SureSmile Advanced
Wire Therapy User Guide
Overview of SureSmile Wire Therapy Process

SureSmile is the first end-to-end solution for fixed and removable appliances that allows the doctor to apply 3D diagnostic imaging and computer-aided treatment planning to unlock the power of both shape memory alloy and ductile archwires through customization. This results in greater control and efficiency for orthodontic care.

SureSmile is comprised of three key components:

- In-vivo scanning is used to capture 3D images of a patient's dentition. These images are used to produce 3D models with individually movable teeth.
- SureSmile 3D software provides powerful visualization tools for precision diagnosis, treatment simulation and customized appliance design. The doctor can review the digital setup with this software and use it to communicate with patients and with the SureSmile Digital Lab.
- The SureSmile Digital Lab processes scans and provides a setup based on clinical instructions from the practice. Our manufacturing facility can produce robotically bent precision archwires, aligners, printed models and IDB trays.

*Important: Dentsply Sirona does not determine patient care. Dentsply Sirona only provides therapeutics as directed by the doctor. The suresmile process depends on the application of the doctor’s diagnostic and clinical judgment.*
Reviewing Therapeutic Models
Reviewing the Therapeutic Model

In SureSmile, a therapeutic model is a 3D model of the patient’s individual tooth anatomy and bracket positions (if applicable). It is created from an in-vivo scan in combination with photos and x-rays. You order the therapeutic model at the point when you are ready to start treatment with SureSmile custom archwires.

To order a therapeutic model, you or your staff must take an intraoral optical scan or CBCT scan of the patient. If the patient has brackets, their conventional wires must be removed and bracket doors closed (if applicable). Current records should also be taken, including photos and x-rays. Once the scan, photos and x-rays have been taken and imported into SureSmile, you or your staff use SureSmile to order the therapeutic model.

The Digital Lab will process the imported scan data, and using the photos and x-rays as references, will create a 3D digital model of the patient’s current dentition. Once the therapeutic model is complete, it is returned to you in digital format to review it for accuracy.
Therapeutic Model Review Checklist

Checklists in the treatment planning workspace support a step-by-step standardized review of models after they are processed by the Digital Lab and returned to you. There are distinct checklists for diagnostic models, therapeutic models, setup models and final models.

You will use a 12-step checklist to systematically review a therapeutic model for any inaccuracies.
Ordering a Setup
Completing the Setup Prescription Form (MACROS)

SureSmile organizes the information required for a setup prescription into six categories – Midline, Archform, Class, Resolutions, Occlusal Plane and Surgery. We refer to these six categories by the acronym MACROS. Think of MACROS as an organizational tool to help you with your treatment planning and to convey your plan to the Digital Lab.

The Digital Lab requires that you make selections under each of the six MACROS categories listed in the prescription form so that your setup technician has enough information to process your setup.

If all of the MACROS categories are not filled out completely, or if the Digital Lab has questions regarding the treatment plan, the setup order is returned to you in a Needs Information state. You must provide to the Digital Lab the information requested in the product notes to complete the order.

What do the MACROS button colors indicate?

- M → Section has not been opened or clicked in
- M → More information is needed
- M → All required information has been provided
### Midline

**Which Midline to Treat to**

<table>
<thead>
<tr>
<th>Maintain</th>
<th>Move Upper to Lower</th>
<th>Move Lower to Upper</th>
<th>Independent (move both)</th>
</tr>
</thead>
<tbody>
<tr>
<td>= maintain current positions</td>
<td>= treat to lower</td>
<td>= treat to upper</td>
<td>= treat independently <em>(specification needed)</em></td>
</tr>
</tbody>
</table>

**How to Achieve Midline Correction**

**Global Movement**

- **Class II Left**
  - Move globally
  - = rotate mandible to the right

- **Class II Right**
  - = rotate mandible to the left

- **Class III Left**
  - = rotate mandible to the left

- **Class III Right**
  - = rotate mandible to the right

**Translation for Functional Shift**

- = translate mandible to the left or right

**Dental Movement**

- **Space Management**
  - = use space closure

- **Asymmetrical IPR**
  - = IPR to allow for dental correction

- **Angulation Correction**
  - = crown angulation change

- **Unilateral Distalization**
  - = distalize left or right *(auxiliary anchorage required)*

- **Cant Correction**
  - = improve midline by correcting the cant
# Archform

## Which Archform to Treat to

<table>
<thead>
<tr>
<th>Maintain Relationship</th>
<th>= maintain current positions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent</td>
<td>= treat independently <em>(specification needed)</em></td>
</tr>
<tr>
<td>Adjust to Upper</td>
<td>= treat to upper</td>
</tr>
<tr>
<td>Adjust to Lower</td>
<td>= treat to lower</td>
</tr>
</tbody>
</table>

## Archform Type Choices

<table>
<thead>
<tr>
<th>Natural (patient’s)</th>
<th>Penta Normal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brader</td>
<td>Penta Ovoid</td>
</tr>
<tr>
<td>ORMCO TMA</td>
<td>Penta Narrow Ovoid</td>
</tr>
<tr>
<td>PAR Arch</td>
<td>Penta Tapered</td>
</tr>
<tr>
<td>Vari simplex large</td>
<td>Penta Narrow Tapered</td>
</tr>
<tr>
<td>Vari simplex small</td>
<td>True Arch</td>
</tr>
<tr>
<td>Bennet &amp; McLaughlin</td>
<td>Damon</td>
</tr>
</tbody>
</table>

## Upper Expansion / Constriction

<table>
<thead>
<tr>
<th>Upper</th>
<th>= amount of expansion or constriction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower</td>
<td>= amount of expansion or constriction</td>
</tr>
</tbody>
</table>

## Archform Reference Teeth

| Archform References | = the teeth with proper archform alignment to be used as archform reference teeth |
### Which Class to Treat to

<table>
<thead>
<tr>
<th></th>
<th>Right</th>
<th>Left</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Molar</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintain</td>
<td>Maintain</td>
<td></td>
</tr>
<tr>
<td>Class I</td>
<td>Class I</td>
<td></td>
</tr>
<tr>
<td>Class II</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td>Class III</td>
<td>Class III</td>
<td></td>
</tr>
<tr>
<td>Best Fit</td>
<td>Best Fit</td>
<td></td>
</tr>
<tr>
<td><strong>Canine</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintain</td>
<td>Maintain</td>
<td></td>
</tr>
<tr>
<td>Class I</td>
<td>Class I</td>
<td></td>
</tr>
<tr>
<td>Class II</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td>Class III</td>
<td>Class III</td>
<td></td>
</tr>
<tr>
<td>Best Fit</td>
<td>Best Fit</td>
<td></td>
</tr>
</tbody>
</table>
### Class

**How to Achieve the Class Correction**

<table>
<thead>
<tr>
<th>Global Correction</th>
<th>Class II</th>
<th>Class III</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>use Class II simulation</td>
<td>use Class III simulation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dental Correction</th>
<th>Space Management</th>
<th>Asymmetrical IPR</th>
<th>Angulation Correction</th>
<th>Archform Correction</th>
<th>Cant Correction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>improve class using space closure</td>
<td>use IPR to help with class correction</td>
<td>improve class by adjusting angulation alignment</td>
<td>improve class by adjusting the archform</td>
<td>improve class by correcting the cant</td>
</tr>
</tbody>
</table>

### Anterior Overjet

<table>
<thead>
<tr>
<th>Ideal</th>
<th>Gap</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mandibular incisor edges contact maxillary lingual surfaces</td>
</tr>
<tr>
<td></td>
<td>space between mandibular incisor edges and maxillary lingual surfaces</td>
</tr>
</tbody>
</table>
## Resolutions

### Tooth Size Discrepancy

| Bolton Ratio and Maxilla & Mandible Sum | = arch measurements and surplus |

### Resolve Tooth Size Issues

| IPR | = resolve tooth size issues using interproximal reduction; choose the location of the IPR; choose the maximum amount of IPR allowed |
Resolutions

### Resolve Tooth Size Issues

<table>
<thead>
<tr>
<th>Resolution</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Restorative (No IPR)</strong></td>
<td>= tooth/teeth will be restored later, no IPR allowed; type notes for Digital Lab in “Resolve Restorative Issues” box</td>
</tr>
</tbody>
</table>

### Resolve Tooth Size Issues

<table>
<thead>
<tr>
<th>Resolution</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Accept Best Fit (No IPR, No Restorative)</strong></td>
<td>= get best fit with no IPR and no restorative work later; prioritize overjet or class if both cannot be obtained</td>
</tr>
</tbody>
</table>

### Space Closure Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reciprocal</td>
<td>= choose Reciprocal to close spaces both mesially and distally</td>
</tr>
<tr>
<td>Max. Anchorage</td>
<td>= choose Max. Anchorage to close spaces distally</td>
</tr>
<tr>
<td>Min. Anchorage</td>
<td>= choose Min. Anchorage to close spaces mesially</td>
</tr>
</tbody>
</table>

### Tooth Movement Restrictions

<table>
<thead>
<tr>
<th>Restriction</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teeth which cannot be moved</td>
<td>e.g., ankylosis, root resorption, periodontally involved tooth/teeth</td>
</tr>
</tbody>
</table>
## Occlusal Plane

### Which Arch to Use as Occlusal Plane Reference
- **Upper**
  - treat to upper occlusal plane
- **Lower**
  - treat to lower occlusal plane
- **Independent**
  - treat independently

### Occlusal Plane Reference Teeth
- choose at least one reference tooth on the reference arch

### Indicate How to Treat Cant

<table>
<thead>
<tr>
<th>Upper Anterior</th>
<th>Lower Anterior</th>
<th>Upper Posterior</th>
<th>Lower Posterior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintain</td>
<td>Maintain</td>
<td>Maintain</td>
<td>Maintain</td>
</tr>
<tr>
<td>Left – Int</td>
<td>Left – Ext</td>
<td>Left – Int</td>
<td>Left – Ext</td>
</tr>
<tr>
<td>Left – Ext</td>
<td>Right – Int</td>
<td>Right – Ext</td>
<td>Right – Ext</td>
</tr>
<tr>
<td>L – Ext R – Int</td>
<td>L – Int R – Ext</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- = maintain
- = intrude left segment
- = extrude left segment
- = intrude right segment
- = extrude right segment
- = extrude left/intrude right segments
- = intrude left/extrude right segments
### Indicate How to Treat Anterior Overbite

<table>
<thead>
<tr>
<th>Anterior Overbite</th>
<th>= &lt; 1 mm</th>
<th>= 1-2 mm</th>
<th>= &gt; 2 mm</th>
</tr>
</thead>
</table>

### Indicate How to Treat Curve of Spee

<table>
<thead>
<tr>
<th>Curve of Spee</th>
<th>Level – Ant. Intrusion</th>
<th>Level – Bicuspid Extrusion</th>
<th>Level – Combination</th>
<th>Maintain</th>
<th>Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>= with anterior intrusion</td>
<td>= with bicuspid extrusion</td>
<td>= with both</td>
<td>= maintain CoS</td>
<td>= increase CoS</td>
</tr>
</tbody>
</table>

### Indicate How to Treat Curve of Wilson

<table>
<thead>
<tr>
<th>Curve of Wilson</th>
<th>Level</th>
<th>Maintain</th>
<th>Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>= decrease crown buccal torque</td>
<td>= maintain posterior torque</td>
<td>= increase crown buccal torque</td>
</tr>
</tbody>
</table>
### Surgery

<table>
<thead>
<tr>
<th>Maxilla</th>
<th>= 1 piece</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mandible</td>
<td>= 2 pieces</td>
</tr>
<tr>
<td></td>
<td>= 3 pieces</td>
</tr>
</tbody>
</table>

*Mandible (Selection of one or both arches activates the Surgery tab)*

**Notes**

- Be sure to leave notes for the Digital Lab specifying the type of surgery that is planned for the patient.
Reviewing a Setup
Reviewing a Setup

What is a 3D setup?

Based on the therapeutic model and MACROS (setup prescription)

Basis of the SureSmile custom archwire or aligner

What are the prerequisites for a setup?

Therapeutic model must be in one of two product states:
- Approved
- Finished
Setup Review Checklist

The setup review checklist was designed under the direction of doctors who are expert SureSmile users.

The checklist helps doctors complete their review faster and find issues more easily.

The checklist is a 14-step review (by default).

The checklist can be customized.
Clinical Considerations: Global Midline Correction

Key Points:
1. Rotation to translation proportion
2. Movements should be in the same direction

The proportion of rotation to translation is approximately 3:1
Translation = to compensate for rotational side effects which could appear in the posterior segment
Rotation and Translation movements should always be applied in the same direction (both + or both – values)
Clinical Considerations: Dental Midline Correction

Dental Correction ~ 0.8 mm Dental Correction to the left
Clinical Considerations: Arch Symmetry

Center midline of 3D model to the navigation circle

Use the Measurement Grid in Front as a guide for symmetry evaluation

Review the archform against the camera navigation circle for symmetry
Clinical Considerations: Arch Alignment

Use the labial/incisal edges and buccal/occlusal margins for arch shape alignment evaluation.

Use the contrast tool to temporarily adjust the lighting to illuminate tooth anatomy.
Clinical Considerations: Anterior Alignment

1. Refer to the therapeutic photos as a reference
2. Compare 3D setup to photos
3. Use Upper/Lower Oblique views to confirm that rotation and torque alignments are appropriate

Remember the “Social Six”
Clinical Considerations: Overjet

Use anterior OJ oblique view and refer to OJ photos if present. Compare the 3D setup to the photos.
Clinical Considerations: IPR & Space Management

To evaluate IPR, use the *Clipping Plane* tool.

IPR values are listed in the Displacements tab, the Buildup/IPR tab, and the IPR Tracking tab.

Note: IPR values indicate planned reduction at the mesial interproximal contact. Clinical judgment must be used to determine how the reduction is distributed between the tooth and adjacent mesial tooth.
Clinical Considerations: Global Class Correction

1.5 mm of Class II mechanics simulation

-0.8 mm of Class III mechanics simulation
Clinical Considerations: Dental Class Correction

Malocclusion

Class improvement done with angulations, rotations, and dental A/P correction

Display both sets of teeth to evaluate dental correction

View model from different angles to evaluate dental correction
Clinical Considerations: Torque Compensation

Tooth Coordinate System

Lingual crown torque → relative extrusion of bracket
Buccal crown torque → relative intrusion of bracket

*Movements relative to center of crown

1.2 mm of relative extrusion due to the lingual crown torque being applied from Tooth Displacements
Clinical Considerations: Torque Compensation

Bracket Coordinate System

When torqueing a tooth using the Bracket Displacement option the tooth rotates around the bracket, and no intrusion or extrusion of the bracket occurs.

* Movements relative to center of bracket slot

No extrusion due to the lingual crown torque being applied from Bracket Displacements
# Tooth Displacements vs. Bracket Displacements

<table>
<thead>
<tr>
<th>Movement Management</th>
<th>Tooth Displacements</th>
<th>Bracket Displacements</th>
</tr>
</thead>
</table>
| Movement Management | Use for the following alignments:  
- Mesial / Distal  
- Buccal / Lingual  
- Vertical Occlusal / Gingival  
- Rotation  
- Torque (if relative extrusion / intrusion is desired) | Use for the following alignments:  
- Angulation  
- Torque (if relative extrusion / intrusion is NOT desired) |

| Movement Evaluation | Use for the following movements:  
- Mesial / Distal  
- Buccal / Lingual  
- Rotation | Use for the following movements:  
- Vertical Occlusal / Gingival  
- Angulation  
- Torque |
Clinical Considerations: Reading the Wire

To evaluate vertical and angulation changes, you can use:

1. Activated and setup wires as a reference
2. Comparison and Bonded Brackets as a reference
Clinical Considerations: Occlusal Contacts

- **Ideal Contact**
- **Heavy Occlusion**
- **Minor Space**
Clinical Considerations: Bracket Interferences

When evaluating the setup, look for possible Bracket-Tooth Interferences.

For information about Bracket-Tooth Interferences refer to DL Notes.

To evaluate bracket interferences, select the *Check Wire and Bracket Intersections with Teeth* tool.
Ordering SureSmile Wires
SureSmile Archwires

SureSmile archwires are custom-bent to the setup (plan) or malocclusion (therapeutic model), as determined by your archwire prescription.

Additional features (e.g., CoS, RCoS, expansion, constriction) allow you to enhance the effectiveness of the wires, to minimize side effects, and make over-corrections or other anticipated adjustments.

Before designing SureSmile archwires you must determine when in the patient’s treatment SureSmile archwires should first be used and whether any overcorrections or other adjustments will need to be made to the wires.

Design Considerations

- Location of bend
- Magnitude of bend
- Slide distance

Design Features of a Bend

- Location of Bend
- Magnitude of the Bend
- Slide Distance
- Design Features of a Bend
SureSmile Wire Design Options

1. Full expression archwire (setup wire)

2. Full expression archwires (with overrides):
   a. Overcorrected archwire
   b. Undersized archwire
   c. Limit archwire with passive segment, 0%
   d. Limit value % archwire (e.g., 75%, 50%, 25%)
   e. Straight archwire
### SureSmile Archwire Stiffness Comparison Guide

<table>
<thead>
<tr>
<th>Stiffness</th>
<th>Type of Material</th>
<th>Cross-Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Nickel Titanium (NiTi)</td>
<td>.016 round</td>
</tr>
<tr>
<td></td>
<td>NiTi</td>
<td>.016 x .016</td>
</tr>
<tr>
<td></td>
<td>Beta Titanium (Beta-Ti)</td>
<td>.016 round</td>
</tr>
<tr>
<td></td>
<td>Beta-Ti</td>
<td>.016 x .016</td>
</tr>
<tr>
<td></td>
<td>NiTi</td>
<td>.016 x .022</td>
</tr>
<tr>
<td></td>
<td>Beta-Ti</td>
<td>.016 x .022</td>
</tr>
<tr>
<td></td>
<td>NiTi</td>
<td>.017 x .025</td>
</tr>
<tr>
<td></td>
<td>NiTi</td>
<td>.018 x .018</td>
</tr>
<tr>
<td></td>
<td>NiTi</td>
<td>.019 x .025</td>
</tr>
<tr>
<td></td>
<td>Beta-Ti</td>
<td>.017 x .025</td>
</tr>
<tr>
<td></td>
<td>Beta-Ti</td>
<td>.019 x .025</td>
</tr>
<tr>
<td>High</td>
<td>Elgiloy</td>
<td>.016 x .022</td>
</tr>
<tr>
<td></td>
<td>Elgiloy</td>
<td>.017 x .025</td>
</tr>
<tr>
<td></td>
<td>Elgiloy</td>
<td>.019 x .025</td>
</tr>
</tbody>
</table>
Slot Filling Torque vs. Additional Twist

Slot Filling Torque is used:
- To compensate for the “slop” of a given wire dimension within the bracket slot

Additional Twist (torque) is used:
- To correct or overcorrect the torque of an individual tooth or group of teeth
- To compensate for the torquing effects of certain mechanics on certain teeth such as CoS, RCoS, inter-maxillary elastics, or space closure mechanics
- Often helpful in controlling the torque of the terminal molar where the control or effect of the archwire may be diminished
- To compensate for manufacturing tolerances of the brackets and wires
Handling Torque Loss in SureSmile

In traditional orthodontics, additive bends are used to correct for the combination of bracket/wire slop and tolerances.

<table>
<thead>
<tr>
<th>Wire Cross Section</th>
<th>Corner Radius (range .002 to .005)</th>
<th>Depth of Wire Engagement</th>
</tr>
</thead>
<tbody>
<tr>
<td>.018 Slot</td>
<td>Range 15° to ∞</td>
<td></td>
</tr>
<tr>
<td>.016 X .016</td>
<td>Range 9° to 14°</td>
<td></td>
</tr>
<tr>
<td>.016 X .022</td>
<td>Range 5° to 7°</td>
<td></td>
</tr>
<tr>
<td>.017 X .025</td>
<td>Range 10° to 15°</td>
<td></td>
</tr>
<tr>
<td>.022 Slot</td>
<td>Corner Radius (range .002 to .005)</td>
<td></td>
</tr>
<tr>
<td>.017 X .025</td>
<td>Range 15° to 22°</td>
<td></td>
</tr>
<tr>
<td>.019 X .025</td>
<td>Range 10° to 15°</td>
<td></td>
</tr>
</tbody>
</table>
Handling Torque Loss in SureSmile

For torque loss as a function of wire size, use the automatic slot filling – lingual or labial torque options.

<table>
<thead>
<tr>
<th>Upper</th>
<th>Lower</th>
<th>UR8</th>
<th>UR7</th>
<th>UR6</th>
<th>UR5</th>
<th>UR4</th>
<th>UR3</th>
<th>UR2</th>
<th>UR1</th>
<th>UL1</th>
<th>UL2</th>
<th>UL3</th>
<th>UL4</th>
<th>UL5</th>
<th>UL6</th>
<th>UL7</th>
<th>UR8</th>
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<tr>
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</tr>
</tbody>
</table>

For torque loss as a function of wire size, use the automatic slot filling – lingual or labial torque options.
Handling Torque Loss in SureSmile

In traditional orthodontics, additive bends are used to compensate for the loss of torque with the use of inter-maxillary elastics.

To compensate for torque loss as the result of inter-maxillary elastics, SureSmile uses values of additional torque entered for each tooth in the wire prescription.

Class II movement

Torque loss as the result of inter-maxillary elastics
Compensation for Curve of Spee in SureSmile

In traditional orthodontics, additive compensatory bends are used to compensate to level a Curve of Spee.

For anterior torque loss:
- in non-extraction cases, lingual slot filling is recommended
- additional lingual crown torque may be considered

For bicuspid torque loss:
- in non-extraction cases, lingual slot filling may be considered
- in extraction cases, buccal slot filling may be considered
Curve of Spee (CoS) & Reverse Curve of Spee (RCoS)

**CoS can be used in the:**
- Upper arch where incisor intrusion or bite opening is desired
- Upper arch during anterior retraction and space closure to counteract the extrusive forces of those mechanics on the incisors
- Lower arch where incisor extrusion or bite closure is desired

**RCoS Can be used in the:**
- Upper arch where incisor extrusion or bite closure is desired
- Lower arch where incisor intrusion or bite opening is desired
- Lower arch during anterior retraction and space closure to counteract the extrusive forces of those mechanics on the incisors
Applying Curve of Spee/Reverse Curve of Spee

Determine how much CoS/RCoS to apply to the SureSmile archwire by overlaying the active model (the plan, shown in white) over the reference model (the therapeutic model, shown in blue).

Display the grid behind both models and use the grid to gauge how much movement has been applied in the plan.

You can then apply your clinical judgment and decide if you want to apply additional overcorrection.

Each square on the grid = 1mm
Expansion / Constriction

Expansion:
Can be used where arch widening is desired
Can be used to compensate for the narrowing effects of other mechanics

Constriction:
Can be used where arch narrowing is desired
Can be used to compensate for the widening effects of other mechanics

Compensation for expansion tipping:
In SureSmile, lingual slot filling torque may be considered for expansion tipping

Compensation for constriction tipping:
In SureSmile, labial slot filling torque may be considered for constriction tipping
Applying Expansion / Constriction

Determine how much expansion/constriction to apply to the SureSmile archwire by overlaying the active model (the plan, shown in white) over the reference model (the therapeutic model, shown in blue) in the 3D viewer. Display the grid behind both models and use the grid to gauge how much movement has been applied in the plan. The doctor can then apply his/her clinical judgment and decide if he/she wants to apply additional overcorrection.

Important! When considering additional expansion/constriction, keep in mind that expansion/constriction is applied to the entire arch. For example, if you apply 4.0 mm of expansion, 2.0 mm of expansion is applied to each side of the arch.

Each square on the grid = 1mm

Expansion in SureSmile
Add Distal Slots in SureSmile

Use the *Add distal slots* feature when:

- 7s and/or 8s are not captured in the scan
- 7s and/or 8s erupted mid treatment
- A molar bracket is not yet present in the SureSmile bracket library

Note: the wire extends straight from the distal of the most distal tooth in the model and does not take into account where the bracket is on the tooth unless an Update scan is ordered.
SureSmile Archwire with Passive Segment (0%)

0% bend or segment prescription intended to prevent movement for the following reasons:
- Stabilization archwires in order to maintain the group of the teeth, e.g. periodontally involved
- Maintain the alignment of teeth segment/group
- Increase anchorage

Passive Bends
Limit Value (%) Wire in SureSmile

Limit value (%) wire can be used to limit the movement of certain teeth as part of a treatment plan while other teeth are being corrected.

Considerations:
- Difficulty of wire engagement
- Ankylosis
- Root resorption
- Periodontally involved teeth
- Low tolerance to discomfort
- Bracket delamination

In orthognathic surgery cases where the surgeon does not want any dental compensations to occur so that he/she can surgically correct a deformity and minimize relapse.
Limit Value (%) Wire in SureSmile

Wire prescription can be staged in percentages from 100% (full expression) to any percentage of expression i.e. 75%, 50%, 25%, etc.

Staging can be done tooth by tooth or to the entire wire

100% = Full Expression archwire (setup wire)

0% = Limit Wire with Passive Segment or Passive wire

100% > Staged Archwire < 0%
SureSmile Straight Wire

- Allows for easier space closure
- Used before a full expression archwire (setup wire)
- Straight segments in posteriors
- Full expression archwire in anteriors to maintain control and anchorage
SureSmile Straight Wire

Select most mesial tooth in segment, software automatically selects distal teeth
You can deselect or override values as needed
## Archwire Recommendations: Indication of Use

<table>
<thead>
<tr>
<th>Stiffness</th>
<th>Type of Material</th>
<th>Alignment</th>
<th>Leveling</th>
<th>Archwidth</th>
<th>Torque</th>
<th>Elastics</th>
<th>Stage of Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Nickel Titanium (Ni-Ti)*</td>
<td>✓✓✓</td>
<td>✓✓</td>
<td>✓</td>
<td>✓✓✓</td>
<td>✓✓✓</td>
<td>Early to Final</td>
</tr>
<tr>
<td></td>
<td>(w/ auxiliaries ✓✓✓)</td>
<td></td>
<td>(w/ auxiliaries ✓✓✓)</td>
<td>(w/ auxiliaries ✓✓✓)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>Beta Titanium (Beta-Ti)**</td>
<td>✓</td>
<td>✓✓✓</td>
<td>✓✓✓</td>
<td>✓✓✓</td>
<td>✓✓✓</td>
<td>Mid to Final</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Elgiloy**</td>
<td>✕</td>
<td>✓✓</td>
<td>✓✓✓</td>
<td>✓✓✓</td>
<td>✓✓✓</td>
<td>Final</td>
</tr>
</tbody>
</table>

✓ = Adequate  
✓✓ = Recommended  
✓✓✓ = Highly Recommended

*Adjustable with virtual pliers (robot) only  
**Adjustable with virtual pliers (robot) or by hand tools
Archwire Recommendations: Space Closure Considerations

<table>
<thead>
<tr>
<th>Stiffness</th>
<th>Type of Material</th>
<th>Space Closure (1-2mm)</th>
<th>Space Closure (3-4mm)</th>
<th>Archwidth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Nickel Titanium (Ni-Ti)*</td>
<td>✓✓✓</td>
<td>✓✓</td>
<td>✓✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(sliding mechanics)</td>
<td>(sliding mechanics with auxiliaries)</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>Beta Titanium (Beta-Ti)**</td>
<td>✓</td>
<td>✓✓</td>
<td>✓✓✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(sliding mechanics)</td>
<td>(sliding mechanics)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Elgiloy**</td>
<td>✓✓✓</td>
<td>✓✓✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(sliding mechanics)</td>
<td>(sliding mechanics)</td>
<td></td>
</tr>
</tbody>
</table>

 ✓ = Adequate
 ✓✓ = Recommended
 ✓✓✓ = Highly Recommended

*Adjustable with virtual pliers (robot) only
**Adjustable with virtual pliers (robot) or by hand tools
Wire Insertion and Laser Marks

Maxilla

Mandible
Wire Insertion

1. Insert wire into tube on one side

2. Position wire using laser marks
   - Use laser markings to check your initial position
   - Upper wire markings face gingival for labial wires
   - Upper wire markings face occlusal for lingual wires
   - Lower wire markings face occlusal
   Engage wire with mark near therapeutic bracket location with room to move to approved setup bracket location
Wire Insertion

3. Refer to 3D model for proper positioning
   Refer to software for positioning
   - Therapeutic model
   - Display wire (full expression wire or setup wire)
   Bends are NEVER in slot
   Brackets ALWAYS on straight segments
Using Diagnostic Simulations
Diagnostic Simulations

A diagnostic simulation in SureSmile is a treatment simulation based on a diagnostic model. The end result of a diagnostic treatment simulation is a 3D model of a patient's treatment objective representing a specific treatment approach. The diagnostic treatment simulation allows you to explore multiple treatment alternatives before deciding on a specific setup prescription. You can create and store numerous treatment simulations for a patient before deciding on a specific treatment plan.

In order to begin a diagnostic simulation, the status of the diagnostic model must be in an *Approved* state. Even though you can also create treatment simulations from an approved therapeutic model, keep in mind that the patient will be in mid-treatment at this point. As a result, you will be more constrained by clinical considerations, since the therapeutic model is the basis for the SureSmile wire.
Setup Workflow Tools

The Setup Workflow tool enables you to rapidly simulate treatment outcomes that approach the quality of a high fidelity setup.

The tool uses an integrated workflow with automated tools for basic alignment for all movements except torque.

It provides an intuitive and workflow guided toolset for setups and simulations.
Setup Workflow Tools

Instead of moving teeth manually, you can set several teeth in each arch as reference teeth, and then allow the software to quickly build a treatment simulation for the entire arch based on the position of these reference teeth.

The automation features allow you to save substantial time, while the integrated workflow ensures a consistent approach to simulate treatment options.

Key to the colors of the teeth in the small tooth crosses:

<table>
<thead>
<tr>
<th>Color</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pink</td>
<td>A reference or rotation symmetric tooth</td>
</tr>
<tr>
<td>White</td>
<td>Reference tooth cross: Unselected teeth that are available for selection as reference teeth. When you choose another reference tooth, the previous reference tooth turns from pink to white. Fixed tooth cross: Unselected teeth that are available for selection as fixed teeth.</td>
</tr>
<tr>
<td>Dark red</td>
<td>A fixed tooth that is also a reference tooth</td>
</tr>
<tr>
<td>Bright red</td>
<td>A fixed tooth</td>
</tr>
<tr>
<td>Gray</td>
<td>Teeth in the inactive arch; Teeth in the active arch that cannot be used as reference or fixed teeth for this kind of movement; Teeth that are missing</td>
</tr>
<tr>
<td>Green</td>
<td>Teeth that are not available for angulation movements. Green is only used in the Angulation I and Angulation II steps.</td>
</tr>
<tr>
<td>Teal</td>
<td>Reference teeth in the inactive arch, or Reference teeth in one angulation step that are consequently unavailable in the other angulation step</td>
</tr>
<tr>
<td>Purple</td>
<td>A fixed tooth in the inactive arch</td>
</tr>
</tbody>
</table>
Simulating Elastics or Other Global Mechanics

Simulate elastics and/or other global mechanics on the Global Registration tab. For example, as shown below, you can simulate CII/CIII elastics under Translation [mm] a(+)p(-) and Midline elastics under Translation [mm] l(+)r(-) and Rotation [deg] l(+)r(-).
Archwire Modifications in SureSmile
Archwire Modifications

Why do I need to modify an archwire?

Setup Modification Wire (based on treatment simulation):
To correct setup misalignment missed during the setup review

Compensation Wire (based on Progress Model):
To make corrective adjustments in response to factors not considered in the setup (i.e. mechanics, biological response, etc.)

How do I modify an archwire?
Use the SureSmile progress evaluation checklist to:
  - assess issues that may arise after suresmile wires have been inserted
  - determine what to do next
Progress Evaluation Checklist

From the wire design workspace, click the Open Checklist icon to open the progress evaluation checklist.

Follow checklist steps until option for resolution is determined.

Select applicable option to direct software to appropriate location in SureSmile.

Checklist shows progress through steps by displaying a check mark next to the steps you have clicked on.

4 or 5 step process:
- Full Expression Wire (only shown if 100% wire has not been ordered)
- Confirm Wire Insertion
- Confirm Setup Achieved
- Check for Interferences
- Progress Model
Full Expression Wire

Confirm that inserted wire has all 100% bends. If a 100% wire has been ordered, confirm this is the inserted wire or insert it now. If a 100% wire was ordered, this step will not appear. If you have not ordered a 100% wire, order it now.
Confirm Wire Insertion

Confirm that the wire is seated correctly

Upper Wire Marks
- Patient right
- Labial wires: gingival side of wire
- Lingual wires: occlusal side of wire
- UR1 and UR4
- Double marks

Lower Wire Marks
- Patient right
- Occlusal side of wire
- LR1 and LR4
- Single marks
- Position the bracket slot between the marks unless a shift or space closure is planned.
Confirm Setup Achieved

Examine wire and tooth positions to determine if setup has been achieved. If the setup has not been achieved, proceed to next step. If the setup has been achieved but the case is not complete, there are two options: Treatment Simulation or New Wire.

Create a new treatment simulation starting from your setup and then order a new wire based on the simulation.

OR

Create a new wire based on the one in use, and modify it to meet your new treatment goals.
Check for Interferences

Check to see if tooth or bracket interferences are preventing full wire expression. Check the wire’s most acute bend, and resolve collisions clinically with methods such as IPR and bite turbos. If issues have been resolved or are not applicable, proceed to the next step.

Check IPR: check notes from the Digital Lab to review planned IPR. Review IPR Tracking tab to confirm it has been completed.

Check interferences: check tooth-to-tooth and tooth-to-bracket interferences. Turbos may be needed to resolve interferences.
Progress Model

A new wire is needed to achieve current setup. Create a new Progress Model that references your plan and order a Compensation Wire.
Treatment Simulation and Setup Modification Wire

Treatment simulation:
- Review the progress photos and setup closely.
- If the misalignment found during the clinical evaluation is also present in the setup, then a new treatment simulation is recommended. (*Full set of current photos is also recommended*)
- Use the treatment simulation features and the *New Setup Modification Wire* button to submit modified wire.
- Manipulate teeth to design a new wire.
- Quicker solution than a new setup since no review cycle.
- Easier than just creating a modified wire, as the teeth can be moved interactively.
- It gives a visual movement representation that helps users determine the amount of correction.
- Recommended option for all new suresmile users.

Setup Modification Wire:
- Modified custom archwire that includes overrides from the selected wire plus the simulated modification values.
- Be sure to select the last inserted wire from the copy overrides drop-down menu to include its values.
New Wire

The modification wire is designed based on overrides from the selected wire plus the values entered into the Wire tab.

Be sure to select the last inserted wire from the copy override drop-down box to include its values (if applicable).

Allows direct manipulation of the wire.

Allows you to rapidly create a solution.

Requires good 3D visualization skills to determine the required correction.
Progress Model and Compensation Wire

Progress Model

A simulation of the estimated current tooth position is based upon your clinical observations.
Includes the misalignment present in the mouth which you want to correct.
The reversed values from the simulation will be used to correct the misalignment via a Compensation Wire.

Compensation Wire

Compensation Wire design is based upon the last inserted wire and the applied reversed progress model values, i.e., the differences between the setup and the progress model.
The reversed values are transferred automatically from the progress model.
Treatment Simulation vs. Progress Model

Values are automatically transferred to the Setup Modification Wire Displacements tab from the treatment simulation.

Note that the values do NOT appear in the Wire tab.
Treatment Simulation vs. Progress Model

Progress Model

*Inverse* Bracket Displacements values are *automatically* transferred to the Compensation Wire Displacements tab and Wire tab.
3D Model Orientation During Simulations

**Treatment Simulation**

3D model orientation on the screen needs to match the orientation of the photo.

Evaluate 3D simulation from different views to ensure proper alignment.

**Progress Model**

3D model orientation on the screen needs to match the exact orientation from the photo.

Do not change the orientation of the 3D model during creation and evaluation of the simulation.

*Note: For chairside simulations, orient 3D model to match patient’s mouth*
Learning Resources

Search the Help Center in SureSmile for:
- Online help topics with step-by-step instructions
- Downloads including forms and reference documents
- Video demonstrations of software features

To open the Help Center, click the question mark button and and select Help Center.