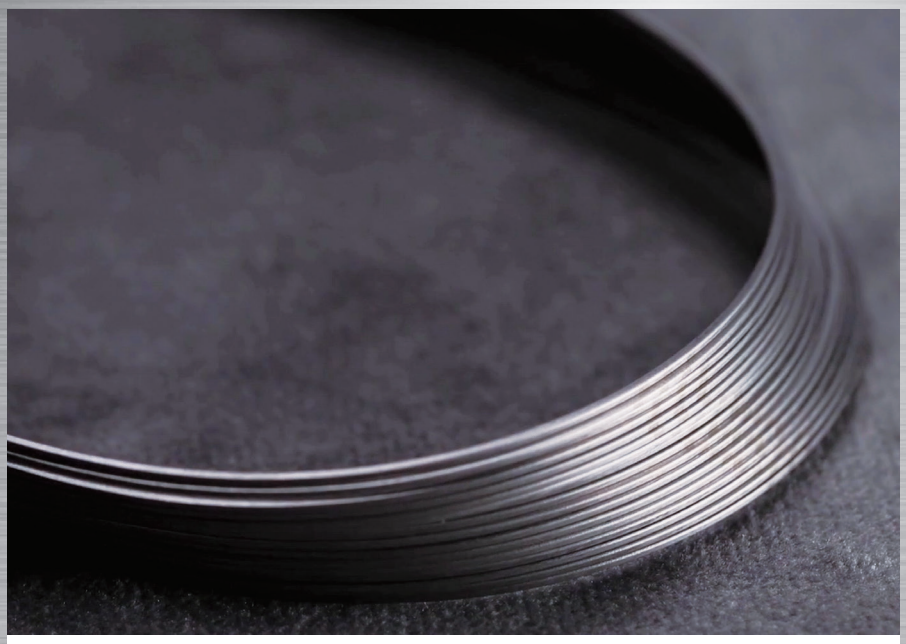
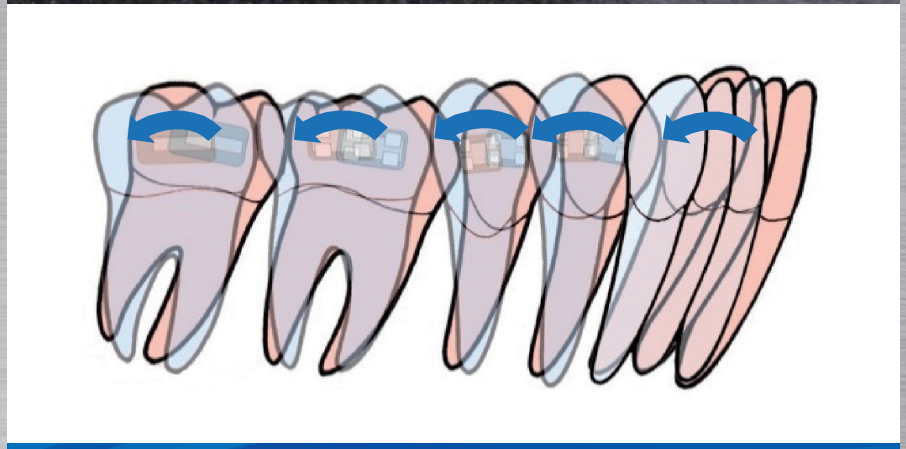
“En bloc” Technic Manual





GUMMETAL®

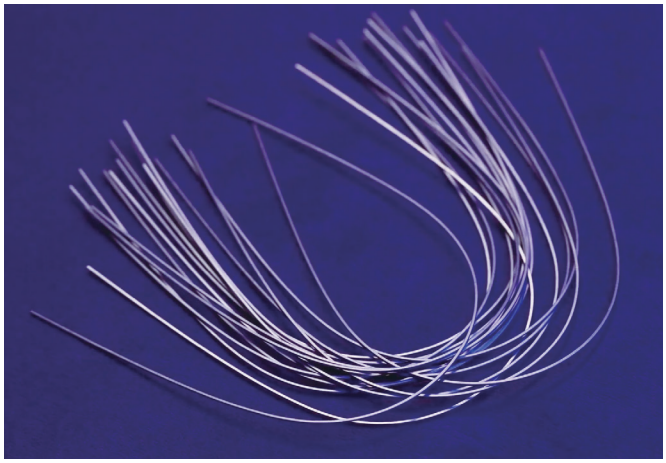
Ti-Nb innovation

JM ORTHO

Overview of En bloc Treatment Using GUMMETAL

1. Procedures for En bloc Treatment

The en bloc treatment using GUMMETAL offers a simpler and more efficient process compared to conventional orthodontic treatments. The procedure is divided into the following three steps:



Step 1: Leveling of the Dental Arch

- In the initial phase, the entire dental arch is leveled to align the height and inclination of the teeth.
- Primarily, horizontal first-order bends (In-Out adjustments) are applied to harmonize the dental arch.
- Ni-Ti wires are used in this stage, as their shape memory properties make them ideal for leveling.

Step 2: En bloc Movement

- The entire dental arch is moved as a single unit (en bloc).
- Instead of moving individual teeth in small increments, the entire arch is moved collectively, significantly improving treatment efficiency.
- This stage employs thick rectangular GUMMETAL wires with torque control. The high tensile strength and flexibility of GUMMETAL ensure uniform force distribution, enabling efficient arch movement.

Step 3: Finishing

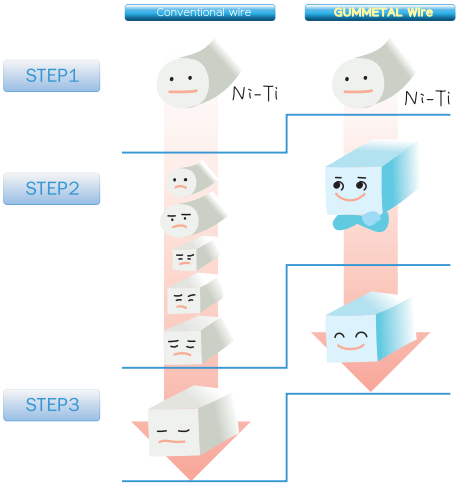
- In the final phase of treatment, fine adjustments are made using intermaxillary elastics and other tools to refine the occlusion and overall aesthetics of the dental arch.
- Using GUMMETAL wires eliminates the need for complex wire bending and enables the application of continuous gentle forces to finalize and perfect the dental alignment.

	Subject	Purpose	Methods
Step 1	**Leveling of the posterior region**	●Preparing to insert GUMMETAL rectangular wire	Use .016 NiTi (GUMMETAL wire is not suitable) Combine with overlay arch (.032 or .036 GUMMETAL)
Step 2	**“En bloc” movement**	●Uprighting of the dentition ●Changing the occlusal plane and jaw position ●Leveling and uprighting of anterior teeth	Vertical control of all teeth with .018 ×.022 or larger sized GUMMETAL wire
Step 3	**Finishing**	Completing the functional occlusion ●Intercuspation ● Overcorrection	Gradually straighten the bends introduced during Step 2 according to the requirements of individual patients

2. Advantages of En bloc Treatment

① Simplification of Treatment Procedures

- After the leveling phase using Ni-Ti wires, thick rectangular GUMMETAL wires with full-size torque control can be utilized from the early stages of treatment.
- This eliminates the need for the step-by-step wire sequence that is typically required in conventional orthodontic treatments.



② Elimination of Complex Wire Bending

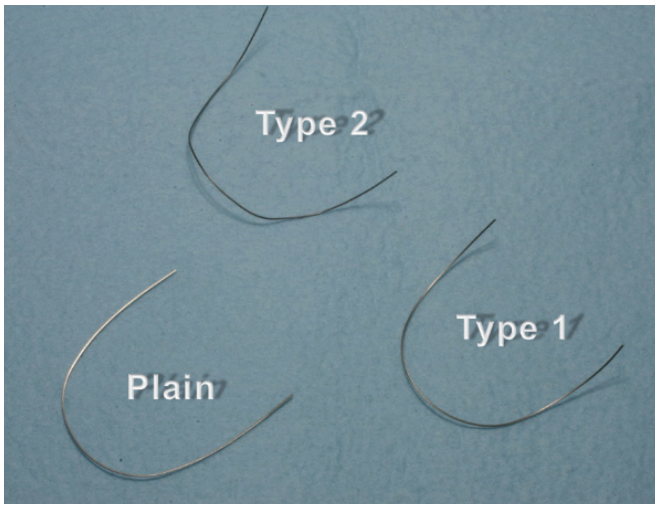
- Complicated bends such as first-order, second-order, and third-order bends are rarely required.
- Orthodontic treatment using GUMMETAL wires allows for efficient and effective adjustments by selecting between two types of wire bending depending on the case:

Type 1

- Designed for uprighting and paralleling in the molar region.
- Suitable for cases where the jaw position or the inclination of the anterior teeth does not need to be altered.

Type 2

- Applies uniform torque across the entire arch.
- Ideal for cases requiring proactive changes to the occlusal plane, such as open bites, Angle Class II division 1 cases, or cases requiring retraction of anterior teeth.



Wire type used for applicable cases

Class Ⅰ Crowding	Upper	Type 1
	Lower	Type 1
Class Ⅰ Protrusion	Upper	Type 2
	Lower	Type 2
Class Ⅱ Div.1	Upper	Type 2
	Lower	Type 1 or Type 2
Class Ⅱ Div.2	Upper	Type 1 (Medium)
	Lower	Type 1 (Medium)
Class Ⅲ	Upper	Straight Stainless wire
	Lower	Type 1
Open Bite	Upper	Type 2 (Strong)
	Lower	Type 2 (Strong)

③ Improvement in Mechanical Efficiency

• The stress relaxation properties of GUMMETAL allow for the continuous application of gentle forces, enabling efficient movement of the entire dental arch.

• During en bloc movement, evenly distributed forces across the dental arch minimize mechanical imbalances, reducing the burden on the patient.

④ Minimal Wire Replacement

• While Ni-Ti wires are used during the initial leveling phase, treatment transitions to GUMMETAL wires, which can be consistently adjusted and utilized until treatment completion.

• This reduces the overall treatment duration and minimizes the number of patient visits required.

3. Comparison with Conventional Straight Wire Technique

Conventional Straight Wire Technique

• **Complexity:**

Requires a detailed wire sequence with gradual changes in wire size and material throughout treatment.

• **Increased Manual Work and Steps:**

Standardized treatment procedures may include unnecessary steps for certain cases, leading to inefficiencies.

• **Frequent Complex Wire Bending:**

Particularly during the finishing phase, individual tooth adjustments often necessitate intricate bends.

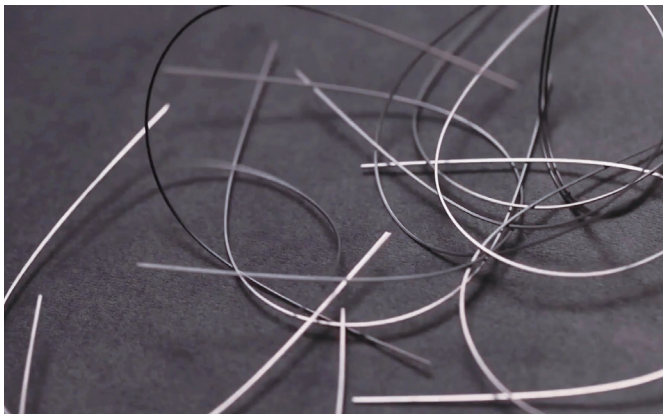
4. Advantages of En bloc Treatment with GUMMETAL

Simplifies all of these complex steps, eliminating the need for detailed wire sequences, unnecessary processes, and frequent bending.

Features	Traditional treatment methods	En bloc trestment using GUMMETAL
Three-dimensional control	Mainly horizontal adjustment	Horizontal,vertical,and rotational adjustments are possible simultaneously
Necessity of an anchorage	Implants requered	No anchorage requered
Force distribution and efficiency	Localized forces tend to concentrate on the dentition	Force is unitormly distributed and acts efficiently
Patient burden	High(implants and complex adjustments)	Low(sustained movement is possibie with light force)
Effects on jaw position	Directly changing jaw position is difficult	Treatment approaches to change jaw pesition are possible

Summary

The en bloc treatment using GUMMETAL offers a dramatically simpler and more efficient procedure compared to conventional methods. Its key features are as follows:



1

Completion in Just Three Steps

Leveling en bloc Movement Finishing.

2

Early Use of Thick Rectangular Wires with Torque Control

Eliminates the need for wire sequences and frequent material changes, simplifying the treatment process.

3

No Need for Complex Wire Bending

Treatment can be achieved with only Type 1 and Type 2 wire bending techniques.

4

Reduced Burden for Patients and Orthodontists

Shortened treatment duration and fewer patient visits.
Efficient tooth movement enhances patient comfort and convenience.

5

Mechanical Efficiency and Stability

Takes advantage of GUMMETAL's unique properties to move the entire dental arch efficiently with gentle forces.

Clinical Advantages of GUMMETAL Wires

1. Pain Reduction and Improved Patient Comfort

- **Young's Modulus is 1/4 of Stainless Steel Wires:**
  GUMMETAL is highly flexible, with a Young‘s modulus (elasticity) approximately 1/4 that of stainless steel wires.
  This avoids excessive orthodontic forces, significantly reducing the pain experienced by patients during treatment.
- **Reduced Risk of Root Resorption:**
  By applying gentle, continuous forces to move teeth, GUMMETAL minimizes the risk of root resorption.
  This helps preserve the patient's long-term dental health.

2. Active Jaw Position Adjustment and Resolution of Skeletal Issues

- **Significant Reduction in the Need for Surgical Treatment:**
  GUMMETAL enables active jaw position adjustments during treatment, addressing most skeletal malocclusions.
  This significantly reduces the number of cases requiring surgical intervention.
- **Adaptability to Skeletal Cases:**
  GUMMETAL makes it easier to correct skeletal factors that were traditionally challenging in orthodontic treatments, expanding treatment options for complex cases.

3. Ease of Intrusion and Treatment Efficiency

- **Facilitates Intrusion:**
  While tooth eruption has been achievable in traditional orthodontic treatments, intrusion has been considered difficult.
  GUMMETAL's flexibility and force transmission properties make intrusion easier, streamlining the achievement of treatment goals.

4. Long-Term Stability and Maintenance of Occlusion

- **Simplified Tooth Alignment and Paralleling (Parallelization):**
  GUMMETAL allows for easy alignment and parallelization of tooth axes, improving occlusal stability.
- **Control of Molar Occlusal Vertical Dimension:**
  Controlling the occlusal vertical dimension of molars is critical for ensuring long-term occlusal stability.
- **Expectation of Long-Term Stability:**
  With precise occlusal adjustments, GUMMETAL reduces the risk of post-treatment relapse, ensuring stable outcomes over the long term.

Bending Method for GUMMETAL Wire in Multi-Bracket Technique

"En bloc" movement refers to moving the entire dentition, including the anterior teeth, as a single unit. This simultaneously achieves improvements in jaw position through vertical control, incorporating uprighting, rotation, or torque control. To achieve this, bends such as tip back, active torque, and toe-in must be applied to GUMMETAL square wire.

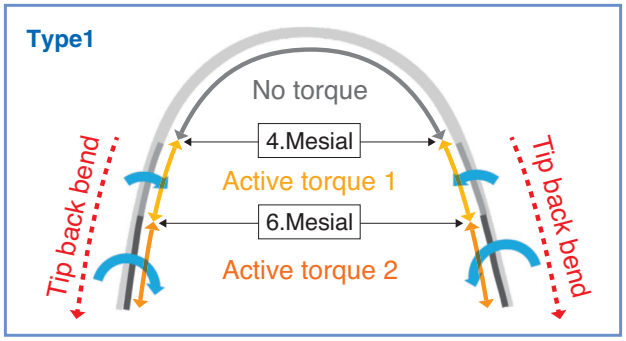
The fundamental wire bending techniques are identical to those used for bending the ideal arch in the Tweed system. However, since straight wire brackets are employed, anatomical tooth axis reproduction (passive torque) and in-out adjustments are left to the bracket slot inclination. The focus shifts to applying active torque, tip back bends, toe-in adjustments, and other necessary modifications as needed.After mid-treatment, once jaw position improvement is achieved, we gradually straighten the wires by reversing previous bends. However, bends tailored to individual variations are freely incorporated to achieve Intercuspation.

Wire used

.018x.022 to .018x.025 GUMMETAL Rectangular wire Instruments
Tweed pliers, torqueing pliers, SH Director, etc.

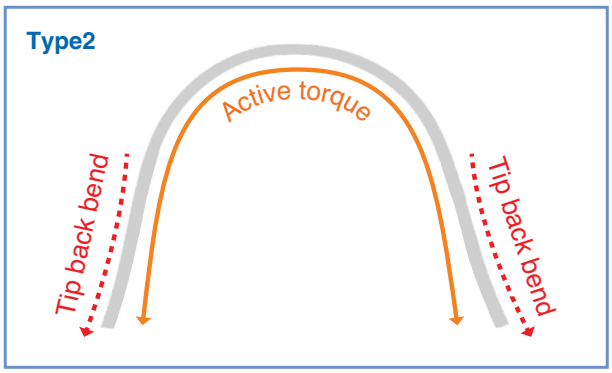
TYPE 1 Bending - Active torque in the mandibular posterior region

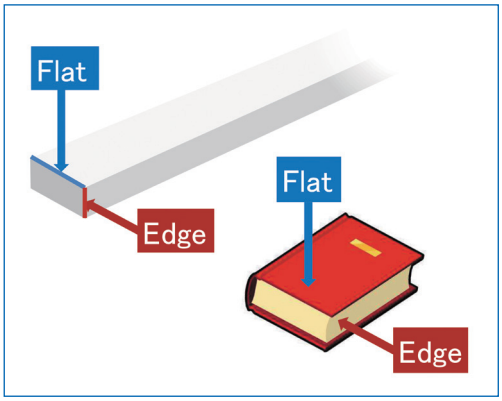
First, apply active torque with a 15-degree bend on the mesial side of the first pre-molar and an additional 15-degree bend on the mesial side of the first molar (progressive torque). The second molar region should have 15+15 = 30 degrees of torque applied. This torque suppresses buccal inclination during tip back and rapidly uprights the molar region.Aim for a tip-back bend of approximately 45 degrees. Practice bending it in pre-molar to molar segment in one motion, using fingertips.

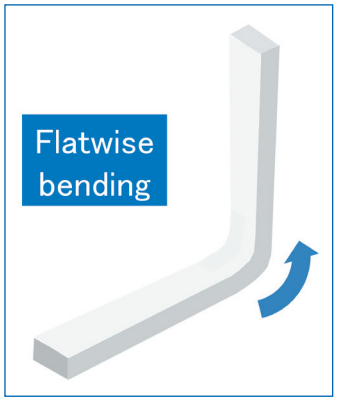


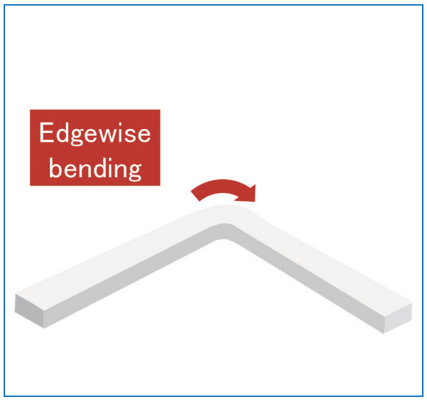
TYPE 2 Bending - active torque including anterior region (torque applied in entire arch)

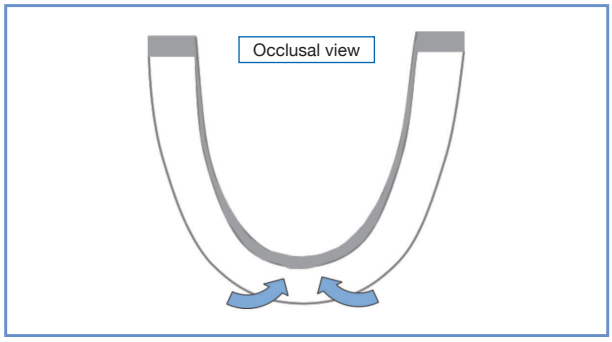
Since Tweed's era of ideal arch bending, applying torque to the anterior region through bending has been one of the most difficult techniques to grasp, often making orthodontics seem daunting. The operation itself is simple and not difficult at all, but the need for three-dimensional spatial awareness is likely what makes it feel challenging. Nevertheless, it arises frequently in cases like Class II Division 1 malocclusion, Class I crowding, open bites, and maxillary/mandibular protrusions, so please hone your skills.





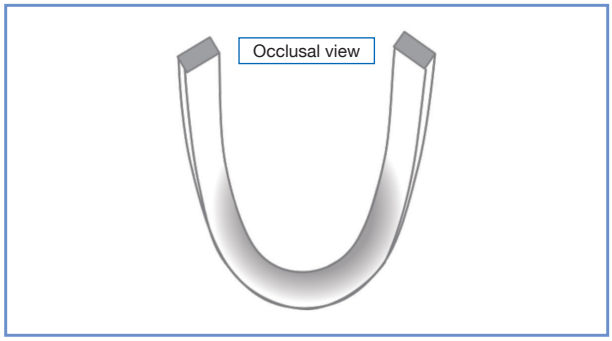




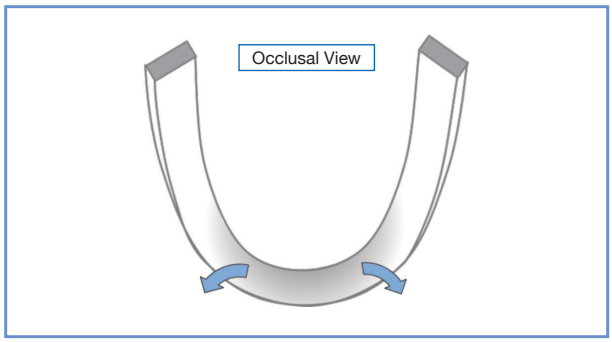


.018x.022 to .018x.025 GUMMETAL wire is Suitable for "en bloc" movement including active vertical control.
Bend the anterior region (around 3-3) flatwise.

*Since the sequence of operations is difficult to understand from the diagram, use a sponge-based rectangular wire model to grasp the three dimensional form.

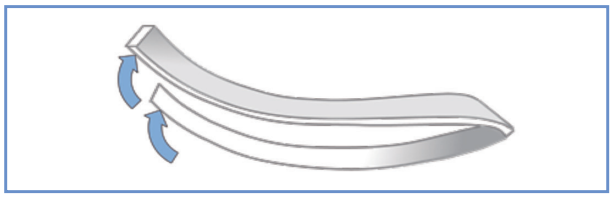


The torque applied to the anterior region is applied in exactly the same amount to the posterior region. Furthermore, the amount of torque applied reduces the R value in the anterior region.

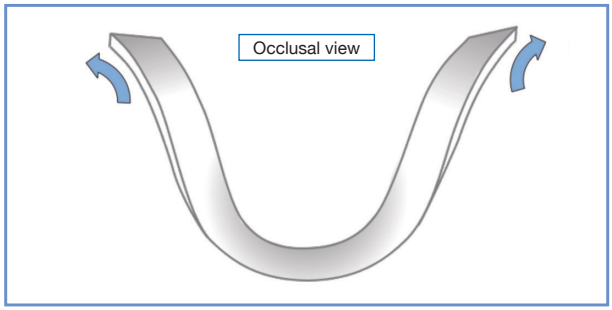


Use your fingers to restore the R in the anterior region. Do not use pliers.

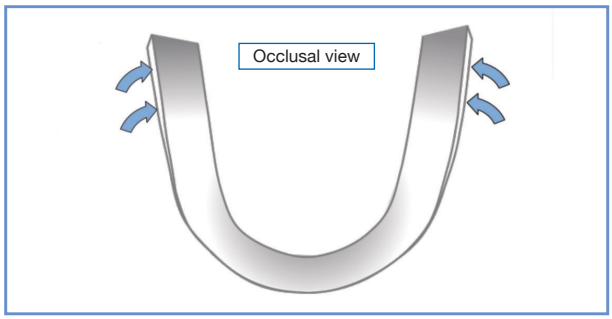
Lingual crown torque is applied to the entire arch.



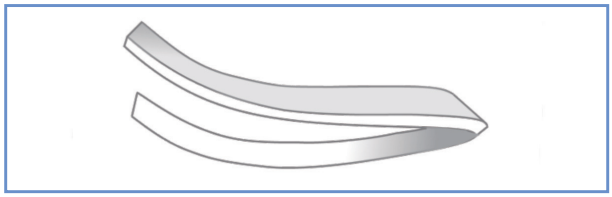
Insert the tip back bend flastwise in pre-molar to molar segment, using fingertips.
Maintain an angle of approximately 45 degrees, ensuring symmetry with no difference between the left and right sides.



It opens outward by the amount of torque applied to the molar region.



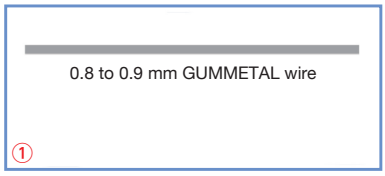
Place toe-in bend edgewise to restore the arch width. Gradually bend inward using Tweed pliers.



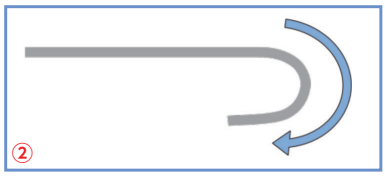
Archwire completion.

Mulligan's Overlay Arch Bending Method

Using 0.8mm (.032inch) to 0.9mm (.036inch) GUMMETAL wire during leveling phase allows for very mild yet effective expansion of the dental arch. Another advantage is that flare-out is less likely to occur during anterior leveling.

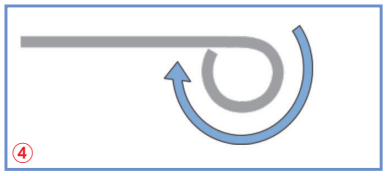


Two thickness of wires can be used, 0.8mm for short segment and 0.9mm for long segment.

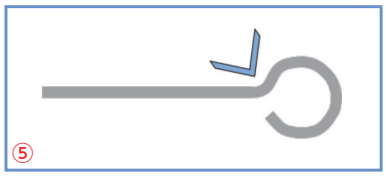


Bend 180 degrees with bird-beak pliers

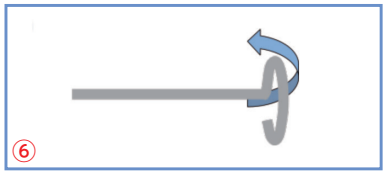
Cut along the curve



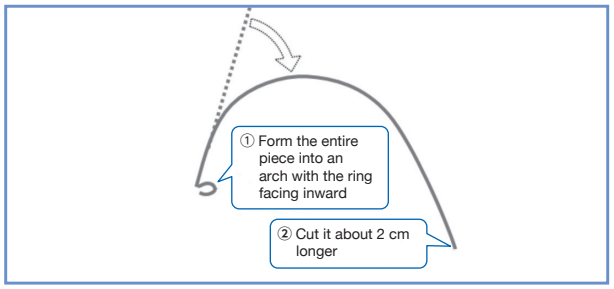
Bend it all the way to 360 degrees.



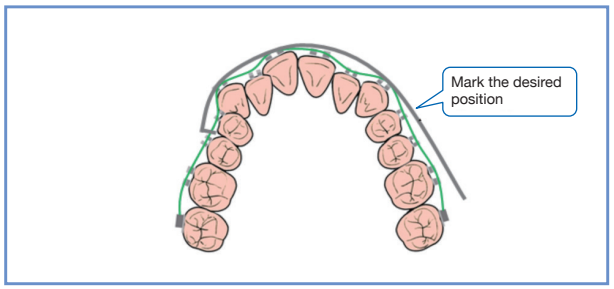
Bend it in the opposite direction at the base of the ring



Bend the ring section at a 90-degree angle to the wire

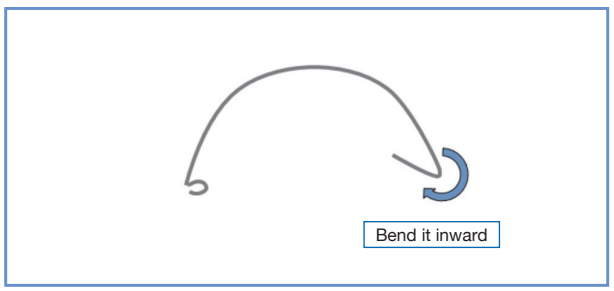


Bend the entire piece into an arch shape with your fingers so the ring faces inward, Cut it 2-3 cm longer.

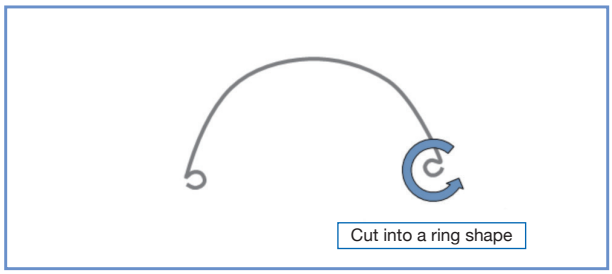


Hook the ring onto the center between the brackets at the desired position and mark the opposite ring position.

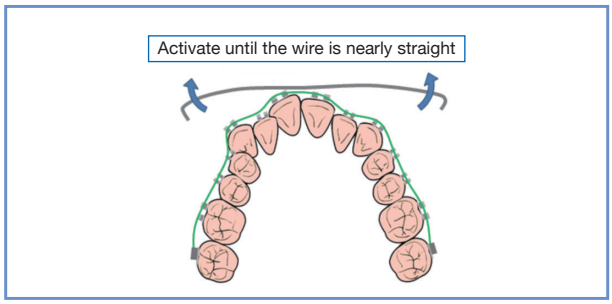
**The primary function of the overlay arch is to incline the posterior teeth buccally. It should be overlaid onto the NiTi round wire during leveling. Even if overlaid onto a torqued rectangular wire in an attempt to prevent buccal inclination, the preventive effect is negligible.*



To achieve bilateral symmetry, bend it toward an internal 45° angle.

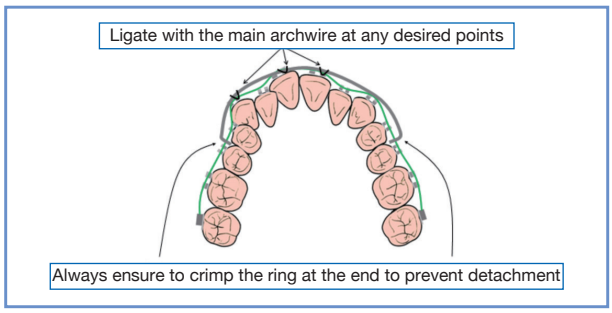


Bending into a ring shape creates symmetry. Cut so a slight gap remains. The cut surface is extremely sharp, so treat it with carborundum or similar.



Activate until it is nearly straight.

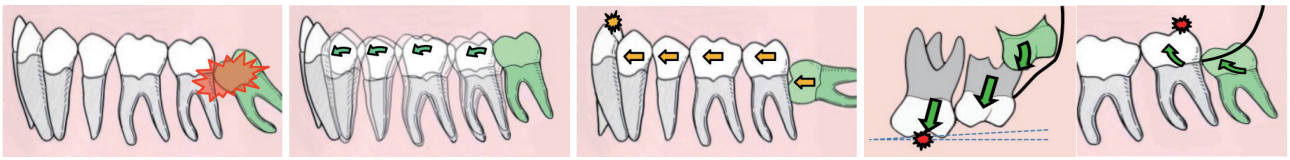
**Force is determined by wire diameter, not activation amount.*
Molar overlay arch: 0.9 mm
Premolar overlay arch: 0.8 mm



Place it in the desired position and secure it by ligating with main archwire. Ligation can be at several points. Do not forget to crimp the ring at the end to prevent detachment.

— Is non-extraction treatment impossible? —

Considering a lifespan of over 80 years, it is only natural that we would not want to lose even a single tooth, and we should always keep in mind that extraction is strictly a last resort.However, in the era of attritional occlusion, the third molar was a crucial molar that erupted into the rearmost space—created after the molar group, whose adjacent surfaces had been worn down by heavy use, had shifted mesially—around the time the individual completed their growth and development. Since adjacent surface wear has ceased entirely and mesial movement of adjacent teeth has stopped, it has become a nuisance that typically remains impacted.In modern humans, the proportion that erupts and participates in the occlusion is less than one-third, and they are no longer even counted as teeth. However, since they exist, some attempt to erupt anyway, while others give up from the start and remain completely impacted;some run out of energy midway and stop in a semi-impacted state, becoming a hotbed of inflammation; or some appear to erupt successfully but actually cause the entire molar region to tilt mesially during the process, create crowding in the anterior region, or cause the molars to over-erupt, creating occlusal interference and becoming a cause of temporomandibular joint disorder—in short, they are a source of nothing but problems.Moreover, in cases requiring orthodontic treatment, the likelihood that a third molar can participate normally in the occlusion is extremely low; it is safe to say that extraction is virtually mandatory. Resolving malocclusion is the most critical factor for achieving functional occlusion and occlusal stability. In other words, establishing functional occlusion with a dentition of 32 teeth, including the third molar, is nearly impossible; to put it another way, it is no exaggeration to say that true “non-extraction treatment” is impossible.



Pericoronitis　Mesial inclination　Anterior crowding　Molar Overeruption

Reasons for third molar extraction

① The eruption rate is approximately one-third, and even lower in orthodontic patients

② Space for eruption is further reduced by molar uprighting

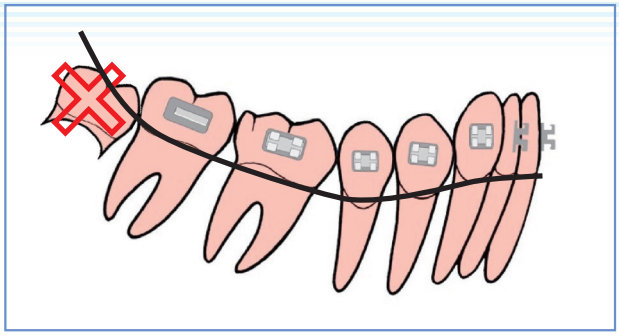
③ It hinders molar uprighting

④ If left untreated, it may lead to anterior crowding, reduced overbite, mandibular lateral deviation, and TMD after the retention

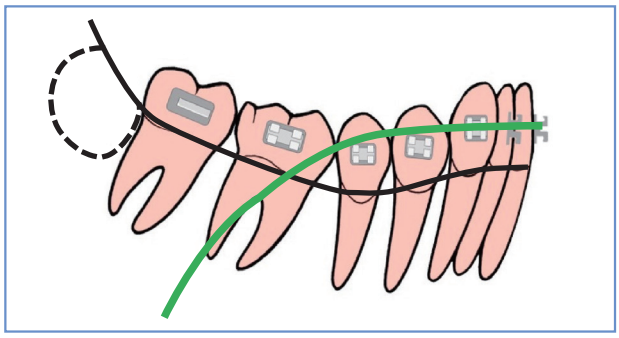
“En bloc” movement: Uprighting of lateral teeth, distal rotation of molars, vertical control

As mentioned earlier, if the third molar erupts forcefully despite insufficient space, it causes mesial inclination of the lateral teeth, which in turn exacerbates anterior crowding. Conversely, extracting the third molar—whether it has erupted or is impacted—creates available space to upright the lateral teeth as a group.In the Tweed method, the concept of en masse movement was positioned as part of what is known as anchorage preparation. However, by actively uprighting the lateral teeth—which have tilted mesially due to molar discrepancy—using an appropriate force system, distal movement of the dentition can be achieved through the“rowboat effect.”Similarly, rotating maxillary molars that have rotated mesially into a distal position can create space equivalent to rotating them around the lingual root. Since GUMMETAL wire has an extremely low modulus of elasticity and is highly malleable, it is possible to apply the desired tip-back bend and active torque required for the desired amount of uprighting to adjust the tooth axis inclination, thereby achieving true three-dimensional control.

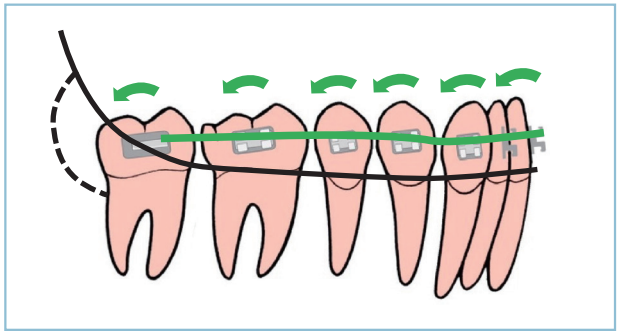
Hereinafter, we will refer to this technique of moving the entire dental arch as a single unit as “en bloc movement.”



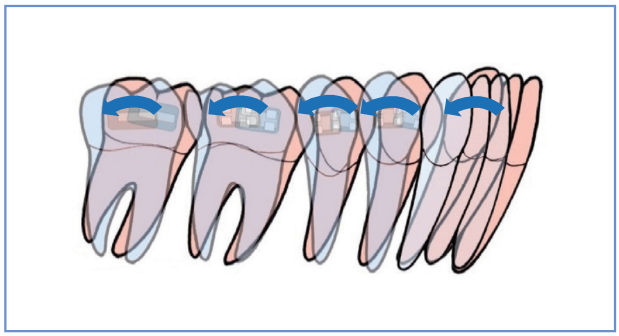
① Mesial inclination of the entire dentition and severe curve of Spee caused by molar discrepancy. Extract the third molars to create available space in the posterior region of the dentition.



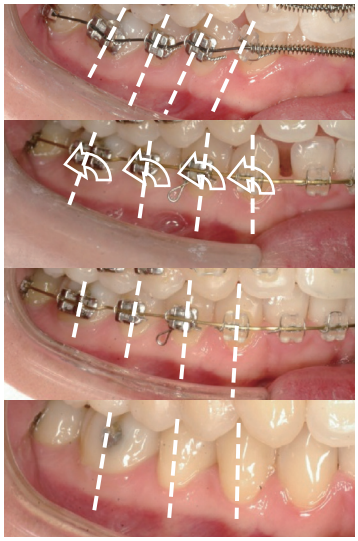
② After simple leveling, insert a GUMMETAL wire of approximately .018 x .022 that has been bent to apply tipback bends, active torque, toe-in, and other specified bends (Type 1 or 2).



③ The entire dentition is simultaneously uprighted and moves distally toward the available space in the posterior region.



④ Teeth are moved "en bloc" by the row-boat effect. Crowns will move distally without implants, extra-oral anchorage, or other fixed source.

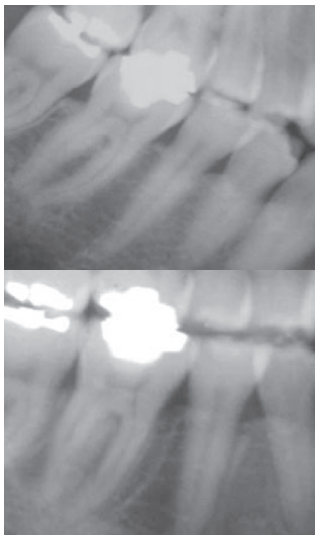


① Significant mesial inclination is observed in the lateral teeth.

② Once you upright all the teeth at once, it creates a significant amount of space in the anterior region.

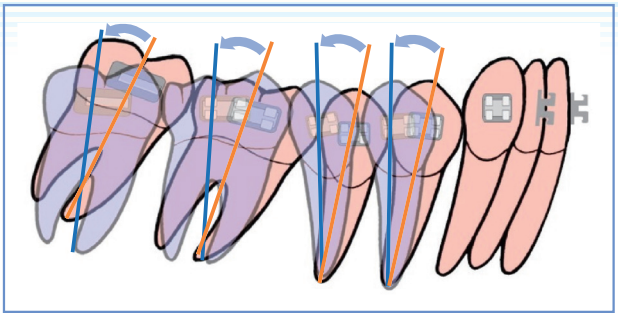
③ Reduce bending to achieve intercuspation.

④ It is evident that the lateral teeth have been straightened.



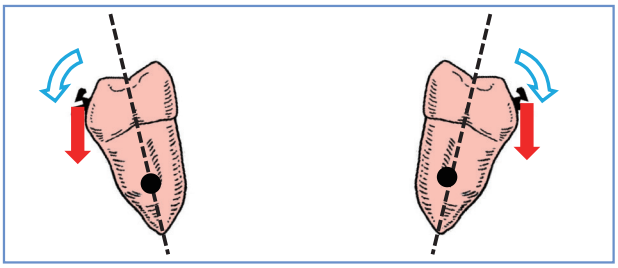
① Pre-treatment panoramic radiograph.

② Post-treatment panoramic radiograph: Significant distal movement can be achieved through bodily tooth movement during the uprighting process.

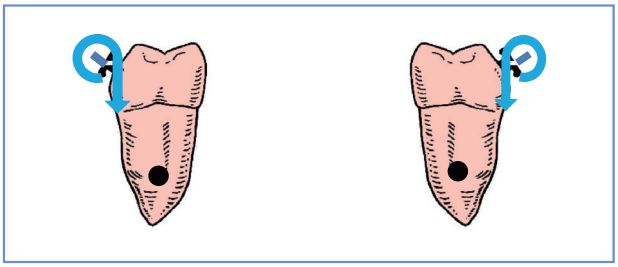


The space created by uprighting = :

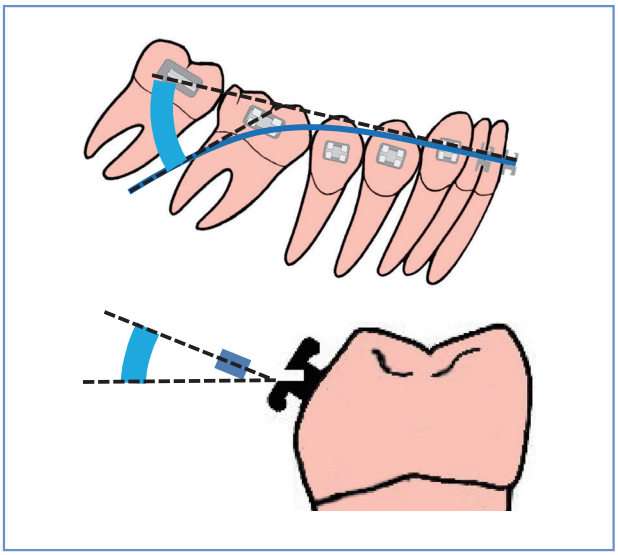
$$\frac{\text{uprighting in degree}}{3} \times 2 \text{ (mm)}$$



① Even if a slot-in inclination is incorporated into a straight-wire bracket, simple intrusion force will inevitably cause buccal inclination of the dentition



② Active crown lingual torque corresponding to the intrusion force is essential



The amount of torque should be set at about 2/3 that of the tip-back bend angle. Since the effectiveness of torque varies significantly from patient to patient, it is important to adjust it based on observations made ateach visit.

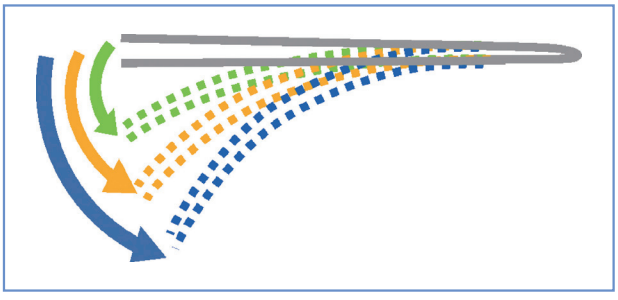
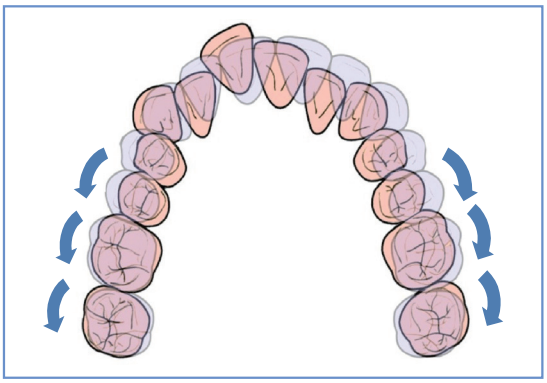


Chart and illustration of tip-back bend and active torque

	Tip-back bend	Active torque
Class Ⅰ Crowding	30°	20°
Class Ⅱ Division 1, etc.	45°	30°
Open bite, etc.	60°	45°

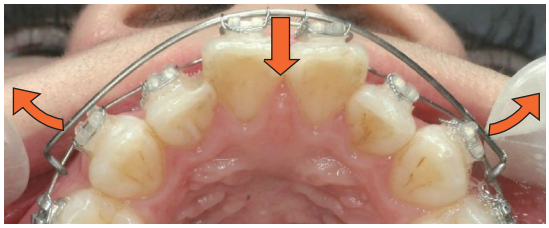
Distal rotation of posterior region



Derorate mesially-rotated teeth
① Mesial inclination of the tooth axis is often accompanied by mesial rotation. Derotation or distal rotation of these mesially rotated teeth will create space.

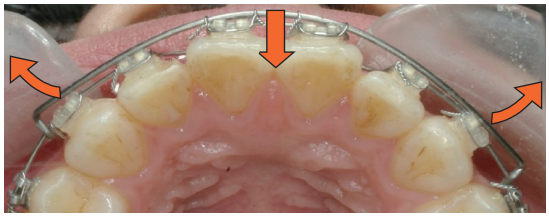
② Uprighting and lateral expansion are also proceeding simultaneously in the posterior region, using .018×.022 GUMMETAL wire.

Mulligan's Overlay Arch



① A Φ 0.8 mm GUMMETAL wire is suitable for intercanine width expansion, as shown in the figure on the left.

Activate the wire until it is nearly straight, then overlay it onto the NiTi main archwire.

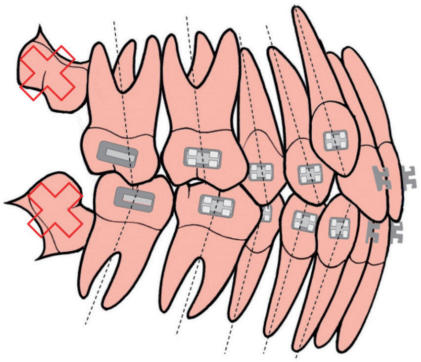


② As the width is expanded, the anterior teeth are automatically retracted.
The advantage of the overlay arch is that it effectively suppresses anterior tooth flare-out during alignment in all cases.

③ Expansion was completed in approximately three months, and a full-sized GUMMETAL square wire was inserted.

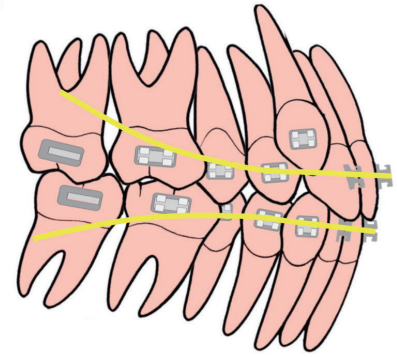
Angle Class I crowding Treatment

1



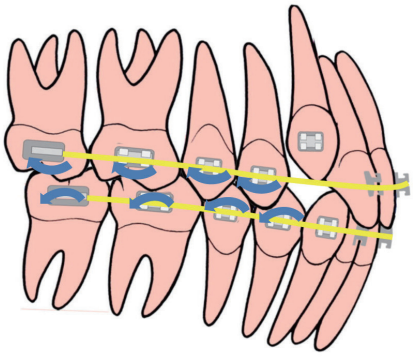
When the arch length discrepancy is 15 mm or less, and there is mesial inclination in the posterior region, and an increase in available space can be expected through expansion or distal rotation, and in cases where significant retraction of the anterior teeth is not required, “en bloc” movement of the entire dentition is applied. If third molars are present, they should be extracted before initiating active treatment.

2



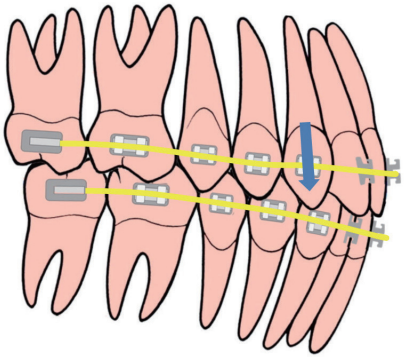
An important principle in treating crowding is not to rush the leveling of the anterior teeth. Keep in mind that anterior crowding is a result of posterior discrepancy, and focus on controlling the posterior teeth to create available space. Apply a 30° tip-back bend and active torque to a .018 x .022 GUMMETAL wire.
(Type 1). At the same time, a GUMMETAL overlay arch or a lingual expansion appliance may be used in combination.

3



With GUMMETAL, rectangular wires can be inserted at a very early stage,allowing for the application of arbitrary torque during procedures such as uprighting, distal rotation, and lateral expansion.Therefore, it is possible to omit the traditional step-by-step approach—which involves using round wire followed by rectangular wire for tooth axis adjustment—and instead set the shortest path toward the goal from the very beginning. In Class I malocclusion cases, Type 1 archwire is generally used; however, Type 2 is used in cases requiring anterior tooth retraction or a strong tip-back bend.

4

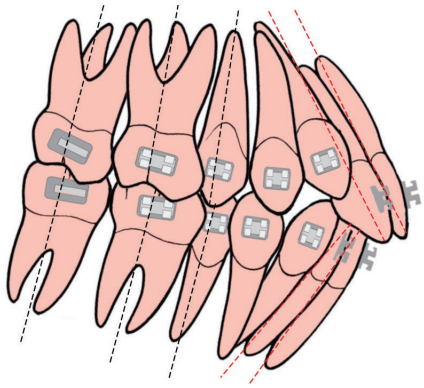


After securing sufficient available space, we simultaneously correct anterior crowding and labial inclination to conclude the active treatment phase.

In case premolars are not extracted, exercise extreme caution, as inadvertently flaring out the anterior teeth will make correction difficult.

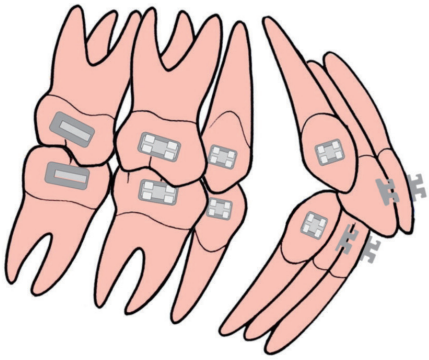
Angle Class I crowding requiring first premolar extraction

1



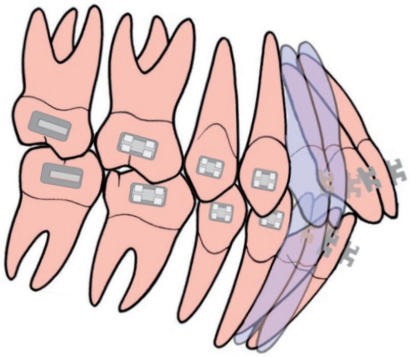
In cases where anterior crowding or labial inclination is present and significant distal movement is required, but the posterior region is already upright and further uprighting is not possible, or lateral expansion cannot be applied— and thus an increase in available space cannot be expected—extract premolars to resolve the discrepancy.

2



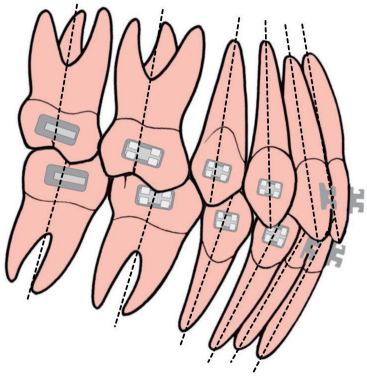
Coordinate leveling with the distal movement of the canines. Also, take great care to avoid unintended changes in the vertical dimension of occlusion during the closure of the extraction spaces, and apply vertical control as necessary.

3



Since anterior tooth retraction is often achieved through simple inclination,active torque is rarely required. Any mechanism—such as sliding, a closing loop, or a round-wire consolidation arch—is acceptable.

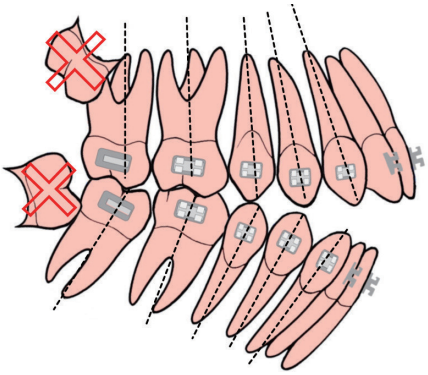
4



Properly aligned lateral teeth and a moderate inter-incisor angle are essential for establishing a functional and stable occlusion. It is important to make a diagnosis that ensures no positive discrepancy remains after active treatment.

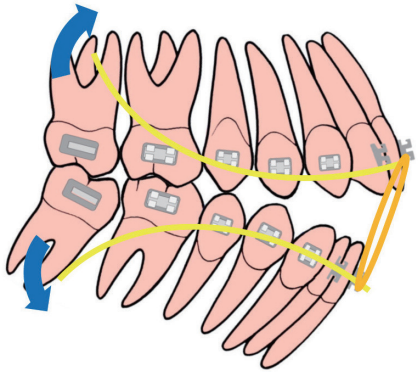
Angle Class Ⅰ, Open bite treatment

1



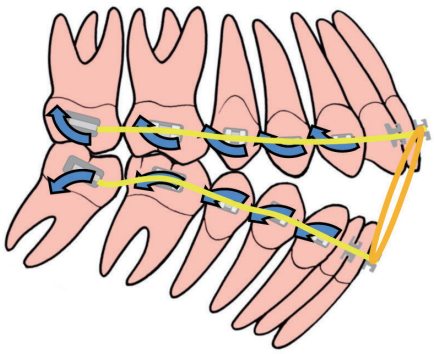
Most open bite cases are of the dolichofacial type and exhibit a mesial inclination of the entire dentition caused by molar discrepancy.
Since vertical control focused on posterior region uprighting is essential, the third molars are extracted prior to active treatment.

2



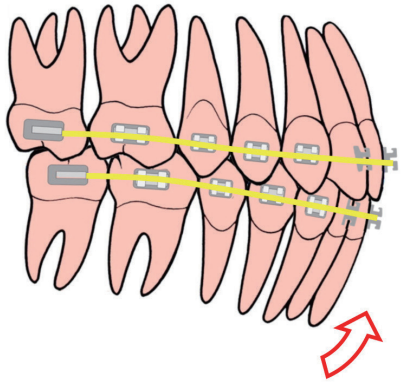
After simple leveling, a GUMMETAL wire of approximately .018 x .022 is inserted immediately. Type 1 is generally used, but Type 2 is often selected depending on the anterior tooth axis and the strength of the tip-back bend. Up-and-down elastics of 3/16" with 3.5 to 4.5 oz tension are used to counteract the tip-back bend force acting on the anterior teeth.

3



Start with a tip-back bend of approximately 60°. Set the active torque to about 45° in the molar region. Adjust the bending as needed depending on the situation.

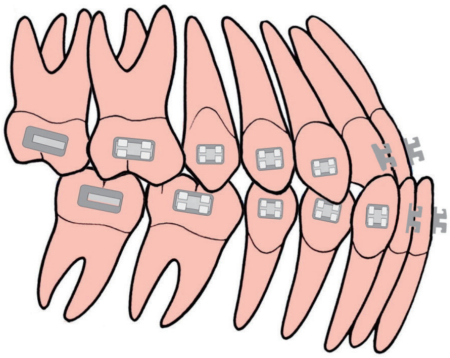
4



Toward the end of treatment, release both the tip-back bend and active torque to complete the occlusion. In open bite cases, create sufficient anterior overbite to account for relapse and strive for as much overcorrection as possible. In open bite treatment, it is important not only o improve the occlusal relationship but also to achieve skeletal pattern improvement (mandibular closing rotation).

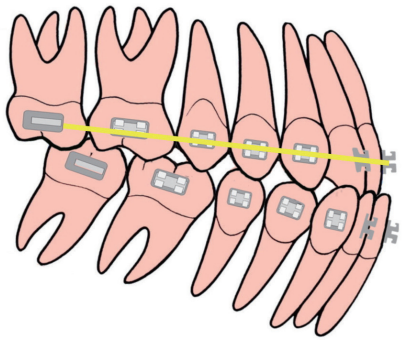
Angle Class Ⅲ Treatment

1



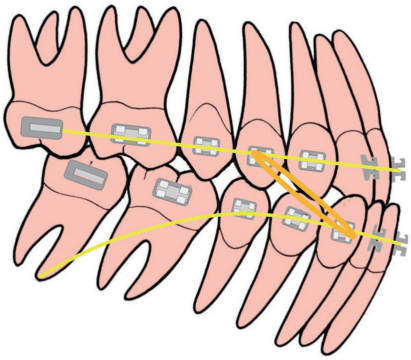
In Class III cases of the mesio or brachy facial type, there is a strong tendency for mandibular protrusion. To improve overjet, in addition to “en bloc” movement of the mandibular dentition, posterior rotation of the mandible is induced through vertical control of the occlusal plane.

2



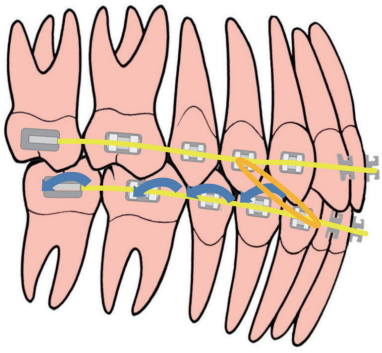
Following the Tweed method, stabilization of the maxilla is performed first. Use GUMMETAL wire of .018 x .022 or larger size, or conventional stainless steel wire, to ensure sufficient rigidity for the use of intermaxillary elastics.

3



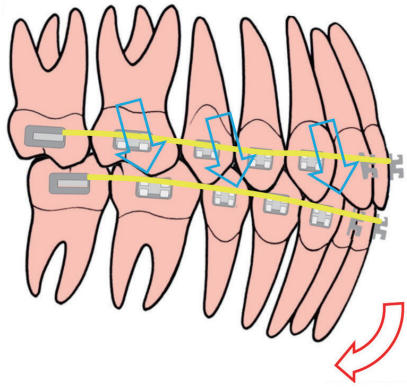
For the lower jaw, use a GUMMETAL wire of .018 x .022 or larger,applying a tip-back bend of approximately 45° and a crown lingual torque of approximately 30° (Type 1). Since lower anterior teeth are often already lingually inclined in cases of crossbite, Type 2, which applies active torque to the anterior region, must not be used.

4



Class Ⅲ intermaxillary elastics should be placed in the central region of themaxillary arch. A size of 3/16" 3.5 to 4.5 oz is preferred. Reduce the tip-back bend and active torque as the mandibular dentition uprighting progresses to achieve intercuspation.

5

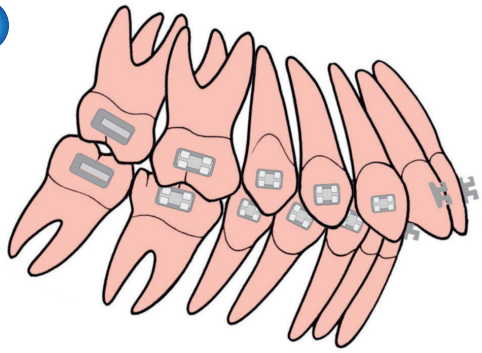


To improve overjet and achieve Class I occlusion, it is important not only to upright the mandibular dentition but also to change the maxillary occlusal plane and, consequently, rotate the entire mandible posteriorly.

In the treatment of Angle Class III malocclusion, in addition to the force system of en masse movement using the stabilizing arch and working arch in the Tweed method, the entire maxillary dentition is moved primarily anteroinferiorly through vertical control of the occlusal plane. Changing the occlusal plane promotes posterior rotation of the entire mandible and can improve the intermaxillary relationship.In Class III cases of the mesio or brachy facial type, where the tendency of mandibular protrusion is strong, this force system is also effective for improving the facial profile. Furthermore, change of the occlusal plane is highly effective in altering the direction of mandibular growth during the growth phase. In other words, it is important to actively initiate active treatment at the peak of growth and development to avoid surgical orthodontics.However, in dolicho facial cases, the mandible rotates posteriorly very easily; therefore, while treatment is straightforward if the sole objective is to improve anterior overjet, one must be cautious as this may exacerbate the skeletal dolicho facial tendency. Particularly in cases where a long face is a primary complaint, it is advisable to consider surgical orthodontics instead.

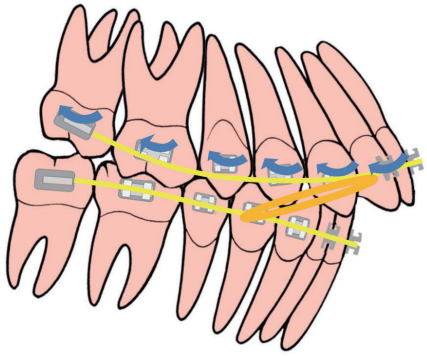
Angle Class Ⅱ Div. 1 Treatment

1



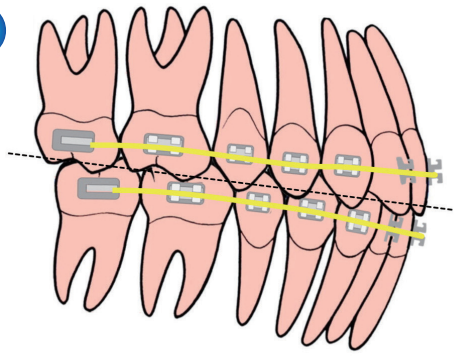
The force system used in Class II Division 1 treatment is derived from the so-called non-extraction cases described in the Tweed method. Specifically, it prioritizes stabilization of the mandible—achieved primarily through uprighting of the posterior region and reduction of the Spee curve via intrusion of the mandibular anterior teeth—followed by occlusal elevation.During this process, if eruption of the mandibular molars occurs, the mandible will rotate posteriorly, leading to a deterioration of the skeletal pattern; therefore, sufficient attention must be paid to vertical control, including the use of active torque.

2



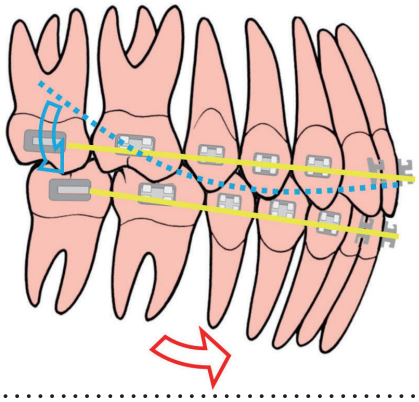
Align the entire dentition en bloc by combining maxillary uprighting, intermaxillary elastics in the central region (avoid intermaxillary elastics originating from the mandibular molar region, as they tend to cause mandibular retrognathism due to extrusion), and lateral expansion.For both the maxilla and mandible, use .018 x .022 GUMMETAL wire with a tip-back bend of approximately 45° and 30° of active torque (Type 2); for Class II intermaxillary elastics, approximately 3/16" 4.5 oz is appropriate.

3



Once the maxillary dentition has been uprighted, reduce the tip-back bend of the maxillary wire and extrude the maxillary molar region in a direction that aligns with the already flattened mandibular dentition to achieve a flat occlusal plane.

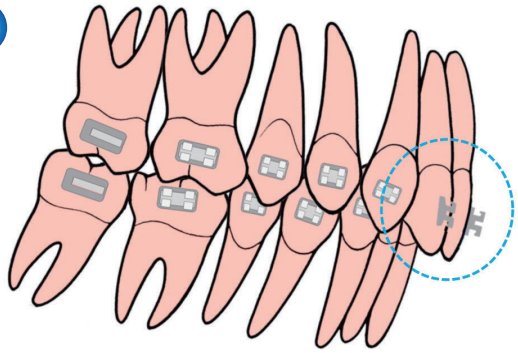
4



Jaw position is altered by eliminating anterior dental dysfunction through occlusal elevation and flattening the occlusal plane. If systemic growth and development can be utilized, occlusal stability can be easily achieved.

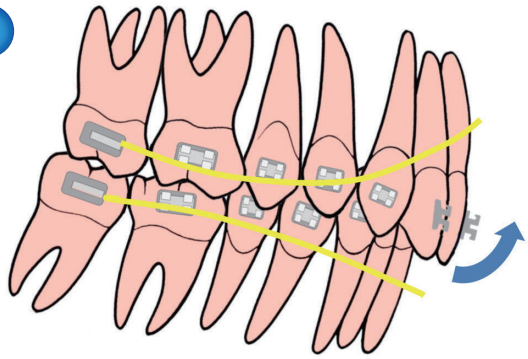
Angle Class II Div. 2 Treatment

1



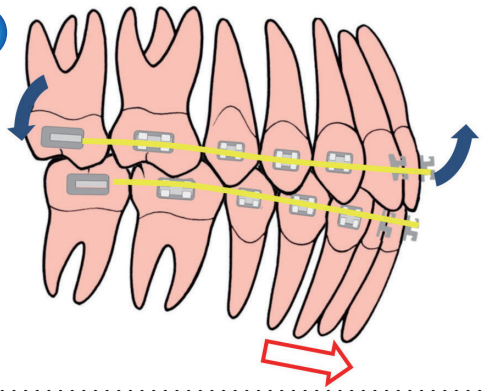
Class II Division 2 cases are considered to be in a state where the disorders caused by deep overbite and lingual inclination of the maxillary anterior teeth. Therefore, the elimination of these functional disorders can be considered the primary goal.

2



Use GUMMETAL wire with a size of .018 x .022 or larger to apply vertical control ”en bloc”. In the maxilla, apply Type 1 that does not have active torque in the anterior region, or apply active labial crown torque depending on the lingual inclination of the tooth axes.In many cases, as the functional disorder improves through the intrusion and labial tilt of the maxillary anterior teeth and the elimination of the mandibular Spee curve, the mandible naturally adopts an anterior position. Furthermore, since most Class II Division 2 cases are of the brachy-facial type, there is no need to be overly concerned about mandibular retrognathism accompanying molar extrusion.

3



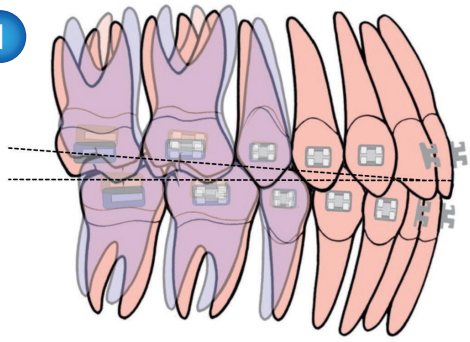
Toward the end of treatment, reduce both the tip-back bend and active torque to achieve intercuspation. To account for relapse, overcorrect the anterior overbite to approximately an edge-to-edge position.

Generally, regardless of whether it is division 1 or 2, Angle Class II malocclusion is, as defined by Angle, a “mandibular retrusion,” and cases involving an anteriorly positioned maxilla are extremely rare. Particularly in Class II Division 2 cases, there are many instances where jaw position changes and intermaxillary relationships improve simply through occlusal elevation and uprighting of the anterior teeth. Longterm stability can be expected not only in patients of an age where growth and development can be utilized but also in adult cases through measures such as extending the retention period.

In Class II Division 1 cases as well, mandibular retrusion is the primary cause, and the focus of treatment is on improving mandibular position through uprighting of the maxillary dentition and flattening of the occlusal plane.Difficult cases include Class II Division 1 of the dolicho facial type, which are prone to molar extrusion accompanying tooth movement, often resulting in mandibular retrognathism,worsening of the dolicho facial tendency, and rabbiting. Since the growth potential of the mandibular condyle is limited, it is difficult to achievea clear improvement in jaw position; however, utmost care must be taken to at least prevent the skeletal pattern from deteriorating.

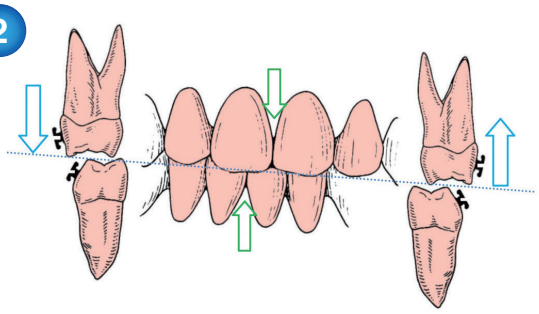
LDM (Lateral Displacement of Mandible) Treatment

1



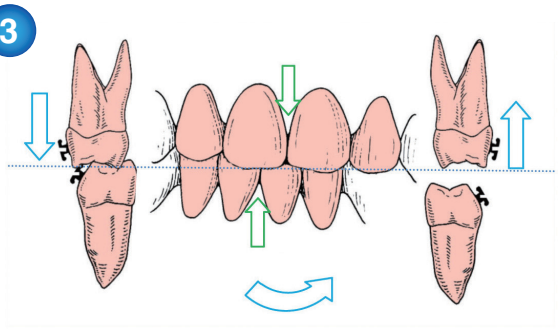
Unless there is a specific reason, mandibular lateral displacement is caused by an inclination of the occlusal plane resulting from a bilateral difference in occlusal vertical dimension, and the mandible is displaced in the direction of this inclination. Since the presence or orientation of the third molars is often related to this bilateral difference in occlusal vertical dimension, they should be extracted prior to treatment.

2



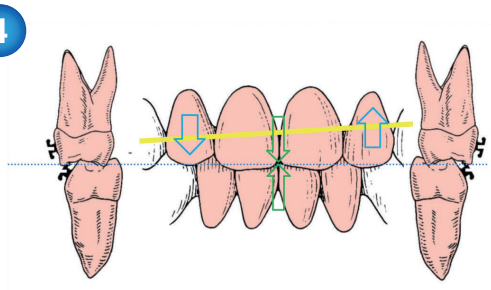
Since midline deviation results from asymmetry in the occlusal plane, the priority is to establish vertical control in the left and right posterior teeth to align the vertical dimension.

3



By applying different tip-back bends to the left and right sides of a Type 1 archwire and controlling the occlusal plane to align the occlusal vertical dimension, the mandible will inevitably be forced to shift toward the contralateral side.

4



Since vertical control in the posterior teeth always generates a reaction force opposite to the anterior tooth axis, an artistic bend is applied in the final phases to align the anterior tooth axis.

Mandibular lateral displacement is often caused by discrepancy in the posterior teeth. To resolve this discrepancy prior to active treatment, the maxillary third molar—and in some cases, the second molar—is extracted to eliminate asymmetry discrepancies in the occlusal plane. Given the nature of this condition, treatment often begins after puberty, and since some degree of relapse is inevitable, we aim for long-term occlusal stability by overcorrecting as much as possible.

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