

## Case Report

# Endodontic regenerative treatment for internal radicular resorption using bio-ceramic material, case report

**Cristhal Duque-Urióstegui<sup>1</sup>, Carla B. Duque-Urióstegui<sup>2</sup>, Baltazar Barrera-Mera<sup>3</sup>,  
Rebeca J. Díaz-Bárceñas<sup>2</sup>, Tonatiuh Alavez-García<sup>2</sup>, Lucía Vega-Arenas<sup>2</sup>,  
Karla A. Bolaños-Lezama<sup>2</sup>, Andrea Anaya López<sup>2</sup>, Sandra J. Alarcón-Méndez<sup>2</sup>,  
Gabriela Castañeda-Palacios<sup>4</sup>, Miguel A. Cruz-Zúñiga<sup>5</sup>, Yanirethe I. Muñoz-Ramírez<sup>6</sup>,  
María F. Jimenez-Banda<sup>7</sup>, Emilio Perez-Ortega<sup>3</sup>, Alan Isaac Valderrama-Treviño<sup>8\*</sup>**

<sup>1</sup>Department of Stomatology, CST-III Health Center, David Fragoso Lizalde. Mexico City, Mexico

<sup>2</sup>Faculty of dentistry, UAM, Mexico City, Mexico

<sup>3</sup>Department of Physiology, Faculty of Medicine, UNAM. Mexico City, Mexico

<sup>4</sup>Faculty of dentistry, ULA, Mexico City, Mexico

<sup>5</sup>Stomatology Department, CST-III Health Center, Maya Culture, Mexico City, Mexico

<sup>6</sup>Stomatology Department, CST-III Health Center, Hidalgo Extension, Mexico City, Mexico

<sup>7</sup>Stomatology Department, CST-III Health Center, Rafael Carrillo, Mexico City, Mexico

<sup>8</sup>Department of Surgery, North Hospital PEMEX, CDMX, Mexico

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### \*Correspondence:

Dr. Alan Isaac Valderrama-Treviño,

E-mail: alan\_valderrama@hotmail.com

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## ABSTRACT

The internal resorption of the internal radicular conduct is a process than can be both physiological or pathological, being the osteoclasts, odontoclasts and dentinoclast responsible for said process. 49-year-old female patient, refers orthodontic treatment at age 20, attends a dental check-up due to pain when chewing. Dental organ (DO) #11 was diagnosed with internal root resorption and symptomatic, suppurative apical periodontitis. Treatment started performing an endodontic access and taking a conductometry reading with an apical foramen locator, using a precision hybrid instrumentation technique and applying hypochlorite irrigation, the intra-canal was medicated with chemically pure calcium hydroxide for 7 days. The canal obturation was repaired infiltrating a bio-ceramic material (BIO-C Sealer) followed by the placement of the single cone using a vertical condensation technique.

**Keywords:** Orthodontic treatment, Root resorption, Canal obturation, Bioceramic material, Cytocompatibility, Endodontic therapy

## INTRODUCTION

The internal resorption of the internal radicular conduct is a process than can be both physiological or pathological, being the osteoclasts, odontoclasts and dentinoclast responsible for said process. The pathological variant occurs after necrosis of the odontoblasts and chronic partial pulp inflammation or partial pulp necrosis may be observed.<sup>1,2</sup> Dentin resorption is generally asymptomatic,

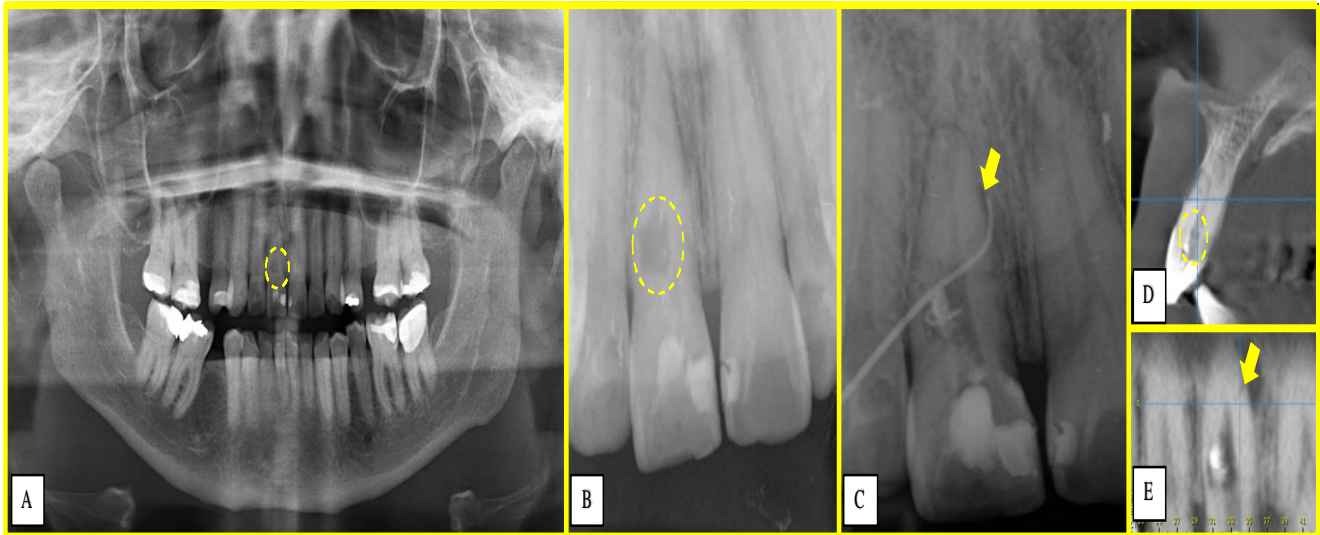
however it can be detected with routine radiographic studies; in advanced cases, fragility in the tooth structure can cause fracture or perforation. Radiographically, a uniform, round or oval radiolucent area is observed, when using the Clark technique an abnormal radicular conduct is almost always present.<sup>3-5</sup>

Traditionally, the treatment for internal root canal resorption is performed using thermoplasticized gutta-

percha due to its high-flow capacity to fill the irregular defects caused by internal tooth root resorption. However, when the tooth root is severely weakened with the risk of perforation, a hybrid technique has been suggested. First gutta-percha is used in the apical portion of the root canal while a biocompatible material is applied to the resorption area. Calcium silicate-based materials have both a high biocompatibility and a higher sealing capacity, thus indicated for use in different clinical applications, including the filling of resorption and tooth root perforations.<sup>6-7</sup>

## CASE REPORT

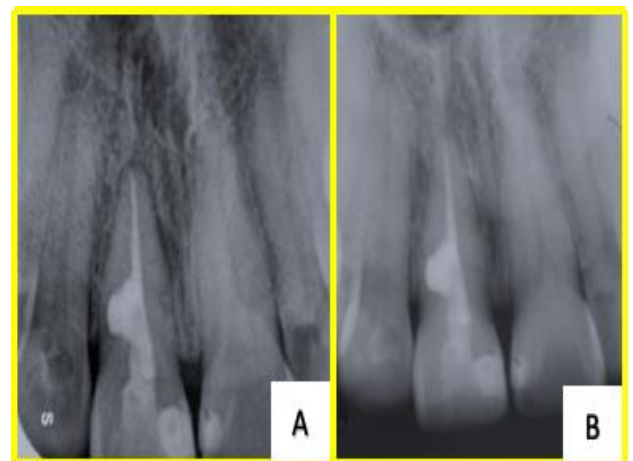
49 years old female patient, with no history of disease, or trauma, refers orthodontic treatment at age 20, attends a dental check-up due to pain when chewing. An orthopantomography was performed (Figure 1 A) observing in dental organ #11 a radiolucent oval-shaped area compromising the tooth root at the cervical third level (Figure 1 B).



**Figure 1: (A) Orthopantomography with radiolucent area in the cervical third of the dental organ 1.1 (dotted circle), (B) Preoperative coronaoapical radiograph, resorption area (dotted circle), (C) Fistulography shows the fistulous path of the lateral canal (yellow arrow) in the middle third of the root, (D) Dentin resorption of the root canal in the cervical third (dotted circle) without communication with the periodontium, (E) Computed tomography, apical lesion in the middle third through the lateral canal (yellow arrow).**

Pulp sensitivity tests were performed across the cervical third of the dental organ, obtaining a positive response to vertical percussion and cold, when the stimulus was withdrawn, the symptoms disappeared. A 6x6 open-mouth tomography with a viewer is performed (Figure 1 D).

Dental organ (DO) #11 was diagnosed with internal root resorption and symptomatic, suppurative apical periodontitis. Treatment started performing an endodontic access and taking a conductometry reading with an apical foramen locator, using a precision hybrid instrumentation technique and applying hypochlorite irrigation, the intracanal was medicated with chemically pure calcium hydroxide for 7 days. Subsequently the canal was prepared with Ethylenediaminetetraacetic acid (EDTA) and physiological solution as irrigant. Following, the canal was dehydrated with paper tips carefully avoiding drying out the canal, then the cone test was performed with adequate adjustment, subsequently, the canal obturation was repaired infiltrating a bio-ceramic material (BIO-C Sealer) followed by the placement of the single cone using a vertical condensation technique.



**Figure 2: Radiographic follow-up. (A) Post-operative coronaoapical radiograph, with coronal restoration, (B) Follow-up coronaoapical X-ray at 8 months of evolution, does not present apical lesion, the middle third of the root presents widening of the periodontal ligament.**

## DISCUSSION

Root resorption has a multifactorial, idiopathic etiology; often being the result of biological susceptibility, genetic predisposition and mechanical factors such as dentoalveolar trauma and orthodontia. Clinically, it may present as a pink stain, due to the presence of internal granulation tissue, frequently affecting: upper lateral incisors, upper and lower central incisors, distal roots of lower first molars, lower second premolars and upper second premolars. The apical third is more frequently affected, followed by the middle third and finally the cervical third.<sup>8-10</sup>

It is of great importance to perform orthopantomography as routine examinations whenever there is suspicion to obtain an early diagnosis, as they are asymptomatic lesions. However, it is essential to determine the extent of the of resorption area to make the best choice of treatment. Three-dimensional evaluation using cone beam computed tomography (CBCT) is an essential resource for both effective therapy an accurate diagnosis.<sup>3</sup>

Bio-ceramics materials are bioactive when repairing hard tissues, capable of producing hydroxyapatite when incorporated with calcium and silicon, showing a functional bond with dentin. Bio-C Sealer demonstrated better cytocompatibility in terms of cell viability, migration, cell morphology, cell fixation, and mineralization capacity.<sup>11</sup>

The single cone can only be performed whenever there is sufficient cement volume in the canal, with this technique infiltration may occur but it usually results in an efficient sealing. Nevertheless, it requires a thermo-plasticized technique to ensure an adaptation of the obturation, resulting in a faster endodontic treatment, the quality of the filling, the apical microfiltration and the penetration of bacteria, is similar to the other existing techniques.

## CONCLUSION

Individualized radiographic interpretation is crucial as root resorption can be asymptomatic and if not treated correctly, it can lead to dental organ loss. The combined treatment using a single cone and bio-ceramic material is an excellent alternative for the resolution of internal resorption, it represents a faster endodontic therapy with an efficient radiographical sealing.

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