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Clinical case

Influence of the type of dentist practice on the management of the palatally impacted canine

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ABSTRACT

Palatally impacted maxillary cuspids are a common eruption disorder whose management in our clinics is based on the previous experience of the involved professional. As a result, the outcome of the treatment is not uniform.

We present seven cases of palatally impacted maxillary cuspids managed with different approaches by several dentists with a different professional background (general dentist, oral surgeon, expert in dental esthetics, prosthodontist and orthodontist). The discussion of these cases reveals the criteria that justified the corresponding treatment approaches.

KEYWORDS

Maxillary cuspids; Palatal deviation; Treatment.

INTRODUCTION

Tooth eruption disorders are a significant problem in dental practice. Dentists with varying professional profiles often select the therapeutic approach that is most in line with their own training and with the experiences over the course of their clinical practice as it relates to this pathology. As a consequence, the same disorder can be handled differently depending on whether the clinician in charge of the case is more expert in oral surgery, prosthesis, conservative dentistry, orthodontics, etc.

Take for example a relatively frequent problem such as palatally impacted maxillary cuspids (PIMC), a genetically conditioned eruptive disorder, independent of available space.

Therefore, from a pathophysiological standpoint, it is totally different from vestibular impaction, which is usually due to mechanical factors derived from lack of space.¹

The prevalence of PIMC in the general population ranges from 0.9 and 2%, with significant interethnic variations and with a certain predominance in women.^{2,3} It is not surprising, then, that this pathology is a common finding in many practices.

We will schematically present several cases of PIMC in young adults or adolescents in the context of B-B moderate conditions that have been treated differently by clinicians with different professional profiles.

CASE 1

Summary description of the case

27-year-old female patient who presents a Class I malocclusion, with crossed occlusion of 17/47 and interincisal diastema. Absence of 26 due to extraction. Crown on 16 and 14 endodontically. 13 is not present and never erupted. The previously restored 53 with composite remains in the arch (Figures 1a and b). No periodontal or functional problems. The radiographic study by cone beam tomography (Cone Beam Computed Tomography, CBCT) reveals the palatal inclusion of 13 without complications such as reabsorption of adjacent teeth, dentigerous cyst or apparent ankylosis of the cuspid (Figure 1c).

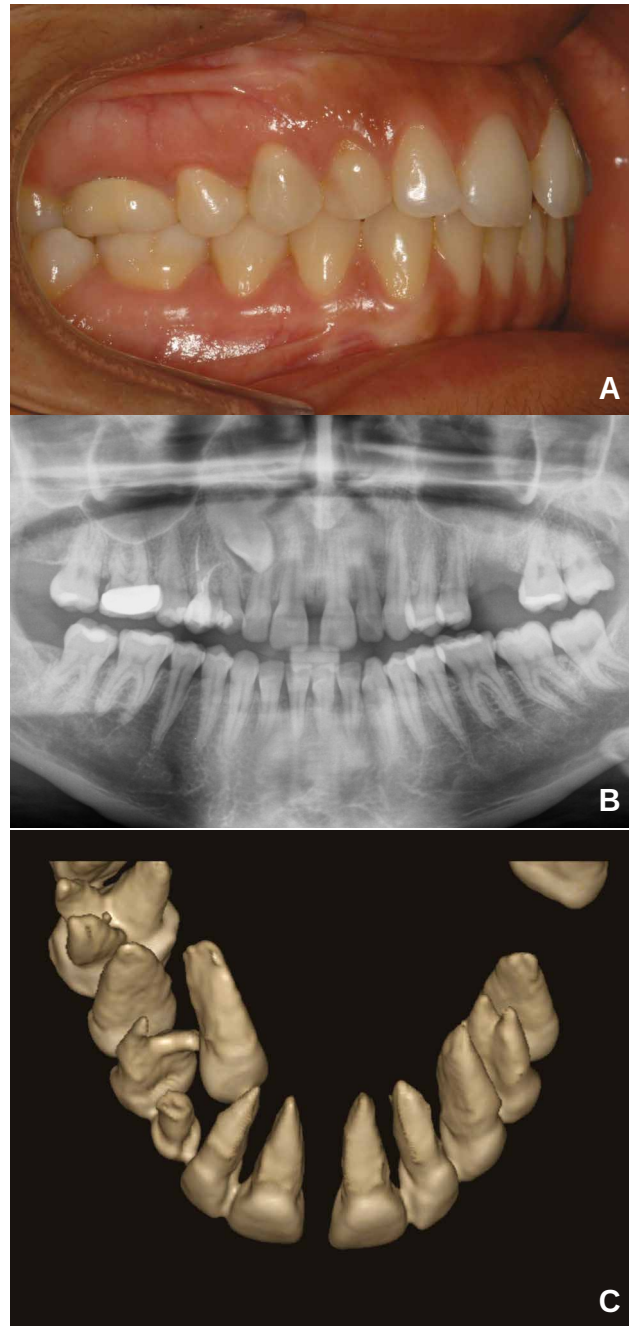


Figure 1. clinical case 1; a, intra-oral photography. 53 restored with composite is observed; b, the OPG reveals, among other findings, the 13 is impacted; c, the CBCT demonstrates the palatal position of 13 and rules out complications of impaction.

Treatment and discussion of the case

Withhold treatment

This patient's dentist, a general dentist who is usually not very interventionist, has advised the patient not to remove

the included canine. He believes that it is best to “leave things as they are” as long as the crown of the temporary canine is not exfoliated or degraded; This one has a caries restoration, the morphology of which has been remodeled favorably and maintains a very acceptable root length.

To opt to withhold treatment, the doctor has taken into account the patient’s biopsychosocial conditions, which she knows well because she has been her family’s dentist for several years. On the other hand, the malocclusion associated with the eruptive disorder is only moderate, without great aesthetic or functional affectation. The diastema is a familiar trait that does not displease the patient. For all these reasons, the doctor considers that orthodontic treatment is not justified at this time since the result with respect to the re-introduction of the PDMC can never be guaranteed and that, if it fails, it could lead to the need for prosthetic rehabilitation.^{4,5}

This very rigorous professional has previously verified through CBCT that at the time of diagnosis the inclusion of the cuspid is not associated with any other pathology related to the eruptive disorder, in particular with reabsorption of the upper incisors.⁶ They are aware that when only orthopantomography (OPG) is used as a diagnostic record, the proportion of incisal resorptions is less than 10% of cases of PDMC, but that three-dimensional imaging techniques, such as CBCT, facilitate more precise detection, increasing the proportion to as much as 48% of cases, according to some authors.^{7,8} This professional has also weighed the risk of possible complications in the future if the cuspid is left in place, such as the development of large dentigerous cysts, external resorption with ankylosis of the cuspid itself, or delayed root resorption of any of the teeth that have been shown to be undamaged on the diagnostic study.^{9,10} In addition, they have also weighed the fact that even though none of these changes are seen at a given moment does not mean that they will not develop in the future

For this reason, the doctor has recommended that their patient perform periodic radiographic monitoring as long as the cuspid remains included. In the end, the professional’s determination, backed by their own experience, is firm: they will continue to recommend withholding treatment as long as the follow-up controls are normal and the temporal cuspid does not exfoliate,

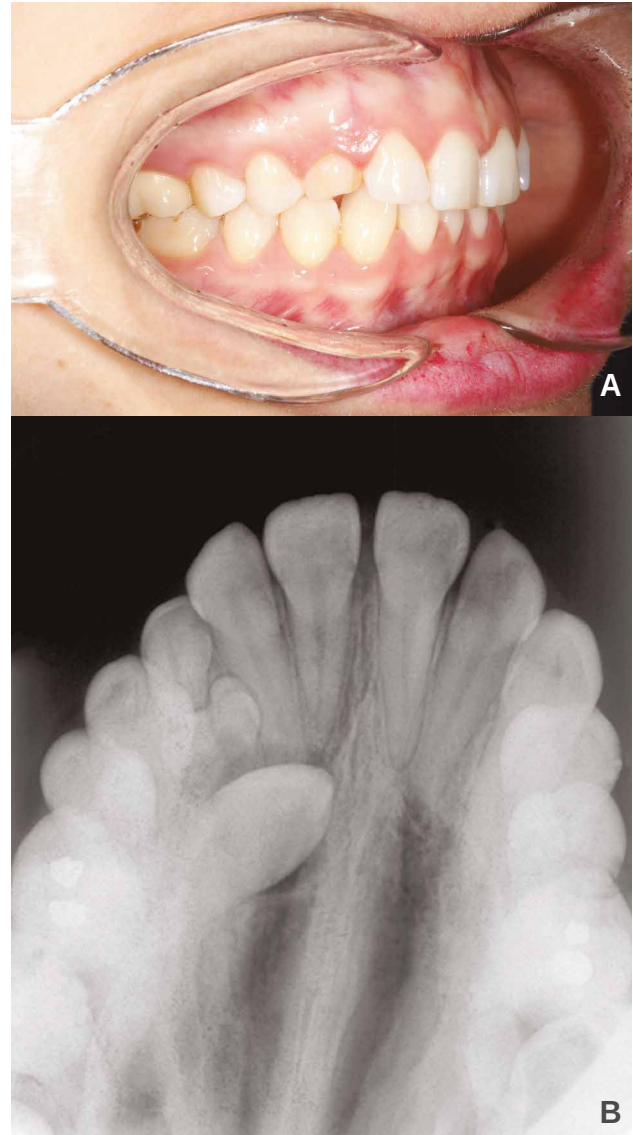


Figure 2. clinical case 2; a, lateral intra-oral photography shows tooth 53 that has not been exfoliated; b, occlusal radiography reveals the presence of a supernumerary odontoma or a tooth that is probably responsible for the inclusion of 13.

an acceptable aesthetic appearance is maintained and the patient continues to cope with the biological and psychosocial circumstances.

CASE 2

Summary description of the case

An 18-year-old woman with an insignificant malocclusion that does not pose functional problems. Inclusion of 13

with the presence of an odontoma (or supernumerary tooth) that could have interfered with its eruption path. The antecedent temporary cuspid has not been exfoliated (Figure 2).

Treatment and discussion. Extraction of the included canine and the odontoma/supernumerary as the only treatment

In most palatal impactions of a maxillary cuspid, there is no obstacle that affects the eruptive disorder, but in this patient it has been possible to detect an odontoma -perhaps a supernumerary tooth- interfering with the PIMC eruptive route.¹¹

The professional in this case, a surgeon, decides to extract the impacted tooth that is causing the obstruction in the same surgical act, basing the decision on preventative criteria. In fact, this professional is almost always in favor of extracting the PIMCs in any circumstance, unless the patient has been referred by an orthodontist. Throughout their professional life, this professional has treated several patients who had developed significant complications related to impacted teeth and feels it is not worth taking unnecessary risks in any case.

As for the available space in the arch, the space now occupied by the temporary canine is insufficient for the substitution by an implant, for which reason the professional recommends maintaining the temporary canine for the time being and not carrying out any rehabilitation procedure.

CASE 3

Summary description of the case

A 40-year-old male patient with a highly inclined and high PIMC in the setting of a malocclusion that the patient does not want to be treated by orthodontics. The corresponding temporal cuspid remains in the arch, which is very deteriorated but still retains acceptable root length. Good periodontal situation although with recessions in adjacent teeth (Figure 3a).

Treatment and discussion. Aesthetic remodeling of the temporary cuspid without extracting the PIMC as the only treatment



Figure 3. clinical case 3; a, the crown of the temporary cuspid is very damaged and there is no guide; b, remodeling with composite of the temporary cuspid with retrieval of the guide.

The dentist who will be in charge of this case, an expert in restorative dentistry and aesthetics, has been sent a 40-year-old patient from with a PIMC associated with a moderate malocclusion that the patient does not want to treat. The antecedent temporary canine is still present and, although its crown has suffered significant abrasion and does not act as a guide, retains its root relatively well, for which the dentist is inclined to rebuild it.

Accustomed to expertly handling composites to reconstruct teeth that are subjected to significant occlusal forces, he thinks that he will be able to obtain excellent aesthetics and recover an acceptable cuspid guide (Figure 3b). This professional has also carried out an appropriate radiographic study to rule out complications, and for

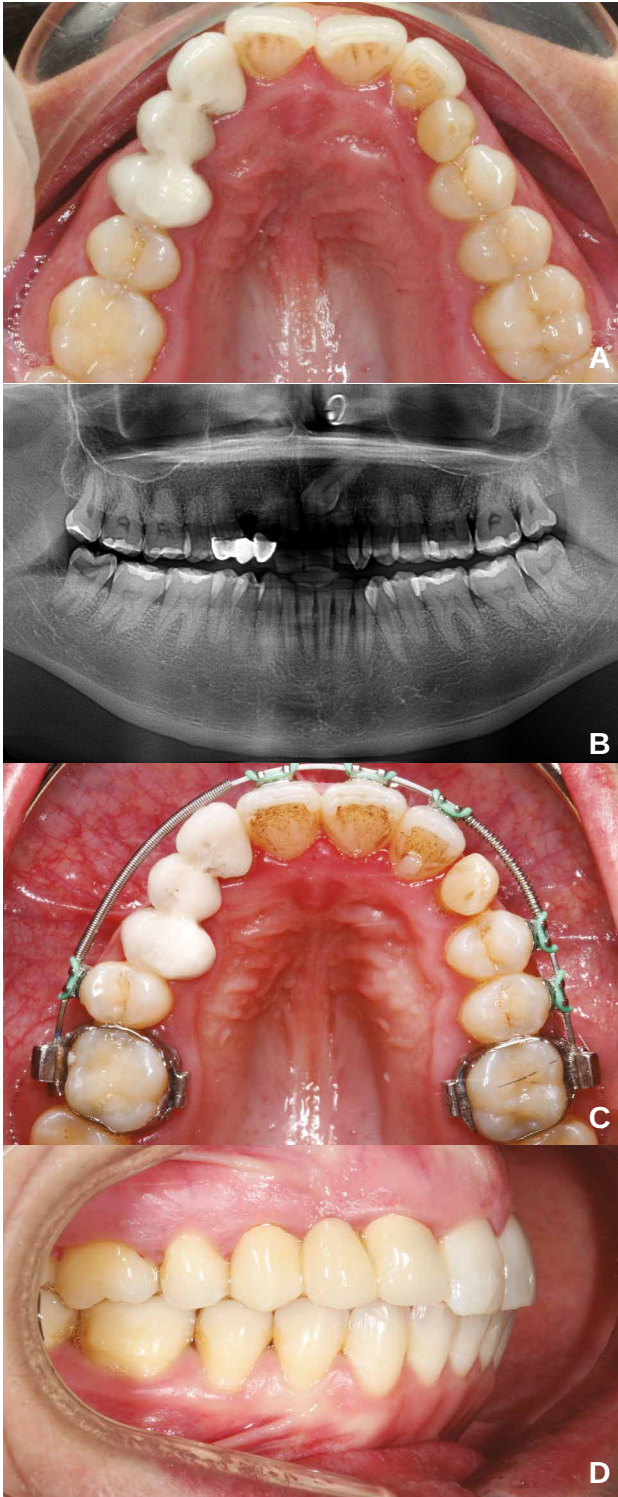


Figure 4. clinical case 4; a, intra-oral occlusal photograph before treatment. The bridge is seen in the first teeth, and the contralateral temporary cuspid; b, OPG shows the impacted 23; c, with orthodontics, space is being obtained for implant placement at 23. 63 persists in the arch; d, final result with the new bridge in the first quadrant.

the moment does not consider it necessary to remove the cuspid surgically, which could be re-introduced by orthodontics in the future should the temporary cuspid be lost or if a complication arises. In addition, a patient who is not currently very motivated towards orthodontic repositioning of the cuspid can change their mind later.

The doctor also advises the patient to carry out periodic radiographic monitoring in case it is necessary to modify the treatment plan at some point.

CASE 4

Case description

35-year-old female patient who had a conventional bridge placed 10 years ago to replace tooth 13, which was palatally included and was extracted. This bridge remains functional, though its color is not homogeneous with that of the adjacent teeth and the gum of the pillars has suffered a certain amount of recession (Figure 4a). Tooth 23 was also included, but it was not treated then. At this time, the patient, who has a Class I malocclusion with maxillary compression and skeletal discrepancy, still retains tooth 63, (Figure 4b and c) that is in crossed occlusion. She agrees to orthodontics to improve the occlusion and make room to replace the temporary cuspid, but not for traction the included 23, and prefers a short treatment and without uncertainties, another reason why this cuspid is also extracted. As for its replacement, the patient would prefer to have an implant placed at 23 instead of a bridge.

Treatment and discussion. Orthodontics, change of the conventional bridge of the old 13 and preparation for single prosthesis over implant of 23

The dentist who will be in charge of this case, one with much experience in conventional prostheses, sees a patient whom he treated when he was 25. This patient presented then the two palatally impacted maxillary cuspids, but for some reason that does not appear in the history, it was decided to initially treat only tooth 13. The treatment plan consisted of extracting the temporary tooth that was present, sculpting the adjacent teeth and making a porcelain bridge. His long experience with this type of fixed prosthesis led him to consider this option as

the best, given that the space for placement of an implant seemed insufficient and the alveolar bone was poor. The PIMC did not seem to interfere with the rehabilitation, but the dentist preferred to extract it. The patient did not return for follow-up even though the doctor had recommended it.

At the present time -10 years after that first incomplete rehabilitation- he requests treatment of his malocclusion by means of orthodontics. With respect to the impacted 23, he refuses orthodontic repositioning, and prefers the tooth be extracted and the space for rehabilitation prepared. The doctor refers the patient to an orthodontist who treats the malocclusion and prepares the space for the prosthetic cuspid while maintaining the temporary cuspid to preserve the alveolar bone (Figure 4d). His preference is to change the bridge at 13 to improve aesthetics and when he finishes his orthodontics, to place an implant at 23. This dentist, although he has been and remains a defender of conventional prostheses, accepts that single implants offer great advantages in cases like this.

CASE 5

Case description

45-year-old female patient with a class II-2 malocclusion, subdivision with deep overbite and retroinclination of the upper incisors that has caused abrasions of the incisal edges (Figure 5a). 13 is palatally impacted and the imaging study appears to show an idiopathic reabsorption of the crown that could be associated with ankylotic behavior before an eventual traction (Figure 5b). 53 is present and at the time was rebuilt with composite. Absence by extraction of 46. Moderate periodontal involvement.

Treatment and discussion. Substitution by single implant as the only treatment

This patient's dentist, an enthusiast of the advantages that immediate impact single implants offer over conventional prosthesis, leans towards that option in this case. The associated malocclusion is significant, but the patient is not very inclined to undergo orthodontic treatment with cuspid traction of doubtful prognosis given the morphological characteristics of her crown.

The doctor recommends surgical extraction of the PIMC along with the temporary cuspid that is still present, as it could interfere with the placement of the implant. Of course she has carried out a careful radiographic workup using CBCT to rule out possible complications. The space available for rehabilitation is scarce, but the professional, a very skilled implantologist, and is able to place implants in almost critical spaces. However, the patient must assume that the prosthesis will be somewhat asymmetric with respect to the contralateral cuspid, a fact that was previously reported: without pre-prosthetic orthodontic treatment, it is not possible to obtain more space. The patient's, which is reasonable for the dentist, is that if orthodontics has been prescribed in an attempt to try to bring the cuspid back, it is an inevitably long, tedious, annoying and doubtful procedure in a patient of her characteristics, that treatment will not be recommended for the sole purpose of increasing the space available for the prosthesis. With a somewhat smaller crown than on the contralateral side, and maintaining her malocclusion, the patient is satisfied with the result of her treatment (Figure 5c) and, like the doctor, assesses the practically immediate nature of the rehabilitation that also includes an implant at 46.

CASE 6

Summary description of the case

16-year-old male patient, brachifacial, with palatal compression without crossed occlusion and a Class I malocclusion with deep overbite, microdontia of 22 and palatal inclusion of 23 (Figures 6 a and b). No complications are detected on CBCT. Good periodontal health.

Treatment and discussion. Orthodontic restructuring of the impacted canine and remodeling of the microdontic 22

This patient's dentist, an orthodontist, considers that interdisciplinary treatment aimed at redirecting the canine to its ideal position in the arch is worth it in this young man, although he has to assume the disadvantages of an interdisciplinary therapeutic approach in the hands of different specialists -surgeon, orthodontist and expert in aesthetic dentistry- with a prognosis that is not entirely

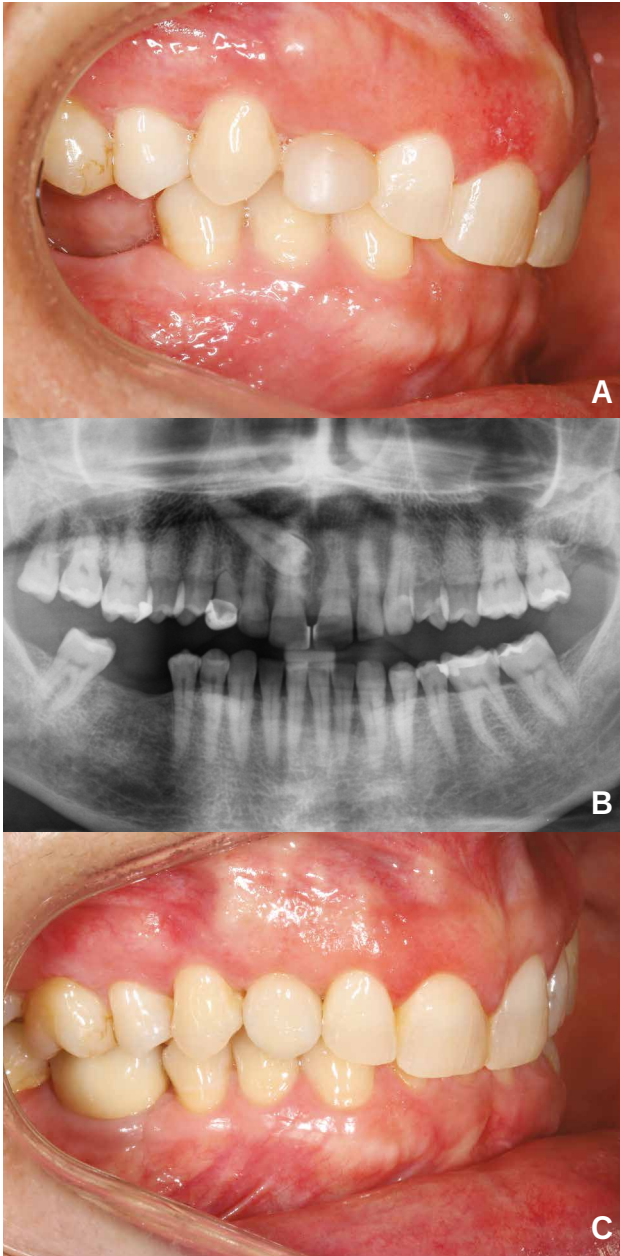


Figure 5. clinical case 5; a, intra-oral photography before treatment shows the significant deep bite and tooth 53 restored with composite; b, OPG reveals the impacted cuspid with an image compatible with reabsorption of its crown. c, after rehabilitative treatment, with implants at 13 and 46. The overbite persists due to the lack of orthodontic treatment.

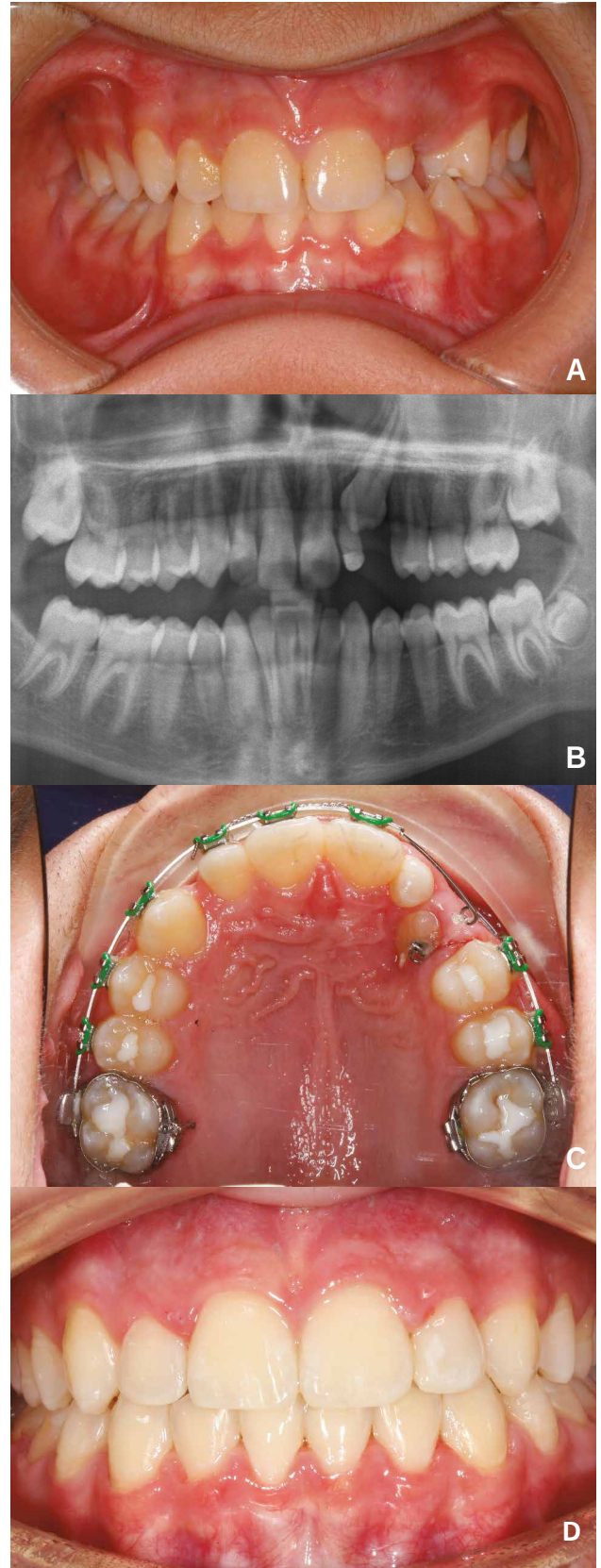


Figure 6. clinical case 6; a, intra-oral photography before treatment where the absence of 23 and microdontic 22 restored with composite is seen; b, OPG shows the impacted 23; c, 23 is being re-introduced through orthodontics; d, after treatment, 23 in its position in the arch and 22 restored with composite.

assured. This orthodontic approach will allow for good occlusion and improve the aesthetics and functionality of the dentition, as well as serve as a basis for traction of the canine and its proper location in the arch (Figure 6c). However, the professional is aware of the negative aspects of the choice and carefully explains them to the patient and his parents so that they make a well informed decision:

- a) Cuspid exposure surgery performed by an oral or maxillofacial surgeon will be necessary. It is very important that this surgeon has experience in this type of intervention, since the future periodontal health of the displaced cuspid will depend to a great extent on it.¹²
- b) Orthodontic treatment, prior to or simultaneous with the traction, will involve discomfort and expense and will inevitably be long.
- c) Around 20% of the palatally impacted cuspids, depending on age, position of the tooth and other factors that are not always predictable, do not respond to orthodontic traction procedures.

In return, the orthodontist argues that, in the unfortunate even the tooth cannot be retracted, the necessary space for rehabilitation will have been prepared by means of a single implant prosthesis, with the appropriate size.

This patient's case ended happily with the proper location and function of both cuspids and adequate remodeling of 22 by an expert in aesthetic dentistry (Figure 6d).

CASE 7

Summary description of the case

28-year-old male patient. Dolichofacial pattern; moderate mandibular hyperplasia; maxillary compression. Class II molar. Absence of 16 and 26 by extraction. Migration and mesial inclination of 17 and 27 with inoclusion of both. Palatally impacted 23. Inferior crowding. Moderate periodontal disease with more intense gingivitis at 21 (Figure 7).

Treatment and discussion. Extraction of the impacted 23 included and 14. Closure of spaces by orthodontics

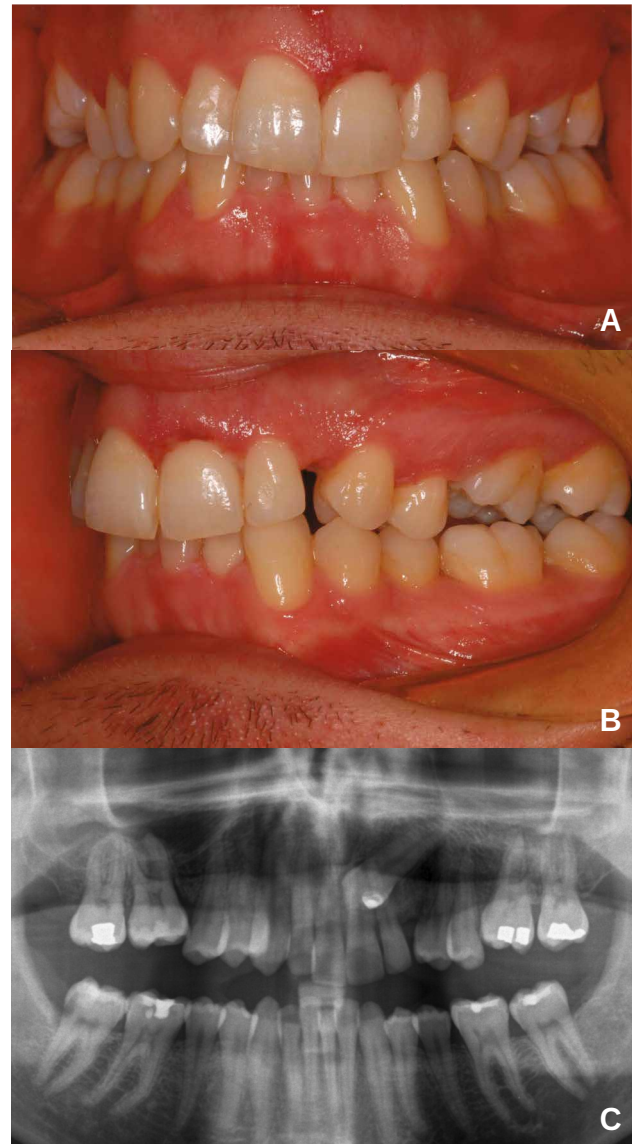


Figure 7. clinical case 7; a, front view, b, left side view, c, OPG with the upper left cuspid (23) included.

The professional who studies this problem, an orthodontist, assessing the patient's malocclusion globally, has decided that he would need an extraction in each of the upper quadrants. In most cases, the teeth that are extracted are premolars. However, in this case the professional chooses to extract the included cuspid and the first contralateral premolar.

He bases his decision on the following arguments:

- The included cuspid may not respond to traction and in that case, after the first adjacent premolar was removed, it would have to be replaced by an implant.

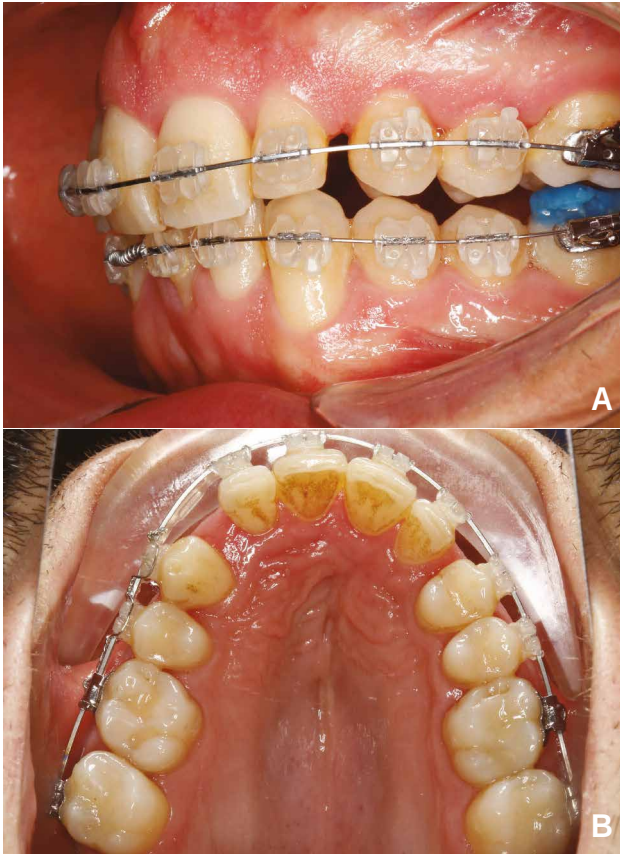


Figure 8. Clinical case 7, orthodontic treatment; a, side view, b, occlusal view.

- Even counting on the cuspid responding favorably, the treatment would be much longer, something that the patient rejects from the start.

Undoubtedly, extraction of an upper cuspid by placing the premolar in its place and in occlusion with the lower canine and first premolar involves certain occlusal limitations that can be minimized if necessary by creating a “pseudo cuspid guide” with the premolar, transforming its morphology and/or providing an adequate occlusal fit. Figure 8 shows intermediate steps of the orthodontic treatment and Figure 9 the frontal and occlusal images of the final outcome.



Figure 9. clinical case 7, final result; a, front view, b, side view.

CONCLUSIONS

- The different PIMC management options presented can be defensible as long as they are based on an adequate diagnosis, taking into account the patient’s biopsychosocial conditions.
- Every clinician, regardless of the scope of their practice and specialization, should know the pros and cons of all options. This way they can explain them to the patient objectively, arguing the reasons why they is inclined towards a certain form of management.
- It is essential to include the basic aspects of the chosen procedure that have led them to propose this therapeutic option, including its limitations, on the informed consent document.



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