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Case Report

Delayed bracket placement in orthodontic treatment

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ABSTRACT

Background*: Beside bracket position, the timing of bracket placement is one of the most essential in orthodontic treatment with fixed appliances. Even it seems simple the timing of bracket placement can be crucial and significantly influence the result of orthodontic treatment. However it is often found brackets are placed without complete understanding of its purpose and effects, which could be useless and even detrimental for the case.* ***Purpose****: The aim of this case report is to show that the timing of bracket placement could be different depending on the cases.* ***Case****: Five different cases are presented here with different timing of bracket placement.* ***Case management****: On these cases, brackets were placed on the upper arch first, on the lower arch first, or even only on some teeth first. Good and efficient orthodontic treatment results were achieved.* ***Conclusion****: For every orthodontic case, from the very beginning of treatment, bracket should be placed with the end result in mind. If brackets are correctly placed at a correct time, better treatment result could be achieved without unnecessary round tripping tooth movement.*

Key words*: bracket placement, various orthodontic cases, delayed placement*

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INTRODUCTION

Setting up the case is the most important aspect of the treatment, after the correct diagnosis and treatment planning. Banding and bonding should therefore not be delegated and should be managed by the orthodontist, to ensure accuracy of appliance placement.[1] In bracket placement there are two things to be considered: the position and the timing of bracket placement. Of these, only the timing of bracket placement will be discussed in this article.

For many patients, it is correct to place all the brackets and bands at the start of treatment so that any discomfort is limited to one episode and all the teeth start to be corrected from the outset. However, in some situations, it may be beneficial to consider partially setting up the case, leaving individual teeth, and in some instances groups of teeth, without attachments. If individual teeth are vertically or horizontally displaced from the primary arch form (Figure 1), it is often good technique to delay bracketing the displaced tooth until the other teeth are well aligned, and space has been made available.[2]

If bracket placement on individual teeth interferes with tooth movements of their antagonist, then it is better to left those teeth not bracketed.[3] In deep-bite cases, when it has been decided not to use a bite plate or occlusal build-up, upper arch should be bonded first, later, after the overbite has started to correct, it will be possible to place the lower incisor brackets without discomfort to the patient or risk

Figure 1. Bracket placement on upper laterals were delayed, until space became available.[2]

of damage to the enamel or the newly placed brackets. In cases where the incisors would inevitably procline if they are bracketed at the start of treatment, as in non-extraction case with triangular-shaped incisors, it is better not to bond the incisors until space become available. Where a sliding jig is used to control or distalize molars, upper bicuspids and sometimes upper canines are normally not bracketed. In many mixed dentition treatments, only the permanent teeth are included in the set-up. Primary teeth may be included in some cases, either to improve the strength and stability of the appliance, or to influence the position of the primary teeth.[1] Nowadays, with the increasing popularity of self ligating brackets, every system must be thoroughly understood, as in some cases the timing of bracket placement can be different depending on the system. With Damon system, it is always advisable to bond and engage as many teeth as possible so lateral adaption can start as early as possible.[4]

It is clear that there are so many variations in the timing of bracket placement, which can greatly influence the treatment outcome and length of treatment. Unfortunately it is often found brackets were placed without complete understanding of their purpose and effects, making undesirable side effects and lengthen treatment time. The aim of this case report is to show some alternatives of the correct timing of bracket placement, so that best orthodontic treatment outcome could be achieved without unnecessary round tripping tooth movement. Hopefully more patients would get benefit from good orthodontic treatment, by correct timing of bracket placement with the most efficient time.

CASES

Five different cases are shown to illustrate the effect of different timing of bracket placement. Besides the careful mechanics chosen, some bracket placements were delayed to get the best treatment outcome in an efficient time.

Case I: A 15 year-old male with class I malocclusion, severe crowding, 33 was impacted, and 36 had a severe cavity Figure 2). Case II: A 15 year-old female with class III malocclusion, anterior and posterior cross bite, severe crowding(Figure 5). Case III: a 12 year-old male with class I malocclusion, moderate crowding, 21 protruded, and 15 missing (Figure 9). Case IV: an 11 year-old female with a class I malocclusion, moderate crowding and impacted upper left canine (Figure 12). Case V: 13 year-old female with class I malocclusion, constricted maxillary arch, and severe upper and lower crowding (Figure 15).

Figure 2. Case I: before treatment.

Figure 3. Case I: eight months of treatment, brackets were about to be bonded on lower arch.

Figure 4. Case I: at the time of upper teeth debonding.

Figure 5. Case II: before treatment.

Figure 6. Case II: bracket were bonded on upper and lower teeth except on 31, 32, 41, 42.

Figure 7. Case II: brackets were bonded on 31, 32, 41, 42.

Figure 8. Case II: at the time of debonding.

Figure 9. Case III: before treatment.

CASE MANAGEMENT

Case management I: 12, 24, 34, 36, and 44 were extracted. Fixed appliance were placed in the upper dentition first while waiting for the 37 to erupt fully. Brackets were bonded on the lower arch 8 months after bracket placement on the upper arch (Figure 3). The case finished after 28 months of treatment (Figure 4).

Case management II: 14, 24, 34, 44 were extracted. Brackets were bonded on upper and lower teeth, except on 31, 32, 41, 42 (Figure 6). After 33 and 43 were uprighted, brackets were bonded on 31, 32, 41 and 42 (Figure 7). The case was finished after 39 months of treatment (Figure 8).

Case management III: 24, 34, 44 were extracted. Brackets were bonded on upper teeth except on 21

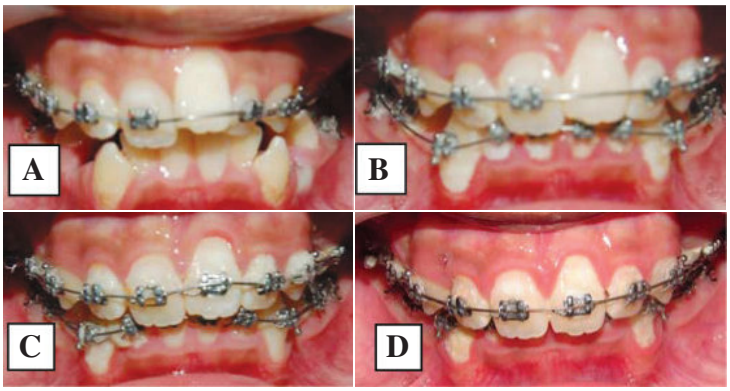

Figure 10. Case III: (A) Brackets were bonded on upper teeth except on 21, (B) 1 month after upper bracket bonding, (C) 2 months after upper bracket bonding, 21 was bonded, (D) 4 months after upper bracket bonding.

Figure 11. Case III: at the time of bracket debonding.

Figure 12. Case IV: before treatment.

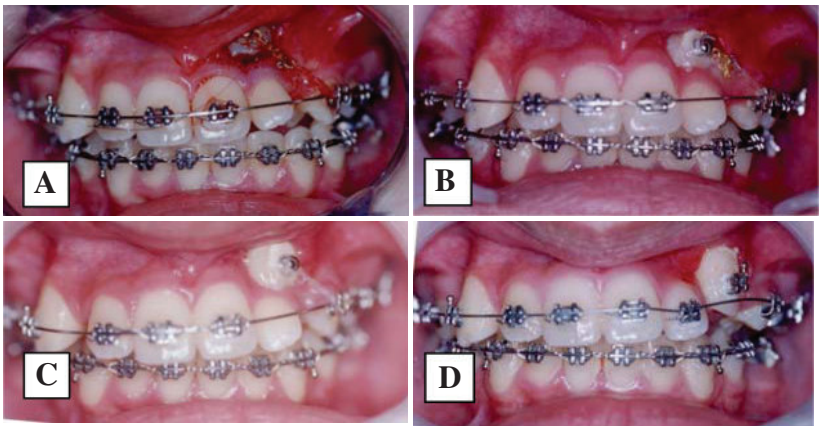

Figure 13. Case IV: (A) 4 months after treatment, (B) 6 months after treatment, (C) 8 months after treatment, (D) 11 months after treatment, 22 was bonded.

(Figure 10). The case was finished after twenty months of treatment (Figure 11).

Case management IV: treated with extraction of 63, 14, 24, 35, 45. Brackets were bonded on upper and lower dentition except on 22, bracket was bonded on 22 after 23 moved away from 22 (Figure 13). The case was finished after 48 months of treatment (Figure 14).

Case management V: treated with extraction of 14, 24, 34, 44. Rapid palatal expander was placed on the maxillary arch to expand the constricted maxilla. Brackets placement

Figure 14. Case IV: at the time of debonding.

Figure 15. Case V: before treatment.

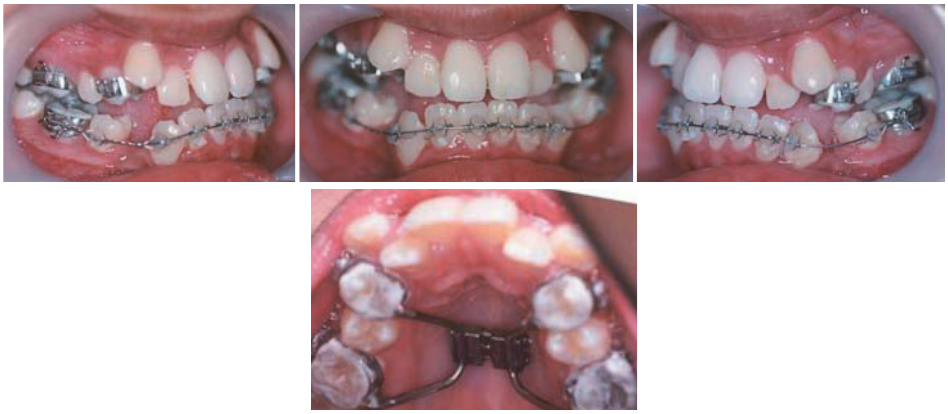

Figure 16. Case V bracket placement on upper teeth were delayed until expansion completed.

Figure 17. Case V at the time of bracket debonding.

on upper teeth were delayed until expansion completed and upper first bicuspids were extracted (Figure 16). The case was finished after 44 months of treatment (Figure 17).

DISCUSSION

In case I, bracket placement in the lower arch was delayed 8 months after the brackets were placed on upper arch. The delay was mainly caused by the time needed for 37 to fully erupt so that a tube can be bonded on it. According to Alexander,[3] in an extraction case the mandibular anterior teeth have a tendency to drift distally, while the mandibular posterior teeth drift mesially, but much more slowly. The mandibular anterior crowding has a tendency to treat itself during the first few months of therapy. The late placement of mandibular appliances is referred to as "drifttodontics". The treatment is usually completed in both arches at approximately the same time, despite the fact that the maxillary arch was bonded earlier in treatment. In this case delayed bracket placement on the lower arch made the crowding in the lower dentition less severe as the anterior lower teeth unraveled and moved distally, the impacted 33 could erupt spontaneously. Careful attention must be considered in cases where maximum anchorage is needed.

In case II, the 33 and 43 were distally inclined, if lower incisors were bonded and archwire was tied, the effects would be bite deepening and proclination of the incisors, which were not favorable for this case. With this in mind, brackets placement on lower incisors were delayed until the position of canines were more upright and had moved

Figure 18. Damage of the lateral incisor root may has been caused, or made worse, by attempt to correct lateral incisor, before the cuspid crown was moved out of the way.[6]

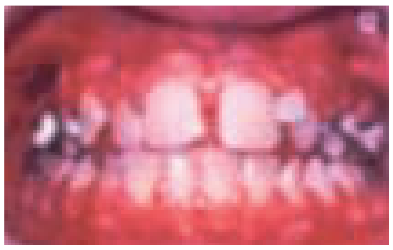

Figure 19. central incisors were separated during the separation of median palatine suture.[7]

distally, and more rooms for the crowded lower incisors were available. According to Bennett[5] when the cuspids were very upright, or distally inclined, the most effective way to manage the situation was to delay placing brackets on the incisors. Because when the incisors brackets were placed, expression of the archwires caused extrusion of the incisors and undesirable bite deepening. Lacebacks were then applied to the cuspids while waiting for the cuspid roots to distalize and the cuspid slot to become more parallel to the occlusal plane.

In case III, if 21 was bonded and engaged into the upper arch wire, it would only procline the other upper incisors and made the treatment more complicated. In this case it was better to leave the 21 without bracket, archwire passed on it and pressing it lingually, while other teeth moved distally occupying the extraction spaces. After there was enough space, and the 21 was not so protrude, then 21 was bonded. To avoid proclination of the other incisors in a case where upper central incisors are proclined in a non extraction class I case, Bennett[6] left the incisors not bonded, until space are available. For teeth which are significantly out of the arch form, should be left unbracketed until adequate space is provided for their movement and positioning.[1]

In case IV, the crown of the impacted 23 overlying the root of the 22, causing it to tilt labially. If 22 was bonded and engaged into the archwire, the crown of 22 would tend to tip palatally and the root labially, such movement could cause root resorption of 22. In this case it was better to delay bracket placement on the 22, until the crown of the 23 moved away from the root of the 22. According to Bennett and McLaughlin,[6] in cases where the unerupted cuspid crown is overlying the root of the lateral incisor and the lateral incisor crown is proclined, it is possible to cause damage to the lateral incisor root by attempting to align the incisor orthodontically before the cuspid crown has been exposed. If a bracket is placed on a lateral in this situation early in treatment, care should be taken not to change the torque and tip position of the lateral incisor. After the cuspids have been moved away from the lateral incisor area, normal incisor leveling and aligning can then be carried out (Figure 18).

In case V bracket placement on upper teeth was delayed until the expansion was stopped. According to Alexander[2] correction of the transverse dimension is performed during the early stages of treatment. If a patient has a posterior cross bite, and corrected with rapid palatal expander, it is done prior to upper brackets bonding. As central incisors separated during the separation of median palatine suture, the upper teeth should be free to move and not be bonded (Figure 19).[7]

Those five cases showed the timing of bracket placement could be different in different cases. Beside these five cases shown here, there are still many variations in the timing of bracket placement depending on the cases. Successful tooth alignment depends on recognizing that unwanted tooth movements can occur early in treatment, mainly owing to the bracket placement. These unwanted tooth movements need to be controlled, or the underlying malocclusion will worsen during tooth alignment, which will increase the time and effort needed to complete the case, later in treatment.[1] If brackets are correctly placed at a correct time, better treatment outcome could be achieved without unnecessary round tripping tooth movement. Therefore, at the first stage of treatment, bracket placement should be carried out with the final treatment goal in mind. In conclusion, in orthodontic treatment each case must be accessed individually and carefully, as the timing of bracket placement could be different and could affect the treatment outcome and length of treatment.

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