

What Is Invisalign?

An Introduction to the Technique

By Lou Shuman, DMD, CAGS

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In May, ADHA and Align Technology, Inc. announced a partnership with the primary goal of educating the dental hygiene community about the Invisalign technique. This article, the first in a series for *Access*, will introduce dental hygienists to this innovative orthodontic method, its applicability and benefits, and the dental hygienist's role in the treatment process.

Invisalign offers a compelling alternative for patients seeking orthodontic treatment: it has the ability to treat most malocclusion and has significant implications for overall periodontal health. It combines proven orthodontic science with 3-D computer graphics to project tooth movement; and it utilizes a series of clear, custom-made, removable aligners to move teeth into the desired position.

Many people who have heard about Invisalign treatment are aware only of the aligners—the clear trays featured in television advertisements and in magazines. But Invisalign is an orthodontic technique, not just an appliance. The method combines several key components (Figure 1) to straighten teeth, as outlined below.

Aligners

Aligners are the foundation of the Invisalign technique. They are thin, nearly invisible dental appliances that correspond to each stage of ClinCheck, a proprietary treatment-planning software. Each custom-made aligner is worn over the teeth for two weeks and then replaced by the next aligner in the series, until treatment is complete. They are worn 24 hours a day, but can be removed for eating, drinking, brushing, and flossing.

ClinCheck

ClinCheck is a virtual treatment-planning tool that allows the practitioner to communicate a treatment plan both to the patient and to Align. The practitioner is able to view and evaluate that proposed treatment plan in 3-D, either stage-by-stage or in full animation.

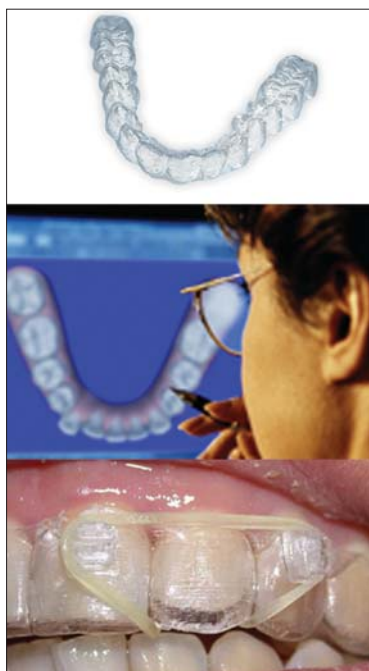


Figure 1. Key components of the Invisalign system: 1) the aligners, 2) ClinCheck® software, and 3) adjuncts

Adjuncts

Invisalign-specific adjuncts, similar to those used in traditional orthodontic methods, complement the aligners. The creation and use of these adjuncts make Invisalign suitable for almost all types of orthodontic cases, not just minor adjustments and movements.

The Invisalign method has gained widespread acceptance in the orthodontic, dental, and periodontal fields. Currently, there are about 285,000 cases either in treatment or completed, and in May 2005, Align Technology shipped its 12 millionth aligner. The technique is now being taught in over 40

dental and orthodontic programs in colleges and universities nationwide, including the University of Pacific, Harvard University, the University of Florida, and New York University. In addition to these outstanding university programs, Align Technology has partnered with renowned organizations and institutes such as the Academy of General Dentistry and The Pankey Institute.

More than 30 articles about the technique have been published in publications like the *Compendium of*

Continuing Education in Dentistry, the *Journal of Clinical Orthodontics*, and the *American Journal of Orthodontics*. Invisalign certifications, seminars, and study groups are held nationwide, and more than 24,000 dentists and orthodontists are Invisalign certified.

Once thought to be an “adult only” technique, the Invisalign system can be used to treat a patient once the second molars are fully erupted or at about the age of 14, which makes it an attractive alternative to traditional fixed braces for teens and adults alike.

Why Invisalign Treatment?

Patients may prefer the Invisalign technique for a number of reasons, including the discreet treatment made possible through virtually invisible aligners. The aligners are more comfortable and cause less pain than traditional appliances. Because the aligners are removable, patients aren't subject to dietary restrictions and can brush and floss normally. Patients can also visualize their projected result through ClinCheck, which can contribute to their enthusiasm and compliance.

The Invisalign system can be a preferred method of treatment because of its clinical advantages as well. Advantages include

- Reduced risk of decalcification
- Decreased occlusal abrasion from parafunctional habits during treatment
- Invisalign's suitability for positioning teeth for proper placement of restorations
- Easier access for the dental hygienist providing routine periodontal maintenance

- Visualization of planned tooth movement (ClinCheck)
- Periodontal benefits resulting from ability to maintain oral health through normal brushing and flossing
- Reduced myofacial pain during treatment as compared to fixed appliances

The Invisalign Process

So, how does it work? The Invisalign system consists of six steps: 1) diagnosis, 2) treatment plan, 3) records, 4) initial treatment, 5) monitor, and 6) finish.

The records stage requires full-arch upper and lower polyvinyl siloxane (PVS) impressions, PVS bite registration, eight photographs, and full-mouth series X rays and/or Panorex. Once the records arrive at Align Technology, the tooth movement planning stage begins. The patient's records are transformed into 3-D images, and the ClinCheck software uses the treatment form and records to generate a computerized final state and all the stages in between. Movements are projected at approximately 0.5 mm per month. Within 10 business days of ClinCheck approval by the treating practitioner, the aligners are shipped to the office.

Although the office receives all of the aligners for the entire treatment phase upfront, they are distributed to the patient in six-week intervals. This allows the oral health care team to monitor progress and encourage compliance frequently throughout treatment.

The Invisalign technique requires more than placing an aligner every two weeks. As with traditional orthodontic meth-

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ods, adjustments and adjuncts are necessary to obtain optimal results. However, through advanced technology, Align is able to simplify the treatment process in several ways outlined below.

Interproximal Reduction

Interproximal reduction (IPR), also known as reproximation or stripping, is often required to allow the teeth to align correctly. By using ClinCheck technology, Align is able to specify the location, amount, and corresponding aligner stage where IPR is necessary.

Attachments

Attachments are composite forms bonded to the tooth surface to facilitate movement. Align places attachments during the virtual case set-up so that the practitioner will have a ready-made template to use during treatment. Attachments are placed to assist in retention of the aligner, intrusion, rotations of teeth, uprighting, and significant space closure (Figure 2).



Figure 2. Invisalign-specific attachments are used during treatment to achieve ideal clinical results.

“Virtual” Pontics

In cases where a tooth has been lost or extracted, Align technicians use a virtual tooth during the manufacturing process to ensure proper spacing in the aligner for each stage of treatment. By using a pontic kit, available through Align, the practitioner is then able to apply a proprietary paste-like material into the aligner, which masks the space and gives the appearance of a full dentition (Figure 3).



Figure 3. A pontic, made of composite material, can be used in the aligner to mask the space caused by a missing or extracted tooth.

Adjunctive Treatment

Through its educational courses, Align gives the practitioner instructions to create all necessary adjuncts necessary for ideal clinical outcomes. The use of adjuncts increases the number and type of cases that can be successfully treated with Invisalign, allowing practitioners to treat more difficult cases of malocclusion.

Detail Pliers

These tools allow the practitioner to make precise minor adjustments and changes to the aligner, typically in the finishing stage.

An Introduction to the Dental Hygienist’s Role

Because of the technique’s growth, the reality is that dental practices will see patients who are either already in Invisalign treatment or are candidates for treatment. Following is some specific information that dental hygienists will find useful to meet the needs of both types of patients.

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What issues can the treatment address?

As a technique, Invisalign is capable, based on the practitioner’s experience, of addressing the following conditions.

- Generalized spacing and crowding
- Orthodontic relapse
- Deep bite
- Combination restorative needs including set-up for implants, veneers, and crown and bridge
- Arch expansion
- Significant spacing and crowding
- Mild Class II malocclusion
- Lower incisor extraction

Are there any issues that need to be addressed before treatment?

As with fixed appliances, prior to initiating Invisalign treatment, all necessary restorative work must be completed, and there can be no active periodontal disease. In addition, the patient must have fully erupted second molars.

Are there any cases where Invisalign treatment is not appropriate?

Some severe conditions affect a patient’s candidacy for any orthodontic treatment. Although Align is continually developing new technology to improve the Invisalign method, patients are not eligible for treatment if they have any of the following.

- Skeletal cross-bites
- Large centric relation/centric occlusion shifts
- Active temporal mandibular pathology, such as arthritis and condylar resorption
- Uncontrolled periodontal disease
- Excessive root resorption
- Active caries

Patients missing all posterior teeth also are ineligible for treatment with Invisalign.

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In what specific ways does the Invisalign method help improve a patient's overall oral health?

- Patients can remove the aligners to brush, floss, and eat normally, allowing them to maintain good dental hygiene practices more easily.
- The technique allows for more control of forces during tooth movement in the presence of moderate to severe bone loss, but also offers the option of no forced movement if required.
- University of Washington¹ and University of Florida² longitudinal studies show that periodontal health actually improves during treatment.
- Prior to veneers or composite bonding, Invisalign can be used to produce ideal alignment, which can mean that less tooth structure has to be removed.

With the Invisalign method, the dental hygienist fills the role of both educator and diagnostician.

hygienist fills the role of both educator and diagnostician. It's Align's goal to provide dental hygienists with the knowledge and tools they need to answer questions effectively and offer advice about treatment options.

In the coming months, this series of articles will take an in-depth look at the Invisalign technique. First, the dental hygienist's role in Invisalign treatment as it relates to providing education, assisting diagnosis, and understanding periodontal implications will be addressed. The next article in the series will examine longitudinal clinical studies on the Invisalign system's periodontal implications. Finally, the technology behind the technique will be presented.

For more information on the Invisalign technique, certifications or local seminars, please visit www.invisalign.com.

What is the dental hygienist's role in the treatment process?

Dental hygienists have a significant role in the treatment process with Invisalign. As mentioned before, there is potential for the dental hygienist to encounter two types of patients: those in Invisalign treatment and potential candidates for treatment. For patients already in treatment, the dental hygienist is a key figure in increasing patient compliance and educating patients about maintaining and improving oral health during and after treatment. For patients who need orthodontic treatment, the dental hygienist serves as both a source of information and a trusted advisor.

What's Next?

Patients turn to dental hygienists for information about options and compliance, and trust them to provide sound oral health advice. With the Invisalign method, the dental

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