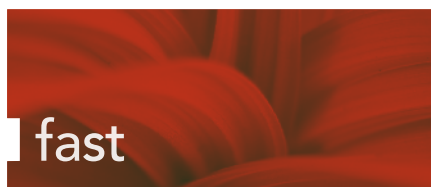


THE CARRIERE® DISTALIZER™ WORKBOOK

Shifting the way you think about orthodontics.



A Message from Dr. Carrière



The *Carriere*® *Distalizer*™ Appliance is a biominimalist appliance of unqualified simplicity.

It operates on the premise that achieving a Class I relationship before correcting individual tooth positions is of strategic importance in simplifying Class II cases being treated nonextraction. This protocol eliminates competing force vectors inherent in traditional Class II correction when traction is combined with fixed appliance treatment.

In developing the *Carriere Distalizer* Appliance, I was intent on creating a device that mimics the body's natural processes using a noninvasive technique to stimulate distalization of the entire buccal segment as a unit. This biomimetic approach is the result of research that takes advantage of the most advanced 3D computer technologies. It represents an evolution of Dr. José Carrière's protocol, which is based on the principle of dental movement using available space. It consists of creating space by a distomesial sequence, transverse arch development, or a combination of both, according to the diagnostic needs prior to movement of the anterior segment in Class II nonextraction cases.

Clinical experience indicates that compared with Class II elastics traction used on fully bonded arch, the *Carriere Distalizer* Appliance can resolve the posterior segments of Class II malocclusions in three to five months, reducing the total treatment time by 35% to 40%. It has also opened new vistas for a more conservative and simplified approach to Class II cases that would have previously required extractions. My hope is that clinicians around the world will find it an invaluable adjunct to their clinical armamentarium.



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¹ Carriere, J.: *The Inverse Anchorage Technique in Fixed Orthodontic Treatment*, Quintessence Publishing Co., Chicago, 1991.

Class II Correction to a Class I Platform

The *Carriere Distalizer* Appliance: Achieving Class I Prior to Tooth Positioning

One philosophy for simplifying the nonextraction treatment of certain Class II cases is to achieve Class I occlusion in the posterior segment prior to correcting individual tooth positions. This protocol uncomplicates treatment by eliminating the collateral distorting vectors and internal binding forces that traditional corrective methods create when Class II traction is combined with successive wire activations via fixed appliances.

The *Carriere* philosophy espouses this approach. The *Carriere Distalizer* Appliance is utilized to correct cases to a Class I Platform during the initial phase of treatment—when patient compliance is at its best—for the macro correction of the occlusion. The clinician can then finish the case with the fixed or aligner appliance system of choice.

While Angle considered the molar relationship the primary reference for defining a Class I occlusion, the *Carriere* methodology subscribes to a comprehensive definition of Class I referred to as the Class I Platform: perfect buccal segment intercuspsation from cuspids to molars in which centric relation coincides with centric occlusion.

When maxillary and mandibular cuspids occlude properly in Class I relationship, the buccal segment can establish itself naturally in Class I if the maxillary first molars are properly distally rotated. Research indicates, however, that 83% of maloccluded patients present with mesial rotation of the maxillary first molars.² This phenomenon results from the maxillary first molars displacing naturally into the mesial leeway left after the exfoliation of the deciduous maxillary second molars. When a maxillary first molar is mesially rotated, the rhomboidal geometry of its anatomy causes it to occupy additional arch length that precludes the cuspid from occluding in Class I. It also creates an unbalanced occlusion with the opposing arch, suggesting a tooth size discrepancy, which it is not (Figure 1).

A primary means of achieving perfect intercuspsation between the maxillary and mandibular cuspids and molars is recovering this space by correcting the first molar rotation and mesial inclination, then distalizing the buccal segments. With this correction, the distal cusp of the maxillary first molar will match with the embrasure of the first and second mandibular molars and bicuspsids and cuspids will occlude in a perfect Class I Platform. Such intercuspsation offers a valuable point for stability in preventing relapse to the original Class II or in inducing the maxillary cuspids to push against the distal inclines of the mandibular cuspids, causing mandibular incisor crowding.³



Figure 1

When maxillary first molars are mesially rotated, they occupy arch length that precludes cuspids from occluding in Class I relationship. Recovering this space allows the cuspid and buccal segment to establish itself in Class I.

² Henry, R.G. *Relationship of the Maxillary First Permanent Molar in Normal Occlusion and Malocclusion*. Am J Orthod. Dentofacial Orthoped. 1956; 42: 288-306.

³ Stoller, A. E. *The Normal Position of the Maxillary First Permanent Molar*. Am J Orthod. Dentofacial Orthoped. 1954; 40: 259-271.

Biomechanics of the Appliance

Tooth Movement that the *Carriere Distalizer* Appliance Fosters

The challenge inherent in employing traditional Class II correctors for distalizing the buccal segment is controlling the unwanted effects of reciprocal movement. These challenges include maxillary molar tipping, maxillary bicuspid anchorage loss and mandibular incisor proclination. The *Carriere Distalizer* Appliance is designed to cultivate cuspid and buccal segment distalization that precludes such undesired side effects (Figure 2a-d) as well as offer technique simplicity and ease of delivery. It is based on the innovative biomechanical concept of "free but controlled" tooth positioning.

The primary biomechanical objectives for the *Carriere Distalizer* Appliance are to:

- Provide controlled rotational movement of the maxillary first molar around its palatal root.
- Upright the maxillary first molar.
- Create a uniform biomimetic force to obtain univectorial dental displacement.
- Distalize the maxillary posterior segment (cuspid to molar) as a unit while controlling for unwanted torquing and tipping.
- Require only a light force to be activated yet be completely passive when traction is not being employed.
- Respect periodontal structures.
- Establish a Class I Platform from which the clinician can finish the case simply and efficiently using the finishing appliance of choice.

The cuspid and first molar have different positions in the dental arch and so require an individualized approach to their dental displacement inside the alveolar bone. Because of this situation, the biomechanical design of the *Carriere Distalizer* Appliance fosters the expression of two completely different types of movement.



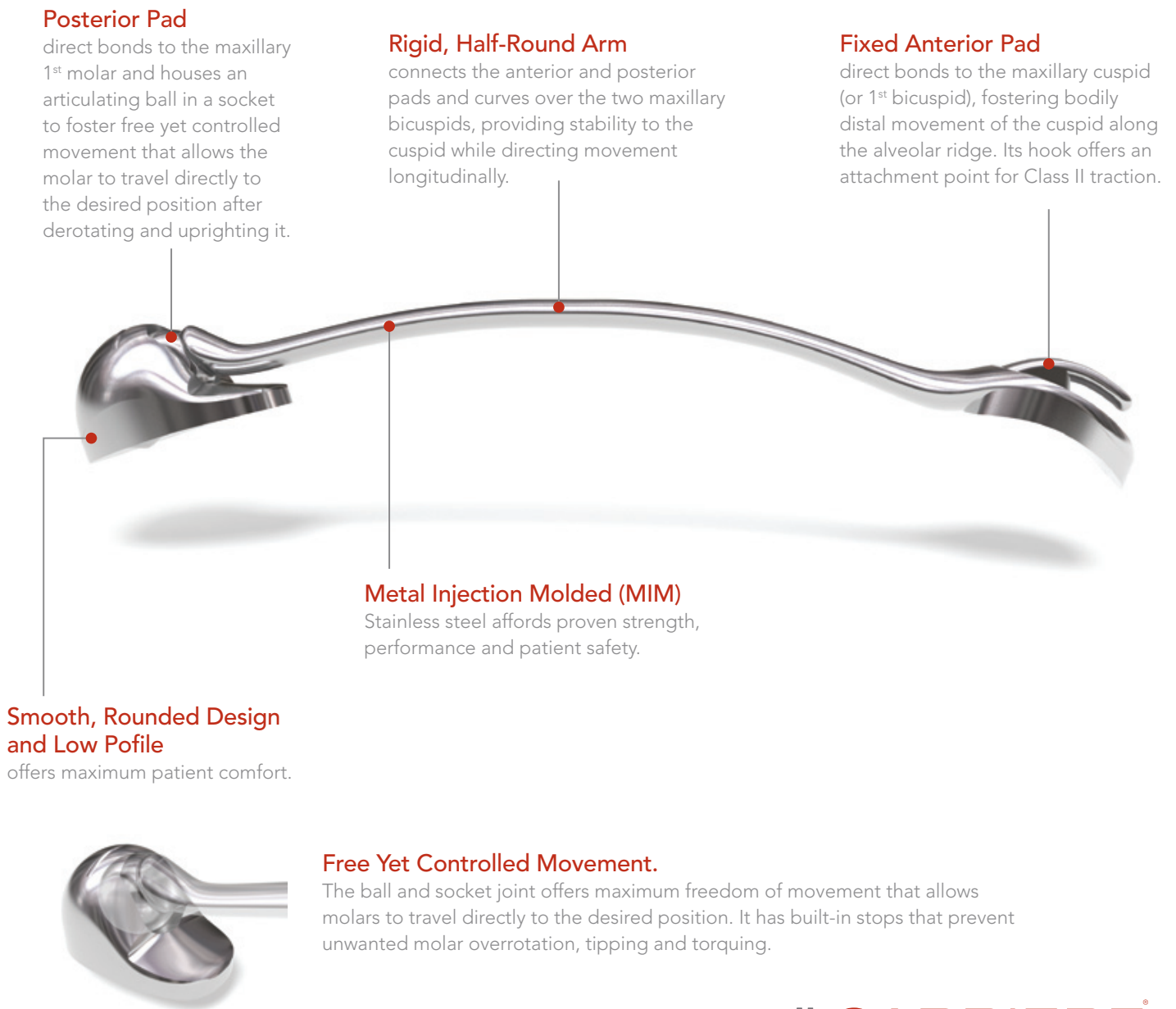
Figure 2a-d

The *Carriere Distalizer* translates the maxillary cuspid and buccal segment as a unit after derotating and uprighting the maxillary 1st molar, providing a platform for the cuspid and buccal segment to occlude in Class I.

Cuspid Movement

The maxillary cuspid requires a bodily movement along the corner of the alveolar ridge with inclination control of its longitudinal axis. The portion of the distalizer attached to it has to be a fixed element that provides stability to the tooth itself while simultaneously directing movement longitudinally and distally. The anterior pad of the *Carriere Distalizer Appliance* that attaches to the maxillary cuspid (or first bicuspid if the cuspid is inaccessible) is a rigid half-round arm that affords this stability (Figure 3). The arm then curves posteriorly over the bicuspids, ending as an articulation ball within a socket on the posterior pad, which direct-bonds to the maxillary first molar.

Figure 3. The *Carriere Distalizer Appliance*



To prevent the tendency for relapse, it is important to surpass the neutroclusion of the cuspids to a Super Class I by continuing the distalization process until the distal incline plane of the maxillary cuspid establishes a contact against the mesial incline plane of the mandibular first bicuspid (Figure 4a). Once accomplished, and the clinician has removed the distalizer and bonded the arches with the fixed appliance of choice to finish treatment, it is necessary to ligate the distalized teeth under the archwire using a .012" stainless steel ligature wire tied in a figure-8 from the maxillary cuspids to the maxillary first molars, maintaining the consolidation throughout the remainder of treatment (Figure 4b). If you are using aligners to finish treatment, you will follow the protocol outlined in Full Esthetic Treatment on page 17.



Figure 4a-b

To prevent relapse, it is important to continue distalization until the cuspids are in Super Class I (a), then, after bonding the case, consolidate the distalized teeth for the remainder of treatment (b).

First Molar Movement

The maxillary first molar requires a triple movement: distal rotation around its palatal root and controlled distal displacement while preventing the distal tipping of its crown and even uprighting if need be. Obviously, the *Carriere Distalizer Appliance* must first derotate and upright the molar so that the distalizing movement can proceed unfettered. Once the molar uprights, the articulation of the ball within the socket prevents unwanted distal tipping (Figure 2).

In true biomimetic design, the ball and socket imitates the body's hip joint. This joint provides maximum freedom of movement with minimal friction while causing the molar to travel directly to the desired position after derotating and uprighting it. There are several predefined points that stop movement for controlling undesired consequences. Polar cuts on the ball articulate with flat surfaces in the socket at a maximum orientation of -15° to the longitudinal axis of the arm, which act as a stop, limiting undesirable movements and providing torque control over the cuspid and molar (Figure 5a-b). When the molar has derotated, the mesial shoulder of the posterior base contacts an eminence in the distal end of the arm that runs between the anterior and posterior pads, preventing overrotation. While the movement of the molar is independent and qualitatively different from the movement of the cuspid, it must also be coordinated with it in order to express a simultaneous response as a unit.



Figure 5a-b

This image (a) depicts the posterior pad of the *Carriere Distalizer Appliance* in a position that fosters molar derotation. When the molar has derotated, the shoulder of the posterior base contacts the mesial arm to prevent overrotation and unwanted tipping and torquing (b).

Indications

Primary Indications

The *Carriere Distalizer* Appliance is ideal for treating growing patients and effective for treating adults. Clinicians can usually expect the same amount of distalization and molar rotation in adults as children although, as one would expect, treatment time for adults will be longer. On average, adult distalization takes five months; growing children, three months.

Brachyfacial patterns respond best to this treatment followed by mesofacial patterns; dolichofacial types are less responsive. The *Carriere Distalizer* Appliance is indicated in the following types of cases if deemed to warrant nonextraction therapy:

- Class II malocclusions, both division 1 and division 2, symmetrical or asymmetrical.
- Class I and pseudo Class I cases with mesially positioned maxillary molars.
- Class II mixed dentition and adult cases with maxillary dentoalveolar protrusion.
- Phase I treatment of mixed dentition Class II cases with fully erupted maxillary first molars. In these cases, the deciduous cuspids must be in good position to hold the anterior segment of the appliance.

Secondary Indications

The *Carriere Distalizer* Appliance can be used creatively in the treatment of:

- Class I and Class II cases in which four extractions would seem necessary. In such cases, the number of extractions can often be minimized and a more esthetic facial result achieved.
- Unilateral Class II cases.
- Space recovery for retained maxillary cuspids in Class II cases, unilaterally and bilaterally.

Anchorage

Possible Sources of Anchorage

To avoid protrusion of the mandibular incisors during activation of the *Carriere Distalizer Appliance*, clinicians must determine an adequate source of anchorage based on each patient's skeletal and neuromuscular pattern (Figure 6). A sound diagnosis for the proper selection of anchorage is a fundamental requirement to prevent anchorage loss. There are four primary sources for establishing anchorage that will each be discussed:

- A passive mandibular lingual arch with molar tubes welded buccally and lingually on mandibular molar bands;
- A mandibular Essix appliance with direct-bonded buccal tubes on the mandibular molars (the preferred method);
- Full mandibular fixed appliances with direct-bonded buccal tubes on the mandibular molars;
- Temporary anchorage devices (TADs).



Figure 6

Once the distalizer is bonded, a Class II elastic attaches from the 1st mandibular molar or TAD to the hook of the anterior segment of the appliance bonded to the maxillary cuspid or first bicuspid if the cuspid is inaccessible.

Forming the Passive Lingual Arch

A mandibular lingual arch to sustain Class II elastics traction is one means of preparing anchorage for the *Carriere Distalizer Appliance* and is particularly suited to patients with strong musculature. A .036" lingual arch adapted to the mandibular dental anatomy must run passively from first molar to first molar (second molars if they have erupted.) When second molars are fully erupted, it is advisable to band them (with buccal tubes) in order to obtain the maximum amount of force from elastics and create better anchorage resistance.

The clinician must remain vigilant that the lingual arch does not create protrusion of mandibular anteriors. The archwire must remain completely passive in order to disallow reciprocal movement of the mandibular dentition. It must also fit the length of the arch exactly and be perfectly adapted anatomically; otherwise, spaces will emerge between the mandibular incisors, an indication of anchorage loss. Clinicians must monitor and control against rotations and torque changes in the mandibular molars at every appointment. Patient acceptance of the lingual arch is excellent: it is invisible, comfortable, requires minimal patient care and is hygienic.

Materials to Fabricate (Figure 7)

- .036" lingual archwire
- .036" lingual arch pliers
- Edgewise pliers
- Wax pencil
- Patient's model



Figure 7

Procedure to Fabricate

1. Shape the archwire from cuspid to cuspid to lie flat above the cingulum of the incisors.
2. At the juncture between the cuspids and bicuspids, make a 45° bayonet bend slanting downward and inward so that the wire runs along the middle third of the bicuspids (Figure 8).
3. Just mesial to the first molar, make another 45° inward bayonet bend in the wire and shape it to insert in the lingual molar tube bonded to the first molar (Figure 9).
4. With a wax pencil, mark the model at the distal end of where the lingual tube will fit. Note: The other white wax pencil marks demonstrate the points where a compensating bend is made (Figure 10).
5. Recurve and compress the distal end of the lingual arch into a bend for insertion into the lingual molar tube (Figure 11).
6. Apply pressure to this distal bend using the tips of the lingual arch pliers. There are two channels at the end of the lingual pliers that fit over the recurved bend. Recurve the distal bend over itself again to make a second bend (Figure 12).
7. Compress the bends again to retain the lingual arch (Figure 13).
8. Closeup of the distal end of the lingual arch that is inserted into the lingual molar tube (Figure 14).
9. Occlusal view of an ideal lingual archwire shaped and placed passively over a dental model (Figure 15).



Figure 8

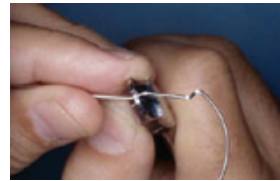


Figure 9



Figure 10

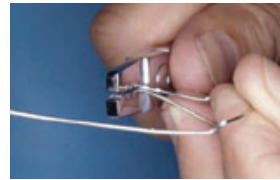


Figure 11

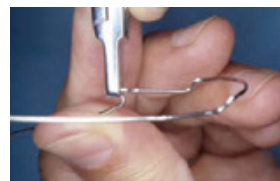


Figure 12

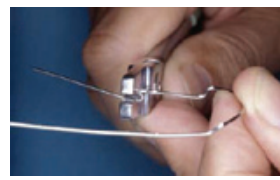


Figure 13



Figure 14



Figure 15

Note: Ortho Organizers also sells a pre-fabricated kit (PN 032-060).

Mandibular Essix Appliance

The Essix appliance (Dentsply Raintree Essix, Sarasota, FL, USA) provides a very good source of anchorage for Class II elastics traction. It unlocks the occlusion, is highly efficient and has become the anchorage method of choice for most clinicians (Figure 16a-b). It must be worn full time except during meals and is particularly applicable to patients with weak musculature. The recommended material is A+ with .040" (1 mm) thickness.



Figure 16a-b

The Essix appliance (a-before and b-after distalizing treatment) has become the most popular choice for anchorage with the *Carriere Distalizer* Appliance.

Essix Fabrication

1. Bond buccal tubes with hooks onto the buccal surface of the mandibular first or second molar.
2. Cut a window in the thermoformed Essix appliance to allow the buccal tubes to protrude.
3. To provide maximum traction and maintain the appliance in position:
 - a. Ensure it fits properly to the dental arch or
 - b. Fabricate the appliance with small composite wedges bonded to the buccal surfaces that fit over the mandibular bicuspids.

Fixed Appliances Bonded on the Mandibular Arch

For patients who present with a severe curve of spee or mild crowding in the mandibular arch, it is advisable to bond brackets to the mandibular dentition to prepare anchorage for supporting Class II traction. After leveling the case with round wires, advance to a .016" x .025" dimension archwire and then to a .019" x .025" *Bio-Kinetix™* Archwire before attaching the Class II elastics.

Temporary Skeletal Anchorage (Temporary Anchorage Devices or TADs)

A variety of temporary anchorage devices (TADs), such as miniimplants, miniplates and miniscrews, are designed with heads that offer mechanisms to receive the insertion of elastics for anchorage maintenance (Figure 17). Examples include Infinitas™ (DB Orthodontics, West Yorkshire, UK) and ST Bone Anchor (Surgi-Tec, Ghent, Belgium) and, as shown in the case below, VectorTAS™ (Ormco, Orange, CA, USA).



Figure 17

TADs are designed with heads that offer mechanisms to receive the insertion of elastics for anchorage maintenance. Case image courtesy of Dr. Dave Paquette, Charlotte, North Carolina, USA.

In the maxilla. For noncompliant patients, the suggested TAD placement is in the maxillary arch using NiTi coil springs or permanent elastics for traction. It is best positioned between the first and second molar at the mid to apical height of the buccal side of the bone, following the direction of the axis of these teeth. In this position, the TAD is actually placed in the prominent arched border of the zygomatic process in which the cortical bone density is more reliable to hold traction. This placement will prevent the TAD from coming into contact with the molar roots as the teeth distalize. The recommended TAD length for placement in this position is 10 mm to 12 mm.

In the mandible. The suggested TAD placement in the mandibular arch is between the first and second molar where there is adequate dense cortical bone to hold the Class II elastic traction. The recommended TAD length for this position is 8 mm.

Delivering the Appliance

Sizing the Appliance

Measure for the appropriate size distalizer by using calipers or the disposable *Carriere Distalizer Appliance Ruler* provided with the appliance. There are 22 sizes available to accommodate the majority of case requirements for bonding from cuspid, or first bicuspid, to first molar.

Taking the Measurement

1. In cases with accessible cuspids, take the measurement from the buccal surface midpoint of the maxillary first molar to the midpoint of the maxillary cuspid crown (Figure 18).
2. In cases with an inaccessible high cuspid when the second maxillary molars are present, take the measurement from the buccal surface midpoint of the first molar to the buccal surface midpoint of the first bicuspid. The appliance can then be bonded to these teeth so that the posterior teeth can be distalized to provide space for the blocked-out cuspid.
3. Use the measurement to choose the appropriate size appliance. When the measurement is between two sizes (e.g., between 24 mm and 25 mm), select the appliance size based on the amount of rotation desired:
 - a. For more rotation, select the smaller size.
 - b. For less rotation, select the larger size.

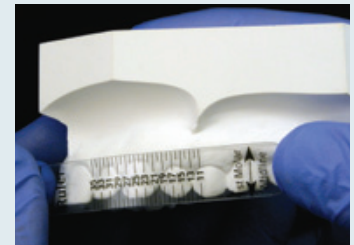


Figure 18

Appliance Selection

R = Right *Distalizer Appliance*

L = Left *Distalizer Appliance*

Prepping the Teeth for Bonding

1. **Isolate** the area being bonded.
2. **Clean** the teeth being bonded with prophylaxis paste (Figure 19).
3. **Rinse** the teeth thoroughly with water (Figure 20).
4. **Dry** the teeth with air (Figure 21).
5. **Etch** the surfaces of the teeth being bonded appropriate to the adhesive selected (Figure 22).
6. **Rinse** the teeth thoroughly with water (Figure 23).
7. **Dry** the etched teeth with a brief air burst. Ensure that the entire isolated area is dry (Figure 24).
8. **Prime** the teeth being bonded with a uniform coating of primer/sealant (Figure 25).



Figure 19



Figure 20

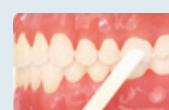


Figure 21

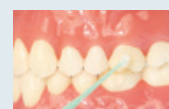


Figure 22

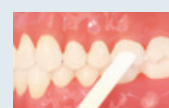


Figure 23



Figure 24

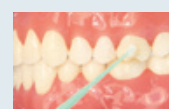


Figure 25

Bonding the Appliance

1. Adhesive Application

- a. Using a locking hemostat, forceps or tweezers, grasp the distalizer by the arm (Figure 26a) and coat both pads of the appliance with a small amount of light-curing adhesive, covering them completely (Figure 26b).

2. Placement

- a. Use the instrument to position the appliance onto the appropriate teeth, placing the posterior pad first and then the anterior pad.
- b. There is a vertical line engraved on the posterior pad to be used as a reference in aligning the pad coincident with the longitudinal axis of the molar. Position the posterior pad in the center of the buccal surface of the molar. In cases of exaggerated mesial molar rotations, the arm of the distalizer can open laterally up to 45°, easing placement.
- c. Position the anterior pad on the mesial third of the vestibular surface of the crown of the cuspid or first bicuspid (not on the midline).

3. Alignment

- a. Using the placement instrument, align the pads on the tooth surfaces (Figure 27).
- b. Generally, little if any adjustment to the curvature of the appliance arm is necessary.
- c. Using the placement instrument, remove excess adhesive from the tooth surface while maintaining the appliance alignment.

4. Light Curing

- a. Fully light cure the appliance pads, beginning with the molar, then the cuspid or bicuspid (Figure 28).

Caution

If the distalizer requires adjustment prior to placement, place it on a solid, flat surface and use gentle finger pressure on the middle of the arm (Figure 29). Do not use an instrument to adjust the bar or the pad. Avoid making repeated adjustments, bending and straightening the bar. Repeated bending will fatigue the appliance and may cause it to break. Avoid trying the appliance on the patient's teeth prior to bonding it; this action may contaminate the bonding pads with saliva.



Figure 26a



Figure 26b



Figure 27



Figure 28



Figure 29

If the distalizer requires adjustment prior to placement, place it on a solid, flat surface and use gentle finger pressure on the middle of the arm.

Activation

Attachment and Activation

Attach the Class II elastic from the selected source of anchorage, then stretch it to the hook provided on the maxillary anterior pad of the appliance. Activation can be initiated immediately after light-curing the appliance in place.

Elastics Traction

When the *Carriere Distalizer* Appliance is placed from the cuspid to the molar, use force 1, Class II elastics: 6 oz, ¼" (PN 424-9F1). When the *Carriere Distalizer* Appliance is placed from the 1st bicuspid to the molar, use force 2, Class II elastics: 8 oz, ⅜" (PN 424-9F2).

Instruct patients to wear elastics 24 hours a day except when eating because of the vertical force vector that opening the mouth while chewing produces. A predominantly vertical force vector may result in a mild extrusion of the cuspids during distalization. Night-time wear can compensate for this phenomenon because it produces a more horizontal vector of traction but will prolong the distalization period. Patients should change their elastics after each time they eat.

Scheduling

Appointment checks at 6-week intervals should take only a few minutes. Each is used to observe treatment progress, explain the progress to the patient and praise and/or encourage compliance.

Typical 6-Week Appointment Protocol

1st Visit: Use mirror and floss. Check cooperation and ensure that contacts are open in the maxillary anteriors.

- If using a lingual arch for anchorage, check the mandibular molar positions and monitor and control against unwanted torque changes and anchorage loss at each visit.
- Using an Essix appliance in the mandible or TADs for anchorage usually precludes the control problems that can occur with a lingual arch; however, you must still check the condition of these appliances and replace them, if necessary. TADs seldom fail; if they become loose, they can usually be tightened. With good compliance, there are seldom emergencies with an Essix appliance. As mentioned previously, the Essix appliance has become the preferred anchorage holding device for use with the *Carriere Distalizer* Appliance.

2nd Visit—Check cooperation visually with the mirror and monitor for unexpected side effects.

3rd Visit—Evaluate whether the case has progressed to a Super Class I position and it is time to remove the appliance.

- If so, schedule immediate removal and fixed appliance bonding or aligner fabrication and begin the transitioning steps, which are outlined later.

Delegation and Precluding Emergencies

Protocols associated with the *Carriere Distalizer* Appliance are highly delegatable depending on your jurisdictional laws, making it a highly efficient Class II corrector in terms of saving valuable doctor time.

There are seldom emergencies associated with the *Carriere Distalizer* Appliance because if one end of it becomes debonded, the patient will generally play with the appliance until the other end debonds. To preclude debonding, ensure that the appliance goes immediately from its packaging to placement. Do not determine the size of the distalizer by placing it in the mouth. Doing so contaminates the retention pad and compromises bond strength, which can cause debonding.

Patient Communication and Acceptance

Patient Acceptance

Patient acceptance of and cooperation with using the *Carriere Distalizer* Appliance has been exceptional. The maxillary incisors are free of appliances and unless the mandibular arch needs to be bonded for anchorage, the mandible wears only an invisible lingual arch or an Essix appliance, which are easily accommodated. Given its rounded contours, the distalizer itself is relatively comfortable to wear and is used in the first three to six months of treatment when compliance is best. Having said that, there are still techniques useful for encouraging compliance.

Encouraging Compliance. Each clinician has methods for garnering patient compliance. Here are suggestions that clinicians successful with the *Carriere Distalizer* Appliance have offered. Asking patients to make the choice between the *Carriere Distalizer* Appliance and bulky alternative appliances can be an effective means of gaining commitment especially when these appliances are also suggested as the contingency treatment for noncompliance. Moreover, being able to avoid bicuspid extractions and shortening overall treatment time by 35% to 40% are excellent incentives for a few months of elastics wear. Adolescents who are looking forward to wearing their braces can be encouraged to wear elastics for the proper amount of time because such compliance means that they will be wearing their braces sooner.

Patient Instructions

Celebrating Treatment Progress. You will necessarily advise patients to expect interincisal diastemas during this first stage of treatment and it is important to advocate the diastemas as something to celebrate—an important signal that the appliance is working.

Instructing About Elastic Wear. Because of the vertical force vector that opening the mouth while chewing produces, instruct patients to wear elastics at all times except when eating. A predominantly vertical force vector may result in a mild extrusion of the cuspids. Night-time wear can compensate for this phenomenon because a closed mouth produces a more horizontal vector of traction but this protocol will prolong the distalization period. Patients should change their elastics each time after they eat.

Discouraging Improper Tongue Habits. Instruct patients not to allow their tongue to get under the horizontal arm of the appliance. Doing so could result in lingual inclination of the maxillary bicuspids and vestibulization of the cuspids. Another habit patients must avoid is placing the tip of the tongue in the space that the distalization creates between the maxillary lateral incisors and cuspids. Mild inflammation at the mucogingival border of the maxillary cuspids is an indication of this habit, which may result in a widening of spaces mesial to the cuspids relative to the interincisal diastemas.

Handling Minimal Discomfort. Some patients may experience mild discomfort for the first three to five days after initial elastic activation. Once the initial discomfort subsides, however, it should not return. Recommend that patients chew as much as possible to alleviate soreness in the least amount of time. Some clinicians recommend mild anti-inflammatory medications, but rarely.

Establishing the Goal. Patients respond positively to feeling that they're in control of their treatment and will appreciate having a visual cue to recognize when they've reached their goal. To employ this technique, use a pencil to mark the crown long axis of the maxillary cuspid and the embrasure between the mandibular cuspid and first bicuspid (Figure 30), then inform the patient that they'll be able to tell that the distalization phase of their treatment is finished when the marks align.



Figure 30

Use a pencil to mark the crown long axis of the maxillary cuspid and the embrasure between the mandibular cuspid and first bicuspid so the patient will know when the distalization phase is complete and will feel more invested in their treatment.

Full Esthetic Treatment

Carriere Distalizer Appliance Correction Dovetails Ideally with Invisalign® for Finishing Treatment

The *Carriere Distalizer* Appliance is the perfect solution for patients who want Invisalign (Align Technologies, San Jose, CA, USA) or other clear aligner treatment but display a Class II malocclusion. The small profile of the *Carriere Distalizer* Appliance will satisfy most patients who are concerned about esthetics and after using it for the sagittal correction, the clinician is free to utilize any appliance system—including Invisalign—to complete treatment. Teenagers are predisposed to wearing Invisalign and easily understand how the *Carriere Distalizer* Appliance can jump start Class II treatment to provide the indiscernible orthodontic correction they seek.

Transitioning from the *Carriere Distalizer* Appliance to Invisalign

After removing the *Carriere Distalizer* Appliance and Class II elastics, transition to an Essix appliance in the maxillary arch until the Invisalign Aligners arrive. If you used a lingual arch or TADs for anchorage, transition to an Essix appliance for the mandibular arch as well. If you used an Essix appliance for anchorage in the mandibular arch, maintain it until the aligners arrive.

Taking Impressions for Invisalign Finishing Treatment

Clinicians take impressions for Invisalign and the Essix appliances by using PVS material for both or PVS for the aligners and alginate for the Essix appliance. If using PVS material for both (and/or for models), a high-quality product is recommended (e.g., for the heavy body: 3M/Espe Position™ Penta™ Quick impression material (a VPS alginate replacement); for the wash: 3M/Espe Imprint™ Garant™ Quick-Step Impression material).

Fixed Appliances for Finishing Treatment

Transitioning to Fixed Appliances for Finishing Treatment

When transitioning from the *Carriere Distalizer* Appliance to fixed appliances, it is advisable to have two bonding appointments. Bond only the maxillary arch at the first appointment. Run the round wire first molar to first molar and keep the lingual archwire or Essix appliance in the mandibular arch until the next appointment (for as much as 10 weeks). At the next appointment, you can then remove the lingual arch or Essix appliance and bond the mandibular arch. Of course, if you used fixed appliances for mandibular anchorage, you simply transition to fixed appliances in the maxillary arch. After removing the distalizer, it is important to ligate the distalized teeth under the archwire using a .012" stainless steel ligature wire tied in a figure 8 from the maxillary cuspids to the maxillary first molars, maintaining the consolidation until the end of treatment. It is necessary to ensure that the ligature wire remains completely passive to prevent the maxillary molars from derotating mesially.

Frequently Asked Questions

Indications

In this section we will present answers to questions in relation to the clinical use of the *Carriere Distalizer Appliance*. This section provides specifics as to the correct use of the device in order to prevent any issues that might appear if the appliance is not adequately applied.

Question: Are there borderline cases in which you would lean toward using elastics or IPR rather than the Carriere Distalizer Appliance?

Dr. Carrière: Since research indicates that 83% of maloccluded cases present with the maxillary first molar rotated mesially, I would use the *Carriere Distalizer Appliance* in such cases to create the space that allows the cuspid to occlude in perfect Class I.

Question: How would you address an open bite or a tendency toward open bite?

Dr. Carrière: Open bites are often a result of incorrect swallowing, chewing, speaking and tongue placement at rest. I would first train the patient to function correctly and place the tongue properly, then use the *Carriere Distalizer Appliance* for initial treatment.

Question: How would you address a skeletal Class II?

Dr. Carrière: If the patient is still growing, the *Carriere Distalizer Appliance* would be useful for a short period to time—for three months or so to take advantage of the active growth period.

If my diagnosis indicates that orthopedic treatment is advisable, I might attach a *Twin Force*® Bite Corrector to the distal portion of the horizontal arm of a *Carriere Distalizer Appliance* to take advantage of the *Twin Force*® Bite Corrector's noncompliant advancement of the mandible. By combining these appliances, two treatment modalities are at work: orthodontic via the *Carriere Distalizer Appliance*; orthopedic via the *Twin Force Appliance*. Additionally, the *Twin Force Appliance* provides the *Carriere Distalizer Appliance* noncompliant anchorage.

If, however, the Class II is pathological and the patient is not a good grower or has little growth capacity remaining, I would not use the *Carriere Distalizer Appliance* in its current configuration because my diagnosis would not indicate such a treatment approach.

Question: What is your protocol for using the Carriere Distalizer Appliance for early treatment?

Dr. Carrière: I bond the *Carriere Distalizer Appliance* to the maxillary first permanent molar and deciduous cuspid and shape a mandibular lingual archwire for anchorage, banding the mandibular first permanent molar (including a buccal tube and hook) for elastics traction. When the case reaches Class I, I remove the *Carriere Distalizer Appliance* and insert a Hawley plate to retrude the maxillary incisors while keeping the posterior segment in place. I maintain the lingual archwire and bands in the mandibular arch until the permanent teeth erupt to keep the space available so that when the second temporary molars are lost, there will be ample space to accommodate the mandibular bicuspids when they erupt, which fosters better alignment of the mandibular arch.

Question: Is the Carriere Distalizer Appliance an effective option to treat mandibular asymmetry?

Dr. Carrière: If the asymmetry is dentoalveolar, the *Carriere Distalizer Appliance* is a valuable treatment option. I would bond the *Carriere Distalizer Appliance* to the mandibular first molar and cuspid and use an Essix for anchorage in the maxilla with buccal tubes on the first or second maxillary molars for Class III elastics traction. Alternatively, I might bond the maxillary arch and use buccal tubes on the first or second molars for Class III elastics traction. After the cuspids come into Class I, I would bond the mandibular arch and center the midline, closing the spaces opened.

Question: Why is it important that the Carriere Distalizer Appliance be used to treat asymmetry cases?

Dr. Carrière: The *Carriere Distalizer Appliance* works independently in each side of the dental arches and the activation in each side can be selective in terms of amount and time of force application. While asymmetry does not appear in a high percentage of patients who present for treatment, few if any other distalizing appliances can deal effectively with asymmetry.

Loss of Anchorage/Unexpected Side Effects

Question: Describe an incidence of incorrect anchorage that could cause anchorage loss.

Dr. Carrière: One such case might include a patient in late mixed dentition whose deciduous molars are already lost but whose mandibular bicuspid are not yet in place to assist with maintaining anchorage when using a lingual arch. In such a case, the mandibular first molars could extrude, causing the archwire to tip lingually and inferiorly surpassing the cingulum, which produces anchorage loss and mandibular incisor protrusion. Sound diagnosis to determine appropriate anchorage selection is of paramount importance for *Carriere Distalizer Appliance* treatment.

Question: If a clinician continues to experience cuspid extrusion, what might be the cause?

Dr. Carrière: If patients continually experience maxillary cuspid extrusion, the culprit is either incorrect placement of the anterior pad of the *Carriere Distalizer Appliance* or the fact that the patient is maintaining elastic wear while eating, which creates a vertical vector of traction and causes an extrusive force.

Question: Is mild mandibular molar extrusion something that is to be expected?

Dr. Carrière: Mild mandibular molar extrusion, usually less than 1 mm, is to be expected and is easily recovered from normal muscular function and fixed appliances during the finishing treatment phase.

Sources of Anchorage

Question: Are there additional methods clinicians might use to increase anchorage when using a mandibular lingual archwire?

Dr. Carrière: For greater additional anchorage control, Dr. Clark Colville, Seguin, Texas, finds it valuable to include the second molar in the lingual setup by extending the archwire distally to the second molar, then up along the lingual groove onto the occlusal surface where it is bonded. This protocol not only increases anchorage, but it also disoccludes the posterior teeth to foster better distalization and prevent the first molar from tipping mesially and proclining the lower incisors (Figure 31a-b).

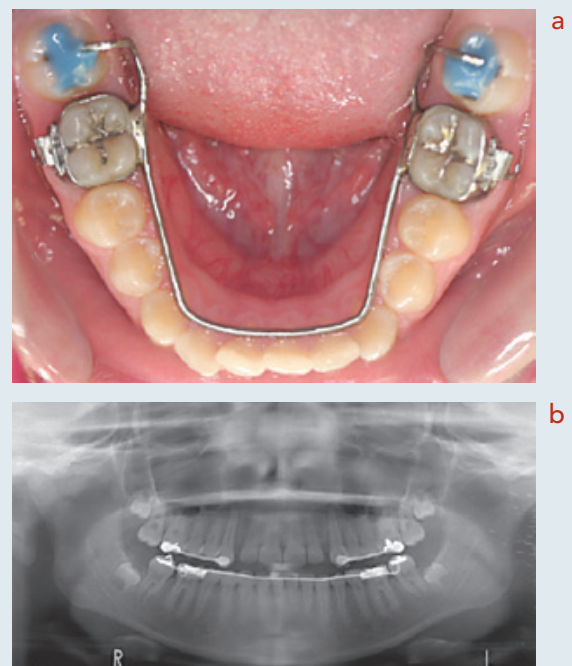


Figure 31a-b

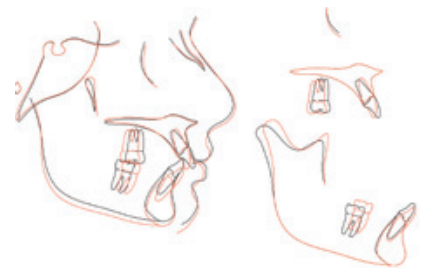
For greater anchorage control, it can be useful to extend the lingual archwire to the 2nd molar (or 1st bicuspid), bonding it occlusally. Case photos courtesy of Dr. Clark Colville, Seguin, Texas, USA.

Clinical Application

Cases

The cases presented in this workbook were treated with the *Carriere Distalizer* Appliance until they reached a Class I Platform, then they were finished with the *Carriere Self-Ligating Bracket* (SLB) fixed appliance system. Clinicians are free to utilize the fixed appliance or aligner system of their choice to complete treatment after using the *Carriere Distalizer* Appliance.

Pretreatment



Treatment Complete



Pretreatment



CASE I: Age 15 years.

Carriere Distalizer Appliance
Treatment, 10 weeks

Carriere Distalizer
Bonded



.014" *Nitanium*® NiTi Archwires, 10 weeks

.014" x .025" *Nitanium* NiTi Archwires, 8 weeks

.017" x .025" *Nitanium* NiTi Archwires, 8 weeks

.019" x .025" *Nitanium* NiTi Archwires, 8 weeks

Class I Achieved In
10 Weeks



.019" x .025" *CNA*® Beta Titanium
Archwires, 10 weeks

Total Treatment Time: 12.5 Months

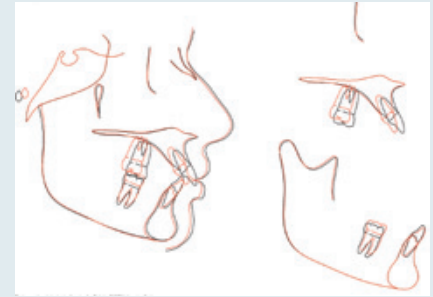
Carriere SLB
Treatment Progress



Treatment Complete
In 12.5 months



Pretreatment



Treatment Complete



Pretreatment



CASE II: Age 25 years,

Carriere Distalizer Appliance

Treatment, 12 weeks

.014" *Nitium NiTi Archwires*, 10 weeks

.014" x .025" *Nitium NiTi Archwires*, 10 weeks

.017" x .025" *Nitium NiTi Archwires*, 10 weeks

.019" x .025" *Nitium NiTi Archwires*, 14 weeks

.019" x .025" *CNA Beta Titanium*

Archwires, 16 weeks

Total Treatment Time: 17 months

Carriere Distalizer Bonded



Class I Achieved In 12 Weeks



Carriere SLB Bonded: Maxilla Only



Treatment Progress



Treatment Complete In 17 months



Products and Accessories

Carriere Oral Elastics



Complement the *Carriere Distalizer Appliance* with *Carriere Oral Elastics*, which were designed specifically to work seamlessly with this appliance and provide optimum results. These elastics are available in two different force levels for both stages of treatment, ensuring a smooth and timely transition to a Class 1 platform.

Carriere Self-Ligating Bracket System



Like the *Carriere Distalizer Appliance*, the *Carriere Self-Ligating Bracket (SLB)* satisfies the clinical need for delivering low orthodontic forces to stimulate efficient, biologically compatible tooth movement while creating the least amount of trauma for patients. Its passive, self-ligating mechanism creates a solid, four-walled lumen which allows beginning light, superelastic archwires to operate freely while providing continuous force of low magnitude. Cases benefit from the gentle stimulation of cellular activity without totally occluding the blood vessels in the periodontal ligament. Such occlusion impedes tooth movement and causes patient discomfort. With light forces, the surfaces of the periodontal structures that the orthodontic force histologically activates are lessened, minimizing the possibility for periodontal damage. As treatment progresses, superelastic edgewise wires in ever larger cross sections control teeth in three dimensions for effective torque expression and rotational control.

- Simple locking mechanism opens with a *Carriere Opener Tool™* and closes securely with a finger for quick archwire changes.
- Torque in base and compound-contoured pad provide the ultimate in precision, control and fit.
- Dual-lock fastener ensures the bracket slide remains closed throughout treatment.
- Beveled slot edges mesially and distally reduce friction and improve sliding mechanics.

Dr. Luis Carrière's Philosophy



Dr. Carrière's philosophy of working in harmony with the body—using precision engineering to achieve treatment-goals has led to a uniquely minimalist protocol for orthodontic correction. Using advanced computer modeling and a scientifically-based, systematic approach to treatment planning, Dr. Carrière has pioneered a treatment path that is conservative, efficient, and optimally effective. He is widely welcomed as a guest professor and lecturer at various orthodontic schools and professional meetings throughout Europe and the USA.



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