


CASE REPORT

Orthodontical Management of Secondary Dental Migration Associated with a Reduced Periodontium: A Case Report

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ABSTRACT

Introduction: Dental migrations following periodontal pathology may lead to significant aesthetic and functional complaints. In this case report, the presence of evident gingival recessions and mandibular crowding pushed us to opt for an ortho-periodontal multidisciplinary treatment plan, using extractions and incisive repositioning. Through this, we ensured tissue gain at the level of the superficial and deep periodontitis, thus avoiding the use of periodontal surgery.

Clinical Case: A Moroccan 26-years-old female medical secretary who, being very concerned about her appearance and facial aesthetics, presented with pathological dental migrations following severe periodontitis, an unsatisfactory periodontal status, a clear mandibular crowding of the anterior inter-incisive diastemas, gingival recessions, attachment losses and quite large pocket depths with advanced bone resorptions in different areas. This required a specific multidisciplinary approach aiming at creating a healthy and well-structured periodontal environment through extensive periodontal treatment, combined with regular plaque control, and supplemented by an orthodontic treatment using extractions and incisive repositioning in order to avoid any vestibular movement that may worsen the recessions and will require possible overlapping. After 22 months of combined treatment, a stable occlusion was obtained with class I molar and canine relationship, perfect dental alignment, healthy periodontal architecture and significant attachment gain and bone growth. In addition, the patient's facial aesthetics and self-confidence have been significantly improved.

Conclusion: The orthodontic treatment supplementing the meticulously planned periodontal therapy that was administered for this patient has helped to improve functionality, facial aesthetics as well as psychological self-confidence. However, it must be gradual with application of mild forces and constant control of the periodontal status, for optimal tissue response.

KEYWORDS: Adult Orthodontics, Periodontal Health, Orthodontic Treatment, Periodontal Disease.

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INTRODUCTION

In recent years, knowledge about periodontal diseases has improved considerably compared to the classification established in 1999 [1]. International experts, gathered in Chicago, United States, under the aegis of the American Academy of Periodontology and the European Federation of Periodontology, have recently adopted a new classification of periodontal and peri-implant conditions and diseases.

This classification will serve as a diagnostic system and will allow patients to be treated optimally. The two chronic and aggressive forms of periodontitis are grouped under the

unique term of periodontitis in the new classification that is based on a multidimensional staging and grading system. Staging is based on the severity of the disease and the complexity of its management, while grading refers to biological elements such as the rate of progression and the risk of a possible development of the disease, as well as its impact on systemic health [2, 3, 4].

Secondary dental migrations due to these periodontal attacks represent an important reason for consultation. Orthodontic therapy can remedy these displacements but can only do so in the context of a healthy periodontium. [5].

The benefit of combining orthodontic treatment with periodontal treatment to restore the function and aesthetics of a reduced but healthy periodontium has now been proven. The control of periodontal disease, a suitable bone and / or mucosal surgical therapy and an appropriate choice of the orthodontic technique are elements that should be mastered while respecting a chronology and established protocols. This interdisciplinary increases, in some cases, bone and bond gain while respecting a satisfactory aesthetic result. [6].

In this case report, we will describe the stages of developing a correct diagnosis and an optimal therapeutic strategy that can ensure satisfactory results on the aesthetic, functional and also periodontal level. This is while focusing on the contribution of orthodontic treatment in the correction of unaesthetic dental malposition or migration and in the creation of a supportive environment facilitating hygienic maneuvers.

CLINICAL CASE

A 26-year-old, systemically healthy, nonsmoking female presented with a long, oval and symmetrical face, a slightly open nasolabial angle and an erased labio-mental furrow. The patient was aesthetically hampered by the inter-incisive diastemas in the maxillary arch and the crowding that is quite apparent in the mandibular arch, which represent the main reason for consultation and the cause of poor self-esteem. (fig. 1).



Figure 1 : Exobuccal smile view before traitement

At the occlusal level, the patient presents Class I angle: Class I right and left molar and canine, with a normal value over-jet and overlay. The inter-incisor midlines are deviated by 2 mm (of maxillary origin towards the right), and the curve of Spee was not deep (2 mm). We also noted during the intraoral examination an average-quality hygiene, gingival recessions with absence on the arch of the 14, 35. (fig. 2).



Figure 2: Preoperative clinical view showing pathological migration

Functional exploration reveals swallowing and optimal breathing. The analysis of the cephalometric data allowed us to make the diagnosis of a skeletal Class I. (Fig. 3), with angles SNA = 83 °, SNB = 79 °, ANB = 4 ° and confirmed

by the value AoBo = 0 ° with a mandibular proalveoli which appears by reading the value of the angle IMPA = 96, however the vertical relationships of the facial stages reveal a normodivergent diagram by an FMA angle = 28 °, with a good labio-mental relationship confirmed by an angle Z = 75 °. Among others, the panoramic radiography confirms the absence of first maxillary right premolar (14) and the third mandibular left molar (38) and shows the inclusion of the second mandibular left premolar (35). (Fig. 4).



Figure 3 : Profil teleradiographs and céphalométric values before treatment

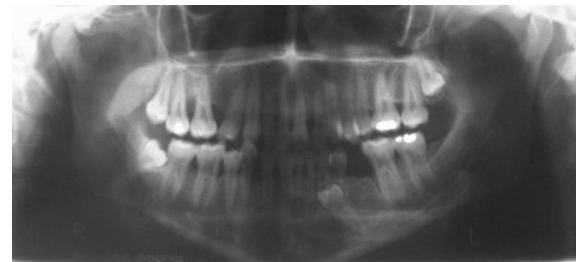


Figure 4 : Panoramic X-ray before treatment

And to be able to establish a periodontal treatment plan, the Radiographic examination was requested; it revealed generalized angular bone lyses on the incisor molar and premolar sectors. (Fig. 5). While the periodontal probing shows the presence of fairly significant pocket depth ranging from 5 to 9mm especially on the 16, 36 21 42 46 13 14 47 44 43 24. (Tab. 1). These different elements of periodontal diagnosis indicate that it is a general periodontitis requiring periodontal management before orthodontic therapy.

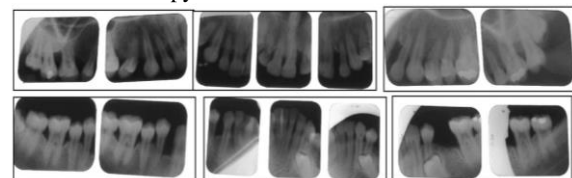


Figure 5 : Preoperative radiographs showing moderate-to-severe bone loss with respect to pathological migration

| | | | | | | | | | | | | | | | |
|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 48 | 47 | 46 | 45 | 44 | 43 | 42 | 41 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 |
| | 313 | 535 | 323 | 357 | 513 | 933 | 231 | 212 | 213 | 213 | 111 | | 913 | 212 | |
| | | 545 | 643 | 433 | 336 | 332 | 952 | 313 | 313 | 332 | 333 | 313 | | 523 | 314 |
| 18 | 17 | 16 | 15 | 14 | 13 | 12 | 11 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| | 116 | 97 | | 315 | 215 | 523 | 713 | 219 | 513 | 313 | 945 | 333 | 234 | 311 | |
| | | 237 | 717 | | 115 | 335 | 332 | 511 | 298 | 633 | 113 | 813 | 313 | 114 | 313 |

Table 1 : Périodontal probing values

TREATMENT PLAN

The treatment strategy followed for this patient consists of multidisciplinary treatment with initial periodontal stabilization therapy, including motivation for oral hygiene followed by mechanical debridement at the end of the planning session. After a re-evaluation phase there was persistence of bleeding periodontal pockets in the survey, which necessitated the use of flap surgery mainly on the first maxillary right molar (16) and an epithelio-conjunctive graft on the first mandibular left molar (36). During the post-surgical reassessment phase, a very significant improvement in clinical parameters and also in probing values was remarked (Tab. 2).

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|
| 18 | 17 | 16 | 15 | 14 | 13 | 12 | 11 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 115 | 517 | | | 115 | 112 | 112 | 522 | 114 | 412 | 212 | 523 | 111 | 112 | 211 | |
| 115 | 514 | | | 111 | 111 | 121 | 511 | 223 | 531 | 112 | 311 | 212 | 112 | 111 | |
| 48 | 47 | 46 | 45 | 44 | 43 | 42 | 41 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 |
| 313 | 323 | 323 | 315 | 513 | 733 | 231 | 212 | 212 | 212 | 134 | | | 712 | 212 | |
| 323 | 333 | 223 | 323 | 323 | 722 | 212 | 312 | 222 | 212 | 315 | | | 523 | 213 | |

Table 2 : Péridontal probing values after réévaluation phase

After this periodontal stabilization phase, a multi-attachment treatment (0,220,28) with extraction of the second mandibular left premolar (35), the first maxillary left premolar (24) and the first mandibular right premolar(44) for alignment of the teeth to its original position.

A full 0.22" preadjusted edgewise appliance was bonded to the maxillary and mandibular arch and special attention was taken in using light force to achieve alignment and leveling with 0.14" NiTi archwire. Step by step ligation of 0.14" NiTi archwire was performed before inserting the archwire into the bracket slot. After leveling the dental arches, we proceeded to retract the maxillary canines, then to retract the incisors using a 0,180,25 arch with active loops (fig. 6) and thus we obtained the closure diastemas and an optimal overbite and overjet relation-ship. Well-controlled mild and continuous forces were applied in conjunction with monthly periodontal maintenance sessions.



Figure 6 : Intraoral views during orthodontic treatment

A retro alveolar assessment was requested during the active phase of treatment, generally after 6 months, to better assess the stability of the bone lesions, with constant oral hygiene motivation (Fig. 7), at the end of orthodontic treatment, the tooth was aligned properly, and a retention appliance was given to maintain its position in the arch.

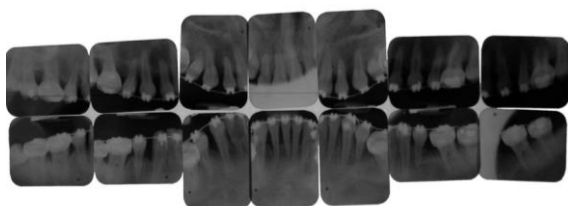


Figure 7 : Radiographs during treatment

RESULTS OF TREATMENT

After an active phase of orthodontic treatment lasting 22 months, the spaces between these upper incisors were closed; the incisors were retracted to obtain an acceptable overjet and an optimal overbite relationship, the mandibular incisors crowding was also absorbed, as was the spee curve which was aligned using the spaces provided by the extractions.

At the end of the treatment, the patient found a very satisfactory smile and an improvement in facial aesthetics with a more balanced profile and a stable molar and canine occlusion class I relation-ship.

Based on this case report, an appropriate combination of periodontal therapy can help to effectively eliminate the effects of periodontal disease in adults even at an advanced stage by improving both aesthetic and functional parameters.



Figure 8 : Extraoral and intraoral views of the end treatment results showing considerable patient satisfaction.

DISCUSSION

Periodontal disease can lead to pathological dental migrations and cause serious functional and aesthetic problems. In this case, the pathological migration of the maxillary incisors and the crowding of the mandibular incisors associated with periodontal disease were very remarkable, and the combined periodontal and orthodontic treatment resulted in stable periodontal health with probing depths less than 5 mm, without any signs of bleeding. However, the etiological periodontal therapy aimed to reduce the oral bacterial load and therefore the reduction, or even the disappearance of periodontal inflammation. This was initially based on the acquisition of satisfactory oral hygiene and rigorously maintained on the part of the patient, which is essential to maintain periodontal health during and following orthodontic treatment. At the re-evaluation, surgical treatment may be necessary to treat the sequelae periodontal disease. It is also indicated in the presence of pockets greater than 6 mm bleeding on probing and of inter-radicular or infra-osseous lesions [7,8], in this case presented there was recourse to a stabilization flap on the right maxillary first molar at a probing depth bleeding and exceeding 6mm.

Also, in this periodontal treatment phase, particular attention is paid to periodontal recessions. Despite the scientific evidence which seems weak to systematize gingival thickening of the "fine periodontics" before orthodontics, one must be vigilant essentially before a movement in the vestibular direction and before the slightest worsening of the recession. However, the presence of a sufficient thickness of attached gum can lead us to postpone the reinforcement after completion of orthodontic treatment [9, 10].

In addition, the resolution of anterior mandibular crowding has helped improve bone support and facilitate access for plaque control. However, although it has been shown that orthodontic dental movement is no longer a

contraindication in treatment of adult patients with severe periodontal disease [11], it must be carefully performed. Where does the role of the orthodontist come from in this multidisciplinary care which consists in choosing the type of appliance while respecting the constraints linked to a reduced periodontium. These systems all cause bacterial plaque retention which induces subgingival microbial colonization. But, compared to treatment with removable appliances, aligners or even more self-ligating attachments, fixed orthodontic appliances seem to promote a greater growth of periodontal pathogenic bacteria and a deterioration of the periodontal state in terms of inflammation, pocket depth, correlated with an increase in plaque index. But to date, there is no consensus, only the patient's compliance, motivation, aesthetic desire and technical considerations can tip the scales towards this or that technique. It is above all the intensity of the forces and the direction of the movements which are factors to be controlled. [12, 13, 6, 14].

In this case, fixed appliances were used with brackets on molars presenting bone loss rather than orthodontic rings that promote inflammation and loss of attachment [14]. And the use of metal ligatures remains to be preferred while elastomeric ligations are less compatible on fragile periodontal land, because they are more porous and retain dental plaque [12].

It should also be borne in mind that retention appliance, both removable and fixed, are potentially at risk for plaque retention and, as such, pose a potential risk for recurrence

AUTHORS' CONTRIBUTIONS

The participation of each author corresponds to the criteria of authorship and contributorship emphasized in the [Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly work in Medical Journals of the International Committee of Medical Journal Editors](#). Indeed, all the authors have actively participated in the redaction, the revision of the manuscript and provided approval for this final revised version.

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