

Journal of Indian Society of Periodontology

ISSN : 0972-124X

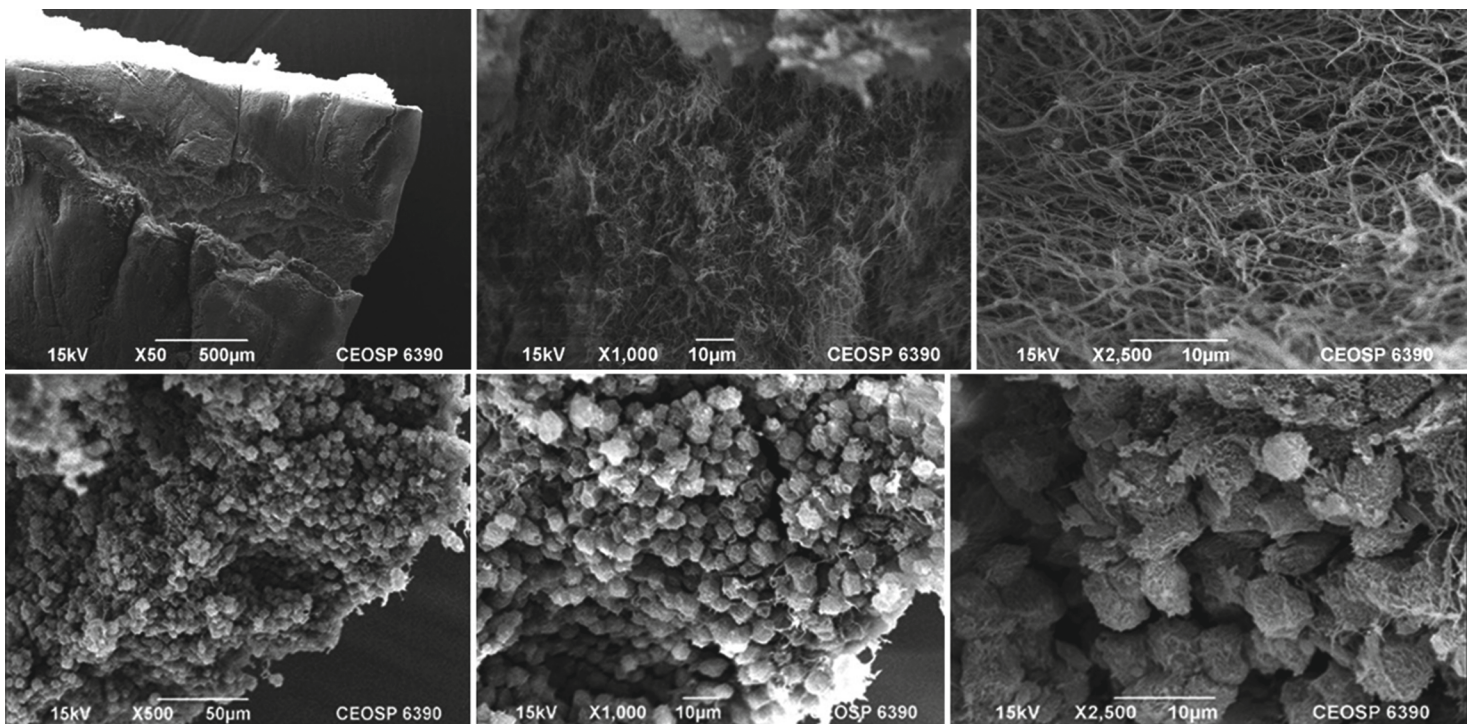
January-February 2022

Vol 26 | Issue 1



Official Publication of the Indian Society of Periodontology

www.jisponline.com



Can a single molar root act as a whole tooth?

Vittorio Checchi

Department of Surgery,
Medicine, Dentistry and
Morphological Sciences,
Unit of Dentistry and
Oral-Maxillo-Facial
Surgery, University of
Modena and Reggio
Emilia, Modena, Italy

The work belongs to
the Ambulatorio Privato
Di Odontoiatria Prof.
Checchi; Via Andrea
Costa 160, 40100
Bologna, Italy

Access this article online

Website:
www.jisponline.com

DOI:
10.4103/jisp.jisp_428_20

Quick Response Code:



Address for correspondence:

Dr. Vittorio Checchi,
Department of Surgery,
Medicine, Dentistry and
Morphological Sciences,
Unit of Dentistry and Oral-
Maxillo-Facial Surgery,
University of Modena and
Reggio Emilia,
Via del Pozzo 71, 41121
Modena, Italy.
E-mail: vittorio.checchi@
unimore.it

Submitted: 17-Jun-2020

Revised: 17-Sep-2020

Accepted: 29-Nov-2020

Published: 27-Sep-2021

Abstract:

This clinical case describes the longitudinal outcome of a radisected upper molar root. The palatal root acted as an abutment and was finalized with a double-premolar-shaped metal-resin crown with two rests on the adjacent teeth. Fifteen years later, the root and its crown were still in place, with no pathologic pocket probing depth and lack of inflammation; the tooth was still in function with no signs of periodontal breakdown. This therapeutic option seemed to have been biologically respectful and maintains the possibility to provide future implant therapy.

Key words:

Longitudinal results, palatal root, periodontal therapy, radisection

INTRODUCTION

In case of severe periodontal attachment reduction of one or two of the three roots in maxillary molars, the removal of the affected roots is indicated.^[1] During tooth hemisection and radisection, affected roots together with their corresponding part of the clinical crown are eliminated.^[1] Often, after root resection therapy, the treatment choice for prosthetic rehabilitation is a fixed dental prosthesis.^[2] However, the clinician goal should be, when possible, to achieve the best conservative result and in case of sound adjacent teeth, the preparation of these intact teeth should be avoided.^[3]

Case reports are anecdotal in nature and are less scientifically rigorous than controlled trials but have a high sensitivity for detecting possible novelties.^[4] In this clinical case, a radisection of two buccal roots of an upper first left molar was performed and the remaining single palatal root had been conserved and restored with a conservative-like fixed crown. Fifteen years later, the tooth is still in function with neither pathologic pocket probing depth nor signs of periodontal breakdown.

CASE REPORT

In 1983, a 53-year-old male patient was referred for periodontal treatment of a generalized aggressive periodontitis. The patient was treated with initial therapy consisting of scaling and root planning, with oral hygiene instruction and osseous resective surgery with apically positioned flap in the four sextants, to obtain pocket reduction. The healing was uneventful and the overall prognosis at that time was good. The

original goal of pocket reduction was achieved, creating a condition in which the patient could maintain a plaque-free environment. Few months later, the patient was enrolled in maintenance recall visits.

After 20 years, in 2003, the patient showed up with moderate pain and a temporary filling to his first upper left molar [Figure 1]. The patient underwent endodontic treatment and during this procedure, a fracture of the pulp roof overhanging the mesial root was detected. After achieving patient consent, an open flap procedure was performed. Due to bone resorption around the distal root and to the presence of a fracture over the mesial root, a resection of both buccal roots and a consequent bone contouring were performed to achieve a favorable positive bony architecture [Figure 2].^[5]

After 4 months of healing, the single-root tooth abutment was prosthetically finalized with a double-premolar-shaped metal-resin crown with a mesial cantilever, with narrow occlusal buccolingual extension and the addition of two rests on the adjacent teeth (second premolar and second molar) [Figure 3].

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

How to cite this article: Checchi V. Can a single molar root act as a whole tooth? J Indian Soc Periodontol 2022;26:79-82.

At 4- and 5-year follow-up visits, clinical condition of the treated tooth appeared stable, with neither probing pocket depth (PPD) nor bleeding on probing, neither signs of inflammation nor tooth mobility, and slight buccal gingival recession and negative interdental pressure index [Figures 4 and 5].^[6]

Nine years after the prosthetic load of the palatal root of the first molar, the patient underwent endodontic treatment of the second molar [Figure 6].

Fifteen years after, in 2018, due to crown fracture, the second molar had to be prosthetically treated with a metal-free zirconia crown and the distal rest of the first molar had to be removed [Figure 7].

At that time, the palatal radisected root and its crown were still in place, with no pathological pocket probing depth (<4 mm)

and lack of inflammation; buccal tissue appeared uniformly pale and pink and interdental tissues were well keratinized. Probably due to the distal rest removal, slight tooth mobility was present, but the function was still maintained.

DISCUSSION

Upper molars with loss of periodontal tissue in the furcation area often are considered hopeless teeth, and extraction seems to be the consequent inevitable therapy.^[7] The rationale for therapy of furcation-involved molars is to remove any root morphology able to retain plaque and to facilitate access



Figure 1: Periapical X-ray showing the upper left sextant 20 years after active periodontal treatment (2003)



Figure 2: Clinical view of the palatal root and its tooth abutment after resection of both buccal roots and alveolar bone contouring



Figure 3: Clinical and radiographic view of the single-root tooth abutment prosthetically finalized with a double-premolar-shaped metal-resin crown, with a narrow occlusal buccal-lingual extension, a mesial cantilever, and the addition of two rests on the adjacent teeth



Figure 4: Clinical view at 4-year follow-up visit: Clinical condition of the treated tooth appeared stable



Figure 5: Clinical view at 5-year follow-up visit: Neither probing pocket depth nor bleeding on probing, neither signs of inflammation nor tooth mobility, and negative interdental pressure index



Figure 6: Periapical X-ray showing endodontic treatment of the second molar (9 years after the prosthetic load of the palatal root of the first molar)



Figure 7: Clinical view at 15-year follow-up: The second molar was prosthetically treated with a zirconia crown and the distal rest of the first molar was removed. The palatal radisected root and its crown are still in place, with neither pathological pocket probing depth (<4 mm) nor lack of inflammation, pale and pink buccal tissues, and well-keratinized interdental tissues. Probably due to the distal rest removal, slight tooth mobility was present

for plaque removal by the patient and dental professional.^[8] Radisection, such as hemisection, is a technique based on the removal of one of the molar roots to reduce pocket probing depth and to achieve adequate plaque control.^[9]

This procedure has been described by Farrar in 1884 and resumed by Messinger and Orban in the middle-50s.^[10,11] Surprisingly, only a few studies on long-term survival of amputated teeth are available in the literature. In 1986, Green presented a 25-year follow-up of 122 maxillary molars that underwent root amputation, radisection, or hemisection. After 8 years, 41 of 101 molars with root amputation had been extracted due to periodontal breakdown.^[12] Klavan, in 1975, showed that 33 of 34 upper molars with root amputation survived for 11–84 months.^[13] These data seem to indicate that hemisection and radisection could only be considered a temporary therapy since many of these treated teeth have failed after root(s) removal.

However, Checchi *et al.* showed that after 7 years from periodontal surgery (including hemisection, radisection and root amputation) also hopeless teeth maintain a good survival rate,^[9] probably due to the presence of periodontal ligament, double blood supply, and high number of fibroblasts. All these anatomical components are able to protect and maintain the tooth, especially when compared to dental implants. Some studies about survival and success rate of root resected molars showed a 30% failure at 10 years^[14] but also a survival rate of these treated teeth higher than 90%.^[15] Similarly, Carnevale *et al.* demonstrated similar survival rates between root resected and nonresected teeth, respectively, 93% and 99% after 10 years.^[16] In a recent systematic review, the authors stated that resective procedures, including hemisection, lead to a survival rate of 62%–100% in a 5–13 years' observation period.^[17]

Several studies compared the survival rate of root resected teeth with dental implants placed in molar position. In a retrospective study with 4-year follow-up of maintenance care, root resected molars showed more complications than dental implants.^[18] Fugazzotto in 2001 compared 701 resected molars with 1472 implants placed in molar areas and demonstrated that, after a mean follow-up of 15 years, the success rate of dental implants and root-resected molars was similar, respectively, 97% and 96.8%.^[19] Teeth success criteria were defined as absence of bleeding on probing, exudation, PPD >4 mm, caries, or fractures. The author concluded that the maintenance of an inflammation-free molar, treated for

compromised furcations, does not preclude an eventual future implant positioning. Pjetrusson *et al.* tested implants placed in 70 patients previously treated for periodontitis. All patients were enrolled in periodontal supportive therapy after implant placement. After a mean follow-up of 8 years, the authors stated that survival and success rate of dental implants are not better than survival rates of properly-treated and properly-cleaned teeth.^[20]

In this clinical case, due to tooth fracture, a radisection of both buccal roots of an upper first molar had been performed. The remaining tooth supported by its palatal root was able to remain in function for 15 years and this could be due to the root wide diameter, its conicity, and patient excellent oral hygiene and compliance to professional hygiene recall,^[21] or due to shifting of occlusal forces toward palatal direction.

When one or two upper molar roots are resected, also the accompanying crown portion has to be removed or modified. Thus, the morphology of the tooth is affected and it requires a specific crown restoration.^[22] Moreover, pillars of this 15 years success could have been also the specific prosthetic solutions adopted in this case: Presence of two rests on adjacent teeth, a premolar-shaped crown with cantilever and the acrylic occlusal surface.

Rests are the primary removable-partial-denture (RPD) components and are ideated to provide an adequate support and a favorable force transmission to the adjacent teeth.^[23] In this clinical case, principles of RPD had been shifted to fixed dental prosthesis to guarantee more stability to the cemented single crown. Adjacent teeth were intact; therefore, preparation of these sound teeth had been avoided.

It has been shown that a reduced buccal-lingual width of the occlusal table is a key factor for the survival of a prosthetically loaded root resected tooth.^[24] Moreover, occlusal adjustments have to provide stable contacts during centric occlusion (except on the cantilevered portion), and no occlusal contacts during eccentric movements.^[24]

In this clinical case, the retaining of the palatal root with an adjacent tooth with a partially compromised periodontium could have put a lot of pressure on the adjacent tooth since the function was reduced on the radisected palatal root. Probably, this could have been the reason for the fracture of the crown of the second molar, which occurred, however, 15 years after the initial procedure.

Teeth have their own strength and purpose that, when respected and in good oral hygiene conditions, lead to successful results through the years. After what can be considered a long-term follow-up, the authors' choice seemed to have been more patient respectful and less expensive; moreover, this therapeutic option maintains the possibility to provide implant therapy if and when this will be necessary.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The

patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

- Walter C, Weiger R, Zitzmann NU. Periodontal surgery in furcation-involved maxillary molars revisited – An introduction of guidelines for comprehensive treatment. *Clin Oral Investig* 2011;15:9-20.
- Augereau D, Pierrisnard L, Renault P, Barquins M. Prosthetic restoration after coronoradicular resection: Mechanical behavior of the distal root remaining and surrounding bone. *J Prosthet Dent* 1998;80:467-73.
- Mostafavi AS, Falahchai SM. Prosthetic rehabilitation of a mandibular root amputated molar using single crown. *J Indian Prosthodont Soc* 2017;17:412-6.
- Vandenbroucke JP. In defense of case reports and case series. *Ann Intern Med* 2001;134:330-4.
- Checchi L, Mele M, Checchi V, Zucchelli G. Osseous resective surgery: Long-term case report. *Int J Periodontics Restorative Dent* 2008;28:367-73.
- Checchi L, Montevicchi M, Marucci G, Checchi V. A proposed new index for clinical evaluation of interproximal soft tissues: The interdental pressure index. *Int J Dent* 2014;2014:345075.
- McGuire MK, Nunn ME. Prognosis versus actual outcome. II. The effectiveness of clinical parameters in developing an accurate prognosis. *J Periodontol* 1996;67:658-65.
- Al-Shammari KF, Kazor CE, Wang HL. Molar root anatomy and management of furcation defects. *J Clin Periodontol* 2001;28:730-40.
- Checchi L, Montevicchi M, Gatto MR, Trombelli L. Retrospective study of tooth loss in 92 treated periodontal patients. *J Clin Periodontol* 2002;29:651-6.
- Farrar JM. Radical and heroic treatment of alveolar abscess by amputation of roots of teeth. *Dent Cosmos* 1884;26:79-82.
- Messinger TF, Orban B. Elimination of periodontal pockets by root amputation. *J Periodontol* 1954;25:213-219.
- Green EN. Hemisection and root amputation. *J Am Dent Assoc* 1986;112:511-8.
- Klavan B. Clinical observation following root amputation in maxillary teeth. *J Periodontol* 1975;46:1-5.
- Carnevale G, Di Febo G, Tonelli MP, Marin C, Fuzzi M. A retrospective analysis of the periodontal-prosthetic treatment of molars with interradicular lesions. *Int J Periodontics Restorative Dent* 1991;11:189-205.
- Blomlöf L, Jansson L, Appelgren R, Ehnevid H, Lindskog S. Prognosis and mortality of root-resected molars. *Int J Periodontics Restorative Dent* 1997;17:190-201.
- Carnevale G, Pontoriero R, di Febo G. Long-term effects of root-resective therapy in furcation-involved molars. A 10-year longitudinal study. *J Clin Periodontol* 1998;25:209-14.
- Huynh-Ba G, Kuonen P, Hofer D, Schmid J, Lang NP, Salvi GE. The effect of periodontal therapy on the survival rate and incidence of complications of multirooted teeth with furcation involvement after an observation period of at least 5 years: A systematic review. *J Clin Periodontol* 2009;36:164-76.
- Zafiroopoulos GG, Hoffmann O, Kasaj A, Willershausen B, Deli G, Tatakis DN, *et al.* Mandibular molar root resection versus implant therapy: A retrospective nonrandomized study. *J Oral Implantol* 2009;35:52-62.
- Fugazzotto PA. A comparison of the success of root resected molars and molar position implants in function in a private practice: Results of up to 15-plus years. *J Periodontol* 2001;72:1113-23.
- Pjetursson BE, Heimisdottir K. Dental implants– are they better than natural teeth? *Eur J Oral Sci* 2018;126 Suppl 1:81-7.
- Checchi L, Pelliccioni GA, Gatto MR, Kelescian L. Patient compliance with maintenance therapy in an Italian periodontal practice. *J Clin Periodontol* 1994;21:309-12.
- Newell DH. The diagnosis and treatment of molar furcation invasions. *Dent Clin North Am* 1998;42:301-37.
- Cecconi BT. Effect of rest design on transmission of forces to abutment teeth. *J Prosthet Dent* 1974;32:141-51.
- Schmitt SM, Brown FH. The hemisected mandibular molar: A strategic abutment. *J Prosthet Dent* 1987;58:140-5.