

# Removal of a silver cone by using clinical microscope and ultrasound: Case report

Maíra do PRADO<sup>1</sup>

Marcos Cesar Pimenta de ARAÚJO<sup>2</sup>

Heloísa Carla GUSMAN<sup>3</sup>

## ABSTRACT

**Introduction:** The retreatment of teeth with endodontic failure associated with the use of silver cone as filling material is still today a reality in the endodontic practice. The present work reports a case of endodontic failure resulting from the use of silver cone and subsequent endodontic retreatment. **Case report:** The procedure consisted of removing the existing metal-ceramic crown and endodontic retreatment with removal

of the silver cone, which was apically sectioned by using ultrasound and clinical microscope. Next, the root canal system was filled and glass-fiber posts and metal-ceramic crown were placed. **Conclusion:** The use of microscope in association with ultrasound was crucial for performing the retreatment, thus allowing the silver cone to be safely removed without unnecessary wear of the dentinal structure.

**Keywords:** Retreatment. Ultrasound. Microscopy.

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<sup>1</sup>Assistant Professor of Dentistry, Federal University of Rio de Janeiro (UFRJ).

<sup>2</sup>Associate Professor of Dentistry, UFRJ.

<sup>3</sup>Adjunct Professor of Dentistry, UFRJ.

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Contact address: Maíra do Prado  
Rua Prof. Rodolpho Paulo Rocco, 325 – 2º andar  
CEP: 21.941-913 – Rio de Janeiro/RJ – Brazil

## Introduction

The retreatment of teeth with endodontic failure associated with the use of silver cones as filling material is still commonly found in the endodontic practice.

Silver cones were introduced as filling material by Trebitsh,<sup>1</sup> in 1929, being largely used in the past.<sup>2</sup> However, studies began to show that this material offered a poor apical sealing, leading to their exposure to tissue fluids and inducing both corrosion and formation of cytotoxic by-products.<sup>3</sup> This was mainly observed in those cases of overextension or where the sealer did not fill the entire area surrounding the cones.<sup>4-7</sup>

The phase of removal of the filling material is one of the most critical in the endodontic retreatment, mainly in those cases in which the silver cones are sectioned at the level of the middle and apical thirds, where no direct access is allowed. In this sense, the use of clinical microscope in association with ultrasound is extremely useful for the removal of silver cones,<sup>8</sup> since the former allows the filling material do be directly viewed and the latter enables to reach the root canal in depth, thus providing shearing of the sealer and opening spaces for the endodontic file.<sup>9</sup> Moreover, whenever needed, the cone itself can be carefully eroded without causing damage to the adjacent dental tissues.<sup>6,10,11</sup>

This study has reported a case of endodontic failure resulting from the use of silver cone as filling material and the subsequent endodontic retreatment of the tooth, which was conducted by using clinical microscope and ultrasound.

## Case report

A 54-year-old female patient attended the endodontic clinic at the Federal University of Rio de Janeiro complaining of discomfort in her tooth #15, which had already been endodontically treated.

During the intraoral exam, it was observed diffuse oedema in areas of teeth #14 to #16 without presence of fluctuation point. Patient had pain at palpation and percussion. Pulp sensitivity test was not performed because the tooth had been previously endodontically treated. Radiographic analysis showed endodontic treatment with silver cone, sectioned at the apical third in association with thickening of the periapical ligament (Fig 1).

A treatment planning consisting of removal of the pre-existing crown, endodontic retreatment, cementation of the glass-fiber post and placement of a new metal-ceramic crown was proposed and accepted by the patient.

During the appointment, the metal-ceramic crown was removed by using a #3216 diamond bur (KG Sorensen) and transmetal cylindrical bur (Dentsply Maillefer). Next, an ENAC ultrasound (Osada Electric Co. Ltd. Nakatsu, Japan) in association with ultra-sonic inserts and clinical microscope (DF Vasconcelos) were used to remove the sealer completely until reaching the apical area, where the silver cone could be visualized. Once the silver cone was found, a #10 K-file (Dentsply Maillefer) was used to find the passage between silver cone and root canal wall, but this was not possible. As a result, the sealer line was carefully eroded to allow a passage. After this small erosion of the sealer, the #10 K-file (Dentsply Maillefer) could reach beyond the silver cone (Fig 2).

The tooth was instrumented until #25 K-file (Dentsply Maillefer). A #25 Hedström file was used to try to pull the cone off, but unsuccessfully.

The tooth was temporarily sealed with coltosol (Vigodent) and camphorated paramonochlorophenol (Biodinâmica) was used as intracanal medication. A new appointment was scheduled to try removing the silver cone.

In the second appointment, the dressing was removed by using a #1012 spherical rotary bur (KG Sorensen) at high speed and then an exploration of the canal was performed with a #25 K-file (Dentsply Maillefer). Next, the apical region was widened until #35 K-file (Dentsply Maillefer) in order to pull the cone off by using a #35 Hedström file (Dentsply Maillefer), but again unsuccessfully. By using a clinical microscope, it was possible to observe that the silver cone could not be removed because it was still stuck in the sealer. Again, ultrasound was used to aid removing the sealer still present in the root canal by vibrating both the file indirectly along the cone and directly the cone. In this way, it was possible to break the sealer at the interface level and remove the silver cone with the #35 Hedström file (Dentsply Maillefer).

Instrumentation was then performed again according to the pre-enlargement technique, which consisted in preparing the middle-coronal third with

Gates-Glidden drills in ascending order of size (#1, #2, #3, #4, #5) and subsequent preparation of the apical third.<sup>12</sup> Instrumentation was performed at zero limit, that is, within the apex in order to provide cleaning of the foramen. A 5.25% sodium hypochlorite solution was used for irrigation throughout the chemical-mechanical preparation, whereas the smear layer was removed with 17% EDTA. The root canal was dried with paper cones (Endpoints) and then obturation was performed by using extra-long medium gutta-percha – specialist series (Endpoints) and Pulp Canal sealer (Kerr-Syborn). Obturation was performed according to the condensation technique and the pack-down phase was performed with a thermo-compactor (Easy). Next, the root canal was re-filled with thermoplastic gutta-percha (re-pack phase) by using a plugger (Obtura Spartan, Fenton) and the tooth was sealed in order to avoid contamination of the root canal system.

In the following appointment, the glass-fiber post (Reforpost, Angelus) was cemented to work as an intra-radicular support. Moreover, a filling nucleus was prepared, a metal-ceramic crown was made, and temporary crown was placed.

The case was finished in the following week with cementation of the metal-ceramic crown (Fig 3).

## Discussion

The conventional retreatment is always the first treatment option in the cases of endodontic failure.<sup>1,13</sup> In the present case, the use of microscope in association with ultrasound was crucial for performing the retreatment. The silver cone was well-adjusted and trapped at an apical position, and according to the literature, well-adapted silver cones sectioned at the apical third level are difficult or even impossible to be removed.<sup>14</sup> The use of clinical microscope was crucial not only for aiding to visualize the cone, but also for removing it as

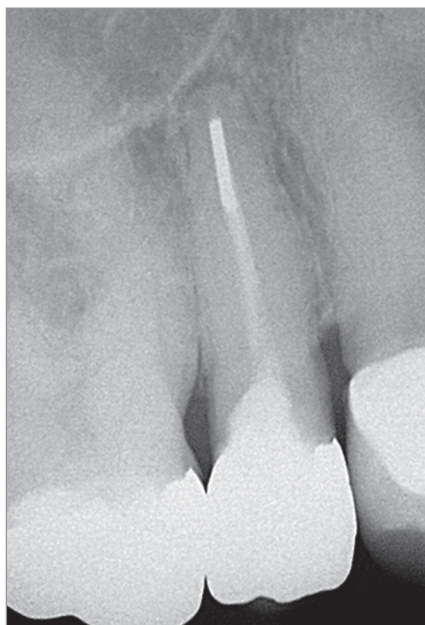


Figure 1. Initial radiograph.

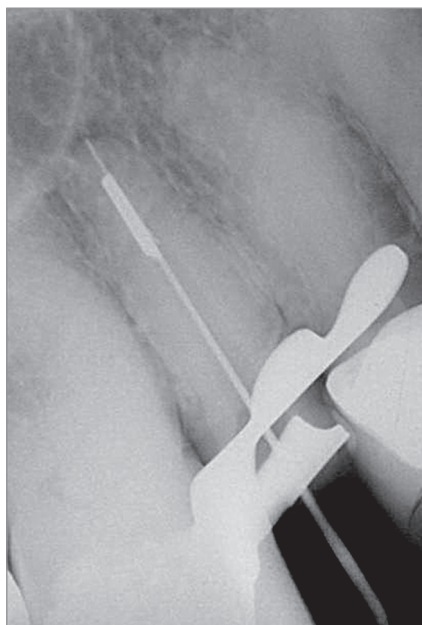


Figure 2. Radiograph showing the file reaching beyond the silver cone.



Figure 3. Final radiograph. Case was concluded after endodontic retreatment and cementation of glass-fiber post and metal-ceramic crown.

well as for assessing whether there was the presence of a second canal, since the literature shows that about 40-50% of the second pre-molars have two canals.<sup>15,16</sup> This was not the case in our work either.

According to previous studies, the use of clinical microscope in association with ultrasound has increased the likelihood of success in the endodontic retreatment, since this technique enables better visualization of the root canal in terms of magnification and illumination. In addition, the ultrasonic inserts are increasingly specific used to facilitate the removal of cones from inside the canal without eroding the dental structure unnecessarily.<sup>17,18,19</sup> In the present case, the ultrasonic inserts were very useful because the tooth was fully filled with sealer, that is, from the cone to the coronal region and with no presence of gutta-percha. Removing this sealer with low-rotation burs would result in more wear of the dental structure and risk of deviations and/or perforation.

In the case reported here, following removal of the silver cone, the root canal was prepared before its obturation as no clinical sign contra-indicating the obturation was observed, such as the presence of exudates.<sup>1,2,13</sup>

With the passage along the silver cone and its removal, it was possible to perform instrumentation throughout the entire root canal and have a hermetic and three-dimensional root canal system, which will favour the prognosis of this new treatment.<sup>1</sup>

A glass-fiber post was chosen because it requires less time for preparation, besides being less expensive compared to cast metal posts, since the procedure is performed in only one session and requires no laboratory phase.

Moreover, these posts behave biomechanically better than the cast metal ones as they have an elasticity module similar to that of the dentin, thus being less rigid than the metal posts.<sup>20,21</sup> The metal-ceramic crown was chosen due to its low cost and because the area was not esthetically demanding.

## Conclusion

The use of clinical microscope in association with ultrasound has been crucial for performing the treatment, since this technique allowed the silver cone to be removed on a safe basis, that is, without eroding the dentinal structure unnecessarily.

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