

AESTHETIC AND FUNCTIONAL RETREATMENT OF TEETH #46 AND #47 WITH QUESTIONABLE PROGNOSIS

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ABSTRACT

Introduction: The decision of whether or not to extract a tooth with questionable prognosis is common in the daily clinic. To make the right decision, we must take into account various factors such as endodontic, periodontal, and restorative prognosis, as well as factors based on patient type, expectations, hygiene habits, tobacco use, systemic state, etc. **Description:** We present the case of a patient, a non-smoker, with good health condition and with a lot of interest in keeping all his teeth. He presents a 46 with a prognosis compromised at the endodontic, periodontal and restorative prognosis; he also present a 47 with a restorative problem. After the appropriate evaluation of the case, retreatment was planned: no surgery endodontic retreatment on tooth 46, extraction of 48, surgical crown lengthening and posterior reconstruction of the teeth, as well as making two monolithic disilicate crowns. **Results:** We can see the success a year after the end of the treatment by checking the cure of the periapical pathology as well as the good functioning of the lithium disilicate restorations. **Conclusion:** In such cases, the individualization of the treatment plan will be key to success.

KEYWORDS: Indirect restorations. Non-surgical retreatment. Success. Surgical crown lengthening.

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INTRODUCTION

The decision between maintaining or extracting a tooth with a questionable prognosis remains a dilemma in clinical practice. Despite the literature that addresses this issue, there is no standardized evaluation method to select the most appropriate option for a particular tooth. When deciding whether to maintain or extract, both key factors related to the patient (the systemic state and perception of the treatment) and factors related to the tooth (periodontal, endodontic, restorative, and prosthodontic) must be addressed.¹

Ovaydi - Mandel A² proposes tree algorithms (for endodontic, restorative, periodontal evaluation, and extraction algorithm) to determine the treatment of compromised teeth, based on the McGuire forecast system³ with five categories for the periodontal state: good, reasonable, poor, questionable, and hopeless. When making decisions, one must take into account different factors such as patient's history, expectations, psychological needs, financial restrictions, or medical contraindications. These aspects will be taken into account individually in the final decision-making.² In recent years, the preferences of patients for more conservative treatments have increased above extraction, with tooth survival after treatment being one of the most valued factors.⁴ Patients choose endodontic treatment as an option to maintain teeth, to preserve natural aesthetics, and for pain relief.⁵ For patients who have had pulpal and periapical diseases caused by caries or trauma, the main goals of radicular root canal treat-

ment are to provide long-term comfort, function, aesthetics, and prevention of reinfection. These objectives are achieved by complete cleaning and shaping, the filling of the channels, and the restoration of the affected teeth.⁵ The objective is to cure or prevent periapical disease in order to promote the long-term survival of the tooth.⁶ It is a predictable treatment with success rates above 97%.⁷

When the initial endodontic treatment is not successful, therapeutic options include non-surgical treatment, endodontic surgery, reimplantation, transplantation, extraction and replacement by the implant, extraction and replacement by prosthesis, and removal without replacement.⁵

DESCRIPTION

A 40-year-old male patient came to the clinic for pain due to mastication and the presence of a fistula in 46. After the clinical and radiological examination, a radiolucent image was seen in the distal root with possible resorption, as well as a badly adapted crown with fully subgingival coronal filtration and a metallic post (Fig 1). The patient also presented endodontics in 47, with a



Figure 1: Initial radiography showing a radiolucent image with possible reabsorption in the distal root of 4.6, as well as the presence of a pole and a bad coronal adaptation in 4.6 and 4.7.

crown filtered at the subgingival level and root proximity with 48, which prevents correct adjustment at the distal level of the crown. After discussing the case with the patient and discussing the questionable prognosis of tooth 46, the following treatment was determined:

1. Endodontic retreatment of 46.
2. Extraction of 48 and surgical crown lengthening of 46 and 47.
3. Reconstruction of stumps and crowns in 46 and 47.

RETREATMENT OF 46

First, the retreatment of the problem tooth 46 was performed, cutting the crown first to remove it and then using the ultrasonic tip Start X n°3 (Dentsply, Maillefer, Ballaigues, Switzerland) and instrumentation up to X2 (Dentsply, Maillefer, Ballaigues, Switzerland). Irrigation was carried out with hypochlorite and EDTA, activating it with Endoactivator (Dentsply, Maillefer, Ballaigues, Switzerland). Due to the presence of a secondary apical periodontitis in the distal root, intracanal medication with calcium hydroxide was placed until the following appointment.⁷ After fifteen days, the pre-obturation irrigation was performed and the ducts were sealed with continuous wave 35.06 in the distal and 30.06 in the mesial (Fig 2A).

Afterwards, the sealing of the chamber was performed with provisionally adhered composite.

EXTRACTION OF 48 AND SURGICAL CROWN LENGTHENING OF 46 AND 47

Once the retreatment was done, extraction of 48 was performed, and after six months, the healing of the apical lesion and the maturation of the tissue in the area of extraction were checked (Fig 2B). After this time, due to the subgingival margins between 46 and 47, surgical crown lengthening was performed.

For this, intrasulcular incisions were made and a flap was raised to full thickness. Subsequently, with a round bur, a 1.5-mm ostectomy was performed, smoothing the area to avoid a large depression

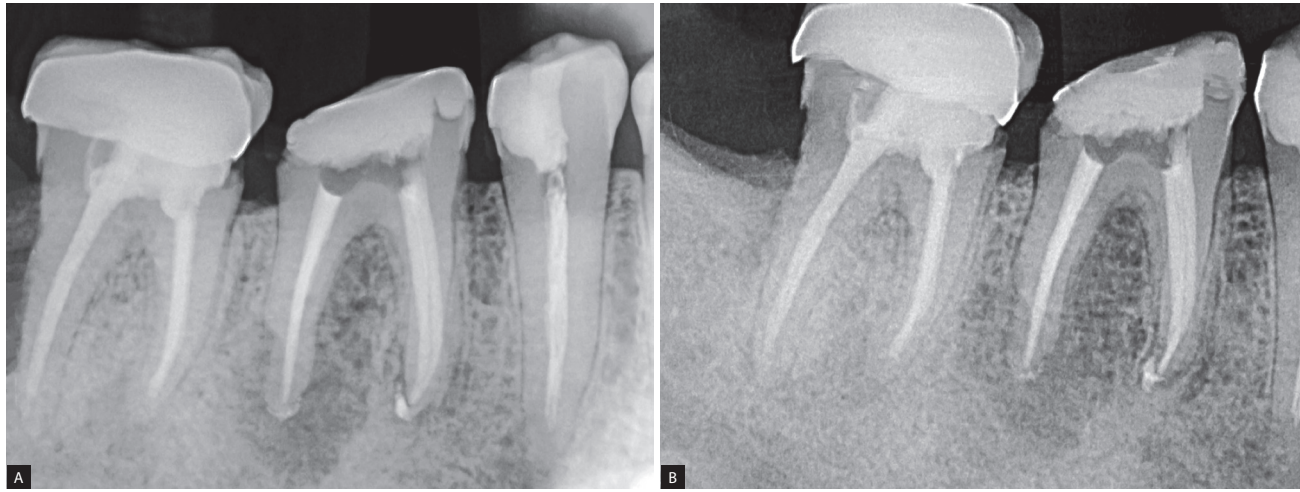


Figure 2: (A) Retreatment of 4.6 and sealing with continuous wave. Extraction of 4.8. (B) Control in 6 months.

in the bone. Subsequently, it was sutured with a non-absorbable monofilament Goretex 6/0 suture, and restoration was expected to start after six weeks.

RESTORATION AND CROWNS IN 46 AND 47

After six weeks, the stumps were directly reconstructed with composite (Figure 3 shows the preoperative radiography and the radiography after carving). After this, the vertical carving was done (Fig 4), as well as the subsequent placement of two provisional crowns. After that, the two definitive crowns were made (Fig 5); in order to achieve good aesthetics, survival, good adaptation, and good periodontal response, we chose lithium disilicate crowns (Fig 6) using Calibra® Ceram resin cement.^{8,9} At six months, we performed two control radiographs to check that all the treatment was working properly (Fig 7).

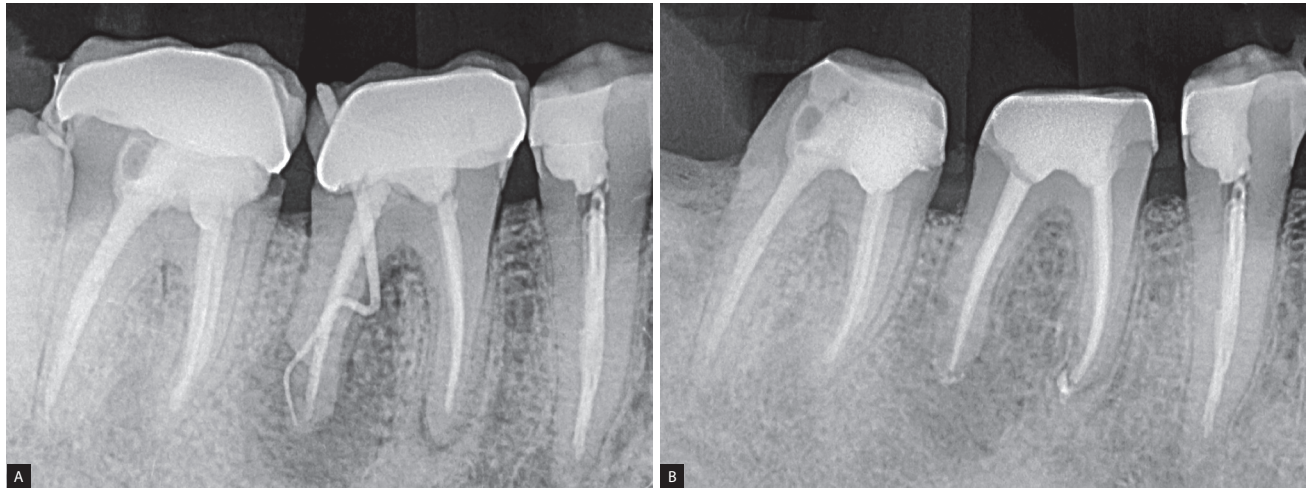


Figure 3: (A) Preoperative radiography. (B) Control radiography after elongation, composite restorations, and vertical carving.



Figure 4: Occlusal and lateral view of the vertical carving. See the placement of the thread to help us in the gingival retraction.



Figure 5: Monolithic lithium disilicate crowns on work models.



Figure 6: Definitive cementing of the crowns with resin Calibra® Ceram.

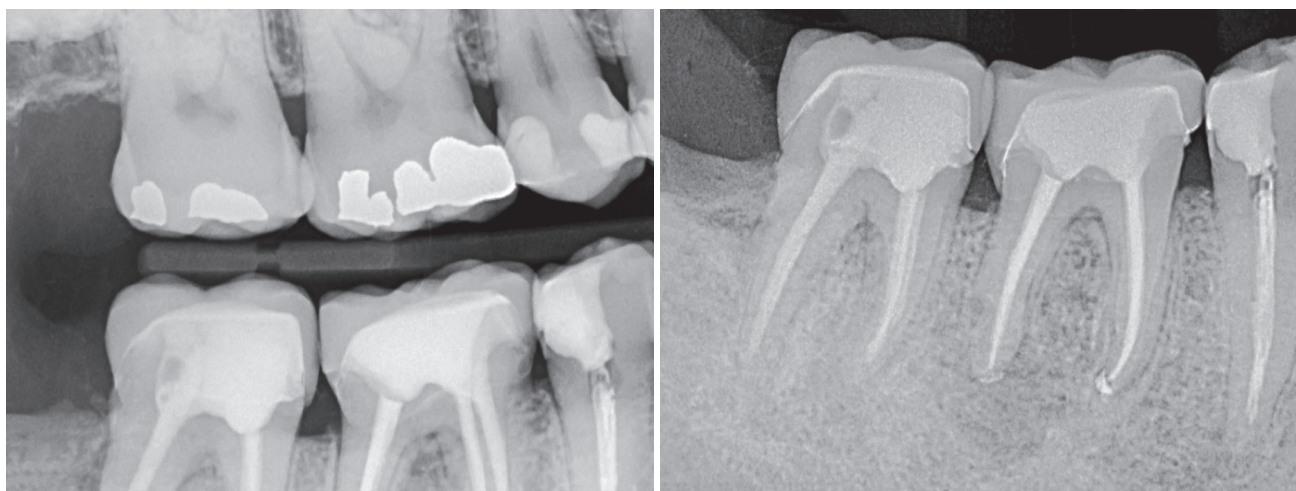


Figure 7: Final radiographs showing the good cervical adjustment of the crowns.

RESULTS AND DISCUSSION

One of the goals of any dentist should be to maintain the dentition of patients as much as possible. The clinician, however, often faces the challenge of deciding when the tooth is condemned and should be replaced by an implant.¹¹ The attitude of the clinician towards a complex case, as described before, is therefore of great importance. The question of retaining or extracting is not satisfactorily answered in the literature.¹² The clinician must take into account the innumerable natural or pathological variations of each patient, along with their habits, the different treatment plans, the cost-effectiveness, the clinician's technical skills, and patient preferences when making the decision.

One of the main problems in the literature when comparing endodontic treatment with implants is the lack of consensus in defining the term "success" in implants. Thus, regarding implants, there is a tendency to speak of a "survival rate", which results in better data, even if the implant is not functional. In endodontics, the healing of periodontitis along with an asymptomatic response is considered success. Thus, in 2017, Chércoles — Ruiz¹³ found no significant differences between the success rate in endodontics and survival in implants, which is in accordance

with the results obtained by Iqbal and Kim in 2008. However, over time, endodontics and implants seem to follow opposite trends. The longer the monitoring time, the lower the survival rate of implants,¹⁴ results contrary to those obtained with endodontic treatments, where complete healing and therefore inclusion in the successful group can appear up to 10 years after the treatment has been performed.¹⁵ Therefore, the time factor can affect the prognosis of treatment, which is an important point that influences the results obtained in the long term and that can help us in making the decision.

Although the survival rates of implants are comparable with the success of conservative treatments, the presence of postoperative complications such as peri-implantitis (28–56% of patients) and mucositis (50% of patients) may require additional treatments.¹⁶ This, according to Doyle et al.¹⁷, affects the stability of the long-term treatment and the comfort of the patient.

It is unrealistic to think that most dental restorations will last a lifetime; it has been estimated that 50% of routine restoration procedures performed in the consultation will last between 10 and 20 years.¹⁸ Because life expectancy is currently over 80 years old, dentists must realise that the restoration to be carried out may not be the last. Thus, cost effectiveness is of vital importance today. A study carried out in the United Kingdom in 2009 by Pennington et al.¹⁹ concluded that endodontic treatment is good in terms of cost effectiveness in extending the life of a tooth. Likewise, reendodontic treatment would also be a profitable treatment. In addition, as far as maintenance is concerned, the cost per year of maintaining a crown is lower than the cost of maintaining implants. If we take into account all the factors discussed above, the decision taken in our case is completely justified.

When performing a reconstruction of an endodontic tooth, it is essential to determine the distance of the carious lesion to the alveolar crest. To determine this distance, a correct probe of the area must be performed after the injury has been removed; in addition, a parallel bite film radiograph will help to identify bone margins.²⁰ One of the problems we encountered in dealing with this case was the proximity of the cervical margin to the alveolar crest (1 mm), which re-

sulted in an invasion of biological space. Because of this, in our case, we opted to carry out a coronary elongation that allowed us to satisfy all the periodontal requirements and ensure the future good functioning of our restoration. Surgical crown lengthening is a periodontal surgical technique used to increase the size of the clinical crown of the tooth. In such cases, periodontal health, corona-root ratio, furca position, proximity between the roots of the adjacent teeth, and the shape of the root should be evaluated. Once the procedure is performed, we should expect a minimum of four weeks of postsurgical healing in the posterior areas with aesthetic requirements.²¹

It is accepted in the literature that endodontically treated teeth are more prone to fracture. This fragility was attributed in principle to loss of water and collagen; however, we now know that the most important biomechanical changes occur due to the loss of dental tissue. Therefore, it is essential to take into account the amount of dental tissue remaining when making the restorative decision, as well as other important points such as the patient's parafunctional habits, occlusal forces, and the aesthetic demand.²² When the loss of structure is extreme, more than two thirds of the tooth, a crown is the indicated treatment. The literature shows that 1.5–2 mm of ferrule are necessary for a predictable long-term success. Nevertheless, in some cases where there is loss of subgingival structure, extraction is the treatment of choice.²³ In our case, due to the great loss of structure and the fact that the teeth had crowns, the decision was made, when apical and periodontal tissue healing was observed, to make two new crowns.

Traditionally, when clinicians prepared teeth for crowns, they created a finishing line for where to place the prosthesis. These termination lines are divided into horizontal preparations (chamfer, shoulder...) and vertical preparations.²⁴ An alternative to these preparations is carving without a finishing line. In this preparation, the clinician eliminates the anatomical emergence of the crown, which coincides with the amelo-cementary union to create a new prosthetic union where the gingival margin is desired to be located.²⁵ This type of preparation offers several advantages such as improving the gingival thickness, generating better stability in the soft tissues, improving the prosthetic union, allowing for optimal adjustment between the tooth and the restoration, preserving the dental structure, and simplifying the printing process.²⁶ In addition, with this type of preparation, both metal restorations and ceramics can be used, but the restorations of zirconium or lithium disilicate also offer sufficient fracture resistance to enable this type of vertical preparation without any horizontal support. Due to all of the above, in our case, a vertical preparation without termination line was performed, and we chose to place a lithium disilicate crown²⁷ attached to restore the function of the teeth.

CONCLUSION

The evolution of dental treatments has allowed us to save teeth that in the past would be condemned to extraction. Correct interdisciplinary planning can restore function in teeth with compromised prognosis.

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» Patients displayed in this article previously approved the use of their facial and intraoral photographs.
