

# Clinical Success

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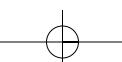
# Invisalign Orthodontic Treatment

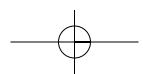
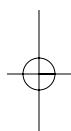
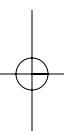
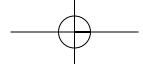
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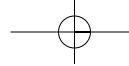
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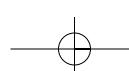


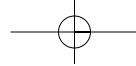
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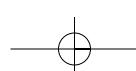


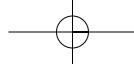
# Acknowledgements

This book would not have been accomplished without:

- The constant support of the author's family, despite his recurrent absence
- The editorial advice of Dr J.-M. Korbendau
- Dr A. Decker and his scientific and academic openness

The author would like to express his profound gratitude to all of them.





# Preface

This book was written to provide the reader a tool for daily clinical use of the Invisalign system. It offers a summary of the author's 8 years of clinical experience treating several hundred patients with this esthetic alternative orthodontic system that makes use of individualized and industrialized thermoformed polycarbonate overlay appliances called *aligners*. Clinical results obtained from various treatment types are shown, from the simplest to the most complicated cases, using aligners alone or in combination with other techniques, eg, fixed and surgical orthopedics or orthodontics.

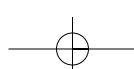
The Invisalign system is unique in that, in order to obtain an optimal result, the clinician must be capable of planning in advance, even before the onset of treatment, the totality of the treatment plan. The fabrication of a series of aligners then follows, corresponding to the desired treatment objectives. This system requires considerable knowledge of orthodontics and biology to establish a sound diagnosis, as well as an understanding of the biomechanics of the appliances to ensure satisfactory movement of teeth and maxillary and mandibular bone.

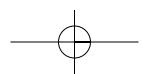
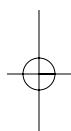
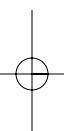
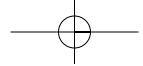
To move teeth, orthodontists initially used removable and later fixed appliances to control and minimize undesirable tooth movements in three-dimensional space. The Invisalign system, in which the aligners have intimate contact with nearly the entire surface of the tooth crown, attempts to bring together the best qualities of removable and fixed appliances. Moreover, it provides an esthetic touch and undeniable comfort as well as easy oral hygiene access for patients.

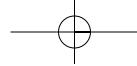
The computer-assisted design of tooth movements (performed in a program called *ClinCheck*) to be carried out by the aligners gives orthodontists a new and fascinating way to treatment plan: programming in advance every desired movement according to their own diagnostic practices, treatment insight, and knowledge of the aligners' biomechanics. According to their diagnosis and treatment plan, orthodontists can use ClinCheck to control:

- Velocity and direction of tooth movements
- Amount and frequency of force to be applied to these movements
- Anchorage and available space necessary for the planned movements

Through precise clinical cases, this book provides tools for ClinCheck application and management of space and anchorage required for desired tooth movements. It is not meant to be exhaustive, but rather a clinical introduction to this comfortable and effective orthodontic treatment concept.

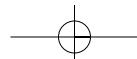


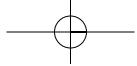




# The Invisalign Concept

1





## 4 • Diagnosis and Treatment Plan

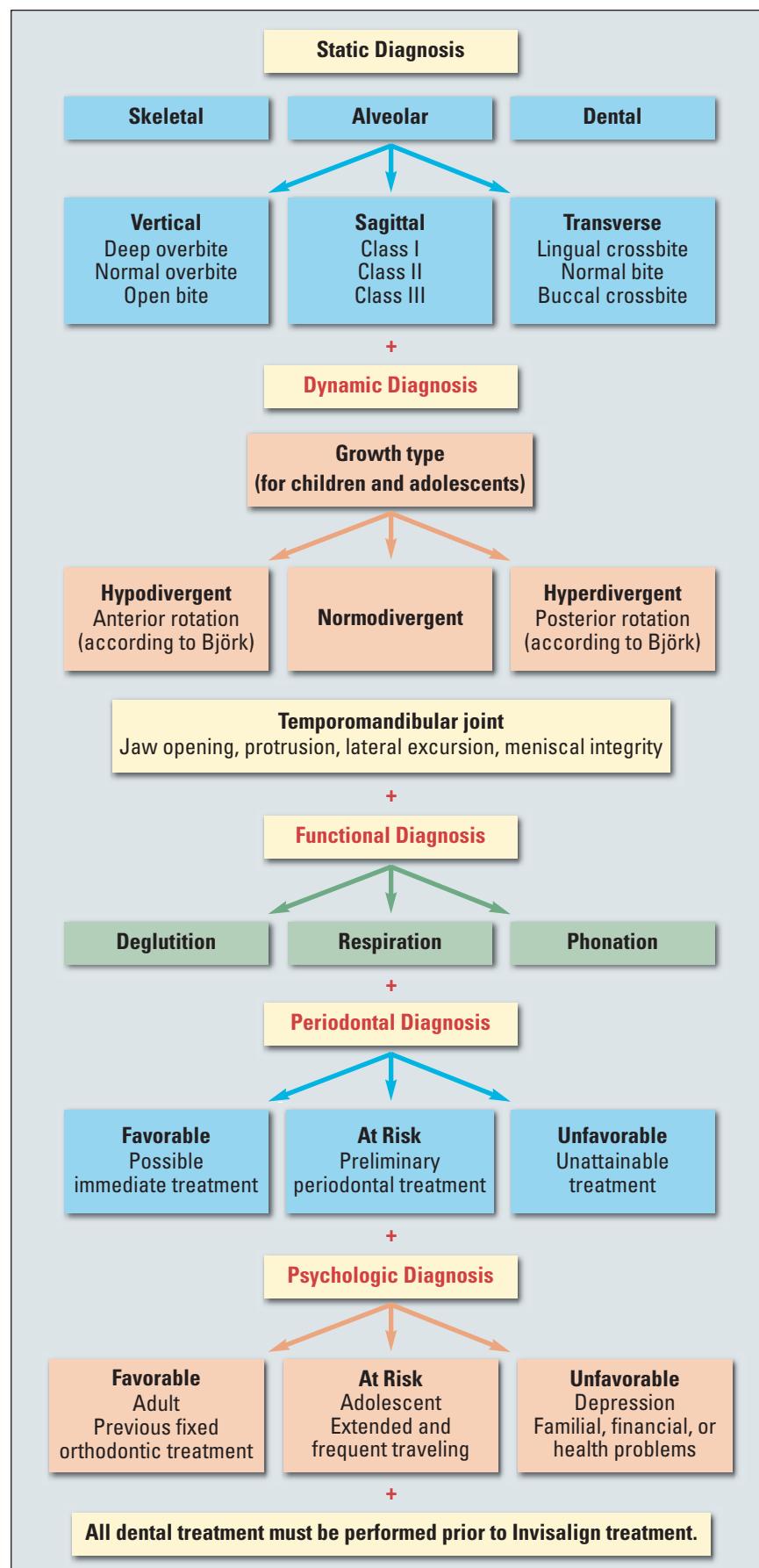
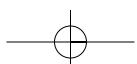
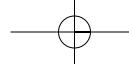


Fig 4-1 Diagnoses required prior to Invisalign treatment.





## Treatment Plan

**Step 1: Doctor and Patient Information**  
 Please fill in the necessary information and click "Next" to proceed. Note items marked with an orange asterisk \*\*\* are required.

Doctor		Shipping	
Name	Bouchez, Richard	Practice Name	Dr. Richard Bouchez
Billing Street	30-36 Place aux Bleuets	Practice Street	30-36 Place aux Bleuets
City	Lille	City	Lille
State		State	
Country	FR	Country	FR
Postal Code	59000	Postal Code	59000
Phone	(+33) 3 20 06 30 70	Phone	(+33) 3 20 06 30 70
Fax	(+33) 3 20 06 60 58	Fax	(+33) 3 20 06 60 58
Email	docteurbouchez@wanadoo.fr	Email	docteurbouchez@wanadoo.fr

**Patient**

\*Name (Last, First, MI) AA, AA,   
 \*Gender  Male  Female  
 \*Date of Birth 01 / 01 / 99  
 MM/DD/YY

**Treatment Type**

\*Order  Invisalign Treatment (Full)  
 Invisalign Treatment (Anterior)  
 Invisalign Express  
 Invisalign Teen

(Please refer to the [Invisalign Terms and Conditions](#))

**Next**

**Fig 4-2** Page 1: Information concerning the clinician and the patient as well as the type of treatment are entered. Note that the shipping address for aligners may be different from the billing address.

## Diagnosis

The clinician performs a series of diagnoses during the first patient consultation (Fig 4-1). This step is essential to determine the patient's risk. Orthodontists are already familiar with the need for this process from their training and daily practice. Nevertheless, it is worth restating that it is important to first make the diagnoses, then the treatment plan.

Once the diagnoses are made, the clinician then fills in online the treatment plan required by Invisalign for the creation of patient's ClinCheck setup.

## Treatment Plan

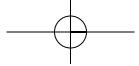
For those just starting out with Invisalign or in case of treatment doubt, Virtual Invisalign Practice (VIP) provides an assistant tool for treatment planning.

### Selecting a treatment type

Invisalign offers four treatment options:

- Full treatment (full arch treatment)
- 3–3 treatment (anterior teeth only—canine to canine)
- Express treatment (simplified variation of full treatment with at maximum 10 aligners per arch and 2 mm of correction of spacing, crowding, and dental midline)
- Teen treatment (for children and adolescents). This book will focus on the other three types of treatment.

The type of treatment must be determined from the beginning (Fig 4-2). In this and in all decisions you make as you are treatment planning, visualize the desired final result, and allow this to guide you. If the results achieved in the treatment simulation are unsatisfactory, a change from full to 3–3 treatment or vice versa is always possible during viewing and modifications of ClinCheck.



## 4 • Diagnosis and Treatment Plan

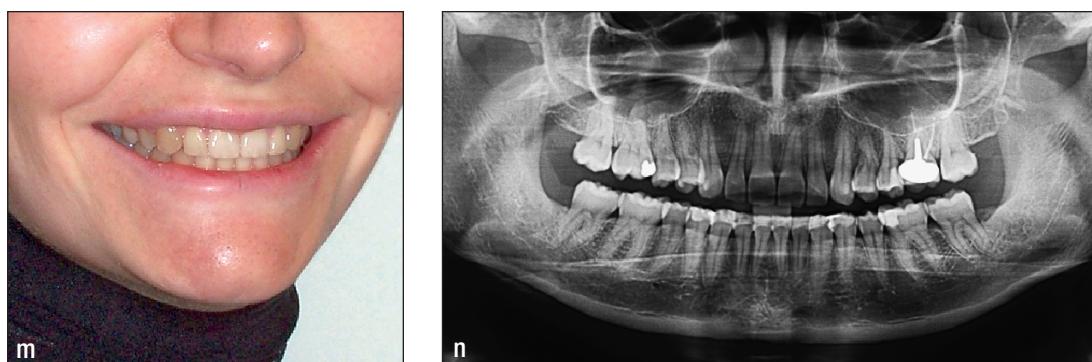


Fig 4-29 (m and n) Extraoral and radiographic results.

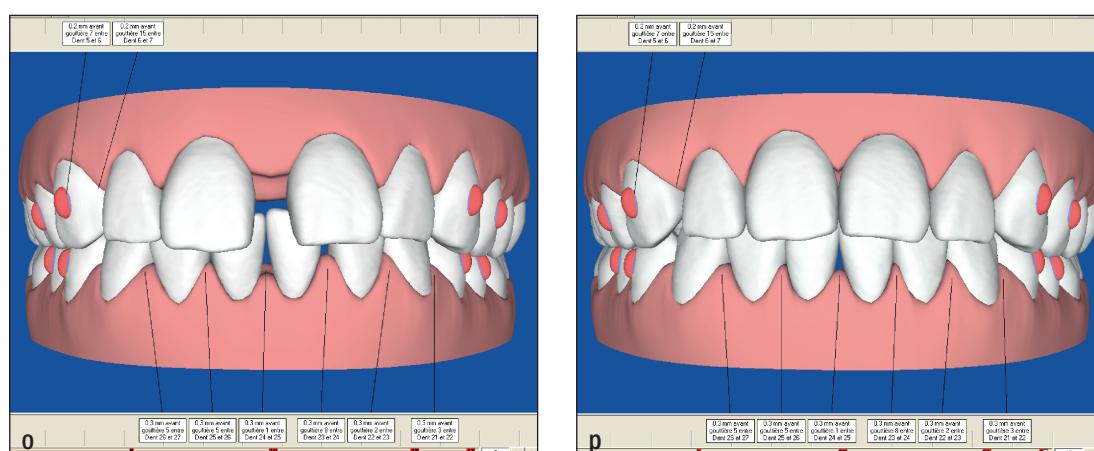


Fig 4-29 (o and p) Planning of mandibular incisor enamel reduction.



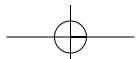
Fig 4-30 Prescription chart marked to leave space.

*Leave space (Fig 4-30)*

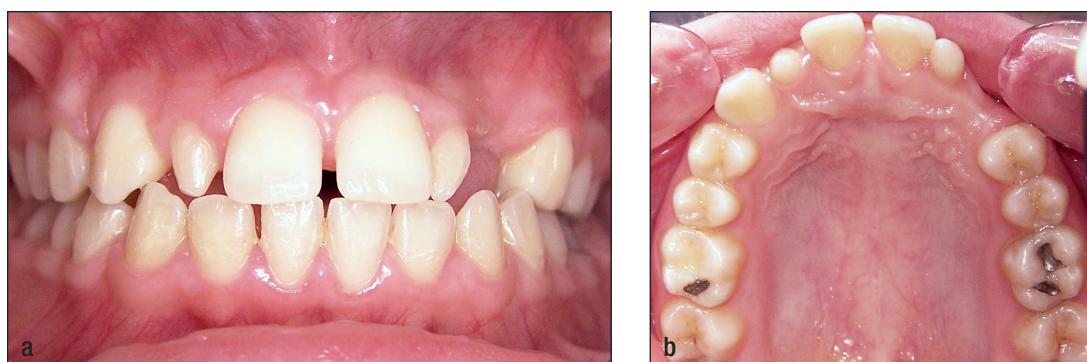
There are two reasons why space may be left:

1. Space is left for a therapeutic reason, eg, planned placement of a prosthesis or implant, restoration of a peg-shaped incisor, or the specific request of the patient. It is necessary to specify to the technician the amount of space required and its location on the arch in the "Special Instructions" section (step 14 for full treatment or step 9 for 3-3 treatment).

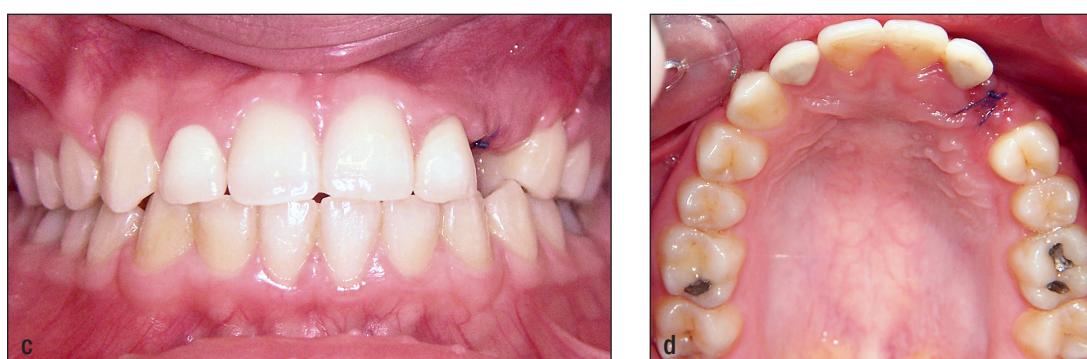
Figure 4-31 provides an example of a case requiring complex anterior spacing correction. The clinician would select "Leave space" for the maxilla and "Close all space" for the mandible. A detailed explanation would be communicated to the technician in the "Special Instructions" section concerning the desired position of both maxillary lateral incisors and the future implant at the left canine site.



## Treatment Plan



**Figs 4-31a and 4-31b** Frontal (*a*) and maxillary occlusal (*b*) views of a patient requiring correction of complex anterior spacing.



**Figs 4-31c and 4-31d** Frontal (*c*) and maxillary occlusal (*d*) views after treatment over the course over 4 months in the maxilla and 5.5 months in the mandible (stage 8 and 11 aligners, respectively). Closure of the space between the central and lateral incisors on both sides of the maxilla positioned them in the middle of the available space, allowing future placement of two provisional crowns on the lateral incisors and an implant in the left canine site.

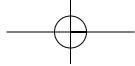


**Fig 4-31e** The provisional prosthetic crown in the left canine site is maintained by the aligner.



**Figs 4-31f and 4-31g** Panoramic radiographs before (*f*) and after (*g*) Invisalign treatment and implant placement.

2. The residual space is due to tooth size discrepancy, and IPR is considered to be undesirable. It is necessary to indicate in the section “Tooth Size Discrepancy” (step 10 for full treatment or step 6 for 3-3 treatment) where the residual space is planned: distal to the lateral incisors or canines (see section on “Tooth Size Discrepancy”).



## 5 • Treatment Strategies

**Table 5-1** ClinCheck default attachments according to type of movement\*

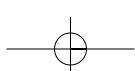
Type of movement		Default attachment type*	
		Automatic	Clinician may request
Rotation	Canine	Optimized attachment (droplet shape) (Enhanced clinical predictability feature)	
	Premolar	Vertical rectangular attachment: variable length, 1-mm thickness	
Extrusion		Beveled horizontal rectangular optimized attachment (Enhanced clinical predictability feature)	Horizontal ellipsoidal attachment of .75-mm thickness
Uprighting of the root axis			None or vertical rectangular attachment of variable height and 1-mm thickness
Extractions	Incisor	Vertical rectangular attachment on each of the two teeth adjacent to the extraction site	
	Premolar	Vertical rectangular attachment on canine, remaining premolar, and first molar	
Intrusions	Anchorage	Horizontal beveled attachment on first premolars	
	Anchorage if premolar is also in rotation	Vertical rectangular attachment of variable height and 1-mm thickness on each premolar	
Retention, anchorage, distalization, torque, others			No attachment will be placed without the clinician's special request

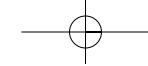
\*Default attachments are used unless the clinician asks for changes in "Treatment Preferences" or when modifying a ClinCheck simulation.

## Control of Tooth Movements: Attachment Types and Indications

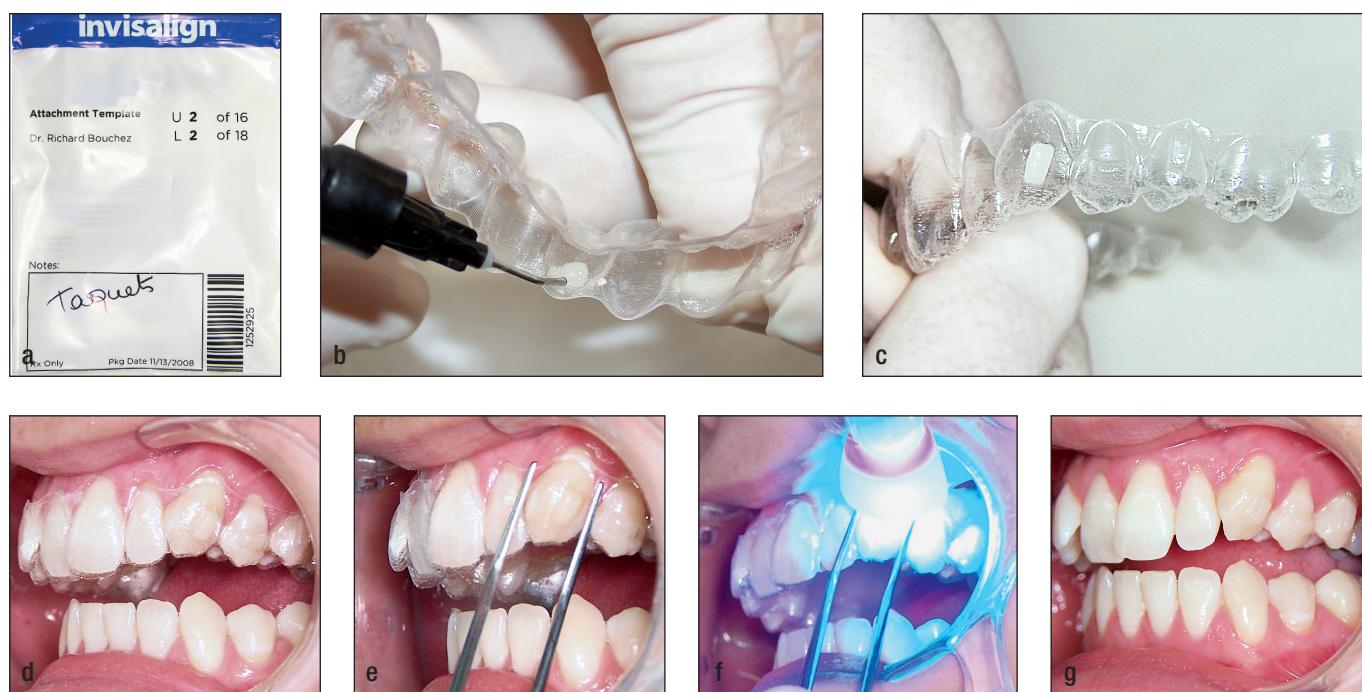
In the ClinCheck program, certain attachments will be placed by default depending on the clinical situation (Table 5-1), but the final choice regarding attachment type, position, and timing of placement and removal is up to the clinician's judgment. The prescription of attachments may be done during treatment prescription in the section "Treatment Preferences," online reviewing, or modifications of ClinCheck.

Various types of attachments are available and can be made in the mouth with light-cured fluid composite placed in an aligner called the *template* (Figs 5-3a and 5-3b). This prefabricated polycarbonate template (Fig 5-3c) is available in different shapes, including ellipsoidal or rectangular, and serves as a mold for fabrication and positioning of the selected

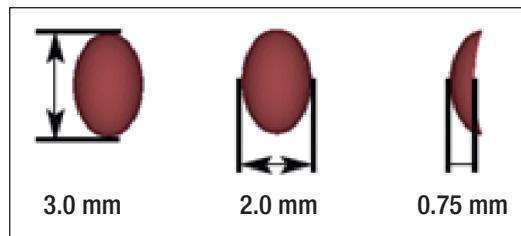




## Control of Tooth Movements: Attachment Types and Indications



**Fig 5-3** (a to g) Bonding of attachments.



**Fig 5-4** Ellipsoidal attachments. Height: 3.0 mm; width: 2.0 mm; thickness: 0.75 mm.

attachment (Fig 5-3d). Using a cotton pliers (Fig 5-3e) to apply pressure mesial and distal to the attachment location on the template (Fig 5-3f) is recommended to avoid making the composite too thick (Fig 5-3g). A small hole can also be drilled at the bottom of the template so that the excess material can be released through the hole. It is strongly advised to select a composite color matched with a shade guide to the patient's tooth color so that the attachment is as invisible as possible.

The following materials are recommended for secure bonding of attachments:

- Tetric Evoflow composite (Ivoclar Vivadent). Contains three types of nanoparticles (nanofillers, nano-color pigments, and nanomodifiers). This material's optimal flow prevents bubbles from forming under the bonded attachment. The material possesses sufficient consistency and can be placed in small cavities with the surface affinity ensured by the nanomodifiers, improved shade due to nano-color pigments, and radiopacity.
- G-Bond self-etching adhesive (GC Corporation)

### Ellipsoidal attachments

Ellipsoidal attachments (Fig 5-4) were the first type used for Invisalign treatment.

Indications:

- Tooth extrusions (default option: horizontal)
- Aligner retention (default option: vertical)