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Treatment of the Deep Overbite Malocclusion with Lingual Orthodontic Appliance during the Patient was Pregnant

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Abstract

While the mini-implant technique is common to use this technique to control vertical malocclusion, lingual orthodontic appliance is also a powerful method to deal with this malocclusion. And pregnancy is quite a challenge for the patients under orthodontic treatment and for the orthodontist. In this article we used the customized lingual orthodontic appliance to treat the patient with Class II division 2 deep overbite malocclusion in the efficient way. The patient satisfied with the result of non-extraction orthodontic treatment and obtained an esthetic smile and the self-confidence.

Keywords: Lingual orthodontic appliance, Pregnant, Pregnancy, Class II division 2, Deep overbite.

Introduction

Deep overbite refers to the increase of overlap of maxillary incisors to the mandibular incisors, which also exhibits abnormal skeletal and dentoalveolar characteristics such as a lower facial height, a deep curve of Spee, a higher anterior teeth alveolar height and so on. While the mini-implant technique is widely applied, it is common to use this technique to control vertical malocclusion after aligning and leveling the upper and lower dentition [1,2]. The lingual orthodontic appliance is also a powerful toll to treat the deep overbite. 3-dimensional evaluation showed that lingual appliance obtained significant lower incisors intrusion [3].

Pregnancy is quite a challenge for the patients who are undergoing orthodontic treatment, so many researchers are investigating in the topic of patients are pregnant during orthodontics process. In animal study, it was found that while the number of osteoclasts was significantly decreased during pregnancy, but pregnancy could not significantly decrease the amount of tooth movement in the linear phase [4]. We do not suggest patients to have orthodontic treatment when they plan to have baby during the treatment process, but sometimes the accidental pregnancy happen. Therefore, the orthodontist should be more carefully when they treated this kind of patients during this special period.

Methods and Results



Figure 1: Pre-treatment photographs.

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Diagnosis and Etiology

A 25-year-old woman came to us for lingual orthodontic treatment. Her main complaint was deep overbite and lateral incisors protrusion (**Figure 1**). Her gum smile was obviously when she smiled. A deep overbite of 7 mm and a serve curve of Spee (5mm) were observed. The upper central incisors and lower incisors present a lingual inclination. The crowding of the both maxilla and mandible arches: 2 mm (**Figure 2**). The periodontal disease was severe with gum swelling and bleeding. The result of cephalometric measurement that the patient was Class II skeletal relationship (SNA 88.6°, SNB 83.3°, ANB 5.3°) with a protrusive maxilla, lingual declined upper incisors (U-Incisor Protrusion 14.3°) and deep overjet 4.0 and overbite 5.3 (**Table 1**).



Figure 2: Pretreatment dental casts.

Measurement	Norm	Pre-treatment	Post-treatment
SNA (°)	82.0 ± 3.5	88.6	87.0
SNB (°)	80.9 ± 3.4	83.3	82.2
ANB (°)	1.6 ± 1.5	5.3	4.7
FMA (MP-FH) (°)	23.9 ± 4.5	21.3	21.9
IMPA (°)	95.0 ± 7.0	88.9	103.9
U1 - Occ Plane(°)	57.5 ± 7.0	77.8	
U-Incisor Protrusion (U1 - APo) (°)	28.0 ± 4.0	14.3	23.5
U1 Angulation (U1 - SN)(°)	102.8 ± 5.5	90.3	99.9
Occ Plane to FH(°)	6.8.4 ± 5.0	4.1	4.2
Lower Face Height (ANS-Xi-Pm) %	45.0 ± 4.0	43.4	46.0
U1-L1 (°)	130.0 ± 6.0	151.7	123.9
U1-SN (°)	102.8 ± 5.5	90.3	99.9
Overjet (mm)	2.5 ± 2.5	4	2.5
Overbite (mm)	2.5 ± 2.0	5.3	0.2
Upper lip to E-plane (mm)	-6.0 ± 2.0	-1.3	-2.2
Lower lip to E-plane (mm)	-2.0 ± 2.0	0.7	-1.1

Table 1: Cephalometric analyze results of pretreatment and post treatment.

Treatment Objective

The following treatment objectives were set;

1. Improved the deep overbite and obtained a natural overjet and overbite.
2. Achieved Class I canine and molar relationship.
3. Alignment of the upper and lower dentition and obtained a more health periodontal environment which would be easier to keep clean.
4. Improved the smile (**Figure 3**).

Treatment Alternatives

Extraction orthodontic treatment: while the patient's Class II skeletal was obviously, extraction of upper first premolar and lower second premolar was one of the treatment alternatives. However, the upper and lower incisors were inclined to the lingual side and the crowding in the upper and lower dentition was slight.

Non-extraction orthodontic treatment: While the crowding was 2 mm in both the upper and lower dentition and the upper and lower incisors were inclined to the lingual side, the non-extraction orthodontic treatment plan could be considered. What's more, while the patient was with a skeletal Class II relationship between the maxillary and mandible, but the canine and molar relationship were not so severe.



Figure 3: Radiographs of pre-treatment: A. Cephalometric radiograph; B. Panoramic radiograph.

After we discussed with the patient, the patient quiet happy to choose non-extraction plan and she preferred to use the lingual orthodontic appliance (**Figure 4**).



Figure 4: Photographs of initiation.

Treatment Progress

The customized lingual orthodontic appliance Incognito was ordered from 3M Company and fabricated in German. The alignment and leveling of the patient's upper dentition were finished in 3 months after the first bonding. And almost at the same time, the patient reported that she was pregnant. So, the patient and her husband were asked to visit our department. And we told the couple the tree alternatives which we could offered: 1) stopped the treatment forever; 2) stopped the treatment temporarily, debond the brackets and ordered a new bracket after the patients delivered the baby; 3) continued the treatment and stop the treatment several months around the period of baby delivering. (**Figure 5-9**).



Figure 5: Photographs of postpartum. Only four brackets were debond by the patient during meal in period of baby delivering.



While the couple chooses the third alternative, and we told the predictable risks, such as the treatment time would be prolonged, the brackets could interrupt the special examination during the pregnancy, the brackets could be dangerous during the baby delivering, and so on. And the patient and her husband should take these predictable and unpredictable risks. And they signed the informed consent which included the content discussed above. And we asked that patient to inform the obstetrician, who was in charge to help her for baby delivering before she had the baby that would give the doctor enough time to prepare some special treatments for her if necessary.

One year after the patient started orthodontic treatment, the patient stopped treatment, rested at home and waited for baby delivery. And 19 months after treatment, the patient visited us again, and after checked, we found that there were only four brackets were debond by the patient during meal in period of baby delivering. And after another 3 months fine adjustment, the patient satisfied the result and preferred to finish the treatment and save time for family.



Figure 6: Photographs of post-treatment.



Figure 7: Radiographs post-treatment: A. Cephalometric radiograph; B. Panoramic radiograph.



Figure 8: Post-treatment dental casts.

Treatment Result

All the treatment objectives were achieved. The deep overbite was corrected, and a natural overjet and overbite was obtained. The upper and lower dentition were aligned and leveled. The inclined incisors were corrected. The patient's periodontal disease was treated too. The periodontal tissue was more health and the aligned and leveled dentition was easier to be kept clean. The CBCT results neither showed that there was no significantly root resorption after the treatment (**Figure 6-9**). The patient's smile was improved (**Figure 10**).

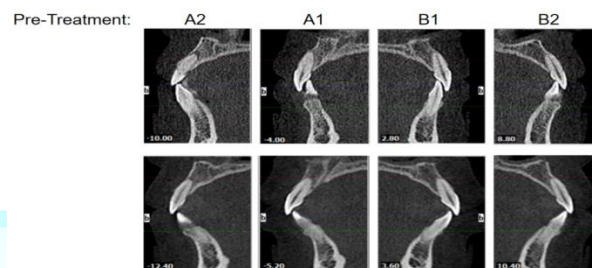


Figure 9: Complement of incisors (A1,A2,B1,B2) pre-treatment and post-treatment.



Figure 10: The photograph of the patient's smile: A. pre-treatment, B. postpartum, C. post-treatment.

Comparing the result of cephalometric measurement between pre-treatment and post-treatment (**Table 1**, **Figure 10**), we could found that while the skeletal Class II relationship was not significantly changed but the Class I dental relationship was achieved, the lingual inclined incisors were corrected (U1 Angulation (U1-SN) 99.9, U-Incisor Protrusion (U1-APo) 23.5), the natural overjet and overbite was obtained (overjet 2.5 and overbite 0.2).

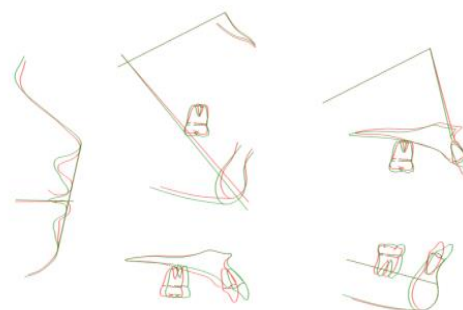


Figure 11: Superimposed pre-treatment (Red) and post-treatment (Green).



Discussion

The relationship between orthodontic treatment and pregnancy had been discussed by some researchers. On the one hand, the pregnancy is maybe a factor to influence adult facial changes. However, result from Bondevik O in clinical study showed that few of the differences between adult males and females in facial changes are caused by pregnancies [5]. On the other hand, the orthodontic is maybe a risk element during the baby delivering. So, before we continued the orthodontic treatment. The predictable and unpredictable risk should be informed to the patient and her husband. And the informed consent should be signed by the couple before the treatment continued. However, we do not suggest patient to be pregnant during having orthodontic treatment.

While sometimes the accidental pregnancy happens, there are several options to deal with this situation. And when the patient and her husband choose the option to have the continue orthodontic treatment. The patient and the obstetrician, who was in charge to help her for baby delivering, should be informed the predictable risks and unpredictable risks by the orthodontist. All of these were what we can do to help the patient to reduce the risks she will face. And all of these will give the doctor enough time to prepare some special treatments for her if necessary.

The three categories following should be the reasons for that lingual bracket orthodontic is difficult: 1) Biomechanical issues; 2) Bracket design choices/constraints; and 3) Lingual anatomy. On the one hand, for the biomechanical issues, the orthodontist should keep on studying to expand our knowledge and change our mind. On the other hand, for the bracket design choices, and lingual anatomy, the faster development of science and technology had offered new method to deal with them. For example, the Computer-Aided Designed and Manufactured (CAD/CAM) technique could produce customized wires the customized lingual bracket systems, which will overcome the brackets and anatomy problem [6-8]. And the efficacy and efficiency of CAD/CAM customized lingual bracket systems was outstanding [7]. For the patient in this study, the lingual customized lingual bracket system was quite efficient in treating the deep overbite. And while the patient had to eat a lot of food around the baby delivering and milking the baby that we could find from the weight the patient had put on, but there only four brackets were debond in half a year. This was due to the powerful bonding and positive lock system of customized lingual orthodontic appliance.

There were several methods for orthodontic vertical control such as mini-implants and Forsus appliance [1,9]. The lingual brackets system is powerful in controlling horizontal problems however it is also efficient in vertical problem [10,11]. The Class II malocclusion with complex problems was treated with lingual orthodontic brackets system in an efficiently way. Although the initial malocclusion and periodontal conditions were unfavorable for the adult patients, it was reported that after orthodontic treatment periodontal changes in adult patients were like those in young adults [12]. In this study, the patient's periodontal disease was treated, and she not only obtained the health periodontal tissue (Figures 6-9, 11), but also had an esthetic smile and the self-confidence (Figure 11).

Conclusion

Lingual orthodontic appliance is one of the powerful tool to treat the deep over bite. Orthodontics and obstetrician should pay more attention to the patient who was pregnant and only in this way can we reduce the risks the patient will face.

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