Severe Attachment Loss at the Maxillary Incisors: Part 1

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Abstract

In this two-part treatment planning series, the case of a 63-year-old woman with severe attachment loss at the maxillary incisors is presented. In Part 1, pretreatment strategies, eg, use of intra- and extraoral photographs, analysis of periapical radiographs, and examination of occlusal and periodontal status, are discussed. The advantages and disadvantages of six treatment options using both conventional and implant therapy are presented. In Part 2, the treatment selected will be revealed and the rationale governing the decision will be discussed.

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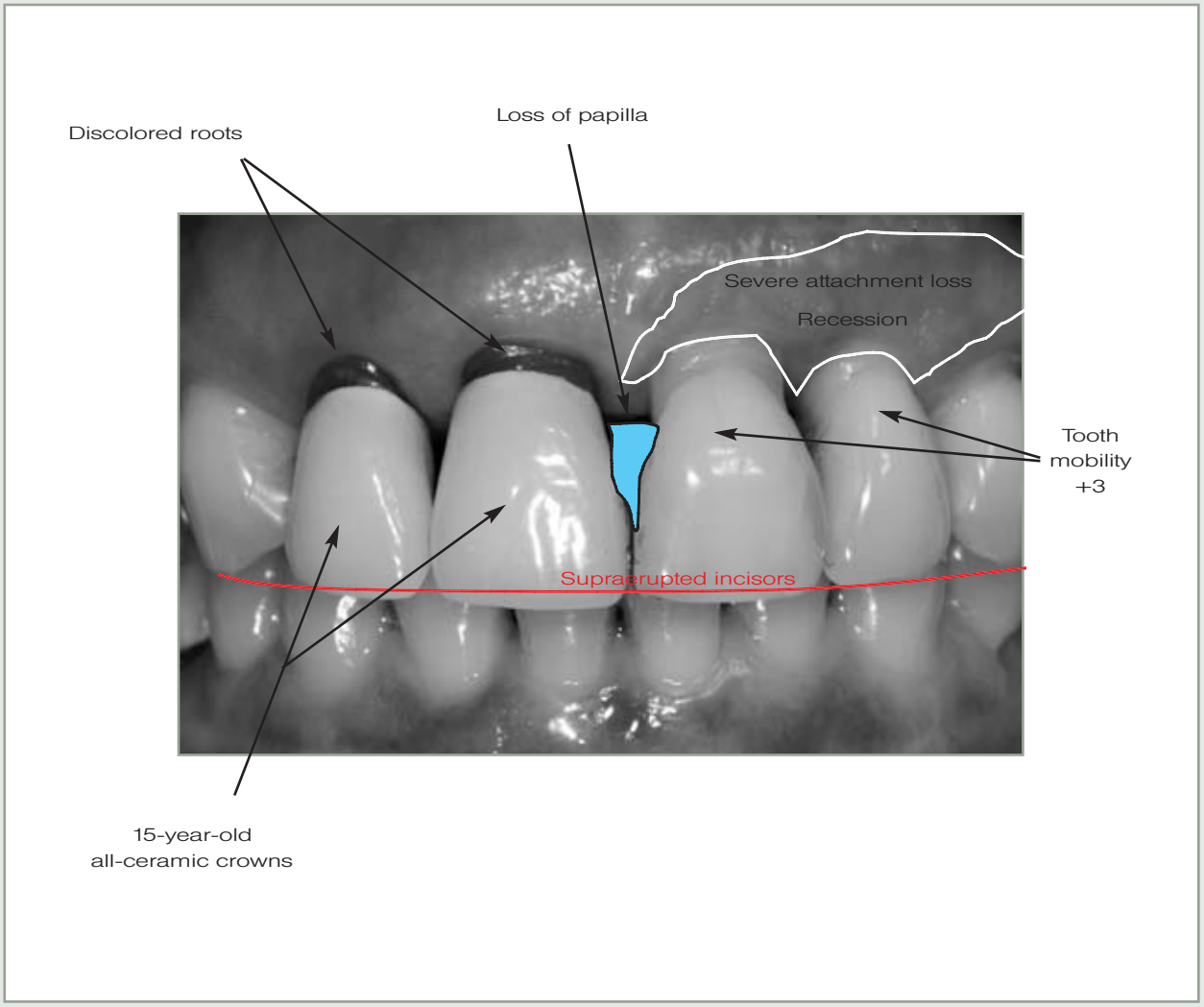

Editor's Note

In dentistry, as in all fields of medicine, there is no absolute right or wrong treatment method for any given clinical scenario. There is a multitude of methods and materials available that can be used to develop an overwhelming number of different therapeutic approaches. In order to provide clinicians with some guidance in this difficult process of treatment planning, each issue of this journal will present a clinical case and describe several possible treatment options. In the succeeding issue, the treatment selected for the case will be revealed, together with the rationale governing the decision.

Fig 1 The gingival prosthesis, extending from canine to canine and covering the entire anterior maxilla.

Fig 2 The gingival prosthesis interlocks in the interproximal spaces created by the loss of the papillae.

Fig 3 Frontal view without the gingival prosthesis during an exaggerated smile.

Fig 4 Frontal view with the gingival prosthesis in place.

Initial presentation

A 63-year-old woman who had been regularly treated for 20 years at the University of Geneva presented with heavily restored dentition in all quadrants and severe attachment loss at the left maxillary incisors. For several years, she was opposed to the idea of losing these teeth, to the extent that she preferred wearing a gingival prosthesis (Figs 1 and 2) to cover the missing papillae, black triangles, and recessions.

By 2005, only a few millimeters of attachment remained, and the patient finally agreed to have the teeth extracted. The critical decision was how to replace them. The medical history revealed osteoporosis, for which the patient had been taking an aminobisphosphonate (Fosamax, Merck) since 1998. The patient also reported a smoking habit of 10 cigarettes per day.

Fig 5 Three-fourths view while wearing the gingival prosthesis.

Fig 6 Three-fourths view without the gingival prosthesis, dramatically showing the attachment loss between the central and lateral incisors.

Fig 7 Guarded initial smile, which could have led to a false impression of the gingival display.

Fig 8 A relaxed smile finally revealed the patient's high smile line, and suggested supraeruption of the incisors.

Fig 9 Three-fourths intraoral view. The supraeruption of the incisors compared to the canine and the occlusal plane *(black line)* is evident.

Fig 10 **(a to d)** Periapical radiographs. The attachment loss is greater at the incisors than at the canines.

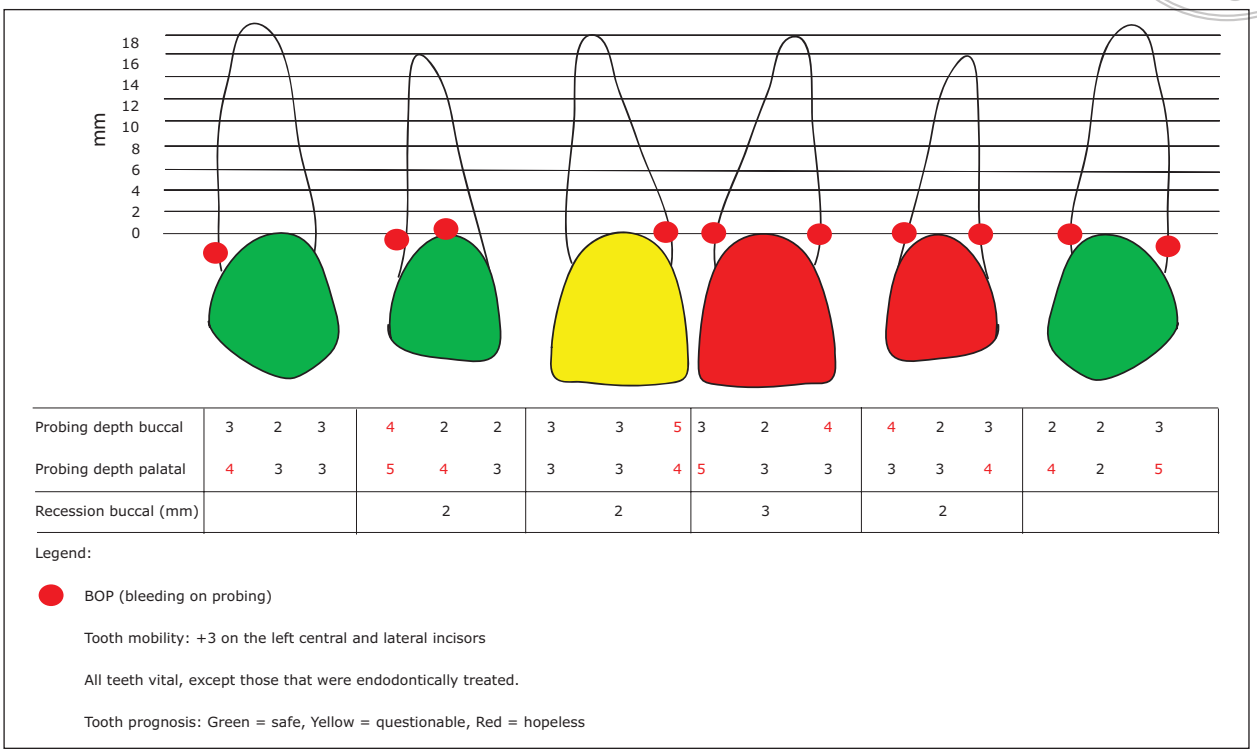

Fig 11 Periodontal status of the patient.

Gathering data

Pretreatment photographs

Before proceeding with any treatment options, a series of extra- and intraoral photographs should be obtained to allow the clinician to evaluate the esthetic concerns. Some patients may be uncomfortable when asked to smile; consequently, the true display of the maxillary incisors may be underestimated. Therefore, asking for an exaggerated smile may be necessary (Fig 3).

To capture a more natural smile, the first photographs were taken with the gingival prosthesis in place (Figs 4 and 5). Without the prosthesis, the patient was very uncomfortable, and several poses were needed to obtain the same lip display (Fig 6). Figure 7 shows the first recorded smile, which was very guarded, without the gingival prosthesis. After several different poses, the patient finally was able to relax and show her real smile (Fig 8). Unfortunately, the patient presented with a high smile line (ie, a gummy smile).

An extraoral frontal view is the most common photograph taken, but others are often necessary. A three-fourths extraoral view allows for evaluation of the harmony between the anterior and posterior dentition, which could be overlooked otherwise, because dentists tend to see patients most often from the front. In this case, a profile view revealed a discrepancy between the occlusal plane and the incisal edges (see Fig 8), ie, the four incisors were supraerupt-

Fig 12 Two implants with crowns and two single crowns.

ed. In the frontal view, the supraeruption was not evident (see Figs 3 and 4). Discrepancies can be disguised in the frontal view if the clinician does not place the camera directly in front of the patient or if the patient tilts the head back while smiling.

In the same manner, three-fourths intraoral photographs can be very valuable. For example, Fig 9 confirms the supraeruption of the four incisors and shows the short clinical crown of the canine. It also shows the striking mismatch in color between the maxillary premolars (amalgam discoloration), the canine (intact tooth), and the incisors (Cerestore crowns, Johnson & Johnson).

Other records

To complete the collection of the data, the following were required:

- Analysis of the periodontal status
- Occlusal analysis (maximal intercuspation and extrinsic movements, lateral and protrusive)
- Complete periapical radiograph series (Fig 10)
- Alginate impressions for diagnostic casts

Because this patient underwent a strict periodontal recall, we can trace the evolution of her periodontal disease. The four incisors had shown signs of chronic periodontitis since 1982. Despite several sessions of scaling and root planing, during the last recall (2005) there was still bleeding on probing (BOP) and deep probing depth (Fig 11). Following consultation with the patient's periodontist, it was agreed that the maxillary left central and lateral incisors had a hopeless prognosis.

Treatment options: Implant therapy

Many clinicians feel that it is preferable to replace missing teeth with implants rather than involving the natural dentition adjacent to edentulous areas. This strategy works perfectly when the implant site does not present extreme loss of bone and soft tissue. Implant osseointegration is no longer the major issue; it is the esthetic outcome, especially in the anterior quadrant, that is not so easily achieved. Below are three solutions using implants; however, when considering implant therapy it is important to remember the following about the patient:

- She is a smoker.
- She is taking aminobisphosphonates (possible risk of osteonecrosis after implant placement).
- She has a high smile line.
- She has severe attachment loss in the anterior maxilla.

Fig 13 One implant with a crown and cantilever and two single crowns. X = pontic.

Fig 14 Two implants supporting a four-unit FPD. X = pontic.

Two implants with crowns and two single crowns

In this treatment, after extracting the teeth and following 2 months of healing time, two implants would be placed (Fig 12). Treatment would be completed with two single crowns.

Replacing each tooth with an implant could be very dangerous in this specific case. The bone loss already present will worsen after tooth extraction and implant placement. Even though the interproximal bone level is moderate between the left canine and the left lateral incisor, it is excessive between the central incisors and the left lateral incisor. Further, placing two implants next to each other will lead to an additional loss of interimplant bone, with catastrophic esthetic consequences. The two crowns will look unnaturally long and large as a result of the lack of interproximal papillae. The photographs of this patient's smile should serve as a reminder that any imperfections of the crowns at the level of the emergence profile will be dramatically evident.

This treatment is also one of the most expensive options. In fact, in addition to the price of the two implants, there would be a supplementary cost: the replacement of the two Cerestore crowns at the right central and lateral incisors. It would be impossible to satisfy the patient's esthetic demands without their replacement, not only because of the obvious color mismatch and the exposed discolored roots, but also because all four incisors need to be repositioned more apically. The correction of the supraeruption would be necessary to compensate for the expected increase in length of the implant-supported crowns.

One implant with a crown and cantilever and two single crowns

Placement of one implant with a crown and cantilever (Fig 13) may appear a superior option; however, the esthetic result is still not guaranteed. Even with one implant there would be additional bone loss. The implant-supported crown would look very long, and this difference would be striking because the patient's natural teeth show a reduced clinical crown height.

Furthermore, there is still the question of where to place the implant: in the lateral

Fig 15 Four-unit FPD (right central incisor to left canine) and a single crown. X = pontic.

position, where more bone is available (next to the canine); or in the central position, where the larger tooth size would allow for a stronger prosthesis?

Financially, this would be a less expensive treatment option; however, as with the previous choice, the cost of replacing the two all-ceramic crowns should be considered.

Two implants supporting a four-unit fixed partial denture

In this option, the four incisors would be extracted and two implants would be placed to support a four-unit fixed partial denture (FPD) (Fig 14). The two implants would be placed in the lateral position, where there is more bone. The two central incisors would be replaced with pontics, which offer a natural appearance. However, the mesial aspect of each implant would be placed in a very deep bony defect, and the final relationship between the soft tissues and the prosthesis would be jeopardized at the level of the embrasure between the central and lateral incisors (because of the lack of papillae).

The biggest advantage of this treatment (as with the two previous options) is that the two canines are not involved. However, it is possible that the implant-supported crowns would appear taller than the two canines, thus compromising the gingival harmony. Corrective crown lengthening of the two canines should be carefully considered because of the high risk of compromising the papilla between the canine and the lateral incisors. Finally, the cost of the two implants and four crowns, as in the first option, is high.

Treatment options: Conventional therapy

If implants are considered to be contraindicated, there are several treatment options based on the abutments selected to support a conventional FPD. Regardless of the abutment combination, the left canine will always serve as an abutment. This tooth is vital and nearly intact, with no signs of periodontal pathology. It should make a perfect abutment; however, preparing a tooth in such good condition for a crown is regrettable.

The patient had good oral hygiene and a low risk of caries, which are important facts to consider when choosing a conventional approach.

Four-unit FPD (right central incisor to left canine) and a single crown

In this treatment, the abutment on the right side of the FPD would be the central incisor (Fig 15). This is a nonvital tooth that shows attachment loss (especially at the mesial aspect). Even with regular peri-

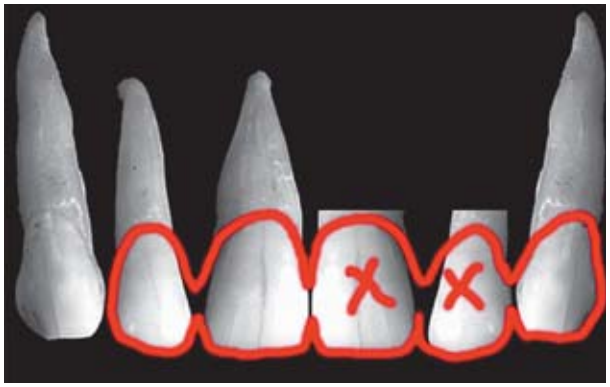

Fig 16 Five-unit FPD (right lateral incisor to left canine).

Fig 17 Six-unit FPD (canine to canine). X = pontic.

odontal therapy, the tooth still showed a pocket depth of 4 mm with BOP (active pathology).

There are several questions to consider before selecting this tooth as a valid abutment:

- To hide the discolored root, a more aggressive crown preparation with subgingival margins would be necessary. In addition, there would be a further reduction of the tooth to compensate for the supraeruption. After these procedures, would the tooth still be a strong abutment for the FPD?
- Aggressive scaling and root planing would weaken the mesial aspect of the root. Should a fracture be expected?
- Is endodontic revision required? If not, is it still necessary to remove the cast post and core from the root to diminish the bluish color at the level of the gingiva?

Replacement of the crown at the right lateral incisor would also be necessary, which would have to be a financial consideration.

Five-unit FPD (right lateral incisor to left canine)

In this option, the right lateral incisor would be included in the FPD, since the crown would have to be replaced anyway (Fig 16).

An important question is whether the right lateral incisor would give more support to the FPD or only jeopardize its longevity. After the more subgingival crown and deep chamfer (shoulder) preparations for esthetic porcelain margins, the integrity of this small tooth, which is already devitalized and restored with a cast post and core, would be questionable. Finally, its periodontal status showed signs of active pathology with a 5-mm distal pocket and BOP.

The cost would be equal to that of the previous option.

Six-unit FPD (canine to canine)

In this final treatment option, all four incisors would be extracted and replaced with pontics. The two vital canines would be prepared to support a six-unit FPD (Fig 17). This would be the most expensive of the conventional treatment options since it

includes the greatest number of units. However, it has the advantage of precluding the need for endodontic re-treatment and replacement of the post and core.

Important questions to consider include:

- Is extraction of the two right incisors justified?
- Is it too aggressive to crown the two canines, which present small Class 3 restorations?
- Are the clinical crowns of the canines too short to provide sufficient strength to the 6-unit FPD?
- Both canines showed pockets depths between 4 and 5 mm with BOP. Could their periodontal status affect the longevity of the restoration?

The final treatment decision for this case will be presented in the next issue of the journal.