

## Beethoven Orthodontic Center's Effective Bonding Procedure

### Introduction

Bonding signifies the beginning of orthodontic treatment. The precision of bonding dictates the efficiency and final quality of treatment and therefore, it is an important issue that we should consider with great care. Beethoven Orthodontic Clinic has adopted Damon® bracket system (Ormco) since 2005, and we keep on improving our treatment quality by routine case analysis. Now Beethoven Orthodontic Center has established a set of standard protocols which can make this important beginning more effective and achieve ideal treatment results.

### Preparation for Bonding

Beethoven's assistants first collect and organize patients' pre-treatment data, including charts (Fig. 1) and study models before their arrival (Fig. 2). The treatment plan has been prescribed and documented by the principle orthodontist, Dr. Chris Chang, on the charts in previous consultation visits. Residents then study the case and mark on the study

**Occupation:** engineer  
**Introducer:** from the Internet  
**Consultation:** have consulted other three clinics  
**Chief complain:** smile arc  
**Correction:** close the molar space  
**Degree of difficulty:** easy average difficult super difficult  
**Treatment plan:**

1. Extrude	2	1	1	2
2. Close	6			6

■ Fig. 1: The chart includes pre-treatment intraoral and facial photographs, radiographs, and treatment plans. Photo-based charts are easier to read for patients as well as for residents.



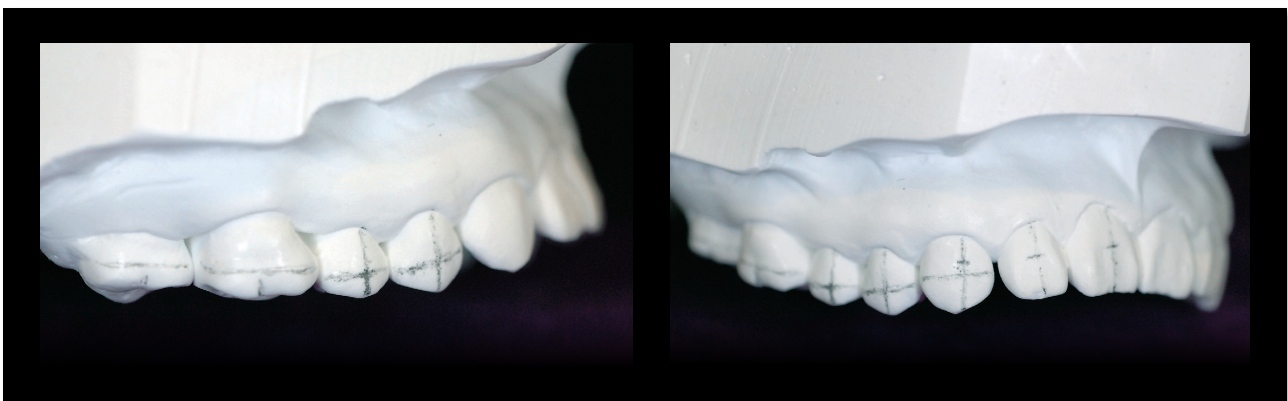
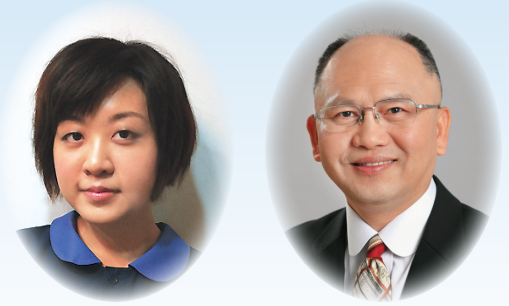
■ Fig. 2: Assistants will collect and organize charts and study models before patients' arrival.

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*Founder, Beethoven Orthodontic Center  
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■ Fig. 3: Study models are marked before bonding.

model (Fig. 3) based on the treatment plan. As such, doctors can significantly save chair-side time and increase bonding accuracy.

## Bracket Placement

Beethoven Orthodontic Clinic currently uses two types of brackets, Damon Q® and Damon Clear® (*ceramic brackets of anterior teeth and maxillary premolars*). The bonding protocols are developed based on Damon, Pitts<sup>1</sup>, Roberts, and Chang's<sup>2-4</sup> methods.

### • Bonding Sequence:

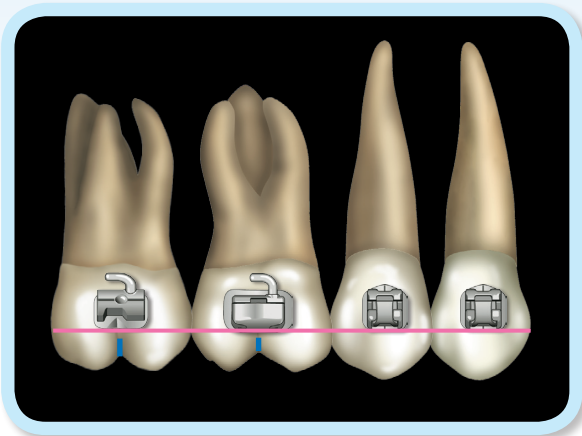
From left second molar to first premolar; from right second molar to first premolar; from left canine to right canine.

### • Bonding Principle:

The main function of posterior teeth is occlusion. Therefore, the bracket placement in this segment is based on contact points between teeth. Maxillary anterior teeth have an esthetic function, and so the bonding positions follow the shape of a smile arc. The bonding positions of mandibular anterior teeth use the overjet and overbite as references.<sup>1</sup>

### • Bracket Position:

1. Maxillary posterior teeth: The occlusal edge of the brackets follows the contact points. The buccal groove of molar bracket pads can fit into the buccal groove of molars (Fig. 4).
2. Maxillary anterior teeth : Place the occlusal edge of the canine bracket at the mesial-distal

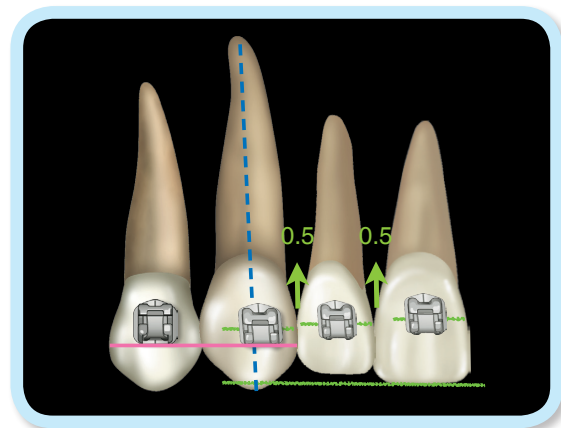


■ Fig. 4:  
The occlusal edge of brackets follows the contact points (pink line). The buccal groove of molar bracket pad can fit into the buccal groove of molars (blue line).

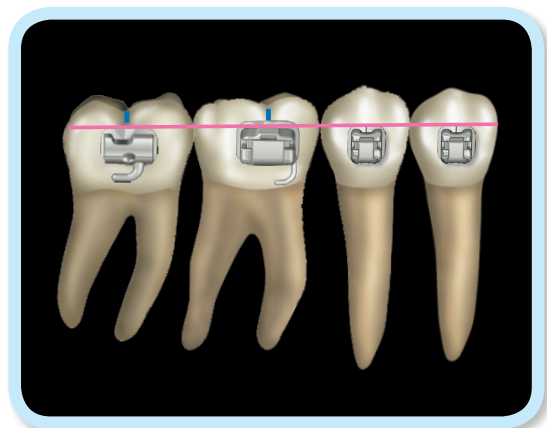
reference points between the first premolar and canine. Align the canine bracket 1 mm mesially away from the long axis of the crown. Use the slot of the canine bracket as the reference for placing the incisor brackets. The slot of the lateral incisor bracket should be more gingival than the canine bracket, and the central incisor bracket should be more gingival than the lateral incisor bracket (Fig. 5).

3. Mandibular posterior teeth : The occlusal edge of the brackets follows the contact points. The buccal groove of the molar bracket pad can fit into the buccal groove of molars. The first molar bracket pad is wider than other brackets. Therefore, remember to place the occlusal edge of the bracket slightly more occlusally (Fig. 6).
4. Mandibular anterior teeth : Place the occlusal edge of the canine bracket at the mesial-distal reference points between the first premolar and

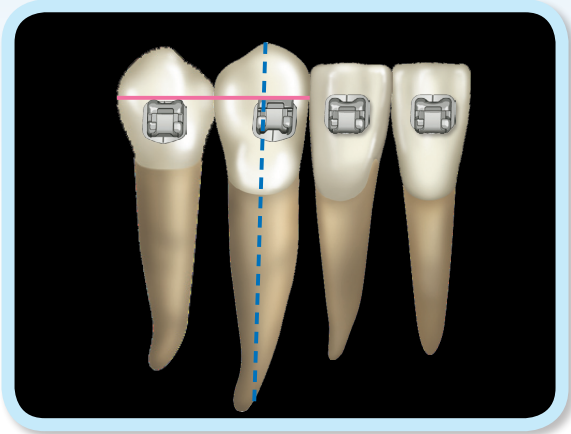
canine. Align the canine bracket 1 mm mesially away from the long axis of crown (Fig. 7). The positioning of the incisor brackets depends on the vertical relationship of the bite (Fig. 8).



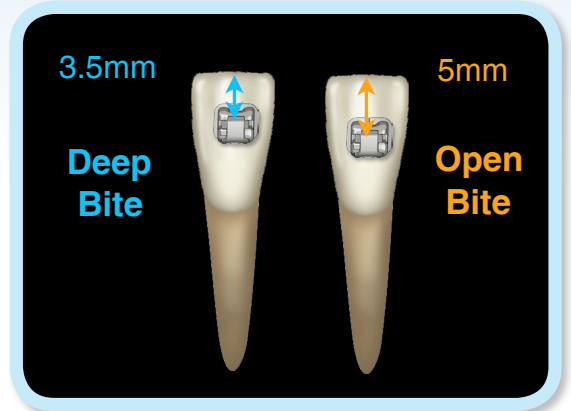
■ Fig. 5:  
Place the occlusal edge of canine bracket at the mesial-distal reference points between first premolar and canine (pink line). Align the canine bracket 1 mm mesially away from the long axis of crown (blue dotted line). Use the slot of the canine bracket as the reference for placing the incisor brackets. The slots of the lateral and central incisor brackets are raised 0.5 mm consecutively (green line).



■ Fig. 6:  
The occlusal edge of brackets follow the contact points (pink line). The buccal groove of molar bracket pad can fit into the buccal groove of molars (blue line). The first molar bracket pad is wider than other brackets, so place the occlusal edge of the bracket slightly more occlusally.



■ Fig. 7:  
Place the occlusal edge of canine bracket at the mesial-distal reference points between the first premolar and canine. Align the canine bracket 1 mm mesially away from the long axis of crown.



■ Fig. 8:  
The positioning of the incisor brackets depends on the vertical relationship of the bite. For a deep bite, the top of the slot is incisally positioned, approximately 3.5 mm from the incisal edge. For an open bite, the top of the slot is gingivally positioned, approximately 5 mm from the incisal edge.<sup>1</sup>

## Bonding Process

- Ensure Bonding Tools are Laid Out in A Logical Order:

1. Doctor's chair-side desktop: mirror, scaler, end cutter, Weingart plier, needle holder, opener, tweezer, super absorbent pad, cotton roll, dry aid, flowable light-cured composite resin, prophylaxis paste, retractor, lighter, .014 Cu-NiTi wire (Fig. 9).



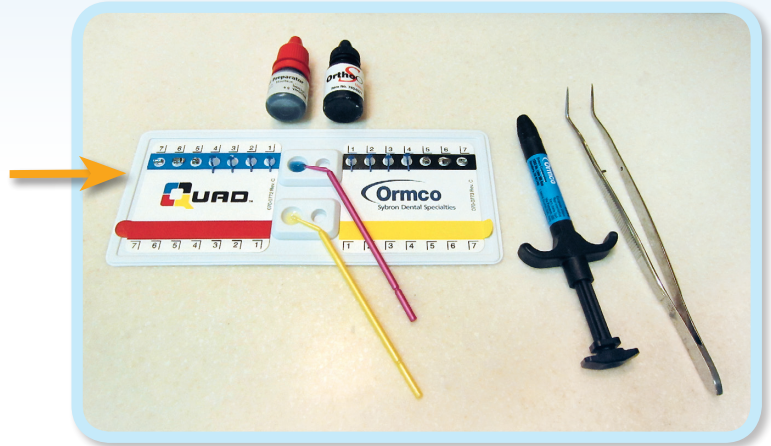
From left to right: super absorbent pad, cotton roll, dry aid, flowable light-cure resin based composite, prophylaxis paste, retractor.

From left to right: mirror, scaler, end cutter, Weingart plier, needle holder, opener, tweezer, lighter, .014 Cu-NiTi wire.

■ Fig. 9. Doctor's chair-side desktop

2. Assistant's worktable : brackets, etching-gel, bonding agent, micro-brush, light cure adhesive, tweezer (Fig. 10).

From left to right: brackets, etching-gel, bonding agent, micro-brush, light cure resin based adhesive, tweezer.



■ Fig. 10: Assistant's desktop



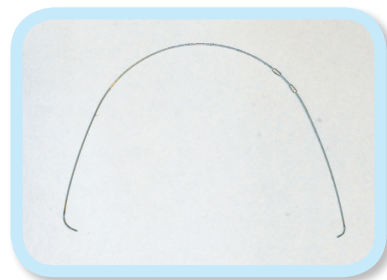
■ Fig. 11: Clinical steps.

- **Step-by-Step Procedures:**

- (1) Polish the teeth surface with prophylaxis paste.
- (2) Air-dry it before applying the etching-gel.
- (3) Rinse the etching-gel and air-dry the surface again. Paint the bonding agent onto the teeth.
- (4) Cure the surface with curing light for about three seconds.
- (5) Follow the bonding sequence. Place the brackets in a precise position onto the teeth. Cure the glue of each posterior bracket about ten seconds.
- (6) Place the left canine and incisors brackets and cure the glue.
- (7) Place the right canine and incisors brackets. After placing all brackets, cure the glue of every bracket for about ten seconds.
- (8) Use a needle holder to pull out the gauges.
- (9) Place the 0.014 Cu-NiTi archwire. At the end of the archwire, reserve about 4 mm in length and heat the last 3 mm with lighter and bend the wire ends inwards. After placing the wire into the brackets, use flowable resin to cover the end of the wire to protect patients from injury (Fig. 12).

- **Clinical Tips:**

- I. There are stoppers on the 0.014 Cu-NiTi Damon® archwire to prevent the archwire from sliding. We put these stoppers between the brackets of the central incisor. However, the stoppers are put between the brackets of the canine for esthetic consideration when placing Damon



■ Fig. 12:  
.014Cu-NiTi. Heat up the ends (3mm) and bend them inwards.

Clear® brackets (Fig. 11-9).

- II. If there is no first molar, we connect the archwire to the second premolar rather than the second molars since 0.014 Cu-NiTi is easily dislodged during food intakes. We will connect the archwire to the second molar when using archwires with a bigger diameter (Fig. 13).

### Patient Instructions

After finishing brackets placement, our assistants will present patients a video to demonstrate the brushing procedures with brackets (Fig. 14). Furthermore, we will offer patients instructions on oral hygiene and a tooth brushing kit for oral hygiene maintenance (Fig. 15).



■ Fig. 13:  
Put the stopper between the central incisor brackets. Insert the .014Cu-NiTi archwire to the second premolar rather than the second molar and use flowable resin to cover the end of the wire to protect patients from injury.



■ Fig. 15:  
A handout on oral hygiene and a brushing kit are provided after placement.



■ Fig. 14:  
An iPad is used to show patients the correct brushing procedure.

## References

1. Pitts T. Begin with the end in mind: Bracket placement and early elastics protocols for smile arc protection. *Clinical impressions* 2009;17(1):4-13.
2. Chang C, Roberts WE. *Orthodontics, 3D i-Ortho encyclopedia, Vol I.* Taiwan:Newton's A Ltd, 2012.
3. Chang C, Roberts WE. *Orthodontics, 3D i-Ortho encyclopedia, Vol II.* Taiwan:Newton's A Ltd, 2012.
4. Chang C, Roberts WE. *Orthodontics, 3D i-Ortho encyclopedia, Vol III.* Taiwan:Newton's A Ltd, 2013.