

Invisalign® Treatment Monitoring & Finishing

Tips & Techniques Guide to Help Doctors Achieve Ideal Patient Outcomes

Introduction

This Guide is intended to help the Invisalign practitioner address monitoring and finishing issues that may arise between receipt of aligners from Align to the completion of treatment. For a more comprehensive understanding of how to *prevent* these issues—please be sure to view the archived ATE Program:

[Managing Aligner Tracking Issues: Tips and Techniques for Keeping Treatment on Course](#) presented by Dr. Doug Brandt

The solutions in this Guide are considerations collected from your peers. These have not all been tested in clinical trials, but rather are tips and techniques from Invisalign-experienced colleagues

Treatment Management Issues Covered in this Guide

During the Treatment

**Attachments
Debonding**

**Attachments Not
Engaging**

**Aligner Does Not Fit At
All**

Aligner “Popping” Off

Aligner Too Retentive

Aligner Not Retentive

Aligners Not Seating

Tooth Not Rotating

Tooth Not Extruding

**Unplanned Intrusion
Occurring**

**Root Movement Not
Occurring**

Finishing Treatment

Black Triangles

Roots Tipped

**Premature Occlusal
Contacts**

Posterior Open Bite

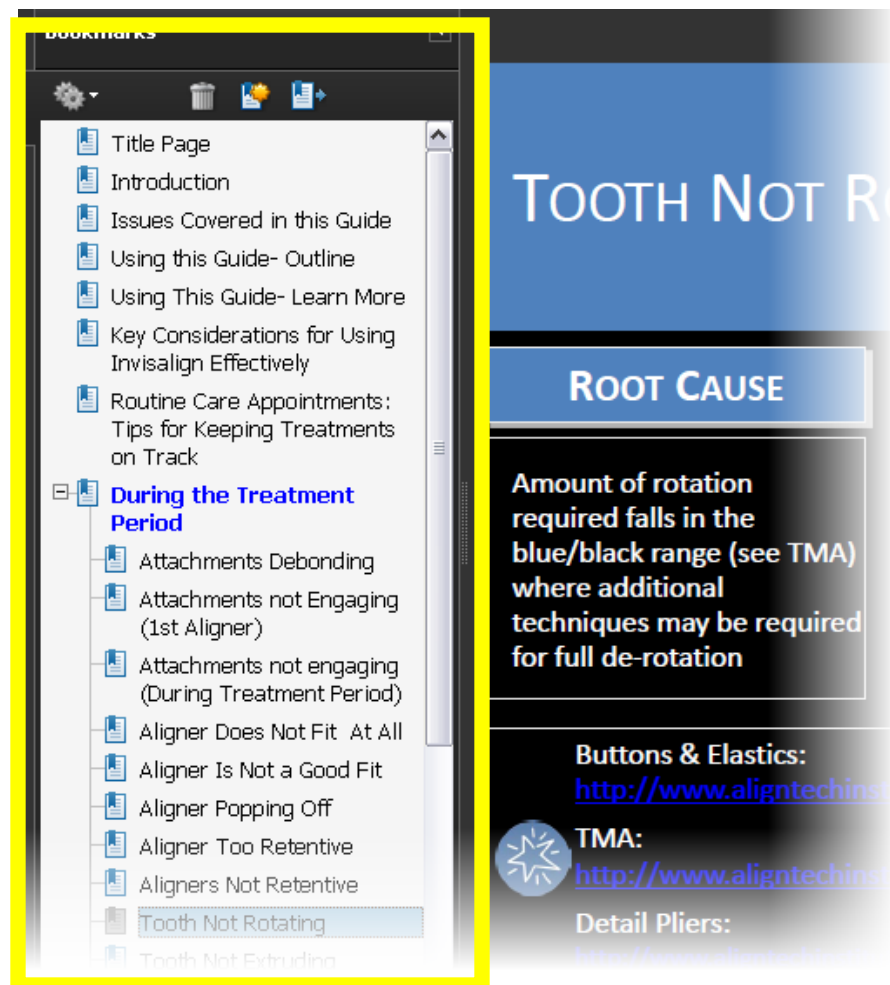
Residual Spacing

Residual Crowding

Using This Guide

To provide you with easy navigation and links to learn more, the following two components are included within this document:

- 1. Document Outline:** An easy way to jump to a topic you want to see specifically—is to use the outline panel to the LEFT. By clicking on any topic in this outline—it will jump you to the **first** page of that topic's content. Please note several sections have more than one page.



TOOTH NOT ROTATING

ROOT CAUSE

Amount of rotation required falls in the blue/black range (see TMA) where additional techniques may be required for full de-rotation

Buttons & Elastics:
<http://www.aligntechinst.com>

TMA:
<http://www.aligntechinst.com>

Detail Pliers:
<http://www.aligntechinst.com>

Using This Guide

To provide you with easy navigation and links to learn more, the following two components are included within this document:

2. **“Learn More” Star:** Jump easily to more information, instructions guides and help resources when you see the “star.”

Click on the link in the document and it will show you more without leaving the page you are viewing in the resource guide



Key Considerations for Using Invisalign Effectively

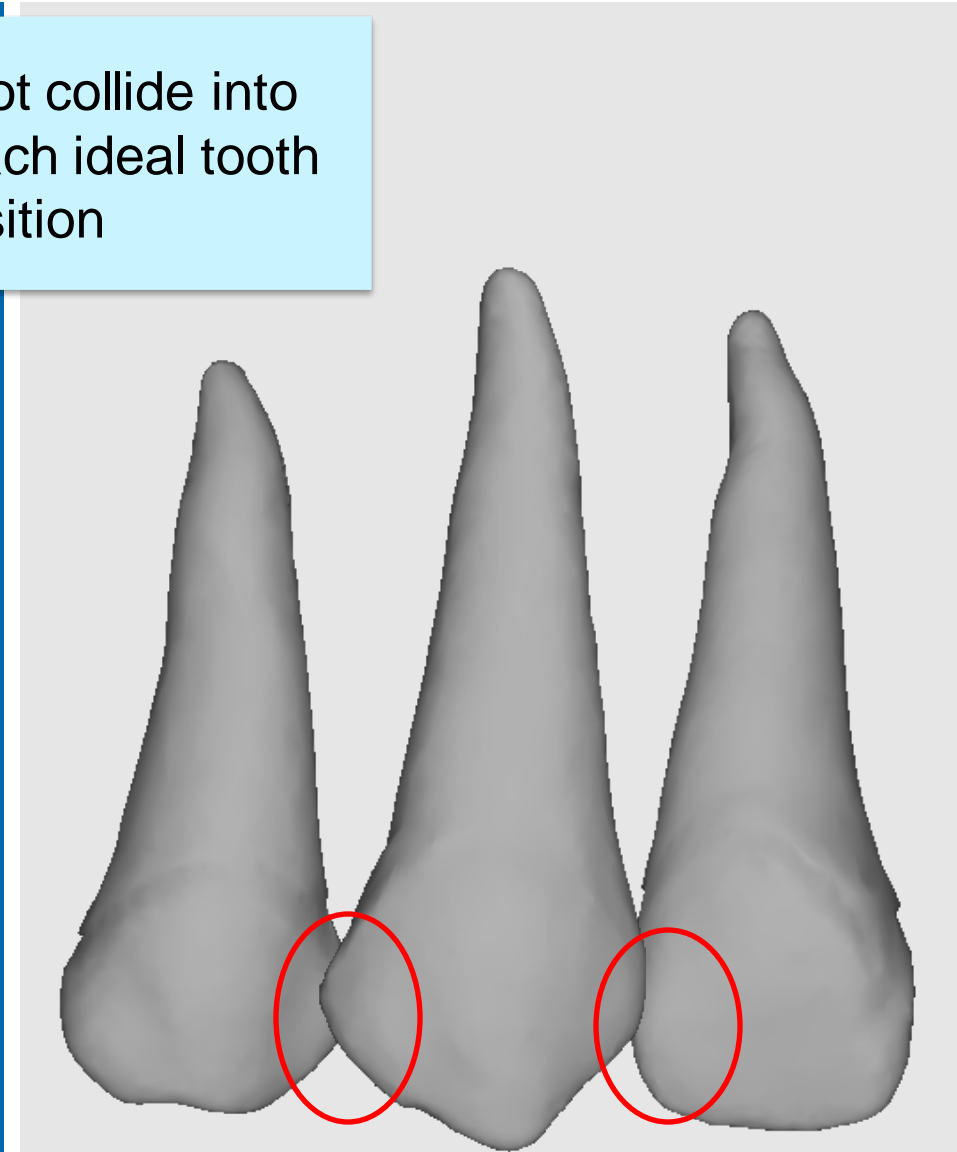
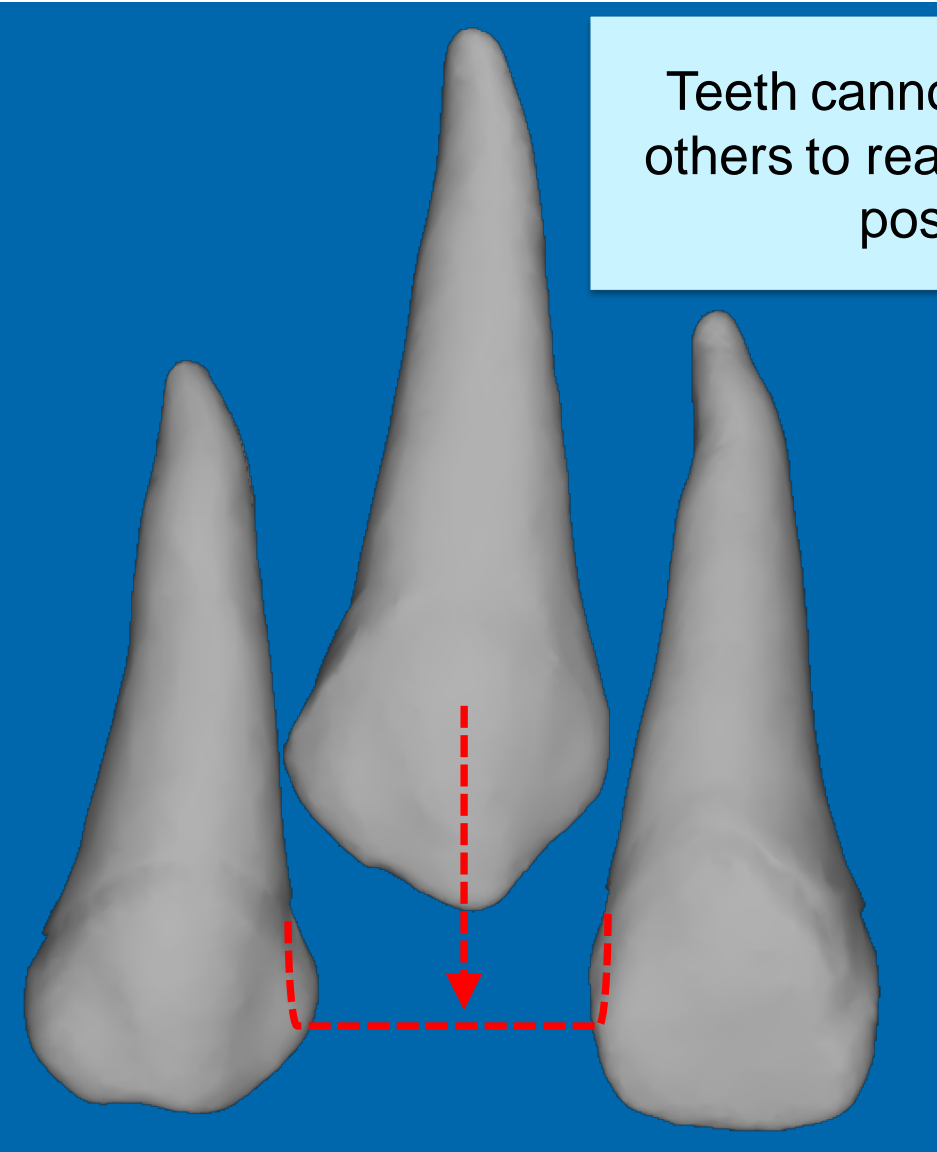
It's helpful to understand some key concepts about Invisalign aligners and tooth movement before you begin to use this guide.

When monitoring treatments, from time to time your patient's teeth may not track to plan. In these instances, it is good to generally keep in mind that this occurs for two fundamental reasons:

1. Insufficient Space
2. Insufficient Force

Insufficient Space

Teeth cannot collide into others to reach ideal tooth position



Insufficient Space

May Be Due To:

- Insufficient IPR
- Effect of insufficient force system/points of contact in the aligner and/or attachment
- Treatment plan that limits the success of creating space required



Changing the Invisalign Clinical Protocols in Your ClinCheck® Treatment Plan

alignwithinvisalign.com

TOOTH MOVEMENT COLOR

BLUE - Moderate Movements: The movements programmed here show good results with the use of aligners and, if any, benefit from additional techniques like the ones noted in the right close monitoring recommendations.

Treatment Management: Additional Refinements and/or Mid-Course Corrections may be needed.

BLACK - Advanced Movements: The movements programmed here show good results with the use of aligners, but often require additional orthodontic techniques that are more challenging to achieve with the use of aligners along with close monitoring as recommended.

Treatment Management: Additional Refinements and/or Mid-Course Corrections likely needed.

BLUE AND BLACK: Additional Options

- Change ClinCheck® treatment plan to incorporate specific movements and/or change treatment goal. May result in a compromised ClinCheck treatment plan.
- The Invisalign clinical protocols may be considered as part of the treatment plan.
- Use alignwithinvisalign.com/alignhelp for additional help, resources or specific treatment topics.

NOTES:

If a doctor requests to remove or change a default attachment (for rotations, extrusions or anterior intrusion anchorage) that has been automatically placed according to the Invisalign Clinical Protocols, the tooth/teeth will be identified as blue or black and may require additional clinical follow-up and monitoring.

The Tooth Movement Assessment displays movements of anterior intrusion, rotation and movement, and I.P. extrusion, which was programmed in the ClinCheck treatment plan.

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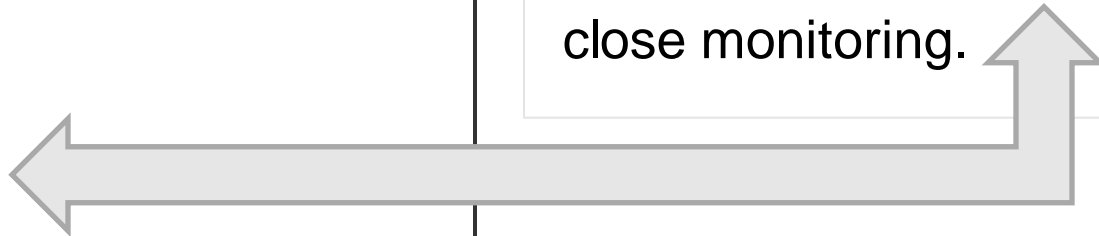
SKILLS/TECHNIQUES THAT MAY BE REQUIRED

Anterior IR	Blue	Black
Posterior IR	Blue	Black
Rotations	Blue	Black
Rotating Independent contacts	Blue	Black
Distalizing Plans	Blue	Black
Extrusions	Blue	Black
Anterior IR (Anchors for Intrusion)	Blue	Black
Posterior IR (Anchors for Intrusion)	Blue	Black
Distalizing Class III (Anchors for Posterior Cuts)	Blue	Black
Anterior Head Tilts	Blue	Black
Full Head Tilts	Blue	Black
Facial Treatment Sequencing (I.P. Extrusion)	Blue	Black
Collapsable Segments	Blue	Black

The color categories for assessing the difficulty of a treatment are provided for the doctor's reference only based on the ClinCheck treatment plan. Each patient's situation is different. Doctor is solely responsible for evaluating whether Invisalign products are appropriate for use with each patient and monitor any claims against Align relating to the treatment or outcomes of treatment.

NOTES:

If a doctor requests to remove or change a default attachment (for rotations, extrusions or anterior intrusion anchorage) that has been automatically placed according to the Invisalign Clinical Protocols, the tooth/teeth will be identified as blue or black and may require additional clinical skills and close monitoring.





Teeth need space to move

If interproximal contacts are too tight:

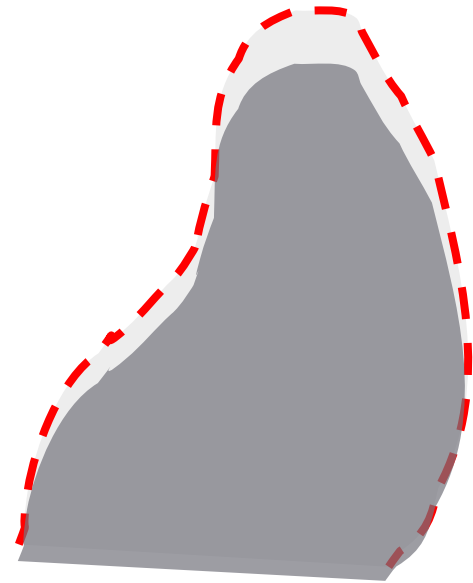
1. Tooth will not move
2. Incomplete seating of the aligner will occur
3. Active Forces increase



Insufficient **FORCE**

Sufficient force relies on sufficient aligner contact with tooth or attachment

Are the necessary forces & points of contact present to ensure movement?

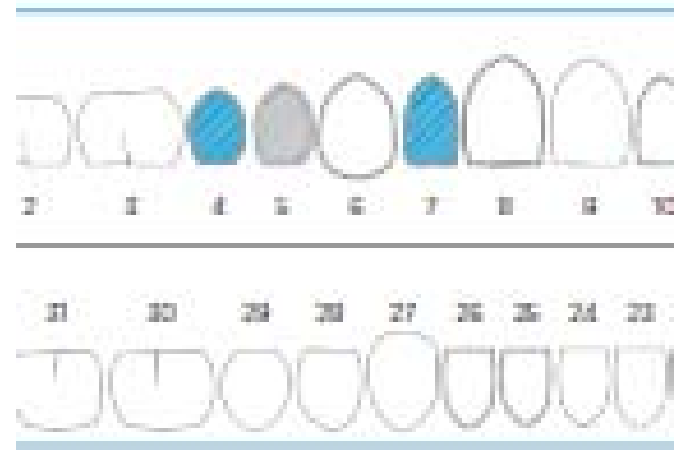


Incomplete seating of aligner means less points of contact with the tooth and subsequently unexpressed force

Insufficient **FORCE**

May Be Due To:

- Doctor's treatment plan – includes (blue/black) movements programmed that at times, benefit from additional techniques
- Lack of correct attachment-to-aligner engagement
- Insufficient time for the movement to express



Tooth Movement Assessment (TMA)

Information in patient's ClinCheck treatment plan that provides guidance in identifying more significant movements present.

During Routine Care Appointments:

1 Have patients arrive with the previous aligner stage

By having patients arrive with the previously worn aligner stage, you can evaluate and compare any fit or tracking concerns that may arise.

2 Review

- Current aligner is a good fit
1. IPR Instructions (and record amount preformed on form (kept in chart)
 2. Condition and engagement of attachments
 3. Evaluate for tight contacts with unwaxed floss and relieve with finishing strips if present

3 Compare to ClinCheck Treatment Plan

Check actual results versus ClinCheck treatment plan every 4-8 stages

Monitoring Aligner Fit



Good fit

- Aligners are seating well over the teeth
- No visible gaps or rocking
- All attachments are engaged properly



Perform & Document IPR



- Perform IPR as recommended
- Print copy of form for patient's chart
- Document amount

Monitoring Attachments



Standard attachment does NOT have full contact with attachment well



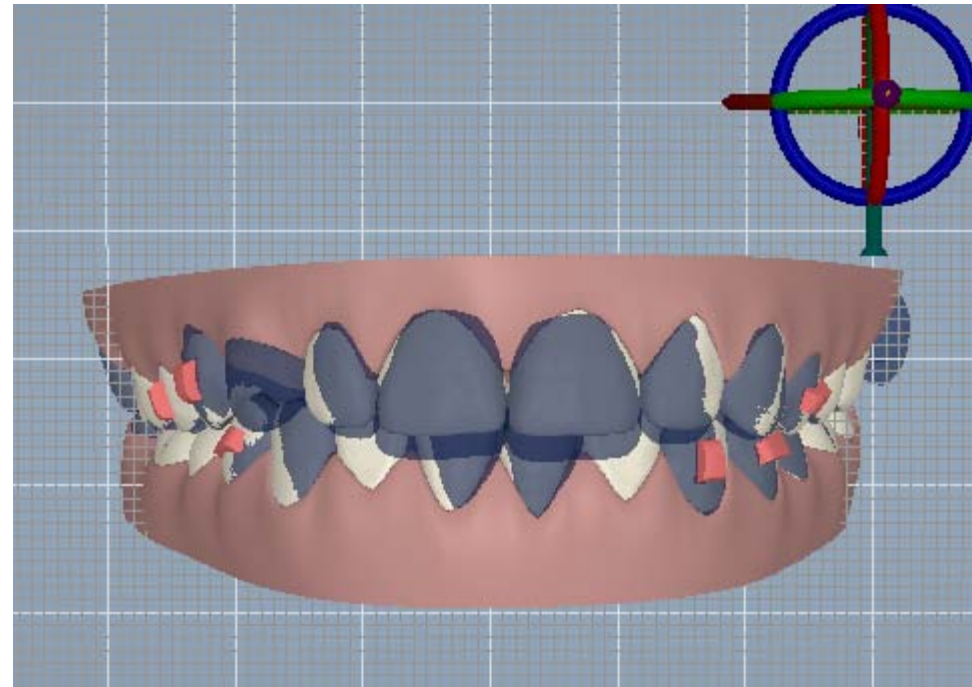
Rub articulating paper over standard attachments to help in evaluate attachment engagement

Monitoring Interproximal Contacts



Evaluate for tight contacts with unwaxed floss and relieve with finishing strips if present

Using your best diagnostic and treatment planning tool(s) to help you stay on course



During the
Treatment Period



Attachments Debonding



Root Cause

Contaminated bond surface or not isolated

Use of bonding material and bonding agent not designed for attachment use

Solution

Replace under better isolation

Replace using the attachment template and bonding materials designed for Invisalign attachments

Prevention

Clean (pumice) the teeth and isolate

The Invisalign Attachment Kit may be ordered through the Align Store



More Information on Attachments including video and guide for placing attachments: <http://www.aligntechinstitute.com/attachments>

Attachment Material Survey & Testing Results:

http://www.aligntechinstitute.com/GetHelp/Documents/pdf/survey_and_testing.pdf

Attachments Debonding



Root Cause

Bonding to porcelain or gold crowns

Solution

Bonding to porcelain or gold can be difficult. Use a bonding products that minimizes failures for these surfaces or use a sand blaster

Prevention

Review your ClinCheck plan to see if teeth with crowns or veneers have attachments and plan accordingly

Attachments not Engaging (1st Aligner)

Root Cause

Excess composite

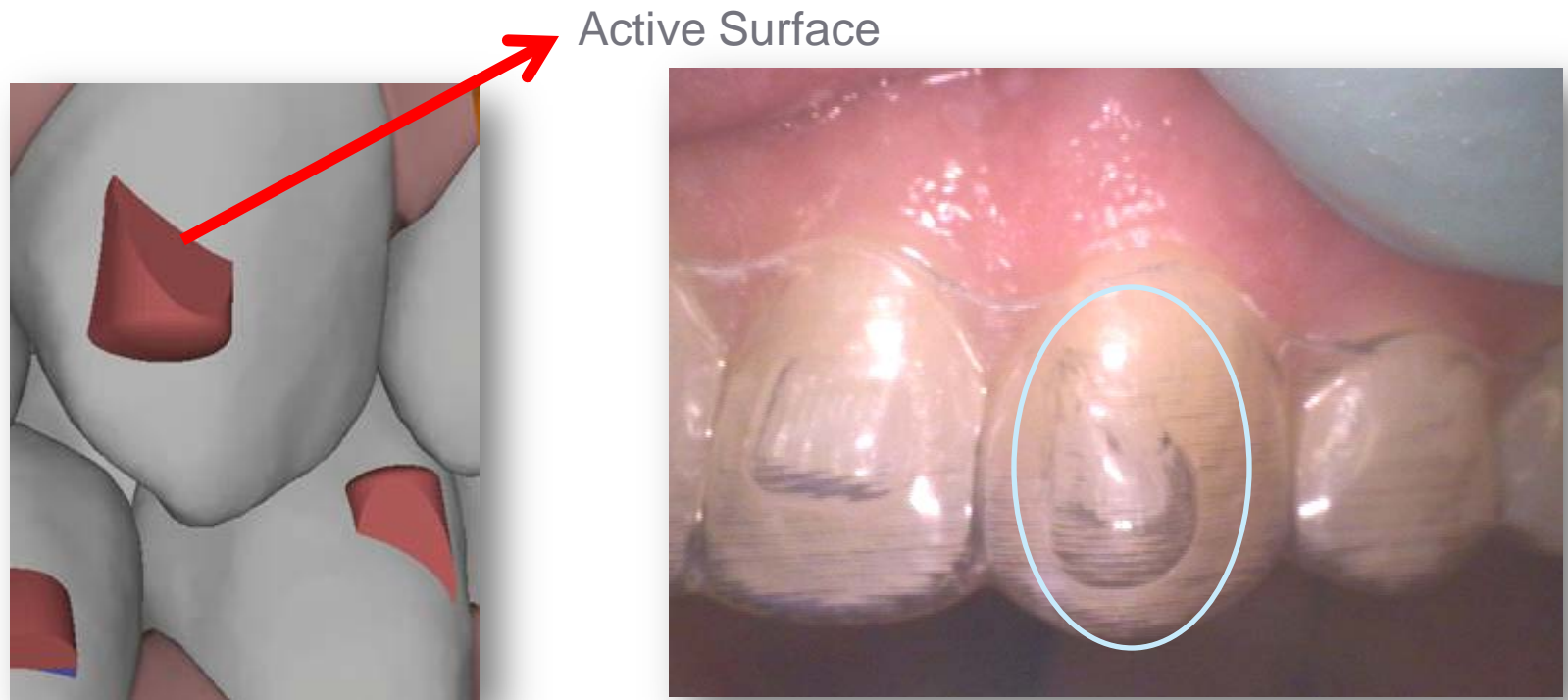
Solution

Rebond the attachment using less composite and remove excess material



Optimized Attachments

Active surface must be in contact with the aligner



* Difference in shape between the aligner and the bonded attachment.

Attachments not engaging (during treatment period)



Root Cause

Lack of engagement, probably teeth are not moving according to the aligner

Solution

Remove and re bond the attachment



More information on re-bonding attachments mid-treatment:

<http://www.aligntechinstitute.com/attachments>

Aligner Does Not Fit At All



Root Cause

At start of treatment: Sub-optimal PVS impressions have affected the fit

Mismatch or incorrect stage given to the patient
Check to make sure patient was given correct aligner

Solution

Take a new PVS impression

Try next aligner first.
Verify patient # imprint on aligner is correct patient

Prevention

See: PVS Impression Inspection Checklist



PVS Inspection Checklist:

http://www.aligntechinstitute.com/GetHelp/Documents/pdf/PVS_Impressions_Checklist.pdf

PVS Impressions:

<http://www.aligntechinstitute.com/impressions>



Aligner Is Not a Good Fit



Root Cause

“Tracking” issue—where teeth are not moving or tracking as planned

Solution

Teeth do not move as planned based on two primary causes:

1. Insufficient space
2. Insufficient force

Determine which factor seems to be the most likely cause to further identify the solution

Prevention

Review information available in ClinCheck software thoroughly before starting each treatment.

IPR instructions help identify where collisions & binding are likely to occur. **The Tooth Movement Assessment** identifies teeth where increased forces from additional techniques may be required

Aligner Popping Off



Root Cause

At the start of treatment:
sub-optimal initial PVS
impression

Movements programmed
into the aligner for
expansion not occurring

Solution

Take a new PVS
impression

Ask the patient to
frequently “bite“ to help
seating and engagement.
“Chewies” provide
assistance in aligner
seating. If no improvement,
send a new impression
(Midcourse/Progress)



“Chewies” by Glenroe
Technologies



PVS Impressions:

<http://www.aligntechinstitute.com/impressions>

Aligner Too Retentive



Root Cause

Divergent path of insertion due to severely tipped, crowded or flarred teeth

Too many attachments

Solution

Trim away aligner in undercut region with trimming bur
Trim the distal of the terminal molars

Smooth the edges of the attachments

Prevention

Position of teeth affects aligner path of insertion/removal. Seat aligner starting with area of greatest crowding or undercut

Refrain from adding additional attachments outside of the Invisalign Clinical Protocols

Aligners Not Retentive



Root Cause

Short clinical crowns without undercuts (common with teens)

Solution

Use Detail Pliers to create retentive dimples for retention

Prevention

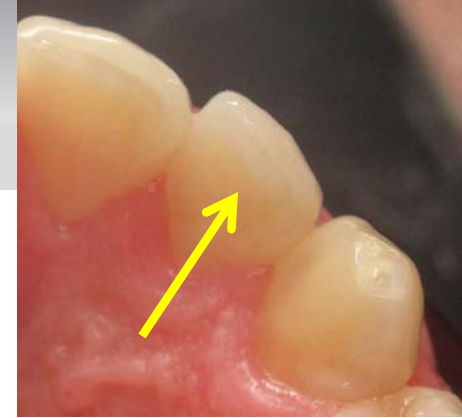
Add posterior attachments (during ClinCheck review) when short clinical crowns are present



Detail Pliers:

http://www.aligntechinstitute.com/files/pdf/monitoring_finishing/TT_Detailing_Pliers.pdf

Tooth Not Rotating



Root Cause

Amount of rotation required falls in the blue/black range (see TMA) where additional techniques may be required for full de-rotation

Solution

Buttons & elastic technique
Invisalign Detail Pliers to assist with minor movements

Prevention

Change ClinCheck treatment plan to remove blue/black movements and/or change treatment goal. May result in a compromised ClinCheck treatment plan

Buttons & Elastics:

<http://www.aligntechinstitute.com/GetHelp/Pages/ButtonsElastics.aspx>

TMA:

<http://www.aligntechinstitute.com/GetHelp/Documents/pdf/ToothAssessment.pdf>

Detail Pliers:

http://www.aligntechinstitute.com/files/pdf/monitoring_finishing/TT_Detailing_Pliers.pdf



Tooth Not Rotating



Root Cause

Binding contacts
(Insufficient Space)

Variation in bone biology
or tooth morphology (i.e.
peg laterals where the
surface contact of the
aligner against the tooth
is small)

Solution

Evaluate for tight contacts
on teeth that are trying to
rotate with unwaxed floss
and relieve with finishing
strips

Buttons & elastics

Extend wear time of
aligner stage

Use Invisalign Detail
Pliers to assist with
minor movements

Prevention

Always monitor contacts
with unwaxed floss during
treatment whether IPR
was prescribed or not



Tooth Not Rotating



Root Cause

Lack of overjet; teeth have no place to move without interference from the opposing arch

Insufficient amount of IPR performed in prior appointments

Solution

Wait for teeth to move out of the way in the opposing arch and re-evaluate progress

1. Perform recommended amount of IPR
2. Measure IPR
3. Record IPR in chart

Prevention



Have team member use highlighter on patient's aligner packaging as a visible reminder IPR is planned at that stage



IPR:

<http://www.aligntechinstitute.com/IPR>

Tooth Not Rotating



Root Cause

Attachment not optimally engaged (slightly)

Attachment not optimally engaged (significantly)

Solution

Have patient bite into cotton rolls/ chewies frequently to help seating and engagement

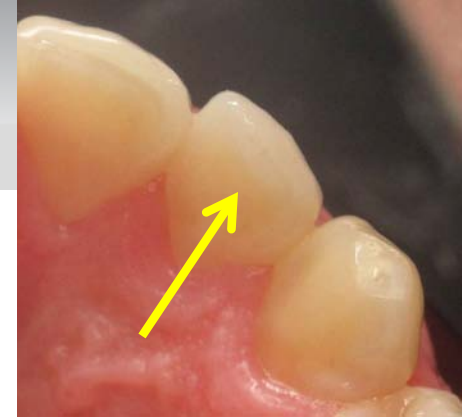
- Use button & elastic to facilitate movement
- Submit new impression (Midcourse/Progress)
- Re-bond attachment using current aligner; Be aware movement is 1+ stages off . Address with Refinement

Prevention



“Chewies” by Glenroe Technologies

Tooth Not Rotating



Root Cause

Insufficient wear time
(Patient Compliance)

Solution

- Extend wear time
- Schedule patient for more frequent visits
- Show patient pre treatment stage for motivation
- Help patient understand any additional costs or fees that may occur for lengthy extensions to the treatment duration

Prevention

- Use Assist/Teen options offering Compliance Indicators if you anticipate this might be a concern
- Look for signs during treatment period:
 - Isn't wearing aligners during routine appointments
 - Aligners very "clean"
 - Reschedules or misses appointments often

Tooth Not Extruding



Root Cause

Amount of extrusion required falls in the blue/black range (see TMA) where additional techniques may be required

Solution

- Buttons & elastic technique
- Fixed sectional appliances
- TADs

Prevention

Consider relative extrusion vs. absolute extrusion in treatment plan to create the appearance of vertical changes

Buttons & Elastics for Extrusion:

http://www.aligntechinstitute.com/GetHelp/Documents/pdf/auxillarytech_extrusion.pdf

TMA:

<http://www.aligntechinstitute.com/GetHelp/Documents/pdf/ToothAssessment.pdf>



Tooth Not Extruding



Root Cause

Attachment not optimally engaged (slightly)

Attachment not optimally engaged (significantly)

Solution

Have patient bite into cotton rolls/ chewies frequently to help seating and engagement

- Use button & elastic to facilitate movement
- Submit Progress Impressions/MCC (product specific)
- Re-bond attachment using current aligner; Be aware movement is 1+ stages off. Address with Refinement

Prevention



“Chewies” by Glenroe Technologies

Unplanned Intrusion



Root Cause

Inadequate IPR (insufficient space), causing aligner to squeeze tooth apically

Solution

- Evaluate M-D space and any binding contacts with unwaxed floss and relieve with finishing strips
- Buttons & elastics to extrude & get tooth back on track

Prevention

Make sure sufficient interproximal space is present during rotations and extrusions

Buttons & Elastics:

<http://www.aligntechinstitute.com/GetHelp/Pages/ButtonsElastics.aspx>

IPR:

<http://www.aligntechinstitute.com/IPR>



Incomplete Root Movements



Root Cause

Amount of root movement falls in the blue/black range (see TMA) where additional techniques may be required

Solution

- Buttons & elastic technique
- Fixed sectional appliances
- TADs

Prevention

Change ClinCheck treatment plan to remove blue/black movements and/or change treatment goal. May result in a compromised ClinCheck treatment plan

Buttons & Elastics:

<http://www.aligntechinstitute.com/GetHelp/Pages/ButtonsElastics.aspx>

TMA:

<http://www.aligntechinstitute.com/GetHelp/Documents/pdf/ToothAssessment.pdf>



Incomplete Root Movements



Root Cause

Insufficient undercut area for aligner to grab the tooth

Skeletal component of expansion

Solution

Add attachments in Refinement as close to center of rotation of tooth as possible to upright the teeth

Request buccal uprighting in Refinement to remove bodily movements

Prevention

Expansion via buccal segment uprighting is more likely to be successful than bodily expansion of the entire segment

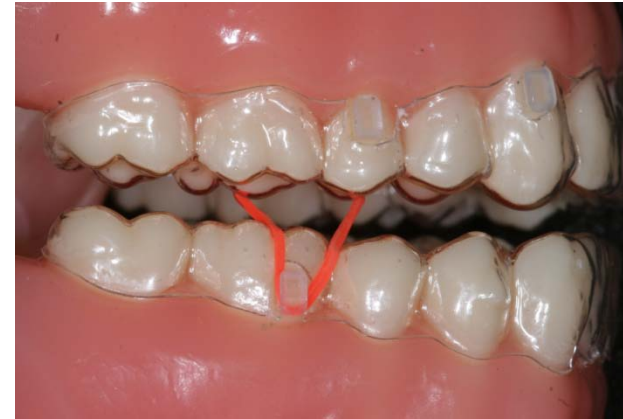
Incomplete Root Movements: Crossbite

Root Cause

Not enough time for movement to express due to variation in bone biology, tooth morphology or patient compliance

Solution

- Extend wear time
- Add buttons and elastics



Buttons & Elastics:

<http://www.aligntechinstitute.com/GetHelp/Pages/ButtonsElastics.aspx>

Finishing Treatment



Black Triangles



Root Cause

Unwanted tip between two teeth causing contact point to be occlusal

Solution

Upright the teeth with Refinement or additional techniques (buttons & elastics or fixed appliances)

Prevention

Pay special attention to anterior incisors with worn incisal edges. A request to “level” incisal edges can create unwanted tip in your ClinCheck treatment plan. Consider doing some enamel re-contouring pre PVS impressions



Buttons & Elastics:

<http://www.aligntechinstitute.com/GetHelp/Pages/ButtonsElastics.aspx>

Black Triangles



Root Cause

Due to shape of teeth, position of teeth, or lack of papilla once teeth are aligned

Solution

- IPR and move contact point gingivally and then close the space with Refinement or Detail Pliers
- Restore
- Connective tissue graft

Prevention

Evaluate shapes of anterior teeth (especially when significant crowding & rotations exists). Inform patient before tx starts of the possibility.

Be aware of the potential of black triangles in ClinCheck review, but note the simulated gingiva may not always accurately represent the patient's gingiva.



IPR:

<http://www.aligntechinstitute.com/IPR>

Roots Tipped



Root Cause

Roots not moving

Solution

Buttons and elastics



Buttons & Elastics:

<http://www.aligntechinstitute.com/GetHelp/Pages/ButtonsElastics.aspx>

Premature Occlusal Contacts



Root Cause

All tooth movements planned during the treatment period were not fully expressed

Doctor's ClinCheck treatment plan (i.e. minimal/no OJ). See Posterior Openbite.

Solution

- Use Refinement to move teeth out of contact
- Re-mount models & equilabrate

- Use Refinement to move teeth out of contact
- Re-mount models & equilabrate

Prevention

Review your ClinCheck treatment plan to ensure it provides sufficient OJ and anterior coupling



ClinCheck Review Tips:

<http://www.aligntechinstitute.com/GetHelp/Documents/pdf/ClinCheckReview.pdf>

Posterior Open Bite



Root Cause

Anterior interference/
insufficient leveling

Solution

- Refinement to relieve anterior interference by additional leveling (intrusion of upper and/or lower incisors) or by moving uppers forward, lowers back. IPR may be needed
- Anterior equilibration to resolve interferences

Prevention

Review your ClinCheck treatment plan to ensure it provides sufficient OJ and anterior coupling



ClinCheck Review Tips:

<http://www.aligntechinstitute.com/GetHelp/Documents/pdf/ClinCheckReview.pdf>

Posterior Open Bite



Root Cause

Transient intrusion of the posterior due to aligner material on the occlusal surface

Solution

Cut out premolar to molar region of aligners/retainer to allow for settling of the posterior

Residual Spacing



Root Cause

Not enough time for movement to express due to variation in bone biology, tooth morphology or patient compliance

Excessive IPR

Solution

- Extend wear time
- Request virtual c-chain (overcorrection) aligners in Refinement

Request virtual c-chain (overcorrection) aligners in Refinement

IMPORTANT NOTE:

Use virtual c-chain aligners **one at a time**, on an “as-needed” basis

If contacts are tight and virtual c-chain aligners continue to be dispensed, there is a high probability of inadvertent intrusion due to contacts becoming too tight.



IPR:

<http://www.aligntechinstitute.com/IPR>

Residual Spacing



Root Cause

Residual space present in the doctor's ClinCheck treatment plan when there's no space to retract the teeth due to lack of overjet/tooth size discrepancy

Solution

- Restore
- Request IPR in opposing arch with Refinement to close spaces

Prevention

Review your ClinCheck treatment plan closely paying special attention to comments provided by the technician



ClinCheck Review Tips:

<http://www.aligntechinstitute.com/GetHelp/Documents/pdf/ClinCheckReview.pdf>

Residual Spacing



Root Cause

IPR ledge makes contact appear open (may be subgingival)

Solution

Remove ledge with IPR, close space with Refinement

Prevention

- Smooth parallel lines with IPR is the goal
- Stage IPR later during the treatment
- Use hand strips to do the IPR



IPR:

<http://www.aligntechinstitute.com/IPR>

Residual Crowding



Root Cause

Not enough time for movement to express due to variation in bone biology, tooth morphology or patient compliance

Solution

- Extend wear time
- Use Detail Plier to apply additional pressure points help correct minor in/out movements

Prevention

Always monitor interproximal contacts to ensure teeth have space to move



Detail Pliers:

http://www.aligntechinstitute.com/files/pdf/monitoring_finishing/TT_Detailing_Pliers.pdf

Residual Crowding



Root Cause

Lack of OJ; Lower crowding can't be resolved because lower teeth are contacting upper teeth (interarch interference)

Insufficient IPR preformed

Solution

Move interference out of the way with Refinement

Resolve remaining crowding with Refinement

Prevention

Plan a different staging proclining upper and lower

- During the treatment period
- Perform recommended amount of IPR
 - Measure IPR
 - Record IPR in chart



IPR:

<http://www.aligntechinstitute.com/IPR>

Prevent Relapse

Don't forget retention

Vivera™ can accommodate fixed lingual wire retainers

