. 2), and the decision between the two treatments may be based on the patient's individual factors and preferences.

Reference

1. de Resende GP, Jordão LM, de Souza JA, Schimmel M, Leles CR. Single versus two-implant mandibular overdentures using early-loaded titanium-zirconium implants with hydrophilic surface and ball attachments: 1-year randomized clinical trial. Clinical Oral Implants Research. 2021; 32: 359-68.