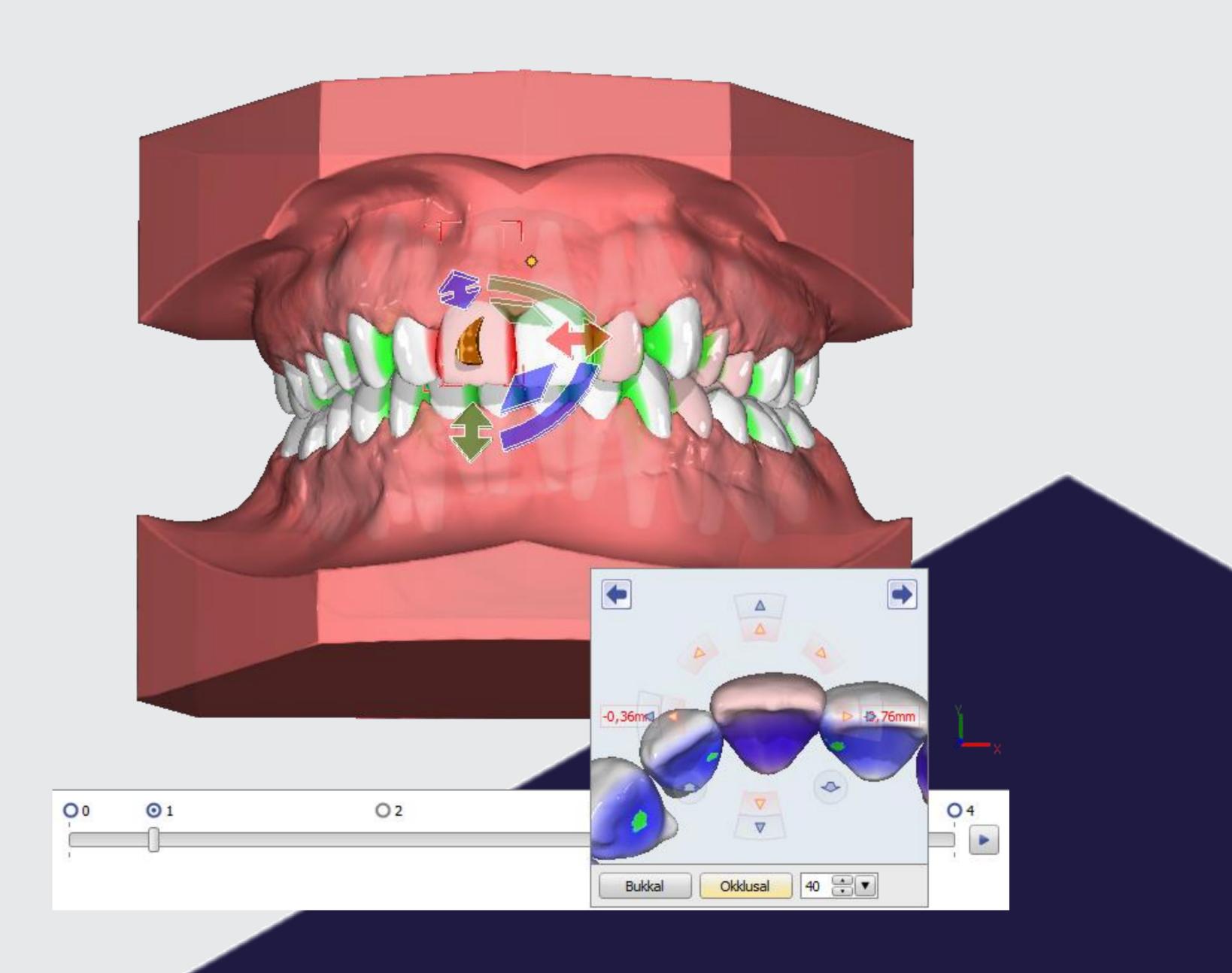**Aligner 3D**
by OnyxCeph³™

Getting Started

Workflow steps for Alignerplanning

1. Import, Adjust Scan Data

2. Attach Base Tray

3. Segment Crowns

4. Setup Treatment Goal
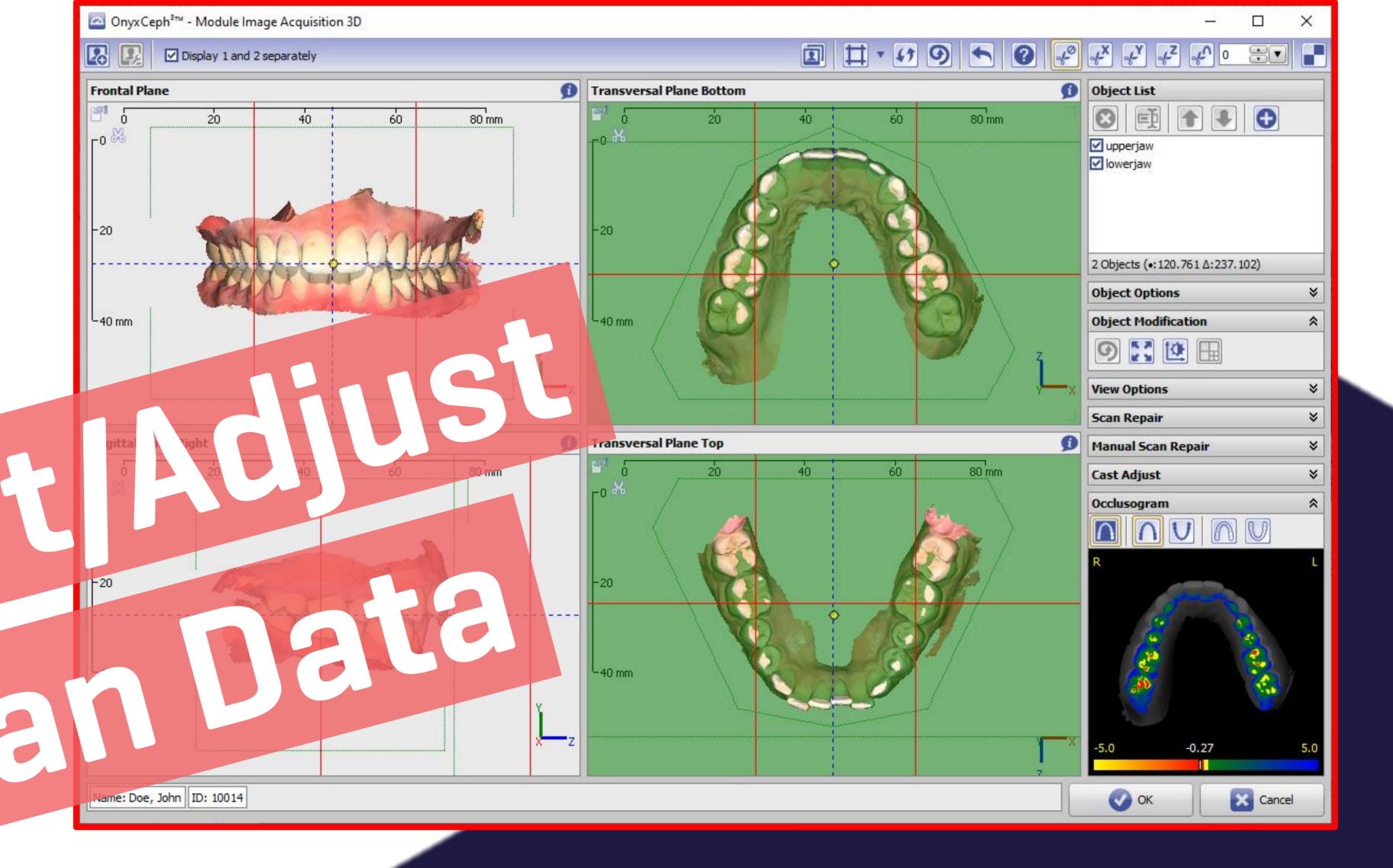
5. Define Steps

6. Serial Data Export

Preface

These "Getting Started" instructions are intended to document the workflow steps practiced in the training course. It does not represent a detailed instruction manual, which is not possible in this context. Rather, the workflow steps should be shown in a chronological order and in a simplified form.

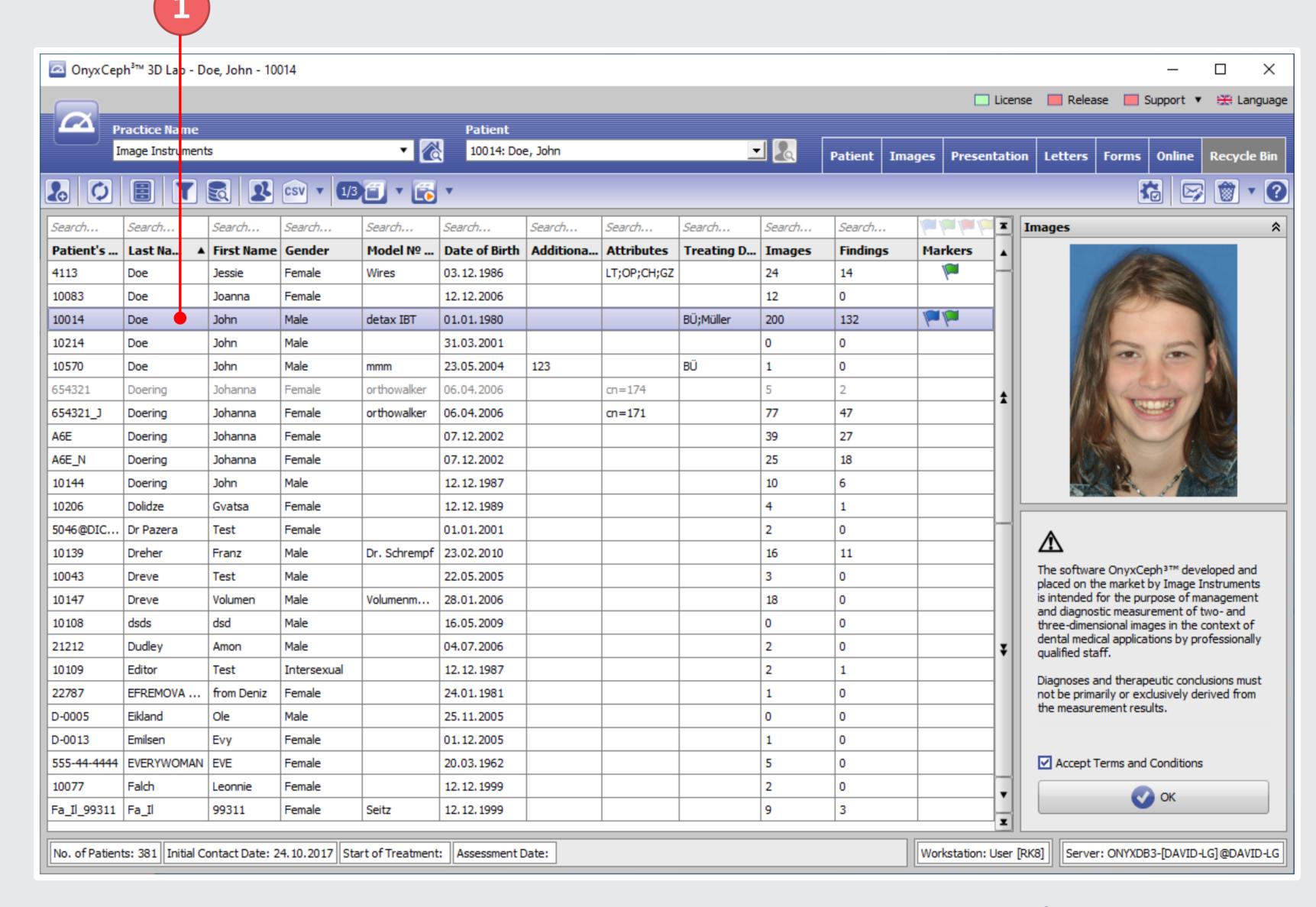Detailed information about the software can be found on the manufacturer's website at:

http://onyxceph.de/ and http://www.onyxwiki.net/

Import Data > Create/Select Patient Record

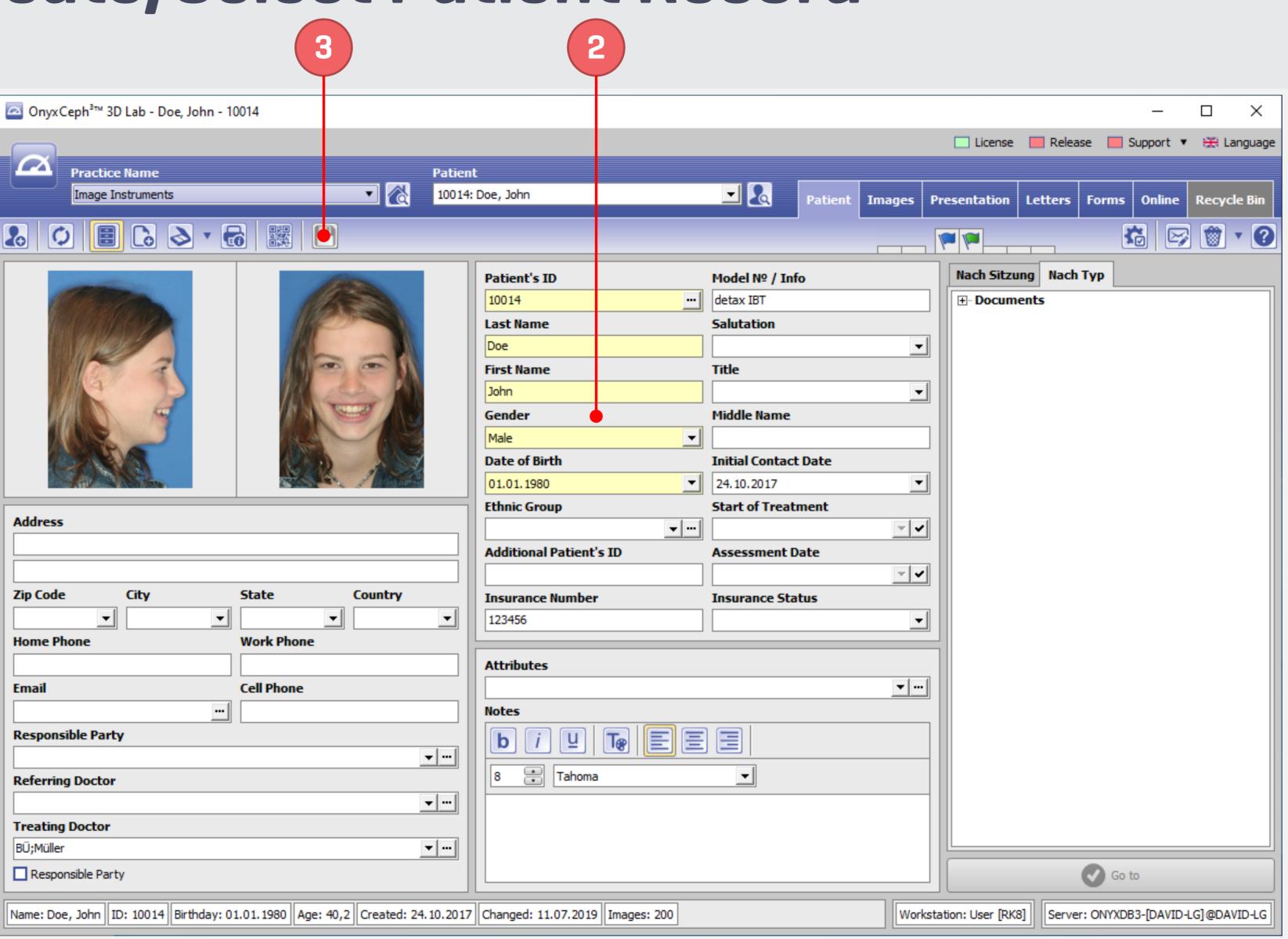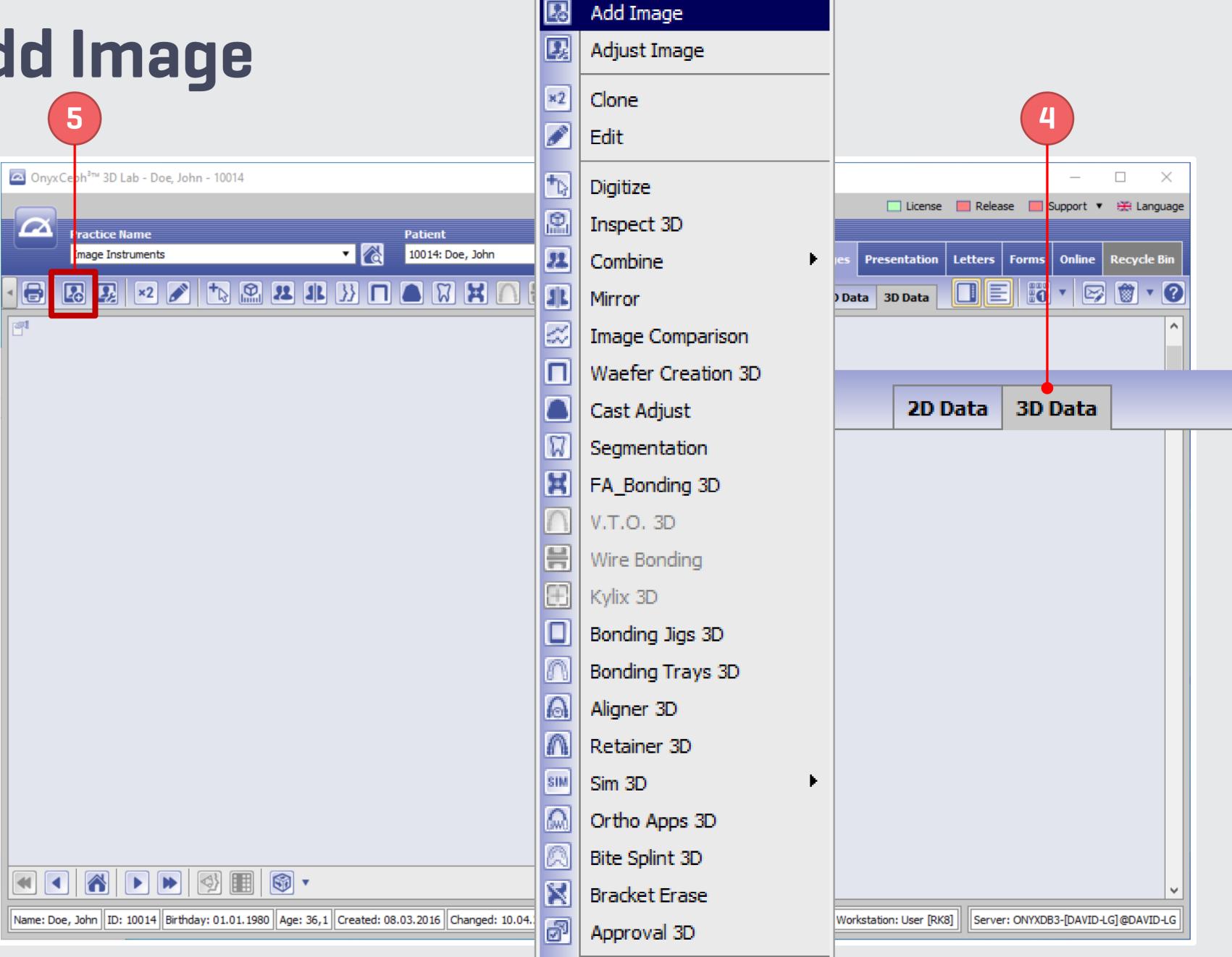**1** Click [New Patient] to create a new patient record or open existing record by double click.

To open an existing patient record, search and select the patient in the patient list and doubleclick or click [OK] bottom right.

Import Data > Create/Select Patient Record

2 Complete mandatory fields.

3 Save input date.

Import Data > Add Image

4 Select tab |Images/3D-Data|.

5 Click icon button [Add Image] to import new 3D data.

Import Data > Add Image
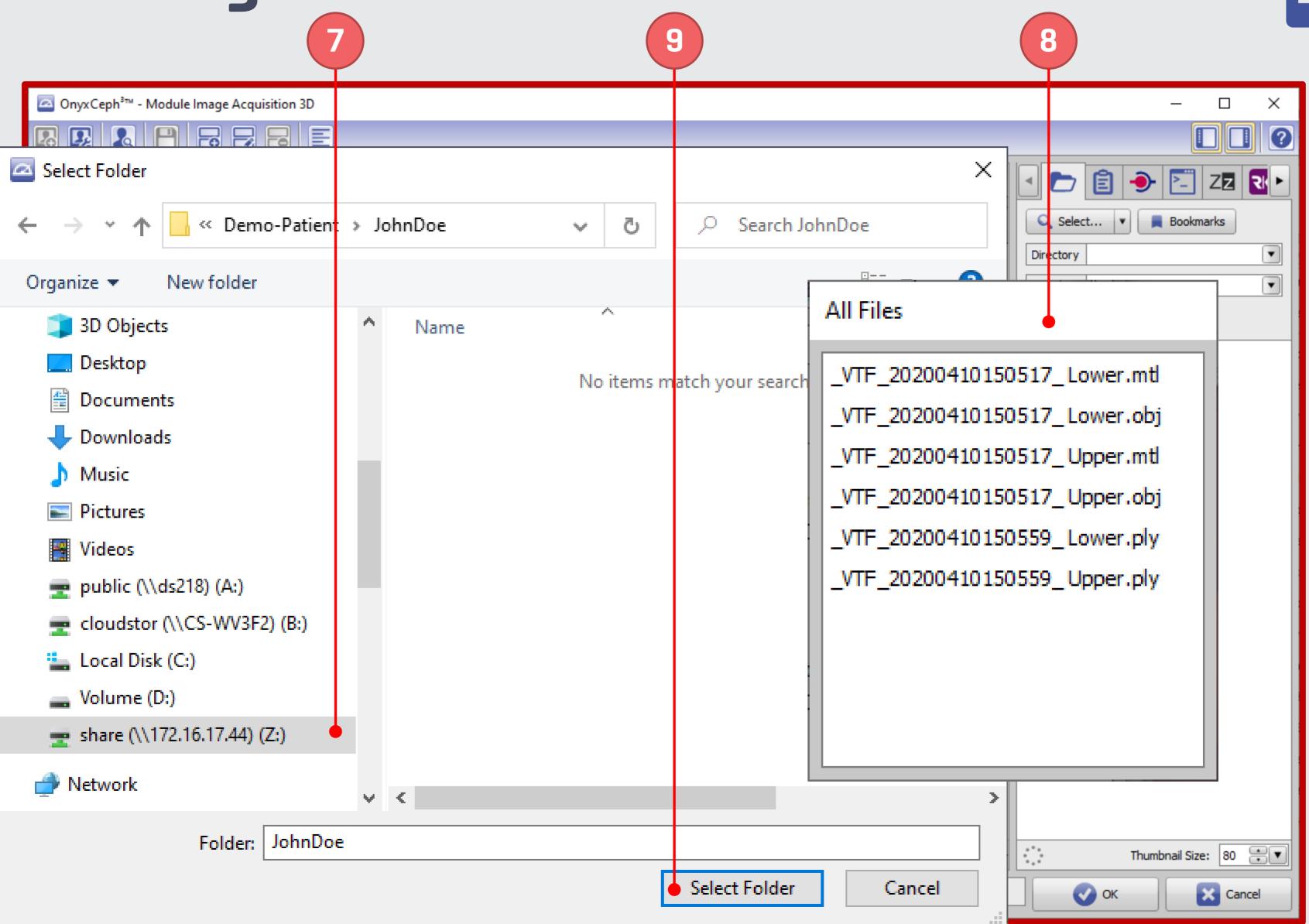
6 Select import source and location.

Import Data > Add Image

7 Could be a folder hosting PLY-files.

8 Preview of 3D folder content.

9 Click [Select folder].

📌
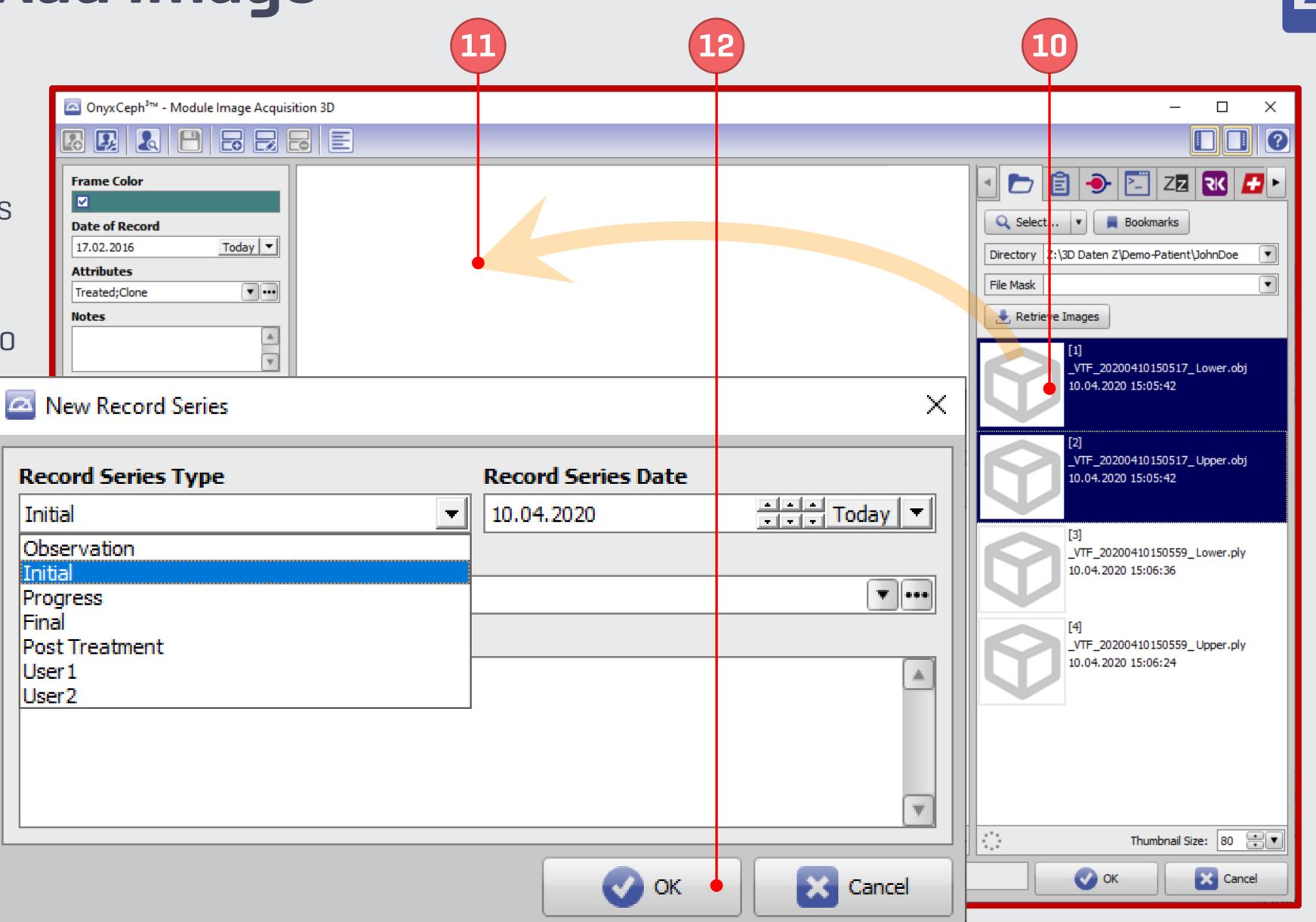
The type of folder search dialog and the content preview has to be defined by the folder options ▼
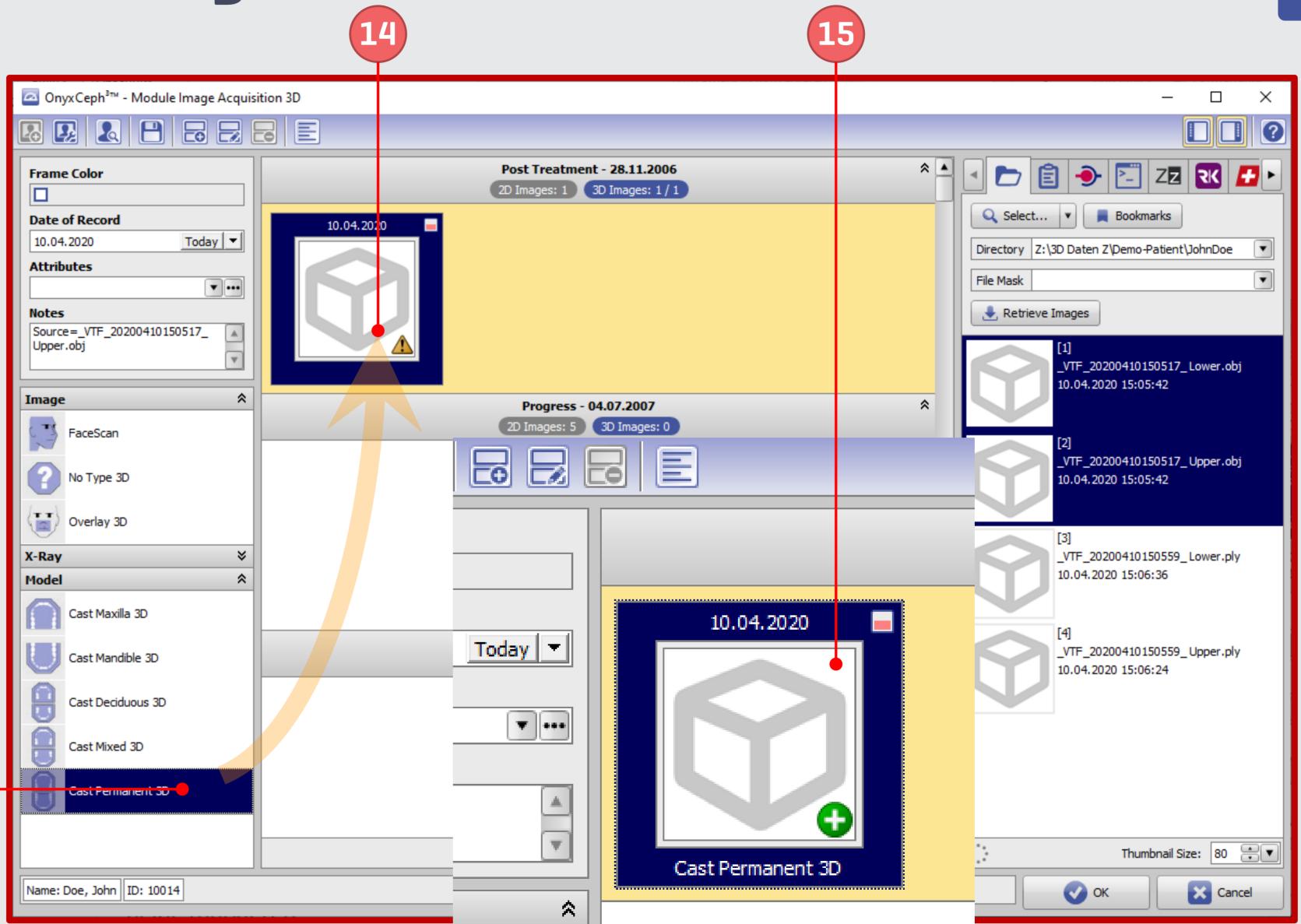
Import Data > Add Image

10 Mark scan files [1]

11 [Drag & Drop] marked files to the middle panel [Window New Record Series will only appear if no record series is existing yet].
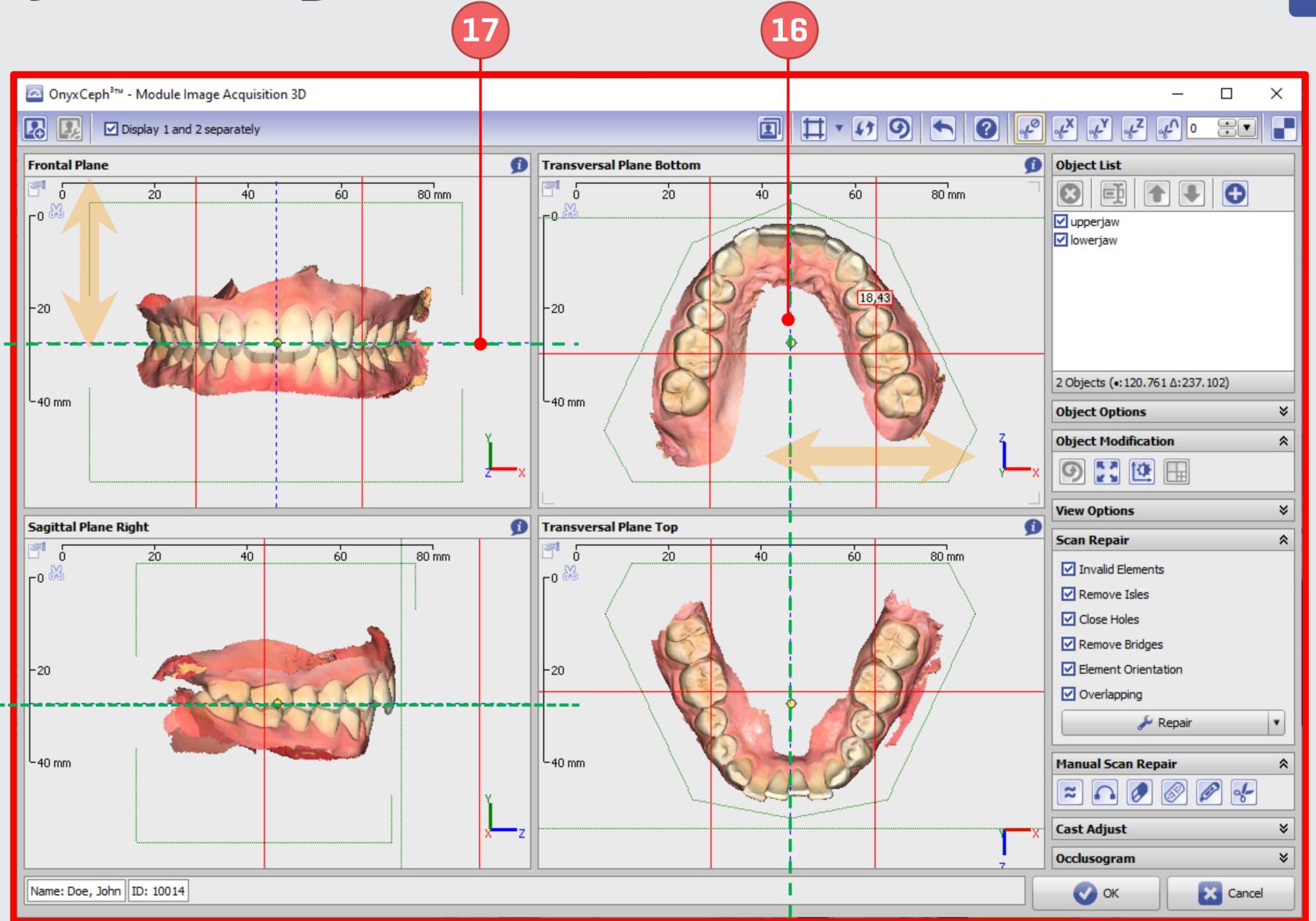
12 Confirm be [OK].

📌

[1] *Usually, upper and lower scan are saved in separate files – in such case, multiselect both by pressed CTRL-button.*

Import Data > Add Image

13 Select Image Type „Cast Permanent 3D" ...

14 and [Drag & Drop] the image type icon onto the thumbnail or vice versa.

15 Double click onto finding thumbnail or on icon button [Adjust Image].

Import Data > Adjust Image

16 Use Raphe-Median-Plane for transversal adjustment.

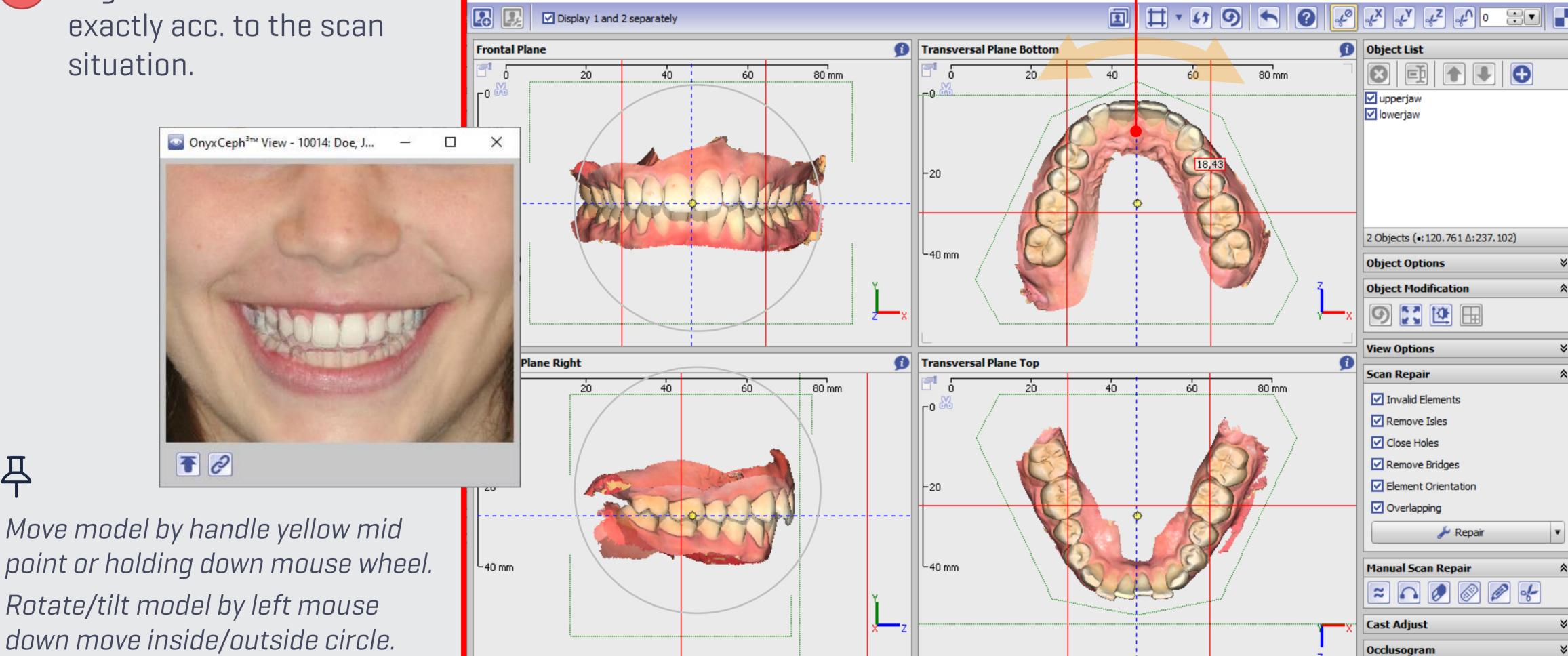**17** Use mid goal occlusion plane for horizontal adjustment.

Import Data > Adjust Image

18 Align dental midline exactly acc. to the scan situation.

📌

Move model by handle yellow mid point or holding down mouse wheel.

Rotate/tilt model by left mouse down move inside/outside circle.

Zoom in/out by mouse wheel.
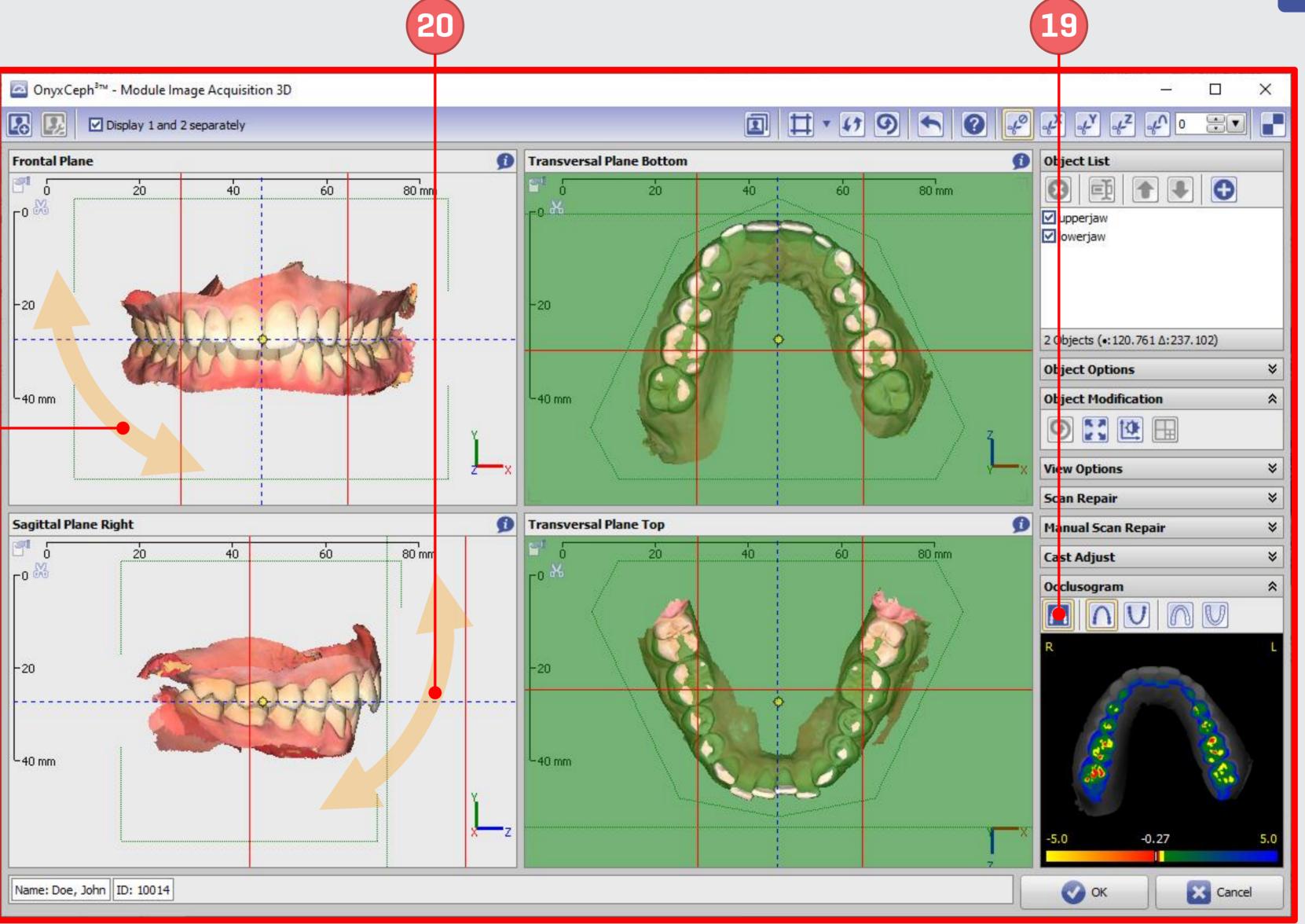
Import Data > Adjust Image

19 Visualize mid goal occlusion plane to support correct adjustment.

20 Adjust bite plane.

📌

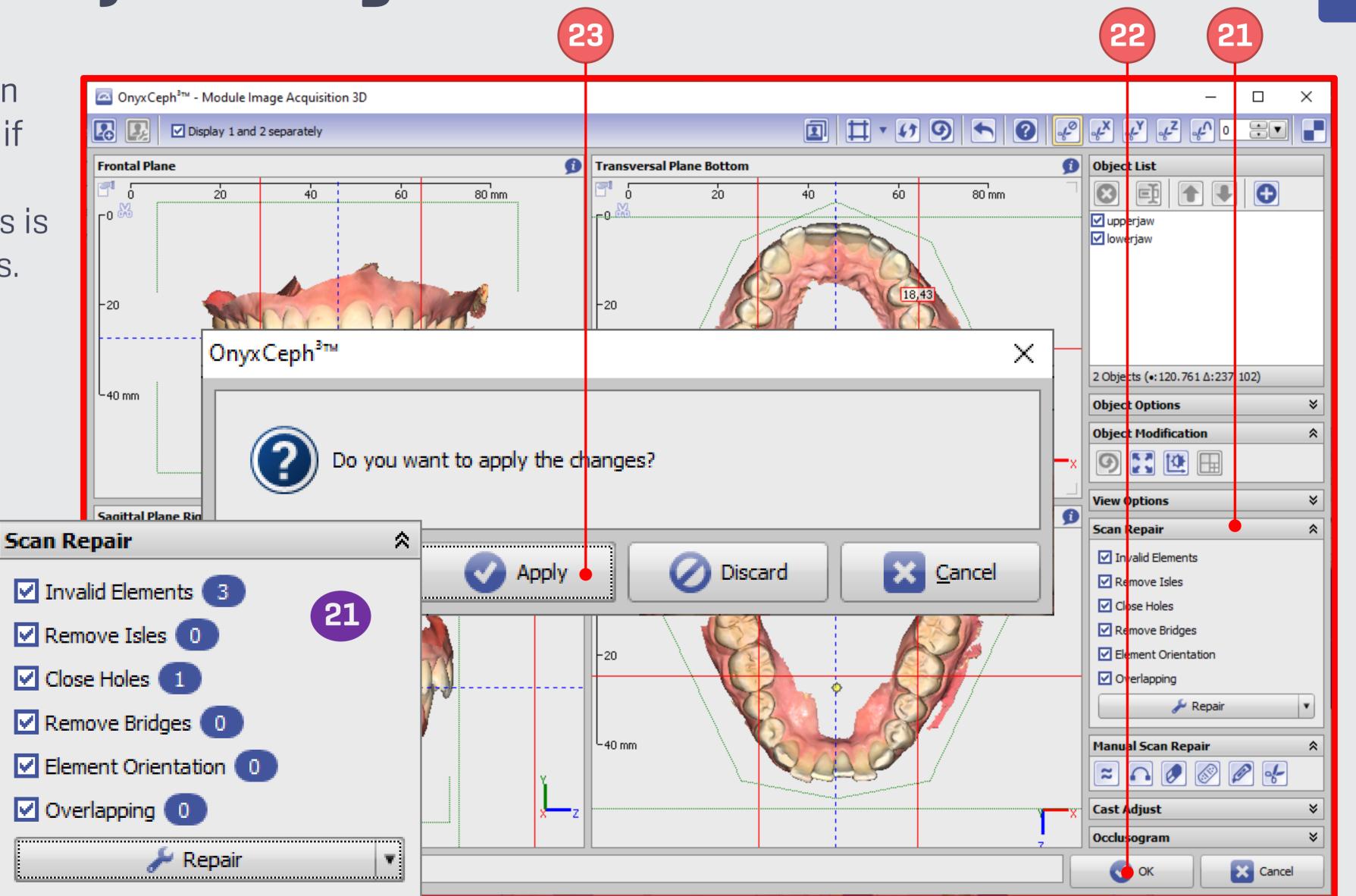*Displace model by moving yellow mid point or by holding down mouse wheel.*

Rotate model by left mouse down move outside circle.

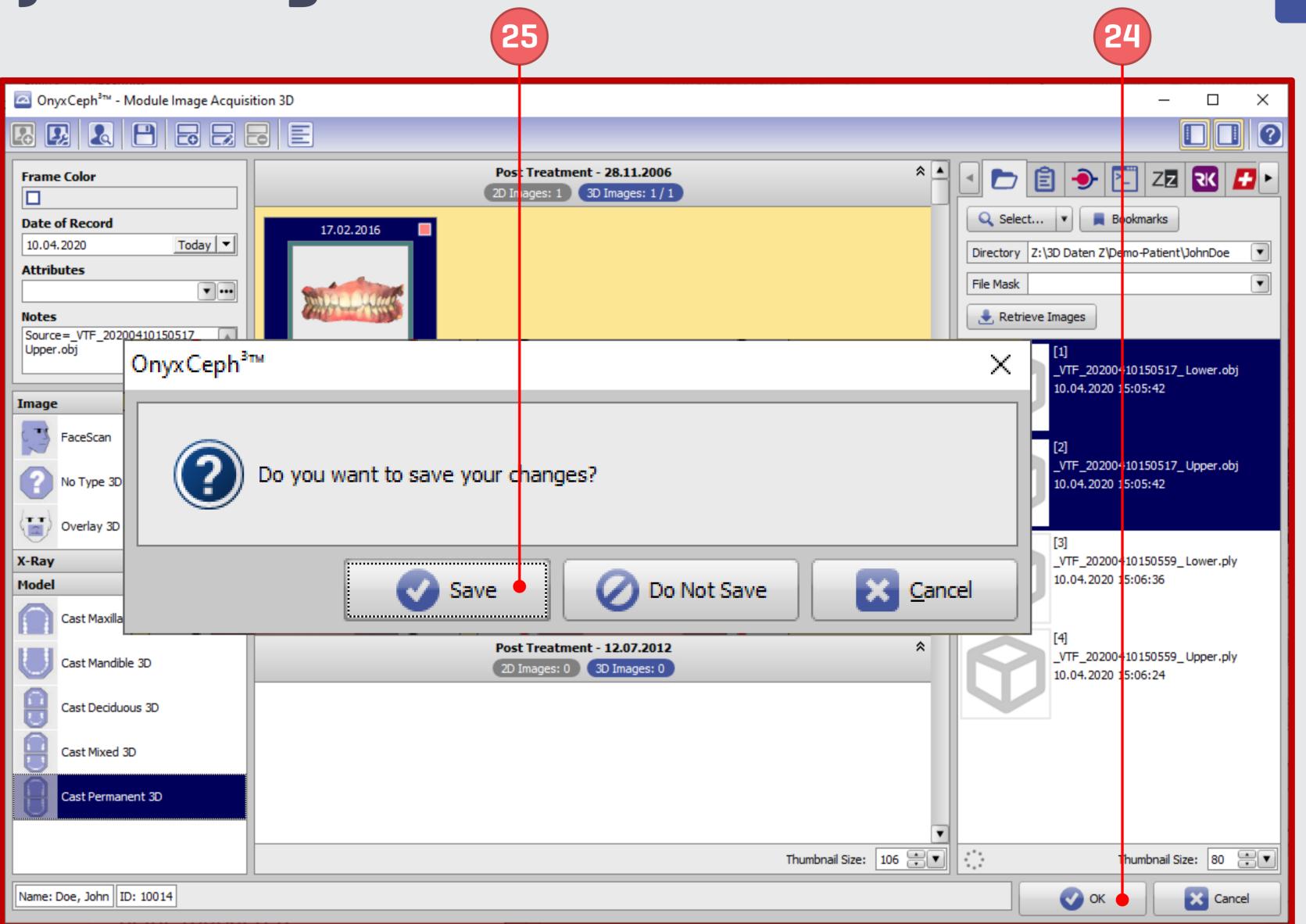*Tilt model by left mouse down move inside circle.*

Zoom in/out by mouse wheel.
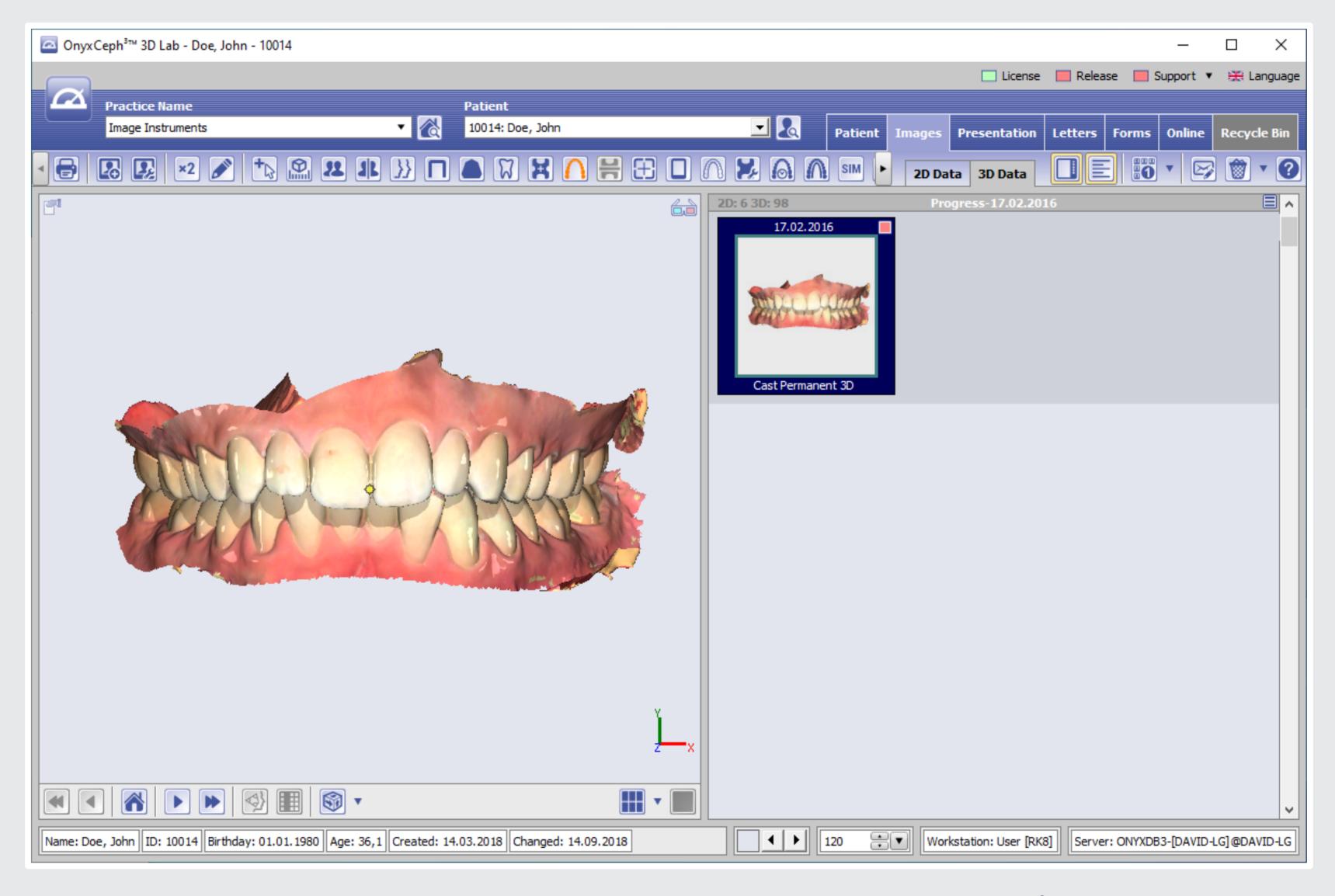
Import Data > Adjust Image

21 Important! Perform scan repair at least one time, if the returned number of foud mesh imperfections is large, repeat the process.

22 Confirm by [OK].

23 And take over changes by [Apply].

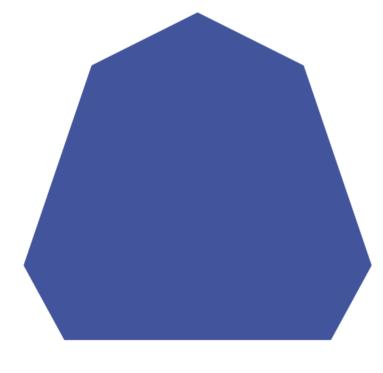# Import Data > Adjust Image

24 Confirm by [OK] again.

25 And [Save].

Import Data

📌

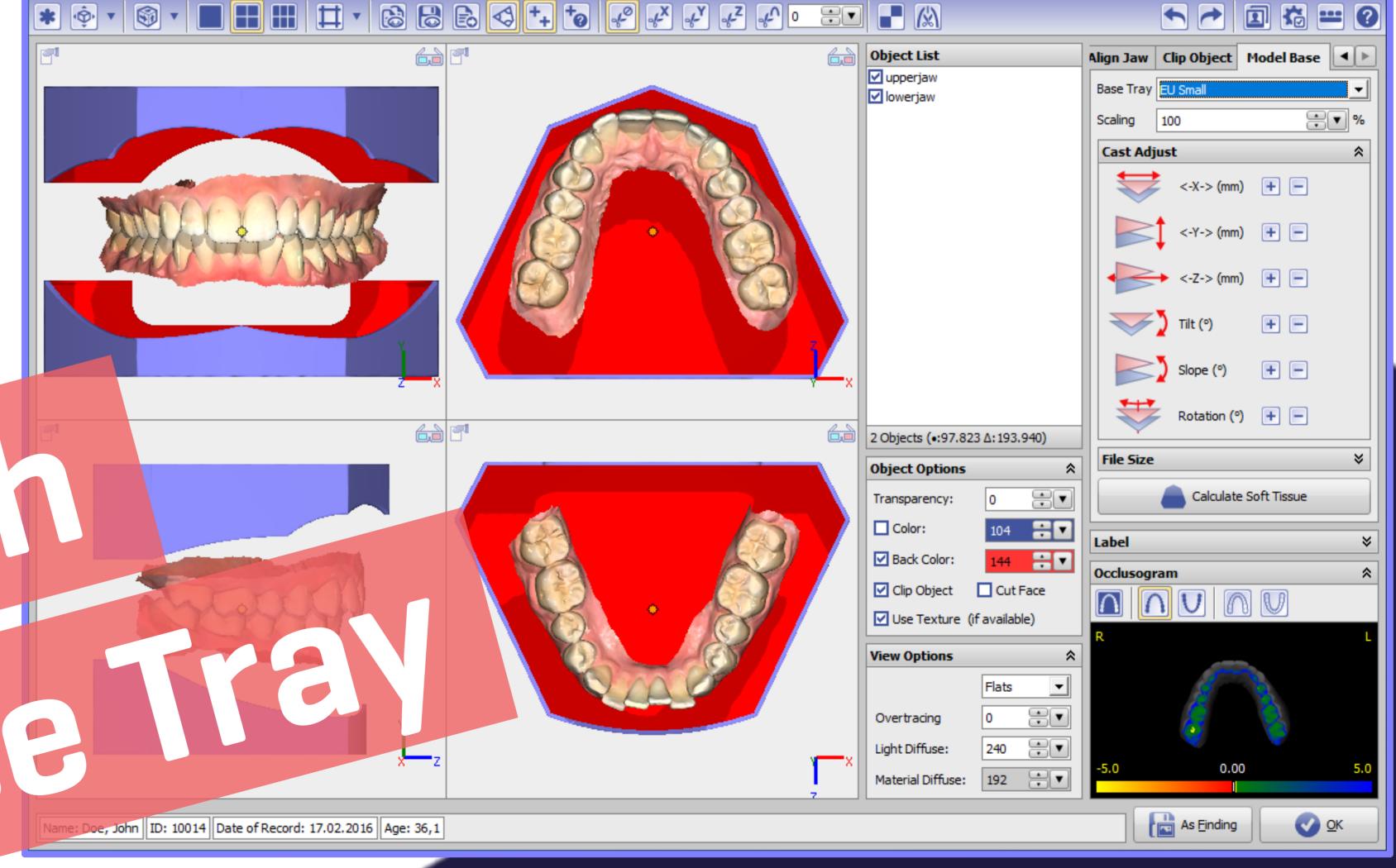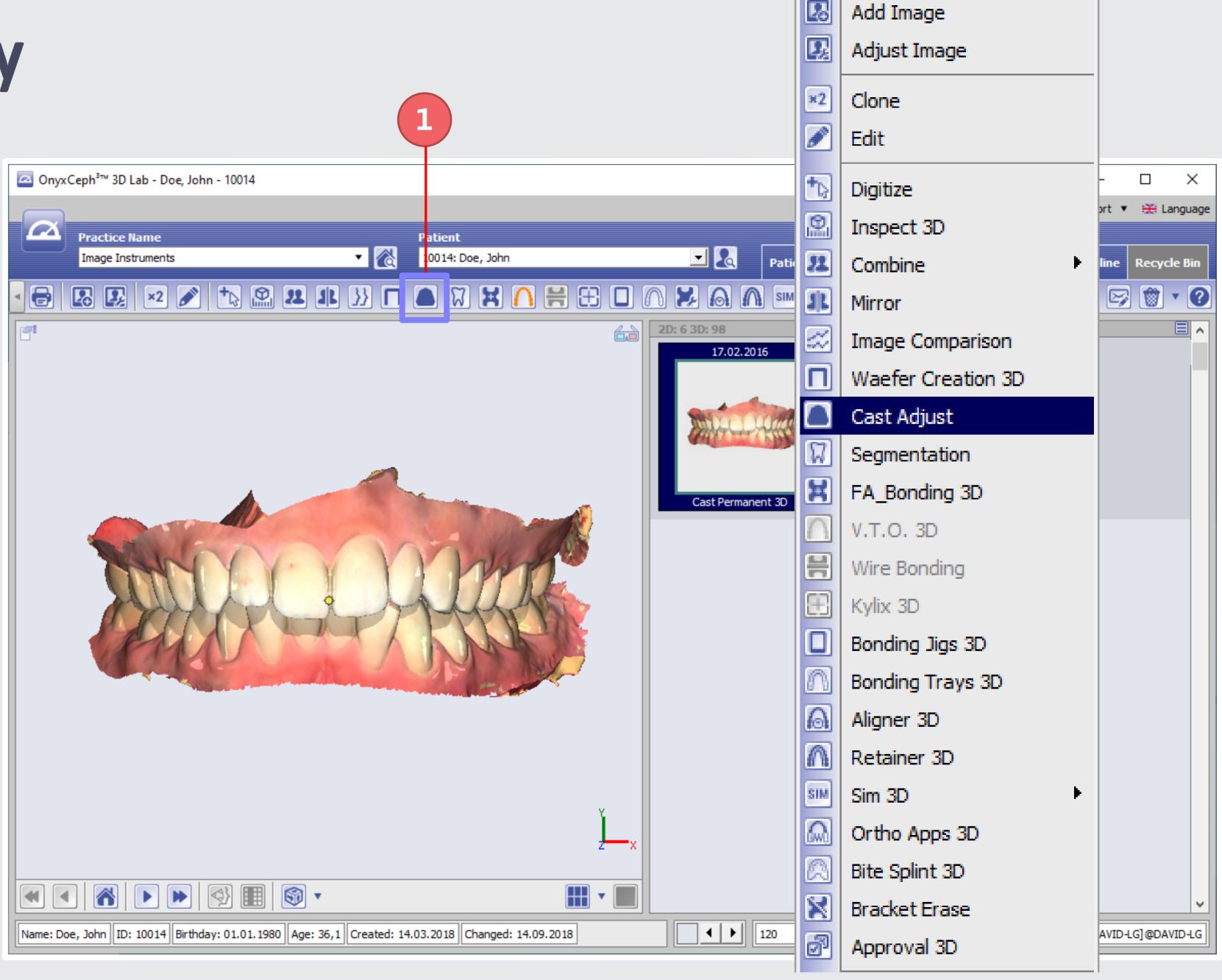*Import process is completed and a finding thumbnail is shown in the patient image album.*
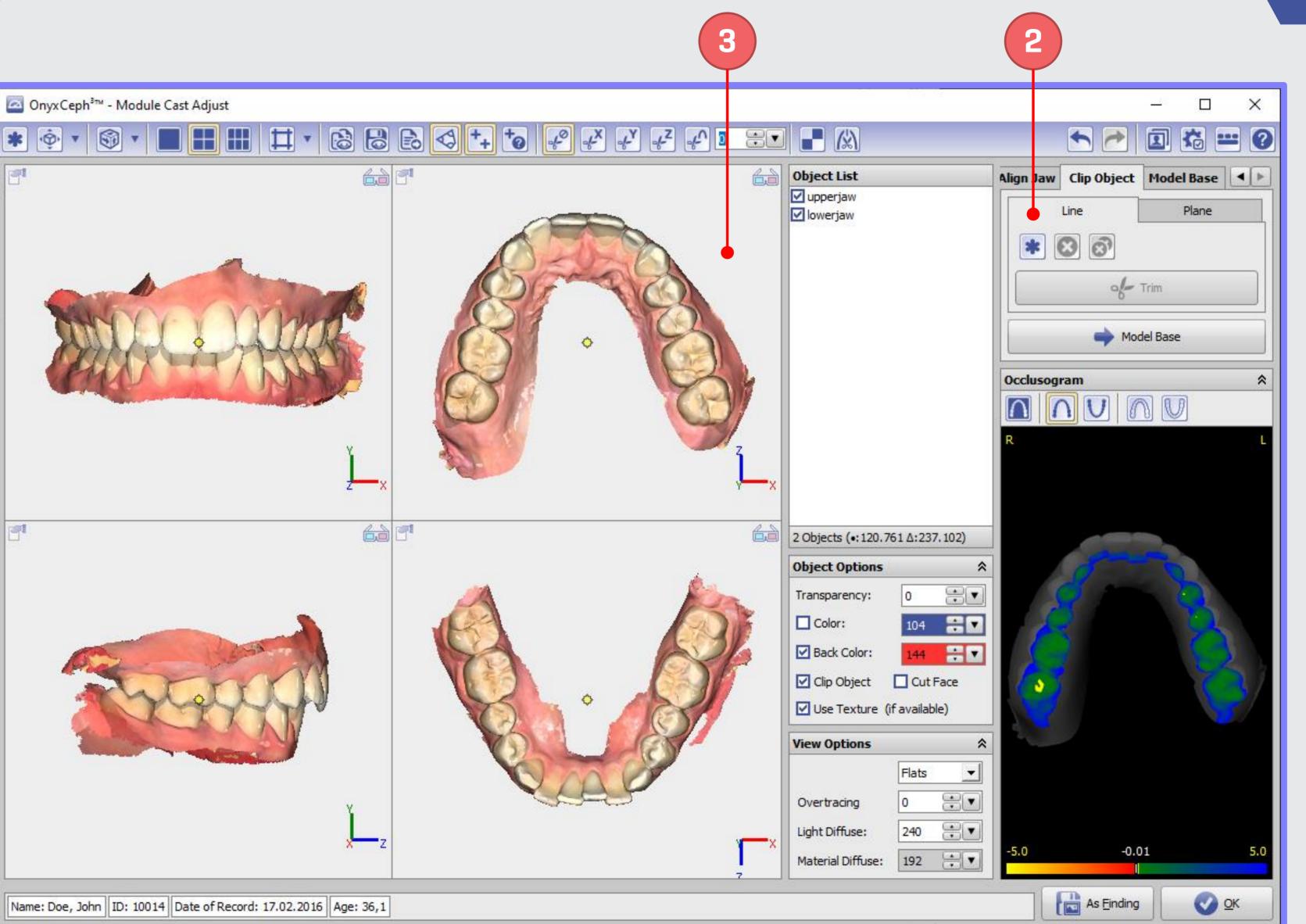
Attach Base Tray

1 Click icon button [Cast Adjust] or open module from thumbnail context menu.

Attach Base Tray > Trim

2 Select tab [Clip Object | Line].

3 Double click upper right panel to maximize view.
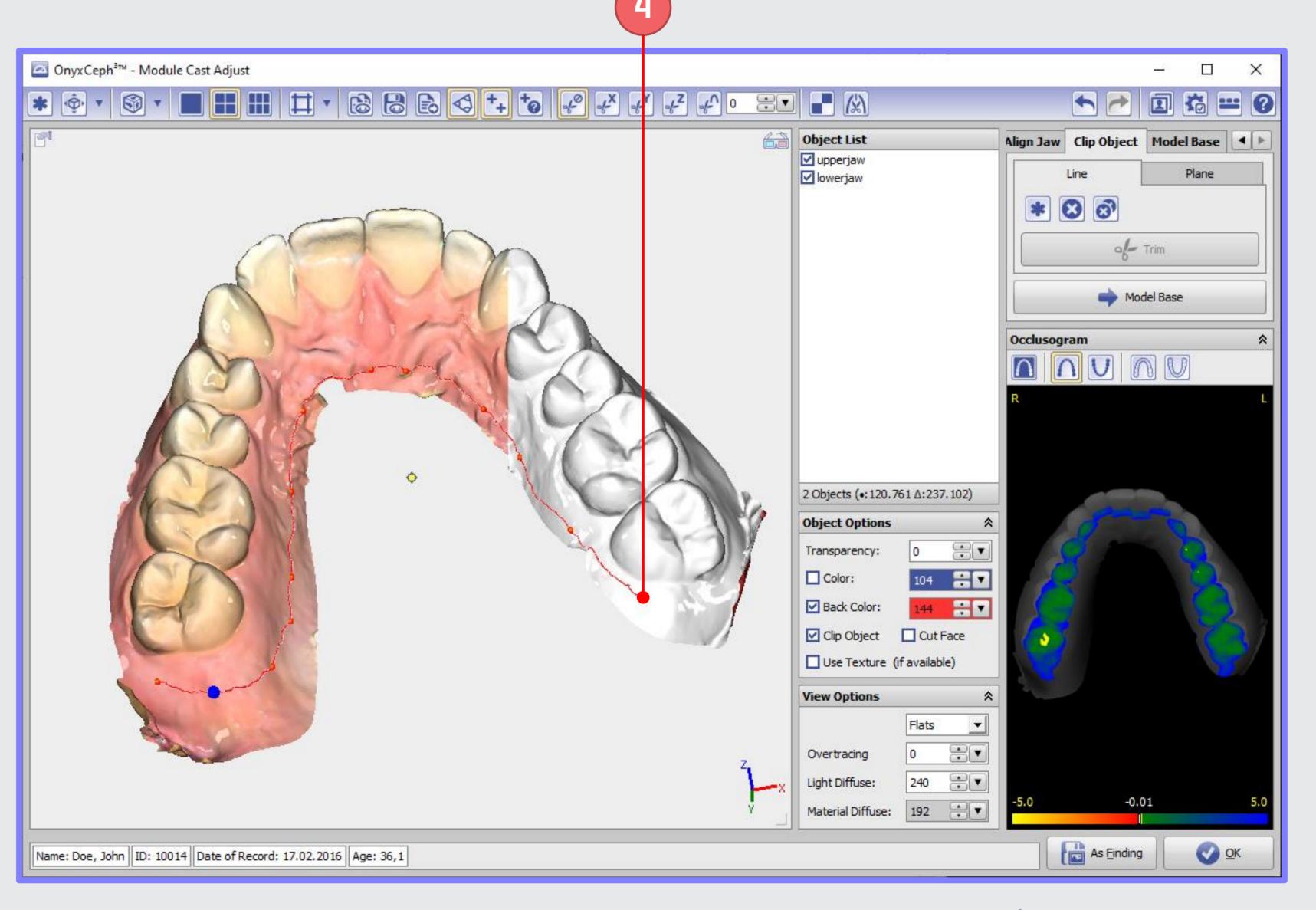
Attach Base Tray > Trim

4 Define trim line by a serie of right clicks.
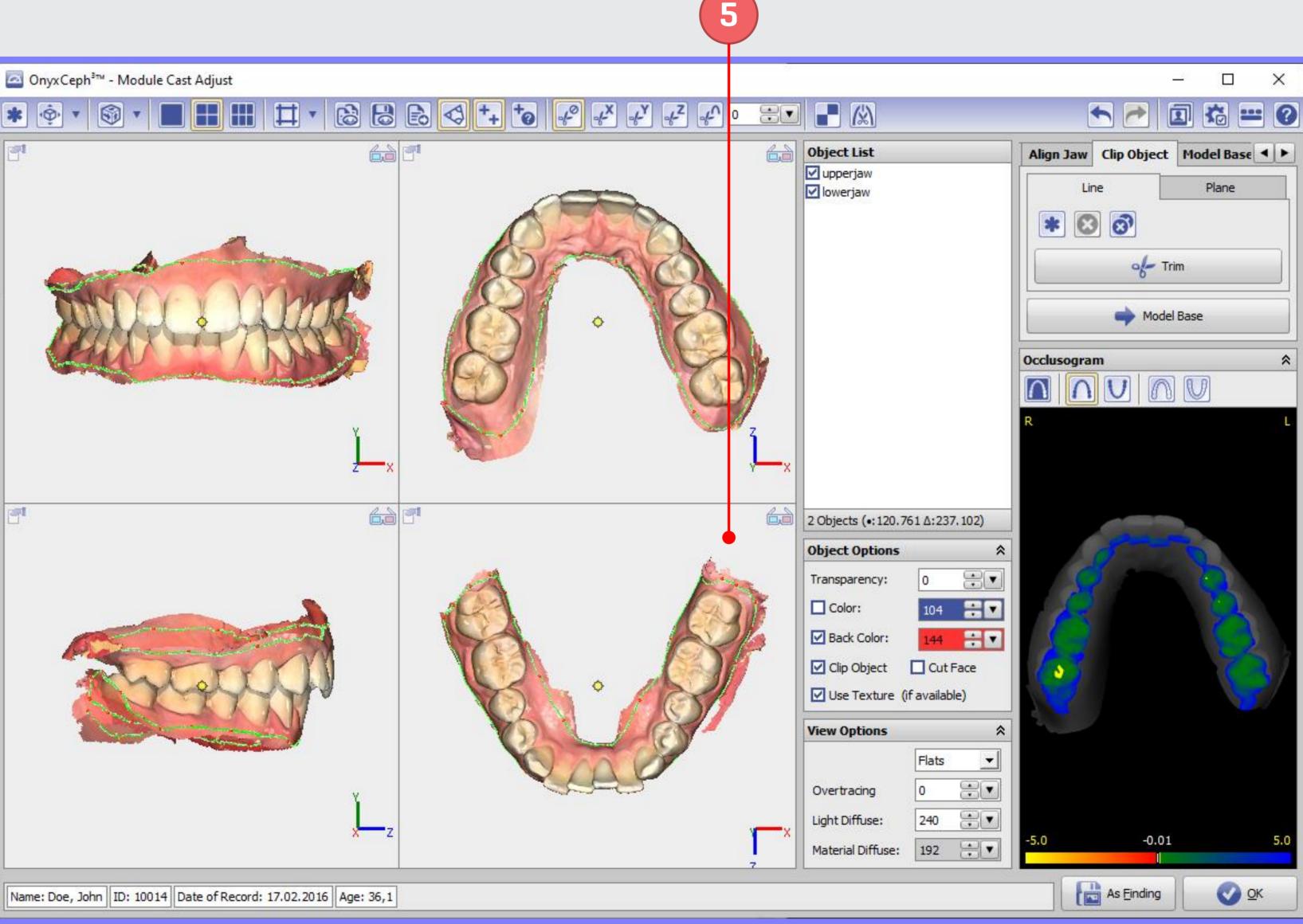
Use CTRL+Z for [undo].

📌

It is recommended to keep the palatal region (if scanned) and the gingival sulcus inside the upper trim line – also the WALA-Ridge on the lower jaw scan.

Attach Base Tray > Trim

5 Close the trim line by a final click near the starting point - line color will switch to green.
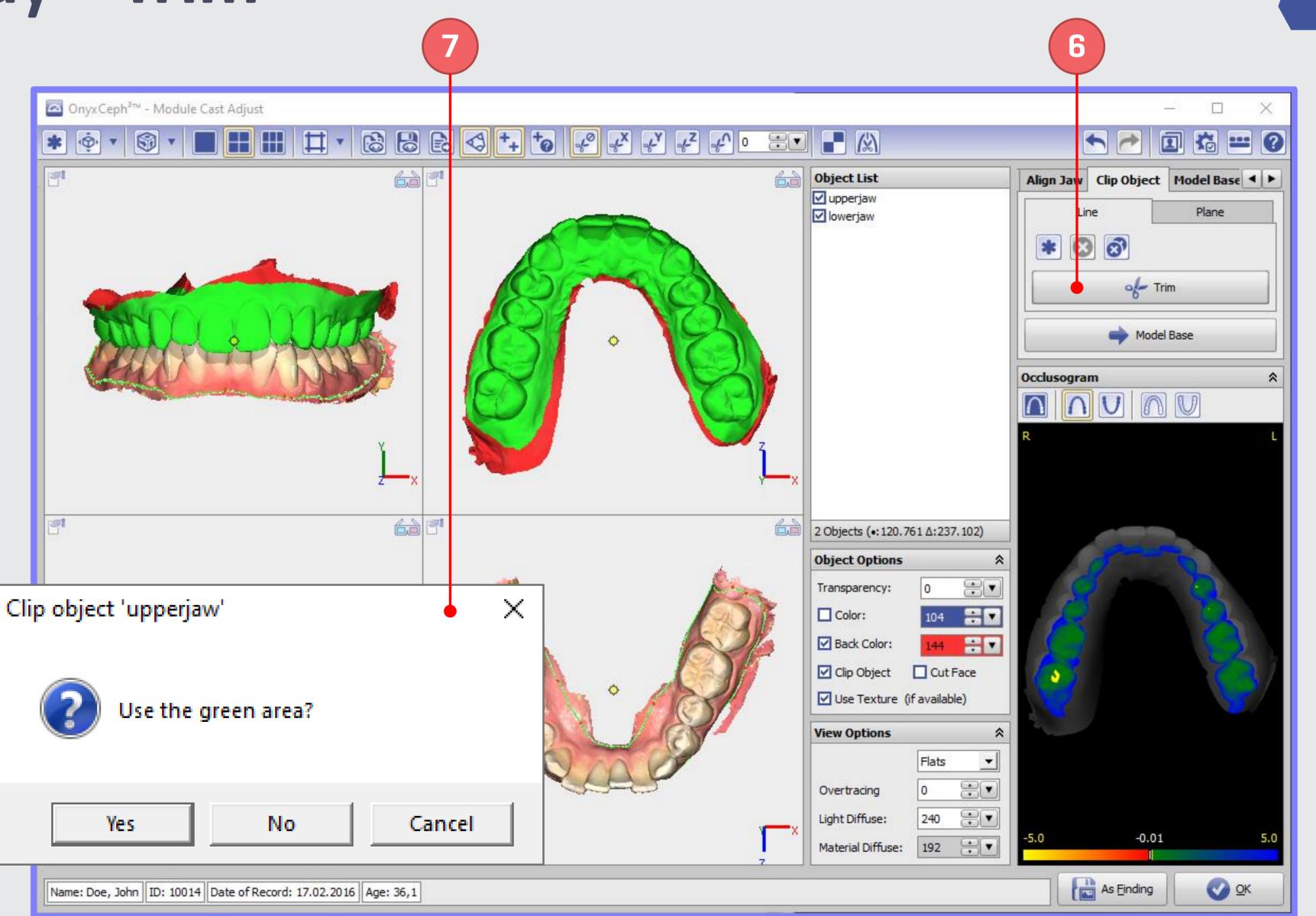
Define trim line for lower the same way.
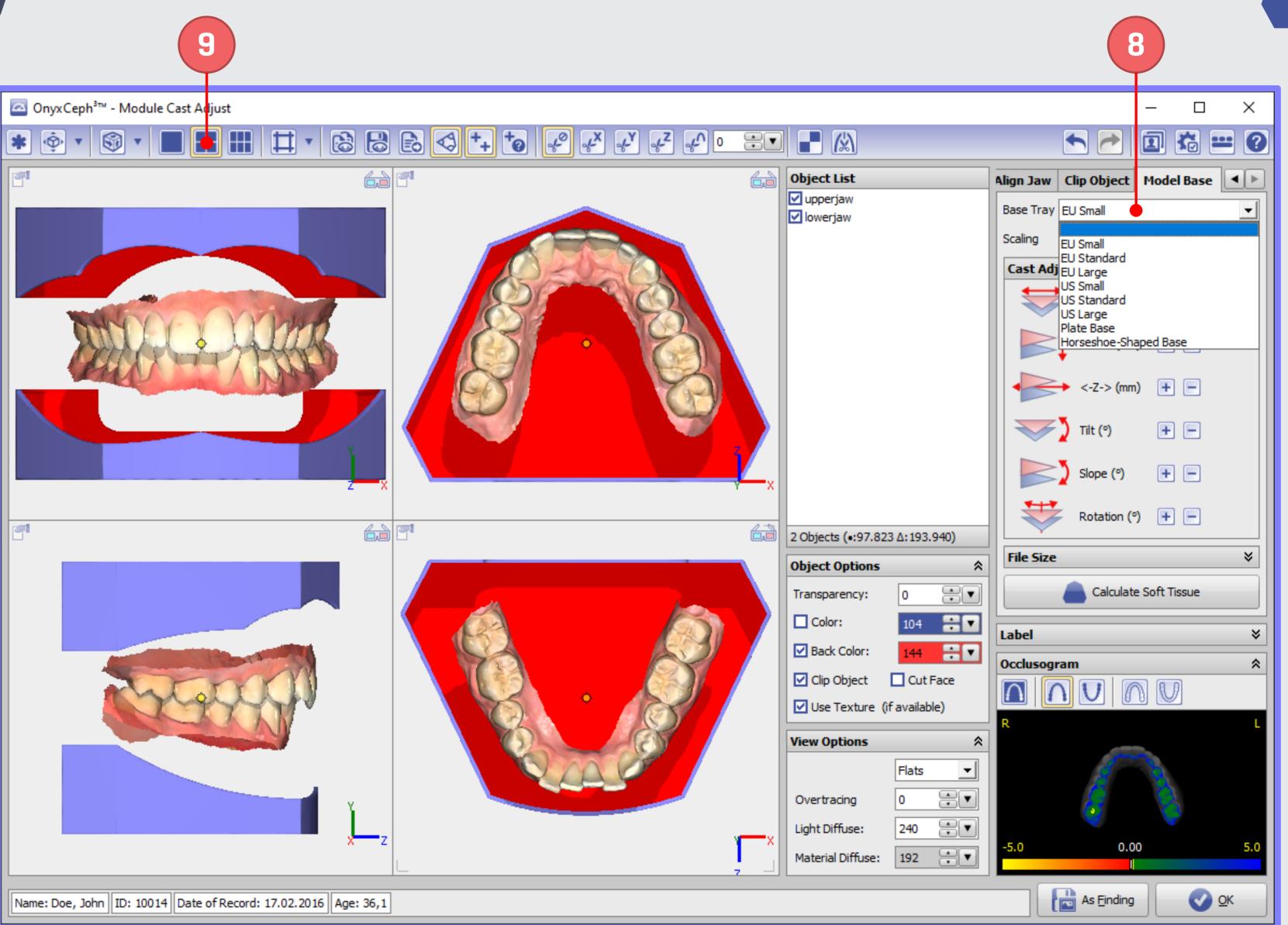
Points can be reset by CTRL+Z or moved by drag&drop.

Attach Base Tray > Trim

6 Click button [Trim].

7 Confirm keeping green area [Yes].

Attach Base Tray
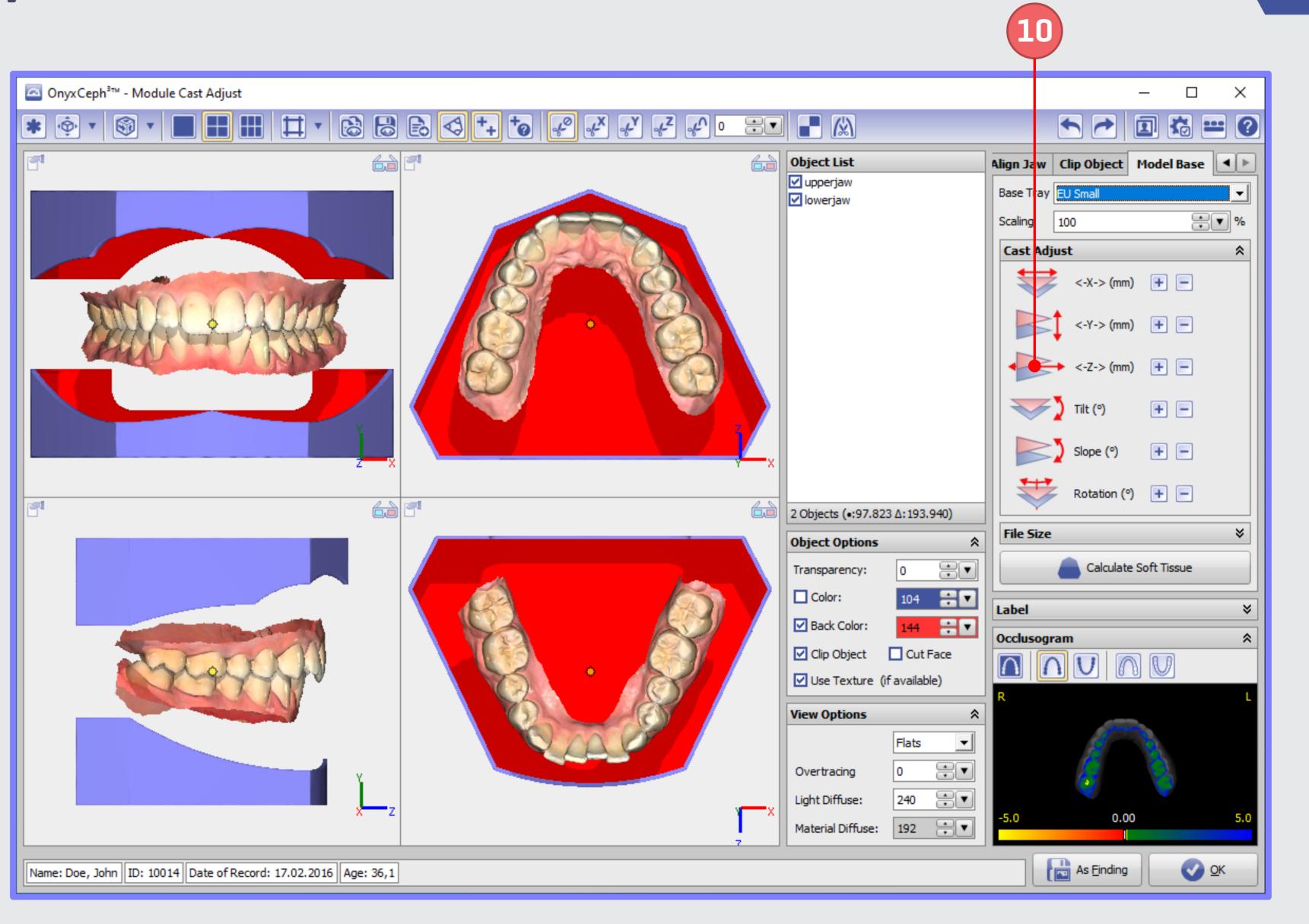
8 Switch to tab |Model Base| and select Base Tray type .

9 Optionally, reset to orthogonal 4-panel-view.

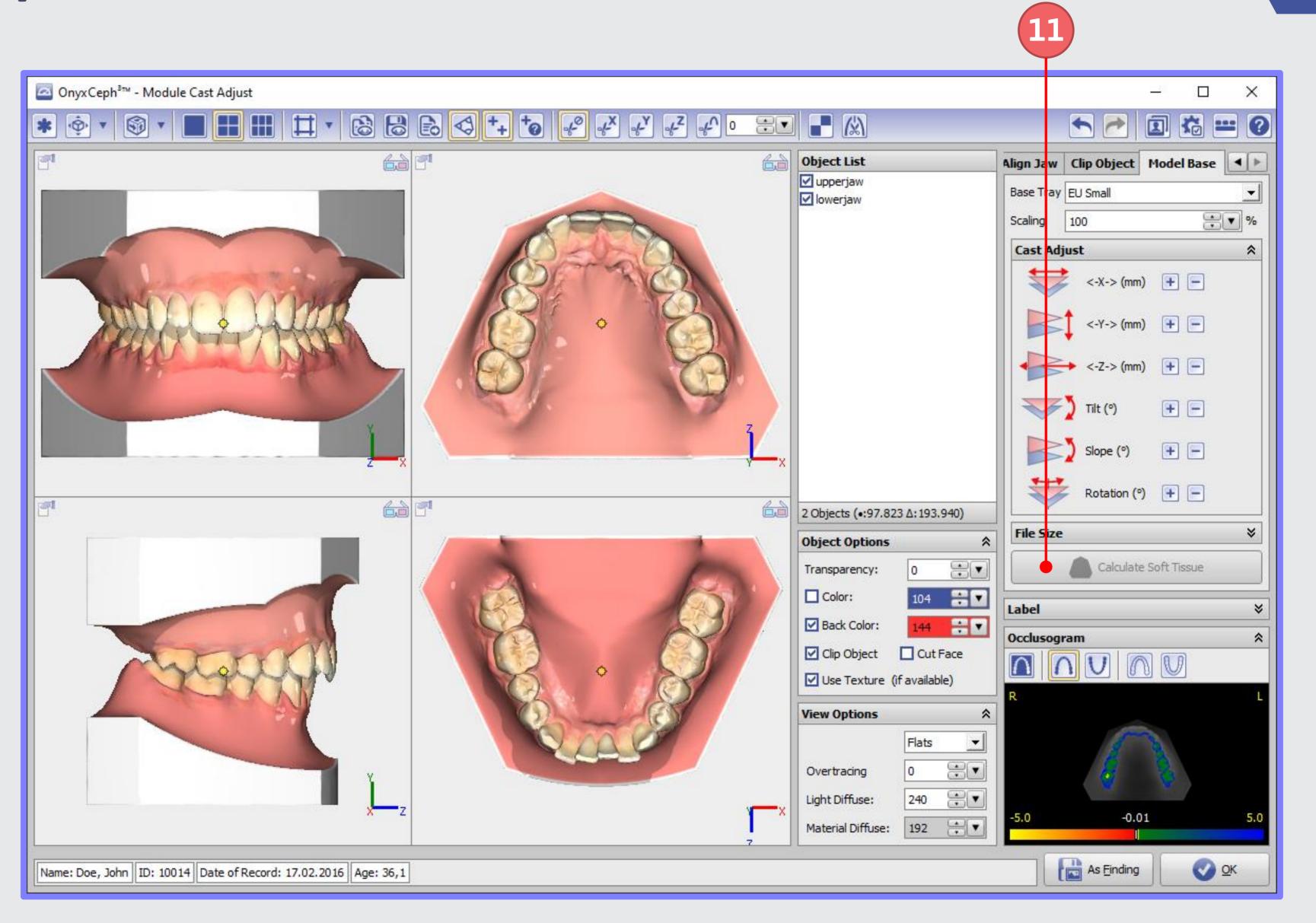# Attach Base Tray

10 If needed, expand panel [Cast Adjust] to re-adjust scan-base tray relation.

📌

Note that only <-Z-> movements will not change the patient related adjustment set up during image import.

Attach Base Tray
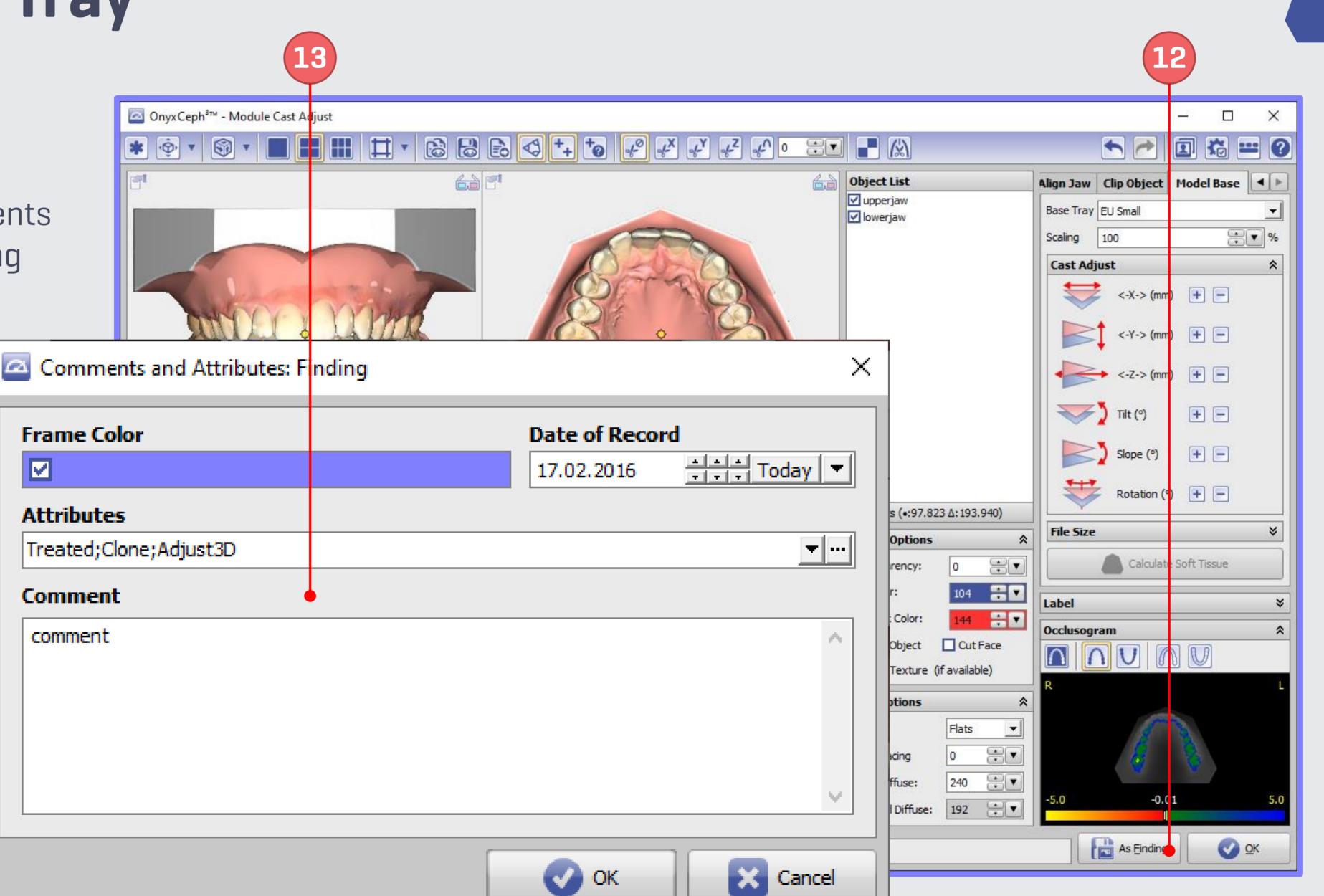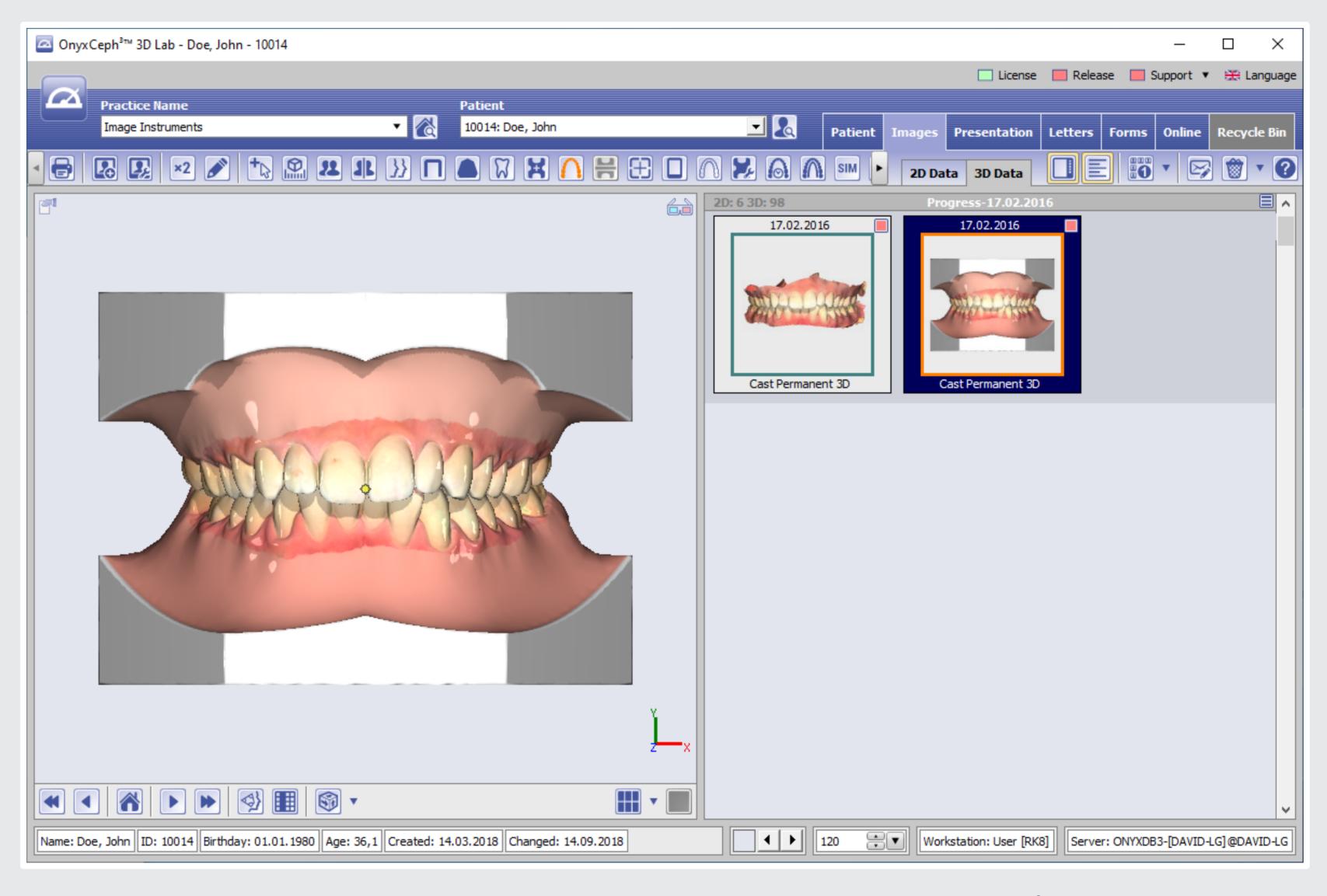
11 Click buttom [Calculate Soft Tissue] to merge scan and base tray.

Attach Base Tray

12 Save [As Finding].

13 Otionally, add comments or attributes to finding and confirm by [OK].

Attach Base Tray

📌

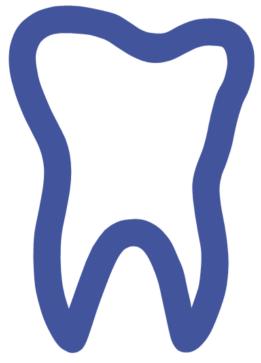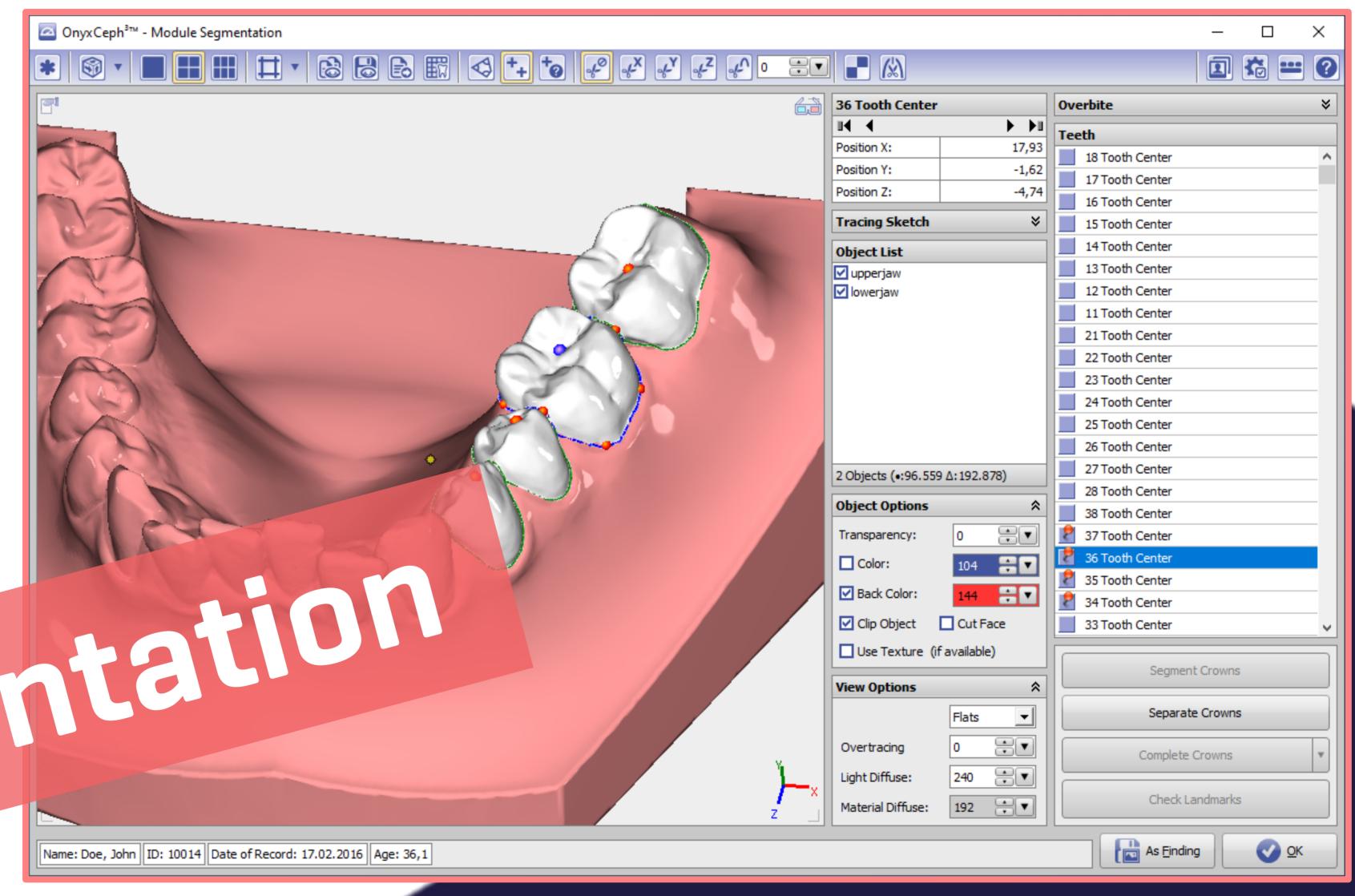*Attaching base tray is completed and a finding thumbnail is shown in the patient image album.*
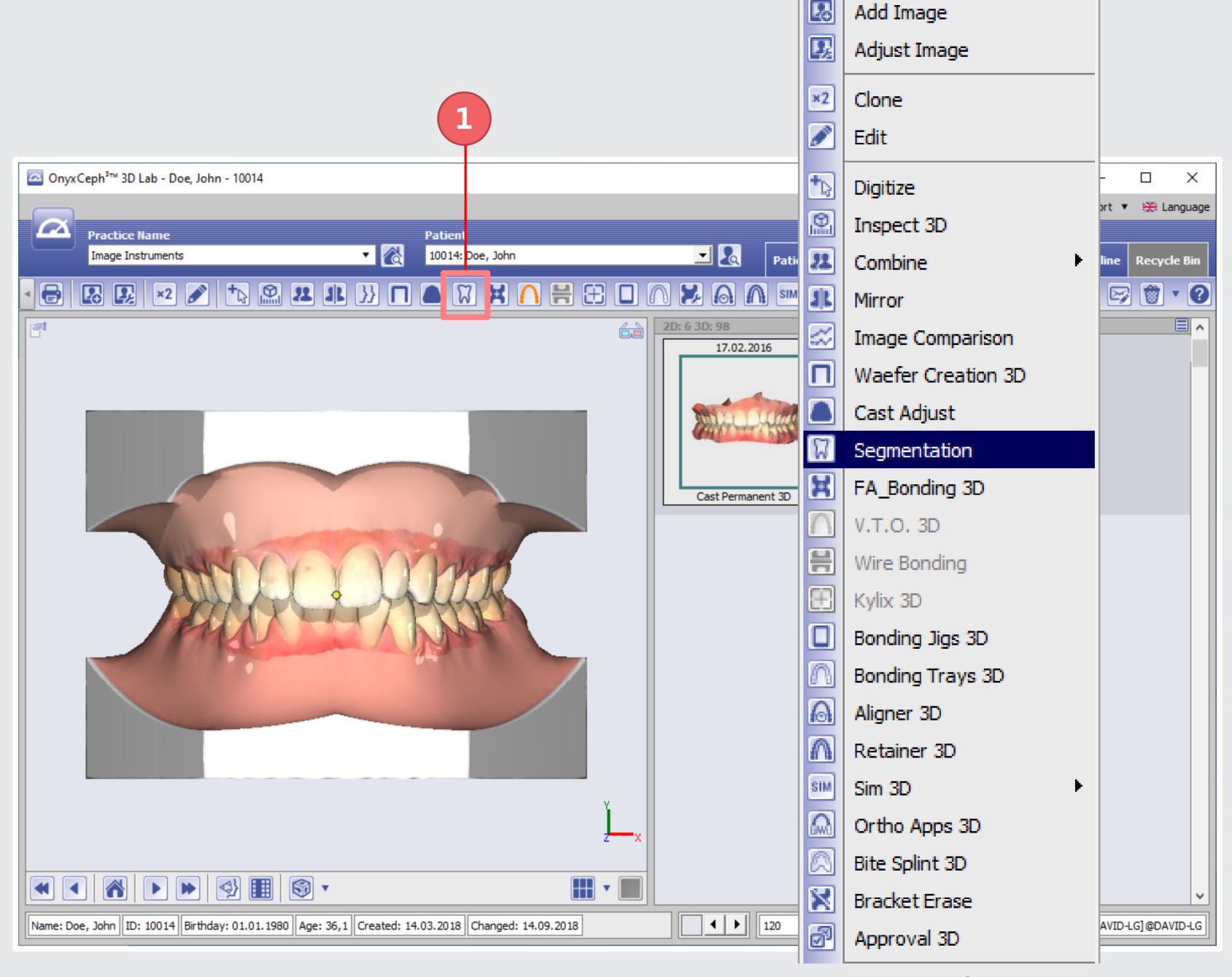
Segmentation

1 Click icon button [Segmentation] or open module from thumbnail context menu.

Segmentation

2 Click button [Segment Crows] > Jaws colored in red. If model is textured, hide texture.

3 Double click upper right panel to maximize view.

Segmentation
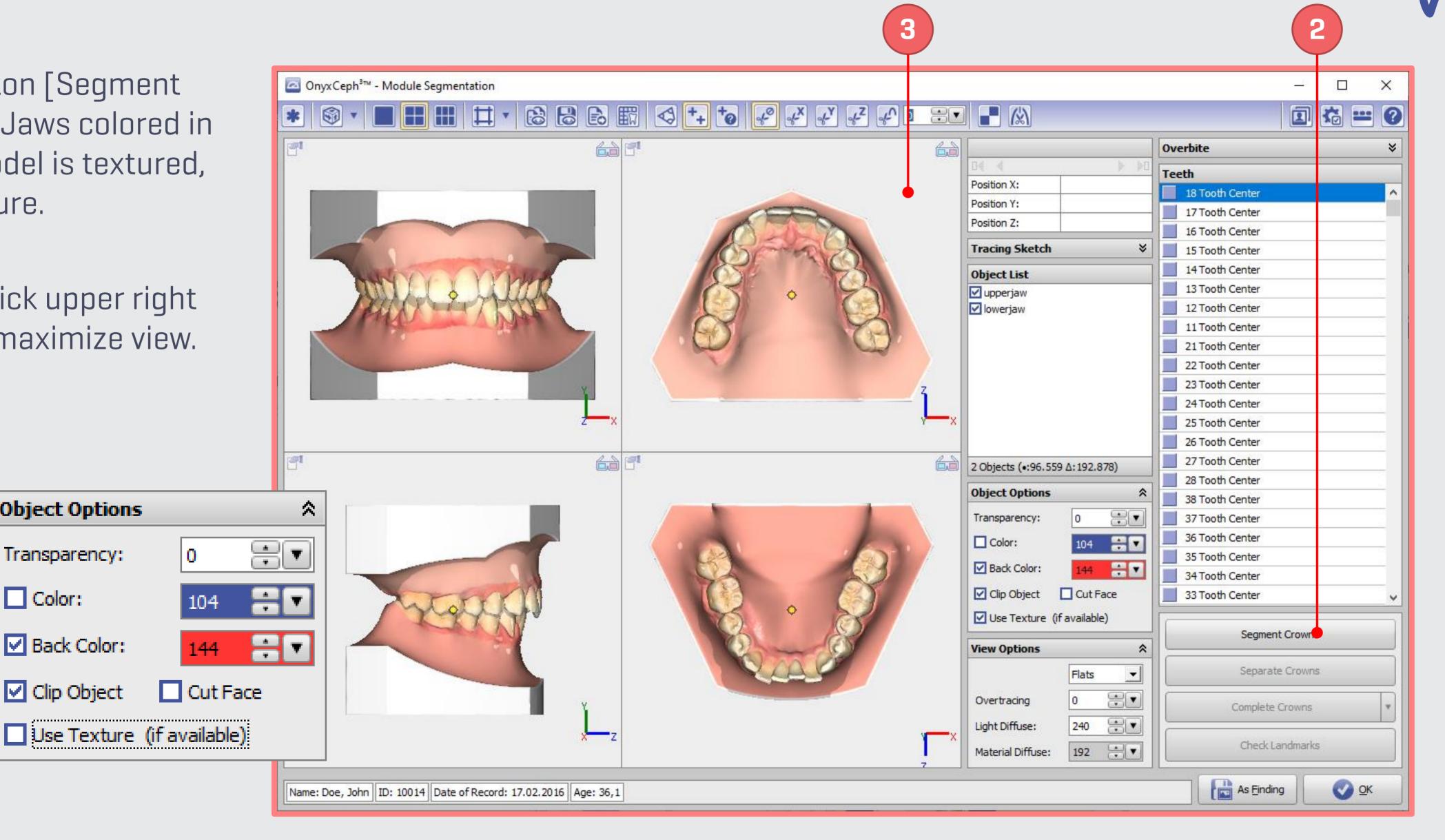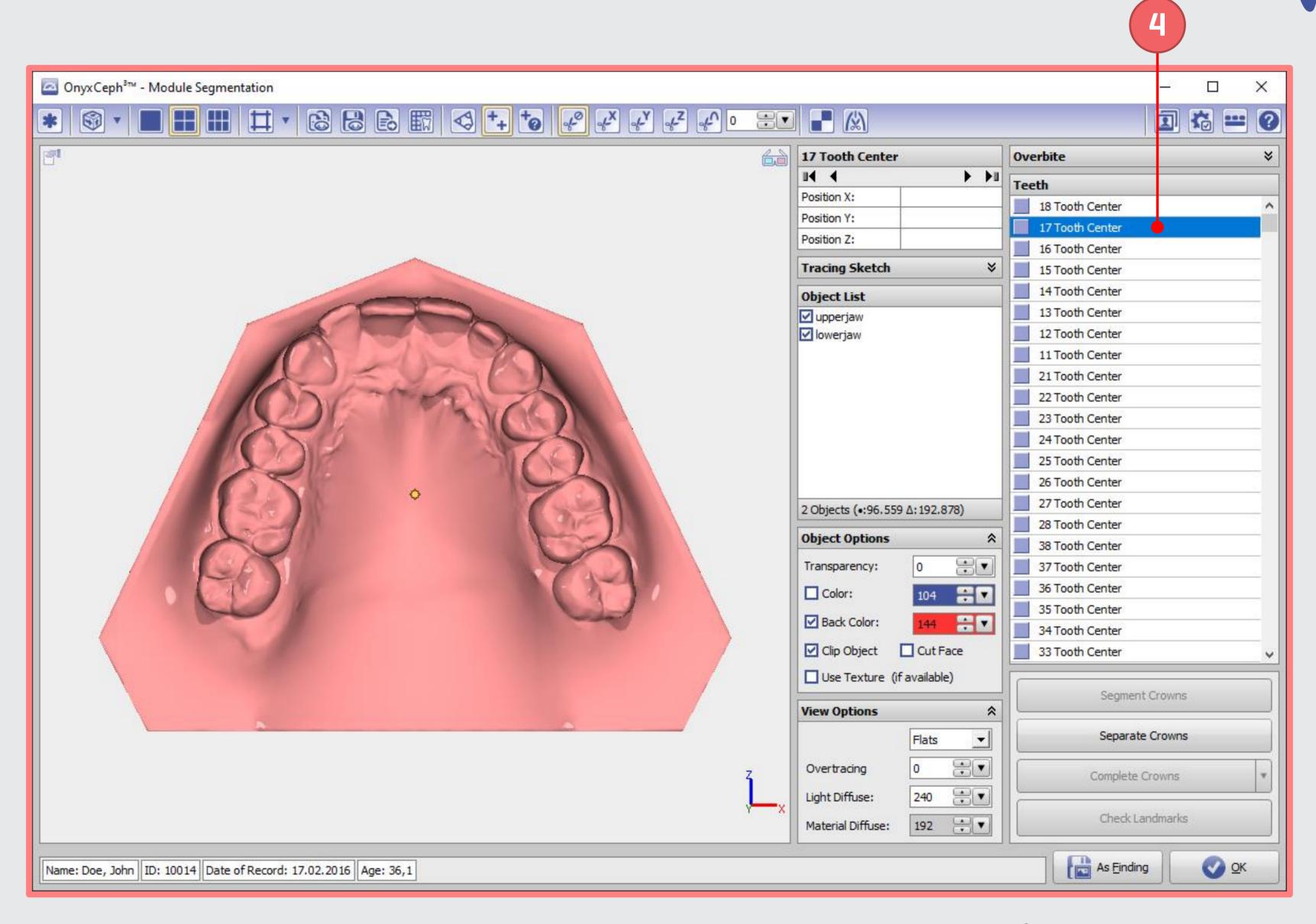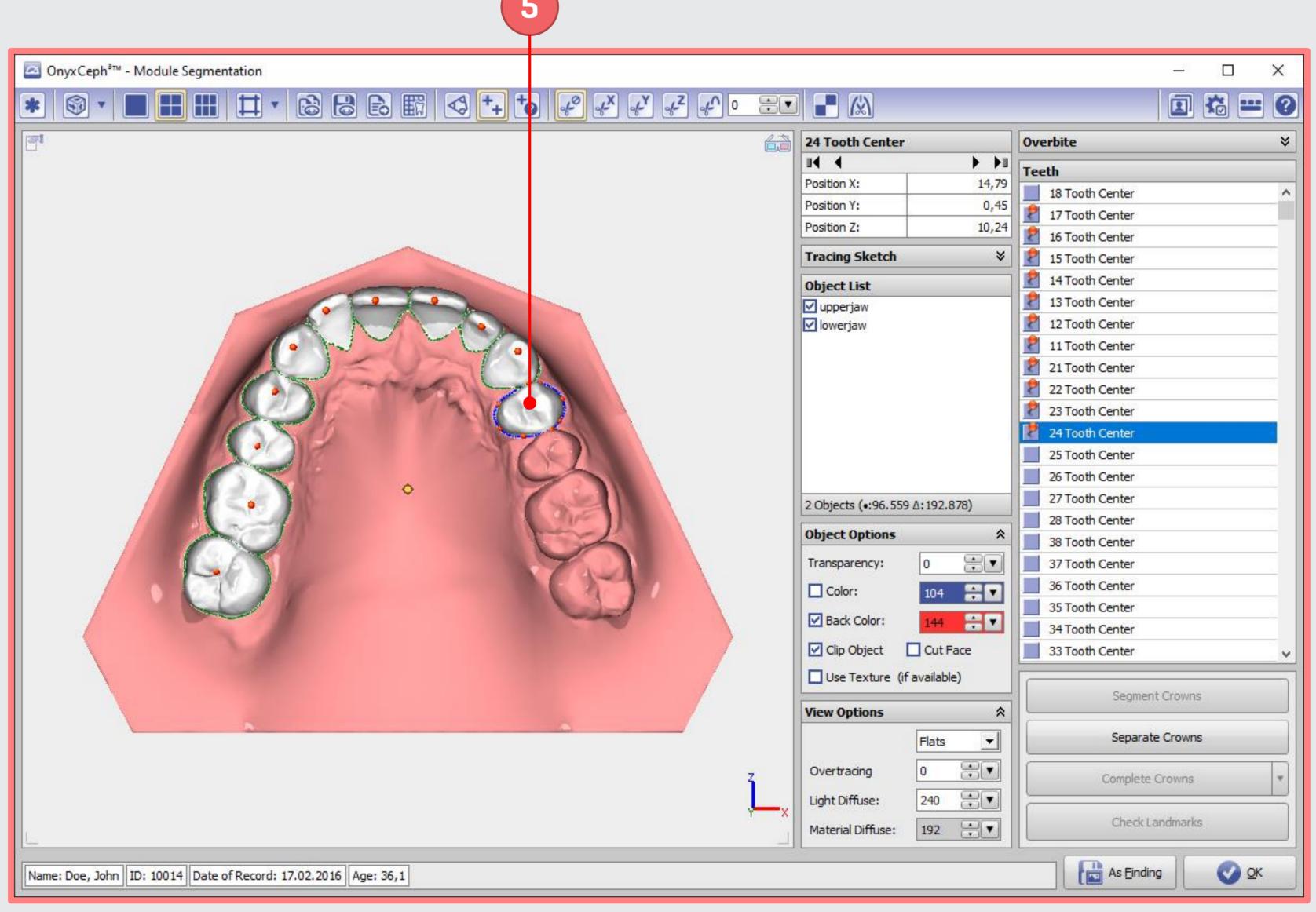
4 Select first crown for segmentation.

Segmentation

5 To segment a crown, right click on a central crown point (fissure, cusp or incisal edge mid point) – Segment crown by crown.
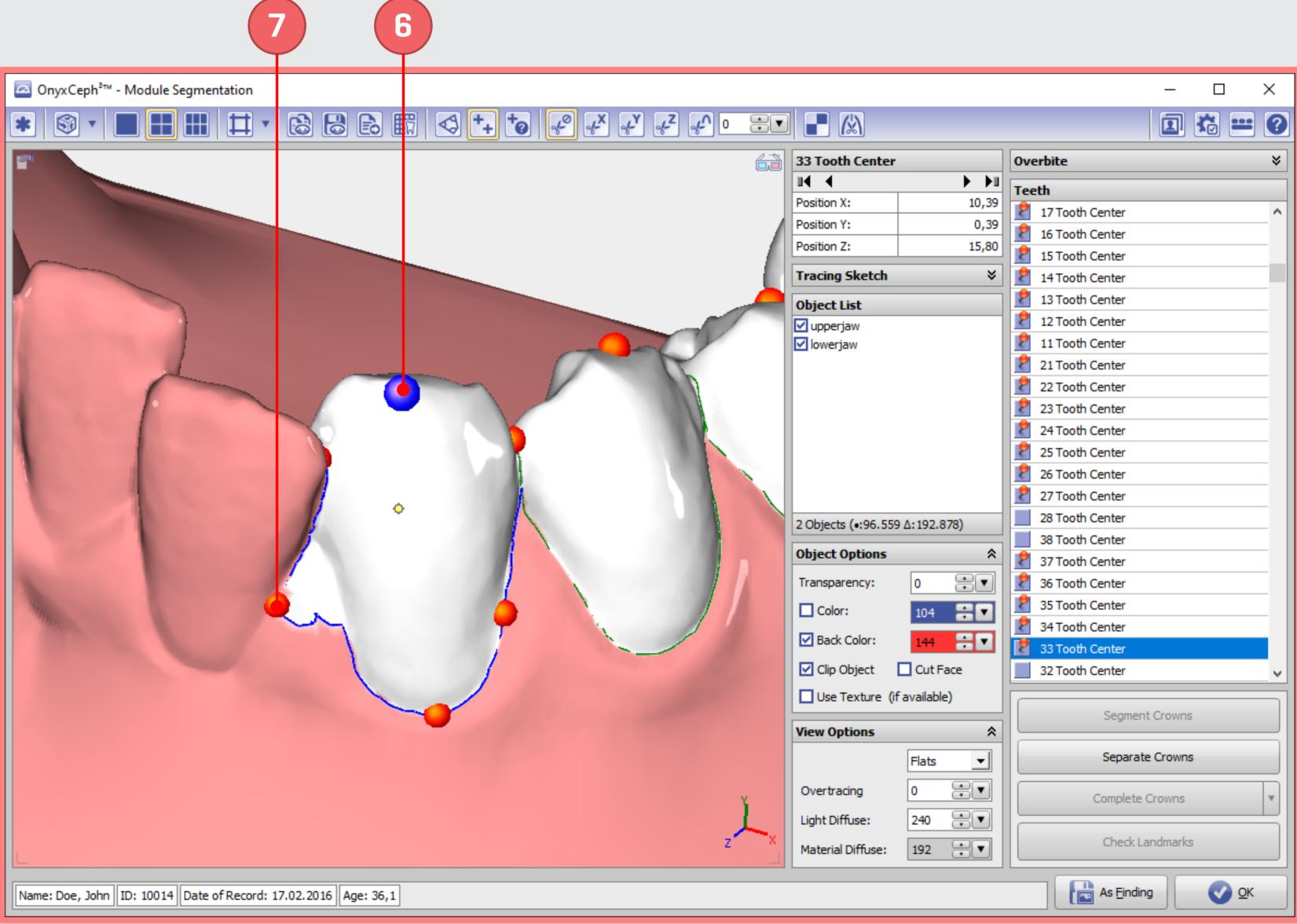
📌 *Starting by the selected crown, the table focus jumps to the next entry in the list automatically - Missing teeth have to be skipped over manually.*

Segmentation > Adjust Gingiva Border

6 Select crown in table [teeth] or by left mouse click on the crown marker > gingiva line will switch to blue.

7 Correct gingiva border by mouse drag&drop of any line grip point (also inbetween the red points).

📌
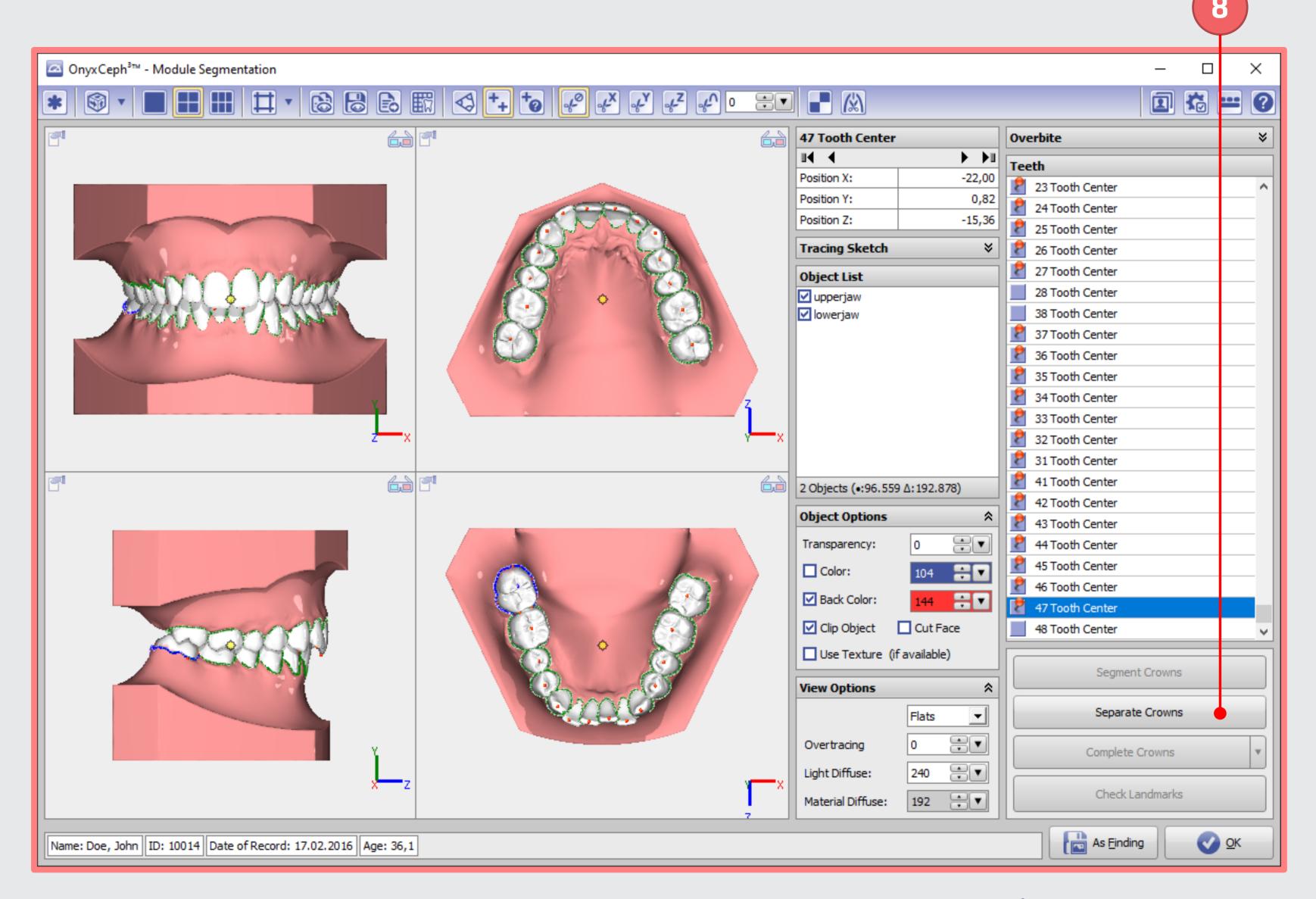
In most of the cases, it is sufficient for gingiva border correction to slightly reposition the marker by drag&drop.
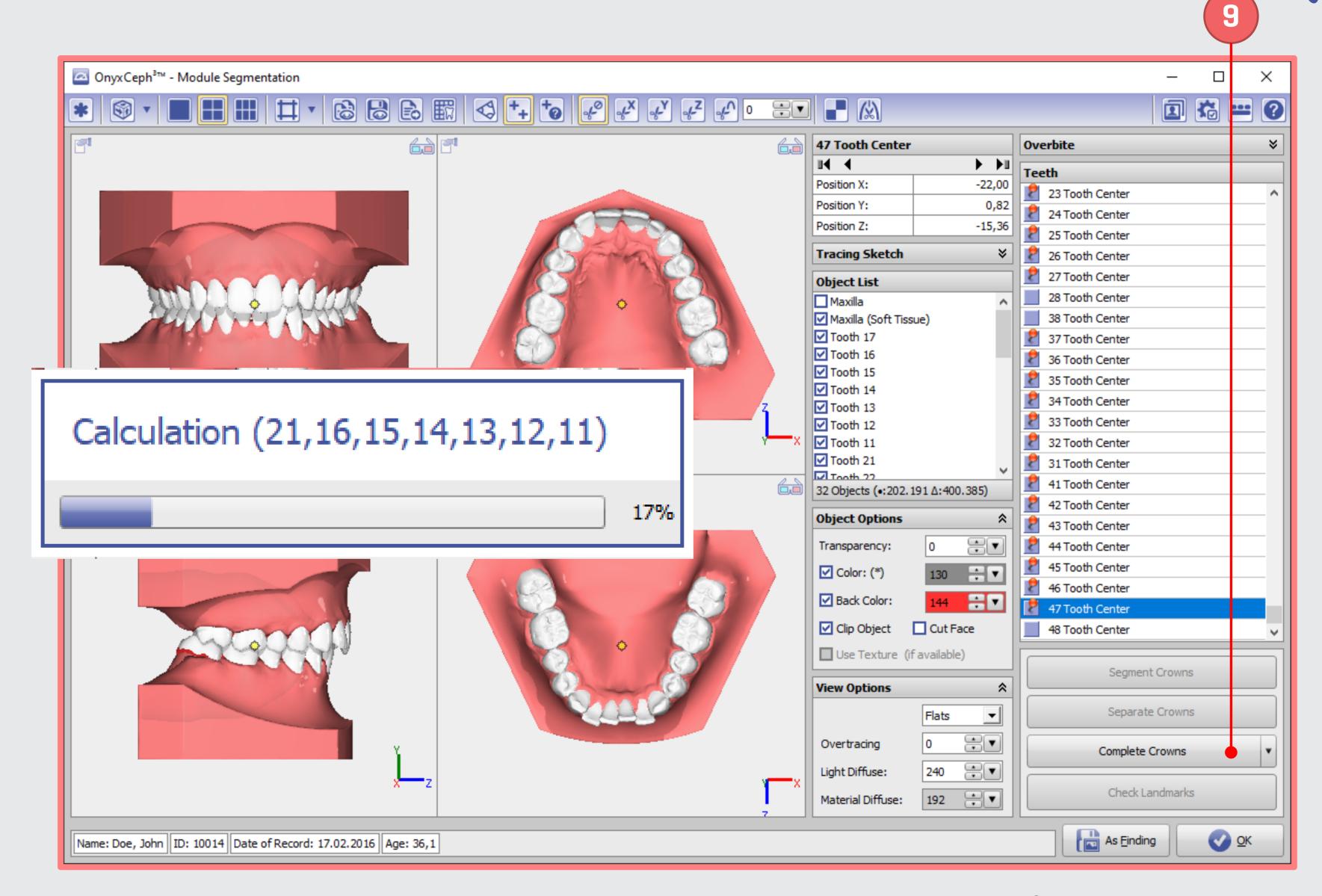
Segmentation > Separate Crowns

8 After segmentation is completed, click [Separate Crowns].
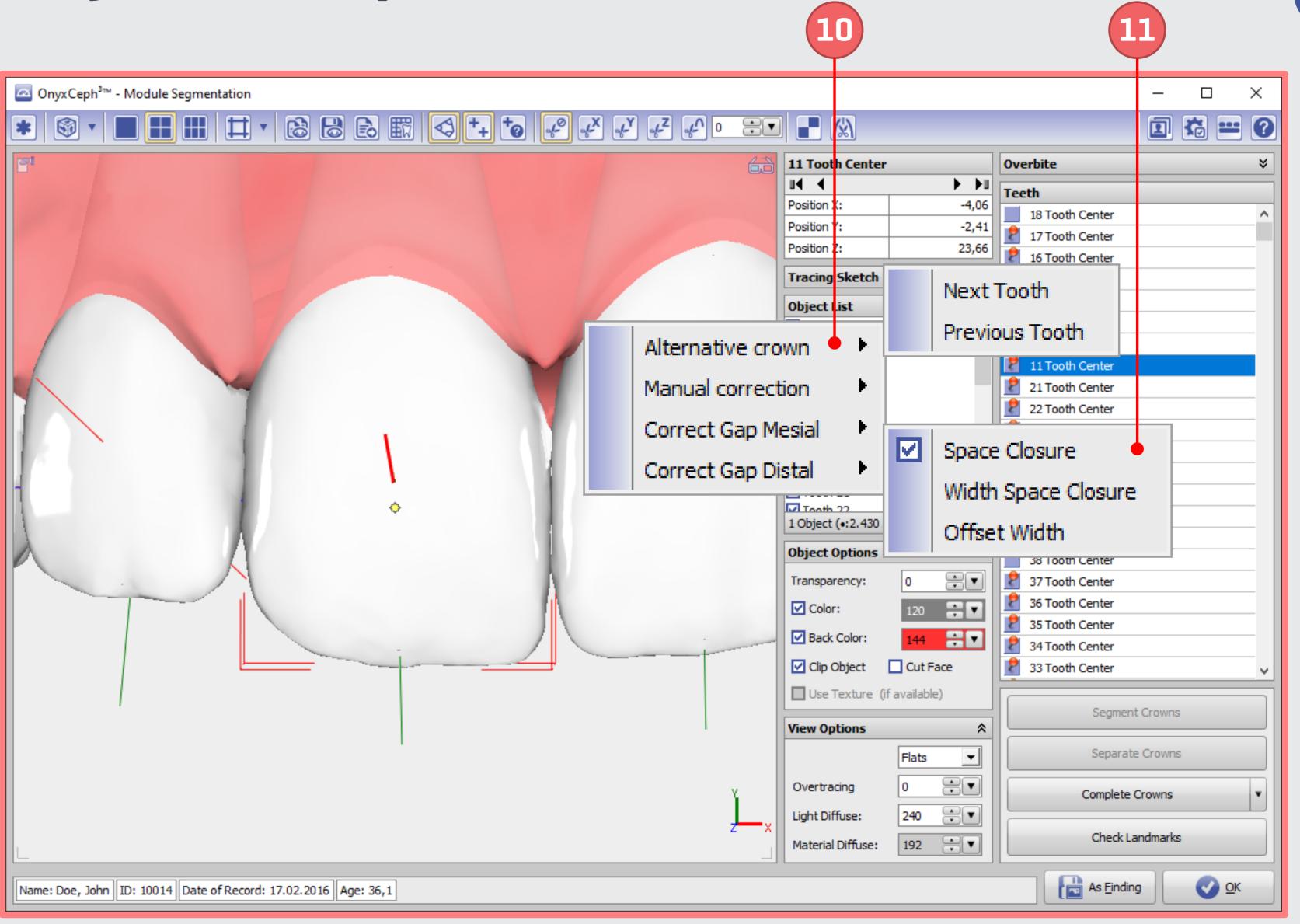
Segmentation > Complete Crowns

9 Click [Complete Crowns].

Segmentation > Adjust Completion
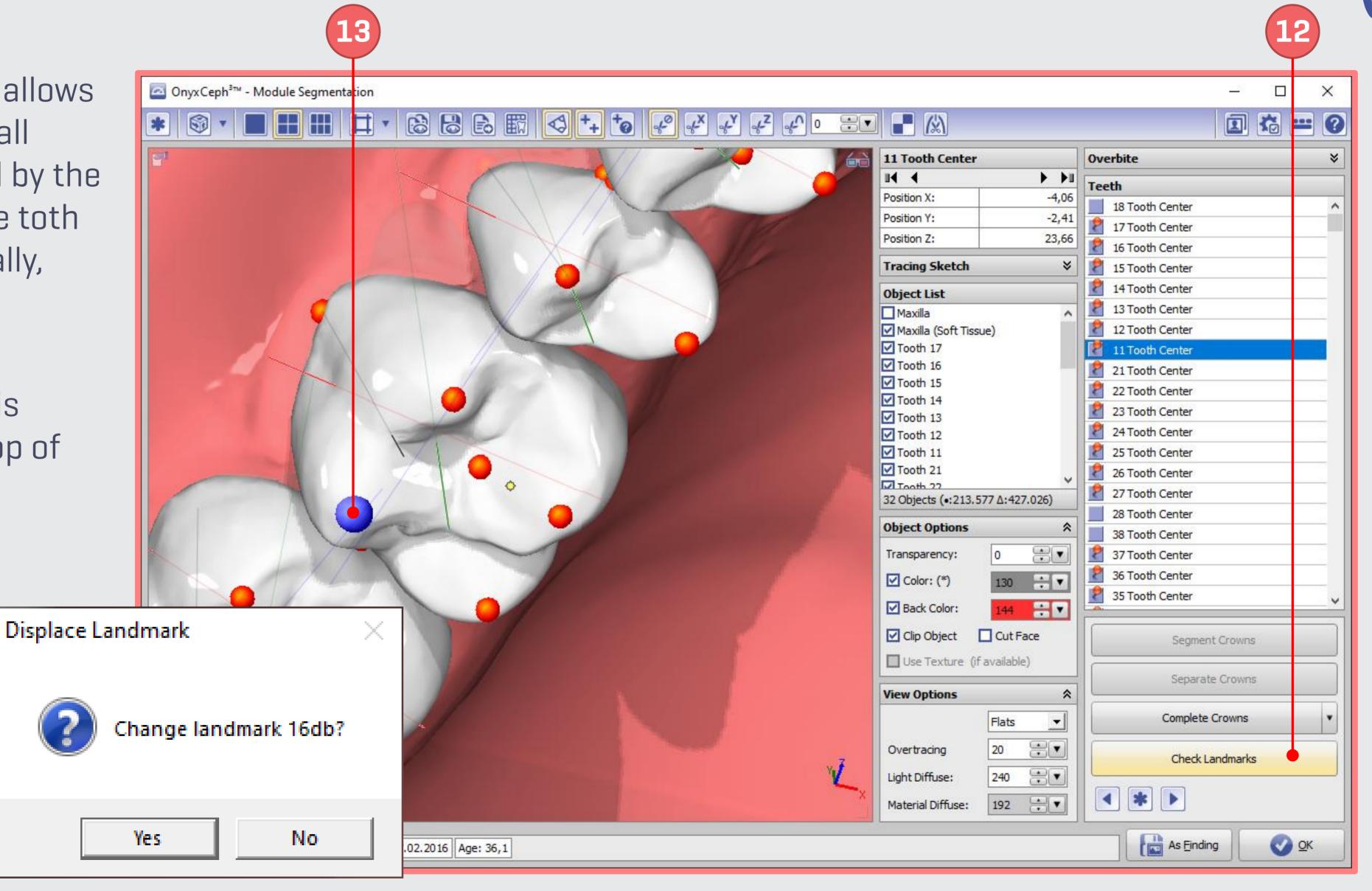
10 By the tooth list context menu, for each crown alterative template teeth can be tested if required.

11 Also by the context menu, the reconstruction of mesial and distal contacts can be corrected if required.

Segmentation > Check Landmarks

12 [Check Landmarks] allows to view and correct all landmarks assigned by the template teeth while toth completion (optionally, crown-by-crown).

13 Position correction is applied by drag&drop of the corresponding landmark.

Segmentation

14 Save [As Finding].

15 Confirm saving synthetic crowns by [Yes].

16 Optionally, add comments or attributes to finding before saving by [OK].

Segmentation

📌

Segmentation is completed and a finding thumbnail is shown in the patient image album.

Aligner 3D > Goal Planning

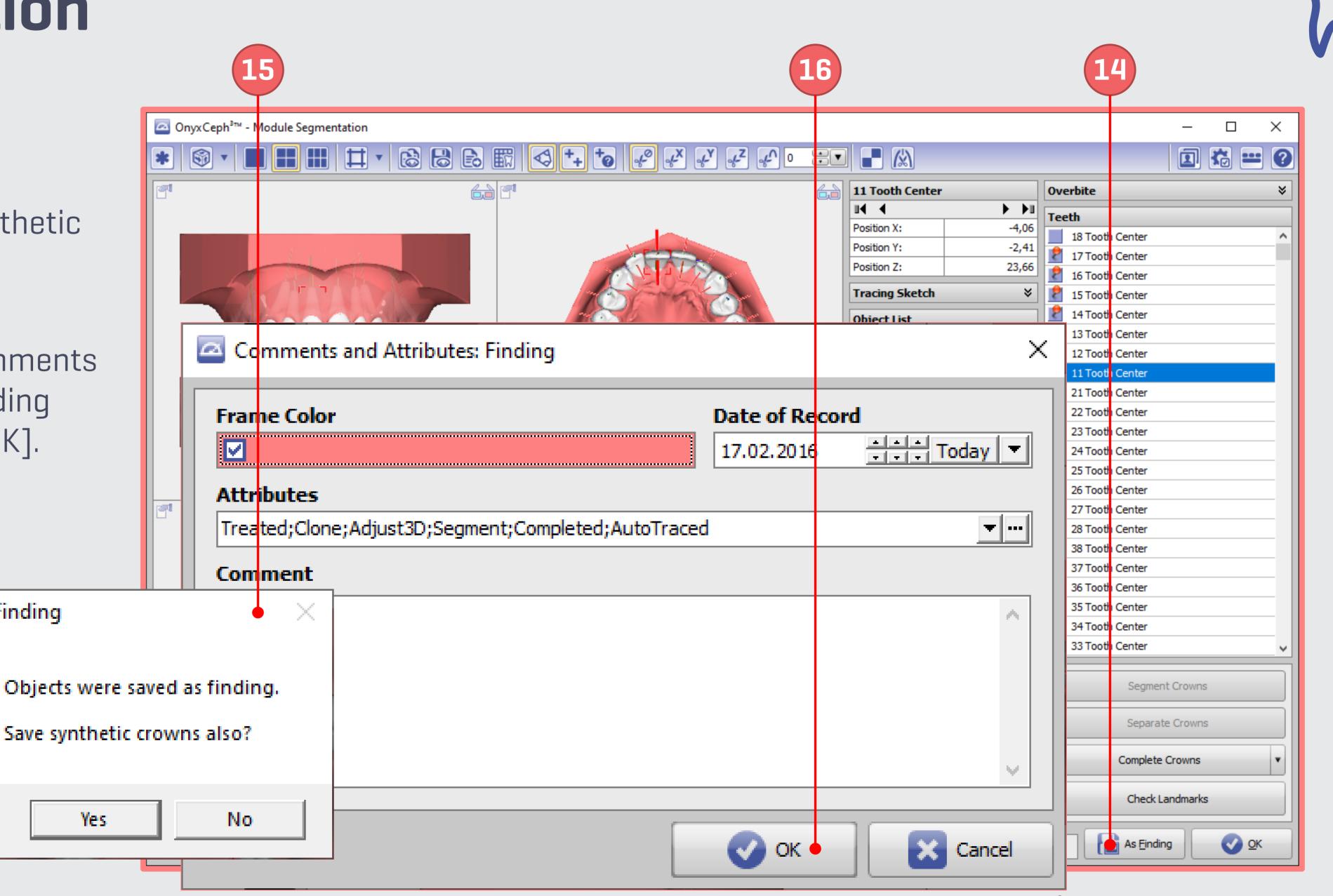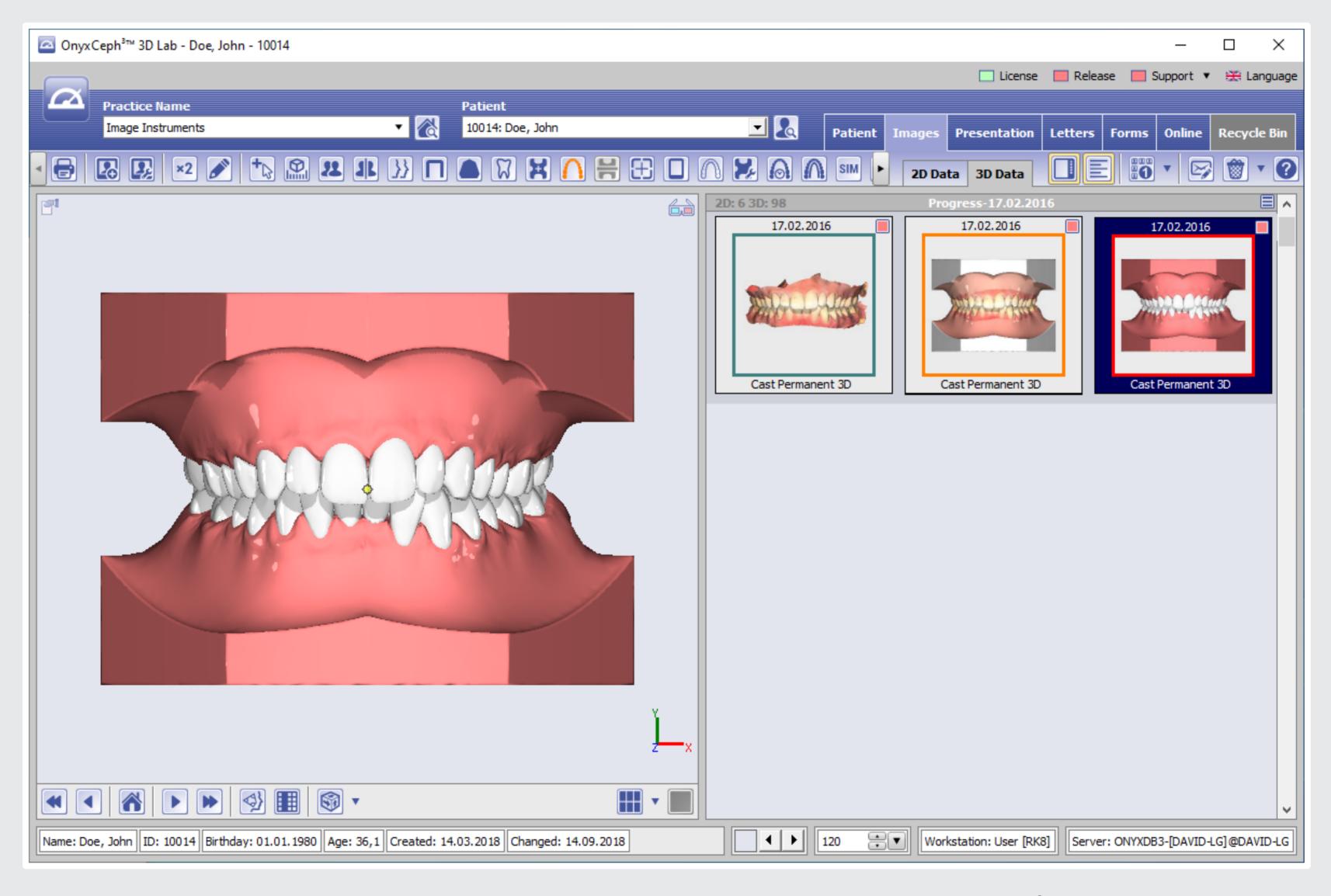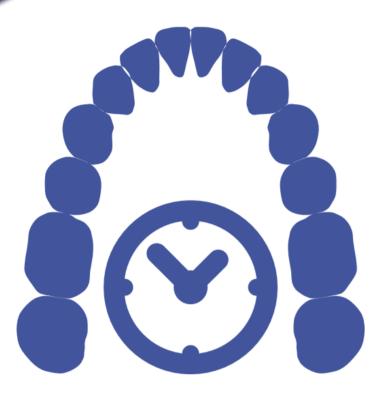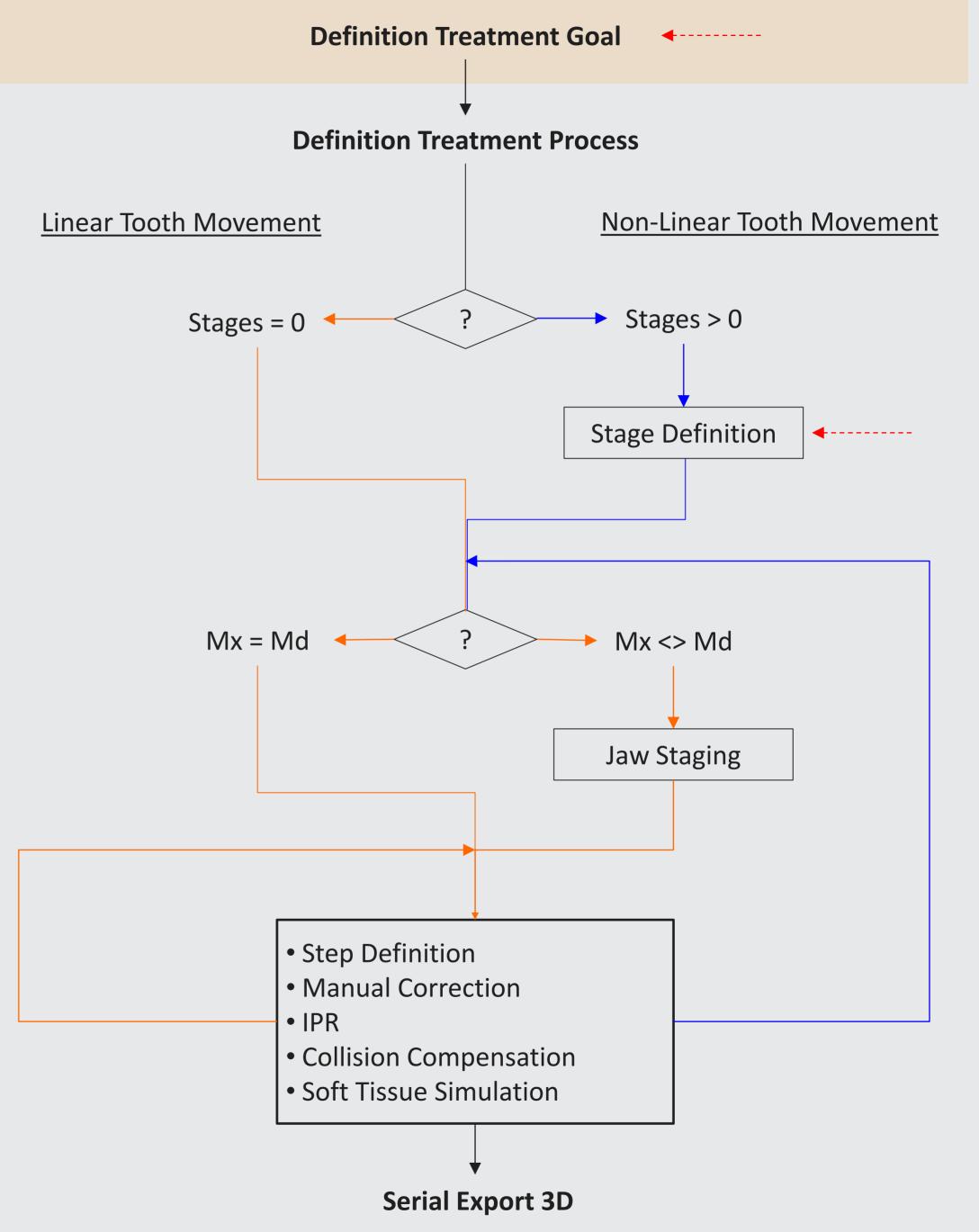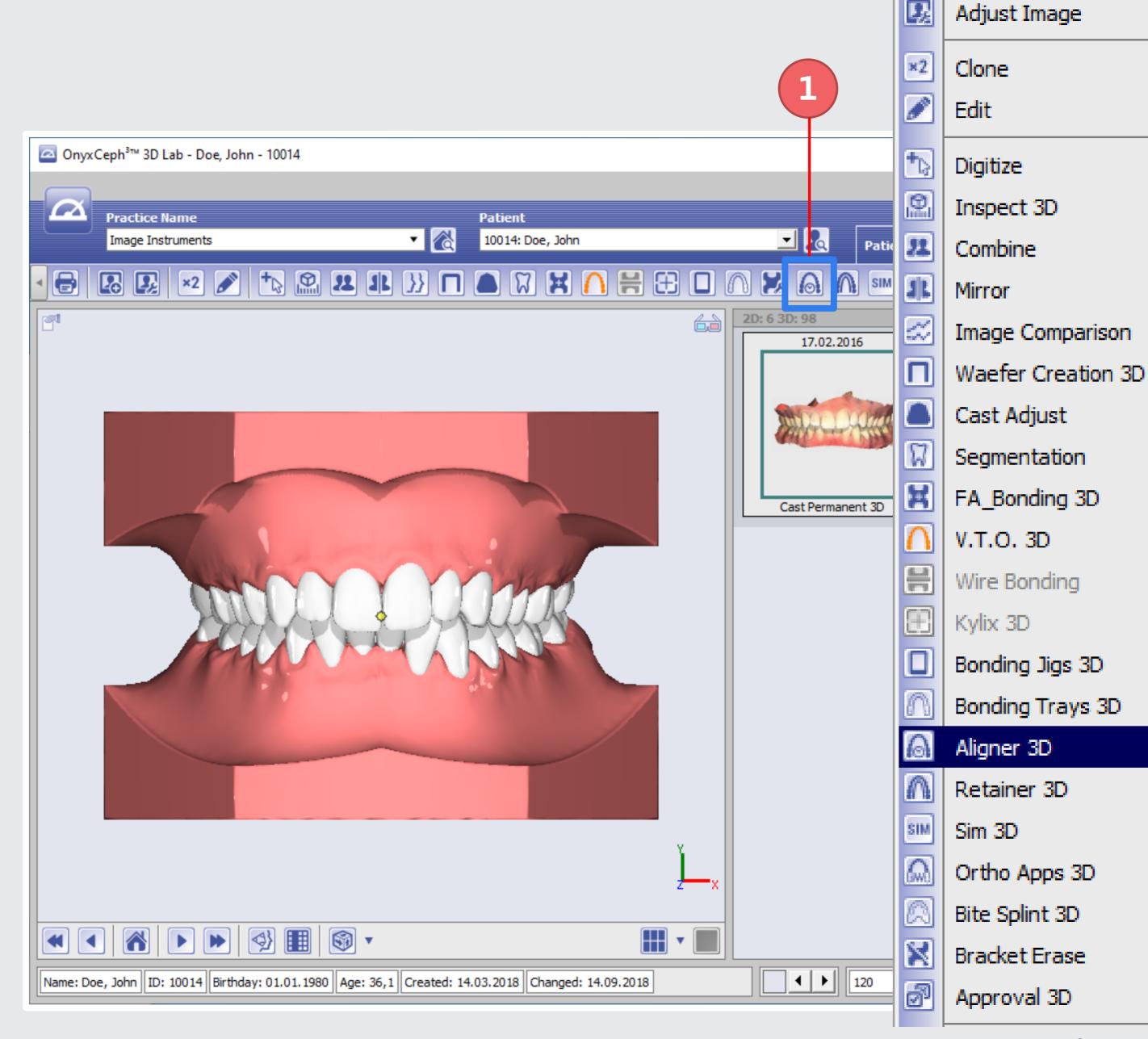The main purpose of module Aligner 3D is to define intermediate treatment goals (stages) and their subdivision into sub-steps in order to achieve a treatment goal which was set up in the Aligner 3D module before or was taken over from module V.T.O.3D. This can be done in accordance with the usual procedure for aligner treatments, while each user can follow up his individual treatment strategy.

The responsibility for the medically correct use of the software for case planning purposes lies with the treating doctor.

In this handout, only some basic tools provided by the module are explained. A detailed description of the Aligner planning workflow can be found in the Quick Reference Guide Modul Aligner 3D which can be requested for download on product website www.onyxceph.com by licensees.

Definition Treatment Goal

Definition Treatment Process

Linear Tooth Movement   Non-Linear Tooth Movement

Stages = 0   ?   Stages > 0

Stage Definition

Mx = Md   ?   Mx <> Md

Jaw Staging

- Step Definition
- Manual Correction
- IPR
- Collision Compensation
- Soft Tissue Simulation

Serial Export 3D

43

Aligner 3D

1 Open module „Aligner 3D".

📌

The module needs to be opened with a segmented data set, which was saved as finding in module Segmentation or V.T.O.3D.
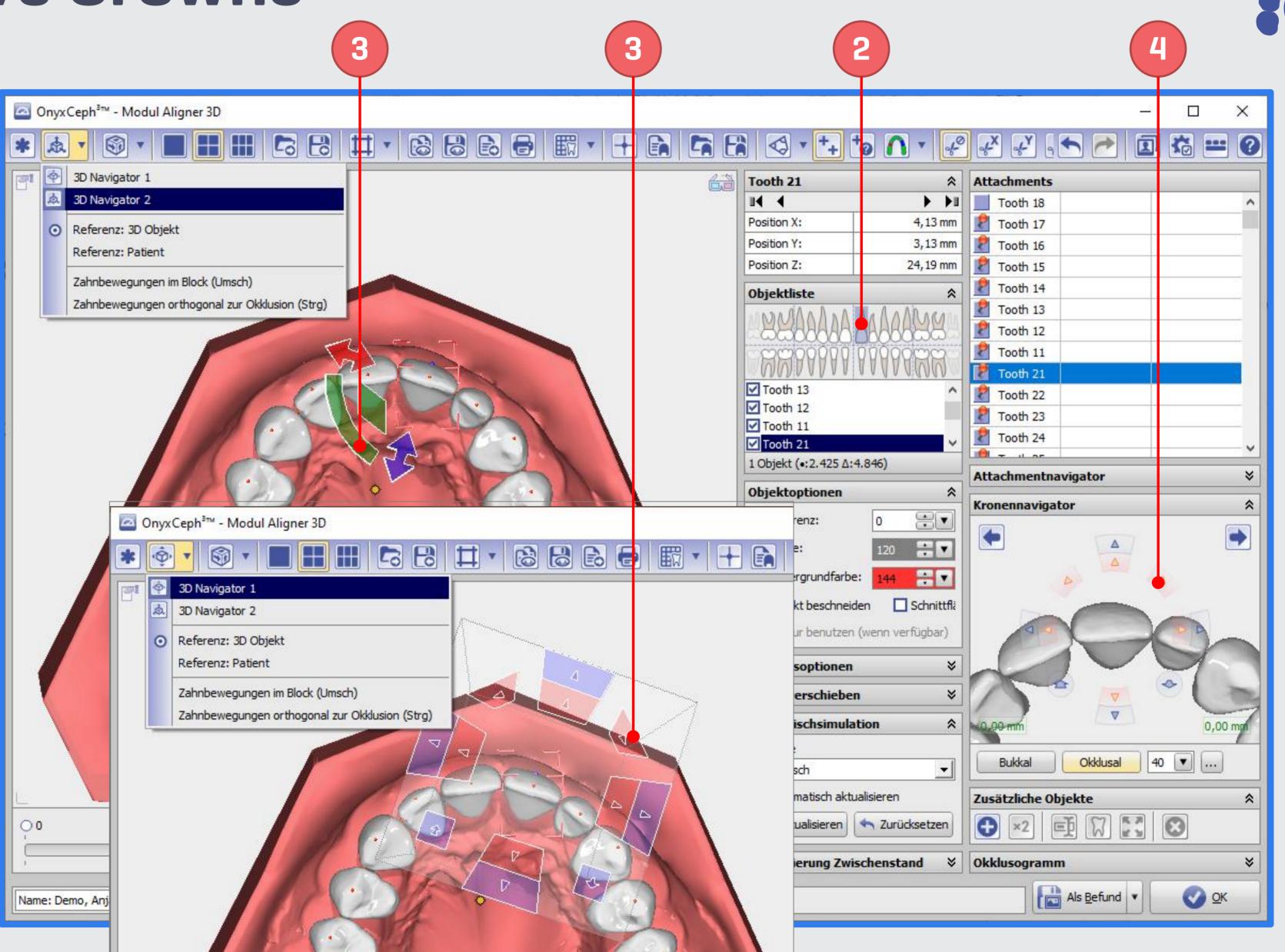
Aligner 3D | Module Window
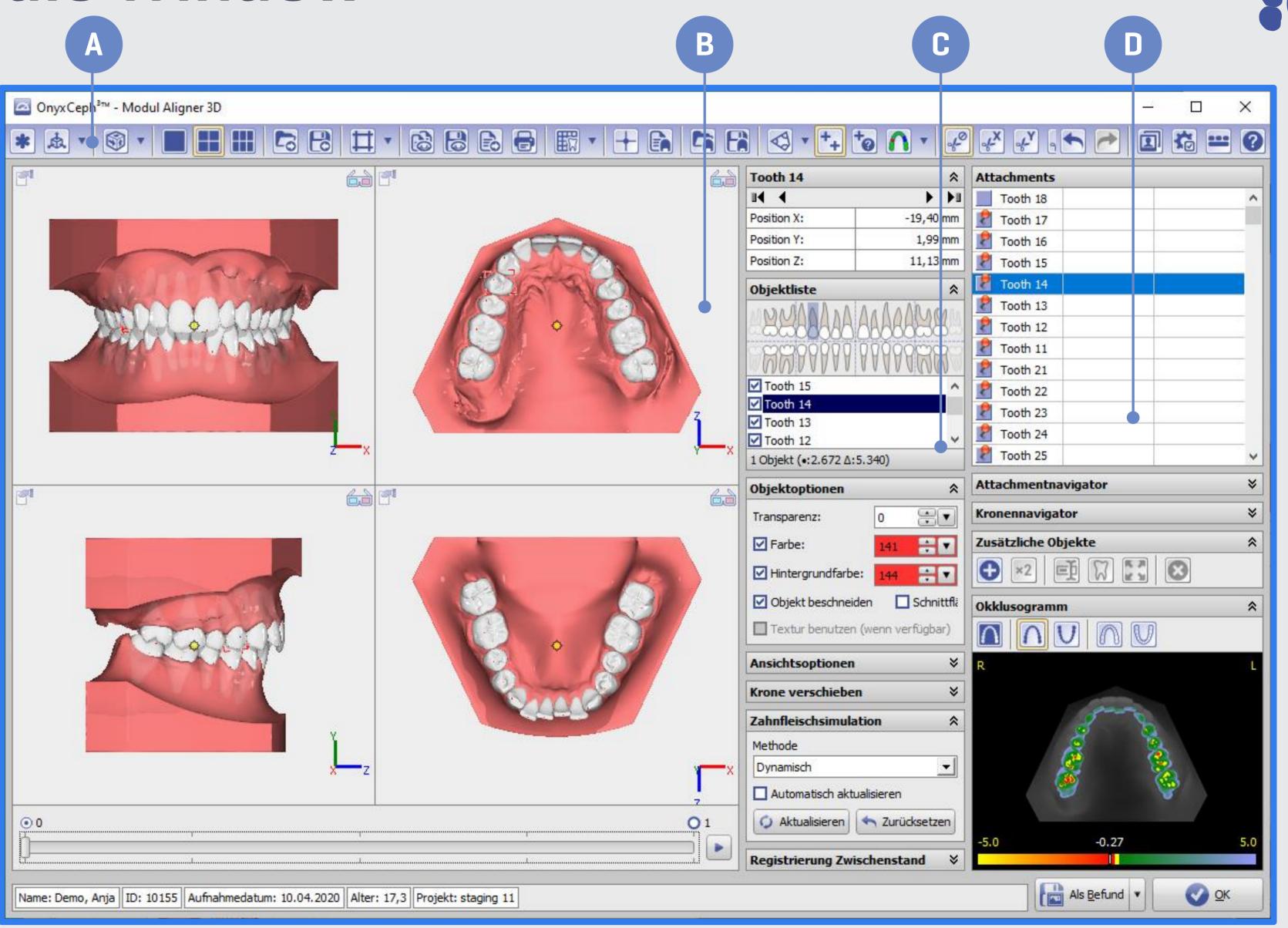
A Icon-Menue View

B 3D-View-Panel

C Mid Panels
- FA Point Coordinates
- Object List
- Object Options
- View Options
- Move Crowns
- Gingiva Simulation
- Register Step

D Panels on the Right
- Attachment List
- Attachment Navigator
- Crown Navigator
- Additional Objects
- Occlusogram

Aligner 3D > Move Crowns

2 Select tooth in Object List or by ALT+Left click directly in the 3D View panel.

3 Move teeth directly in the 3D View panel acc. To the selected reference system.

4 Alternatively: Control tooth movement in panel Crown Navigator.

📌

Arrows around the tooth indicate available movement directions. Depending on the orientation, the movement directions will change.

Aligner 3D > Crown Navigator 1 - Occlusal

The effect of the single control buttons depends on object orientiation:

Protrusion | Retrusion
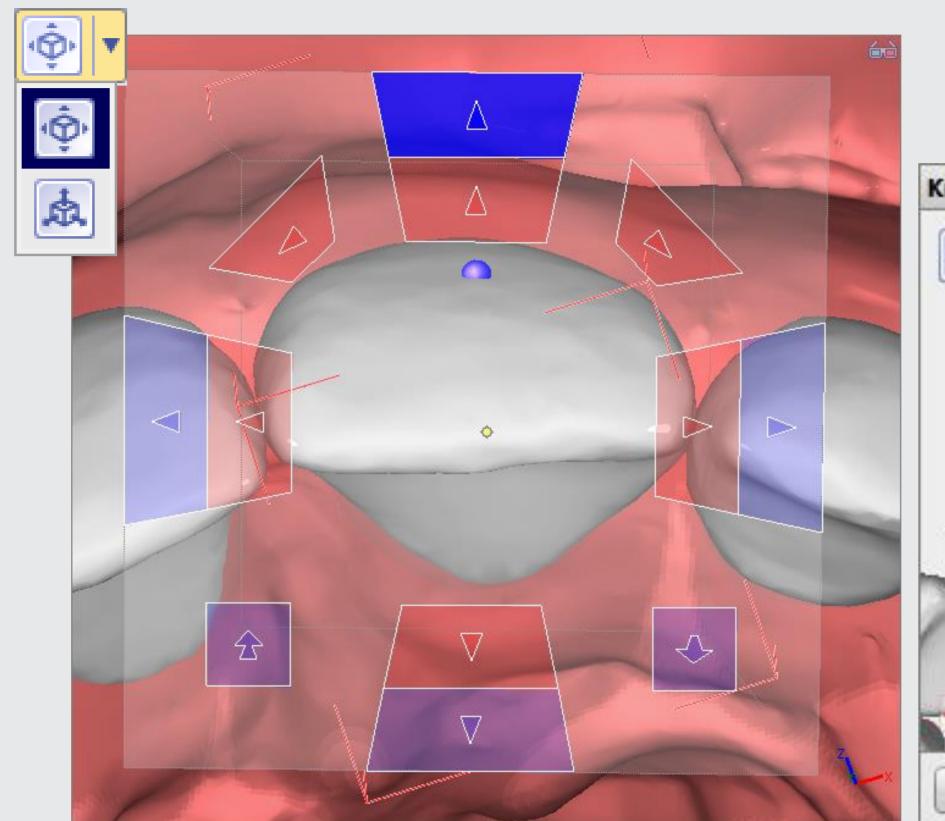
Distal | Mesial

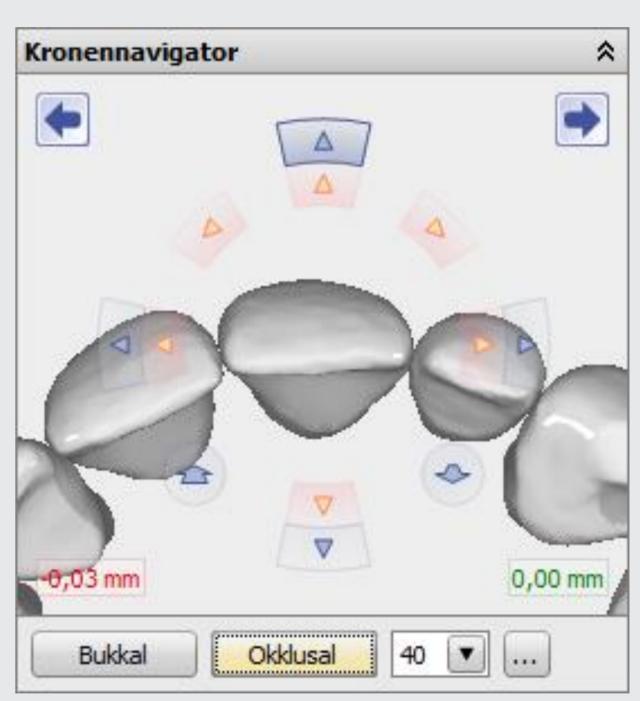Intrusion | Extrusion

Inclination +|-

Rotation +|-

Angulation +|-

Movement directions of both navigator types are identically.

Aligner 3D > Crown Navigator 1 - Buccal

The effect of the single control buttons depends on object orientiation:

Intrusion | Extrusion

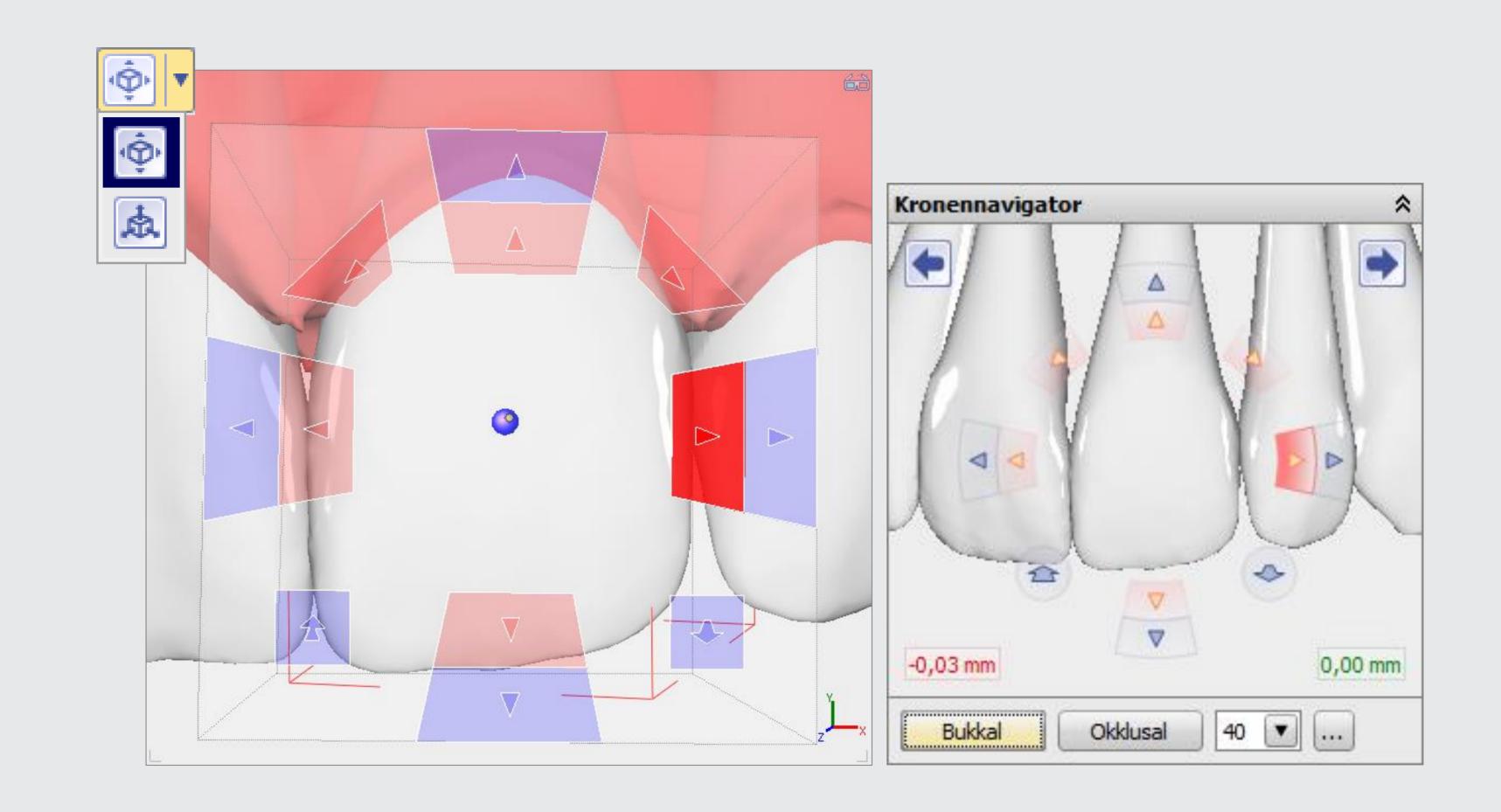Distal | Mesial

Retrusion | Protrusion

Inclination +|-

Angulation +|-

Rotation +|-

Movement directions of both navigator types are identically.

Aligner 3D > Vrown Navigator 2

The effect of the single control buttons depends on object orientiation:

Distal | Mesial

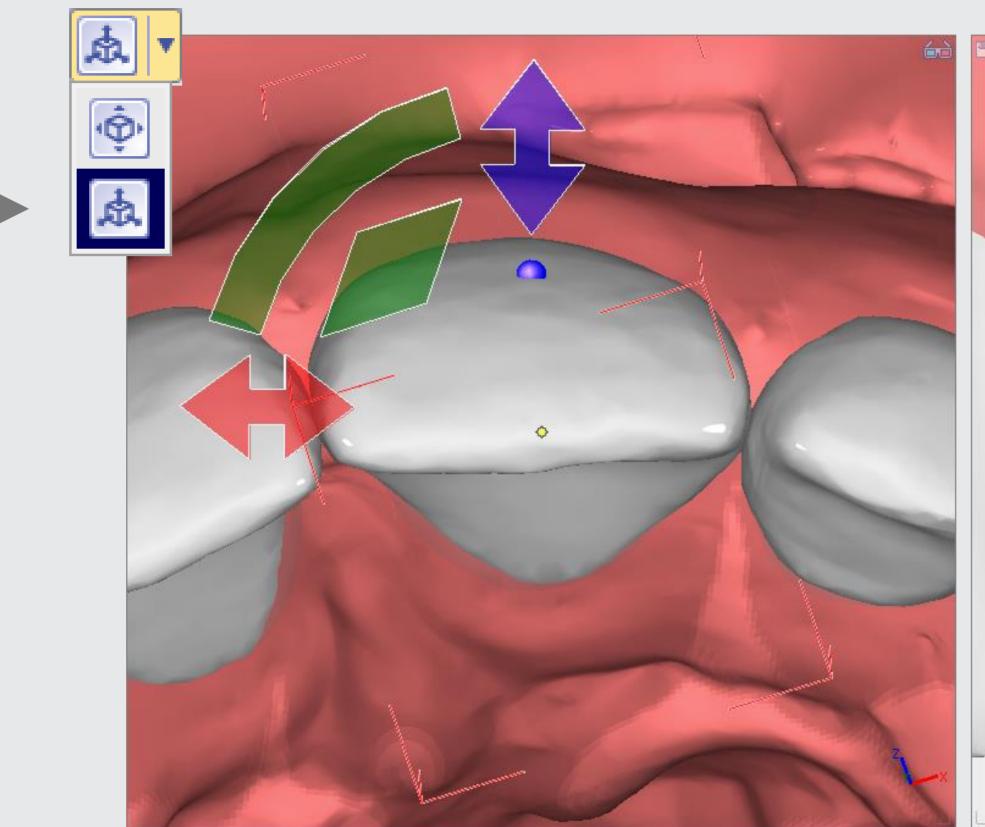Retrusion | Protrusion

Intrusion | Extrusion

Inclination +|-

Angulation +|-

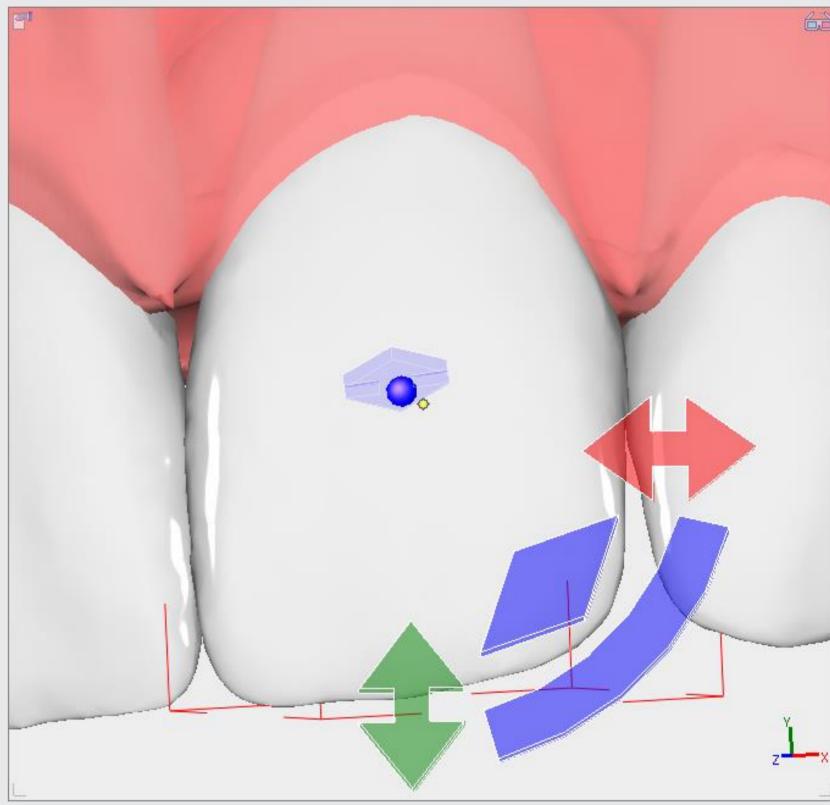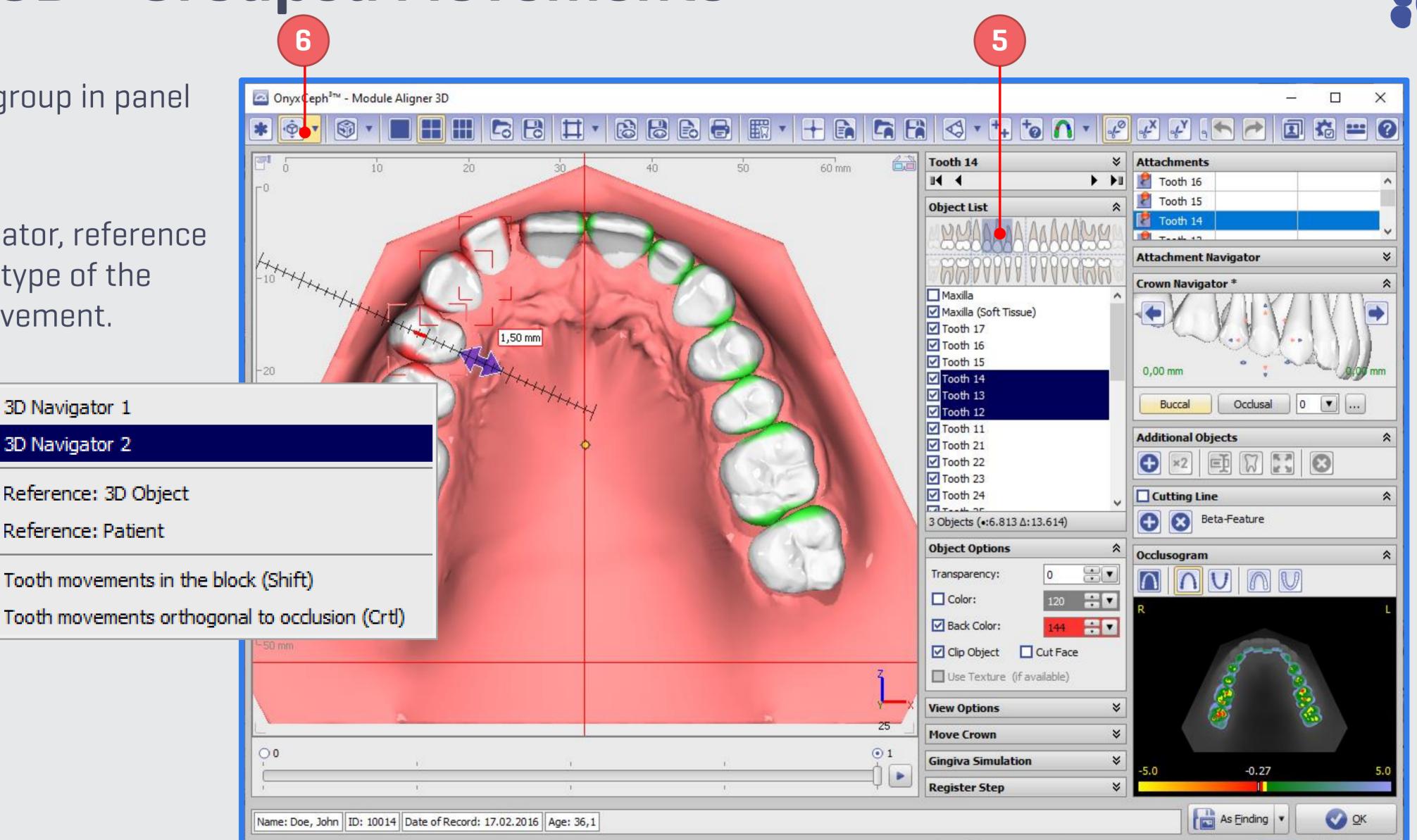Rotation +|-

Aligner 3D > Grouped Movements

5 Mark tooth group in panel Object List.

6 Select navigator, reference system and type of the grouped movement.
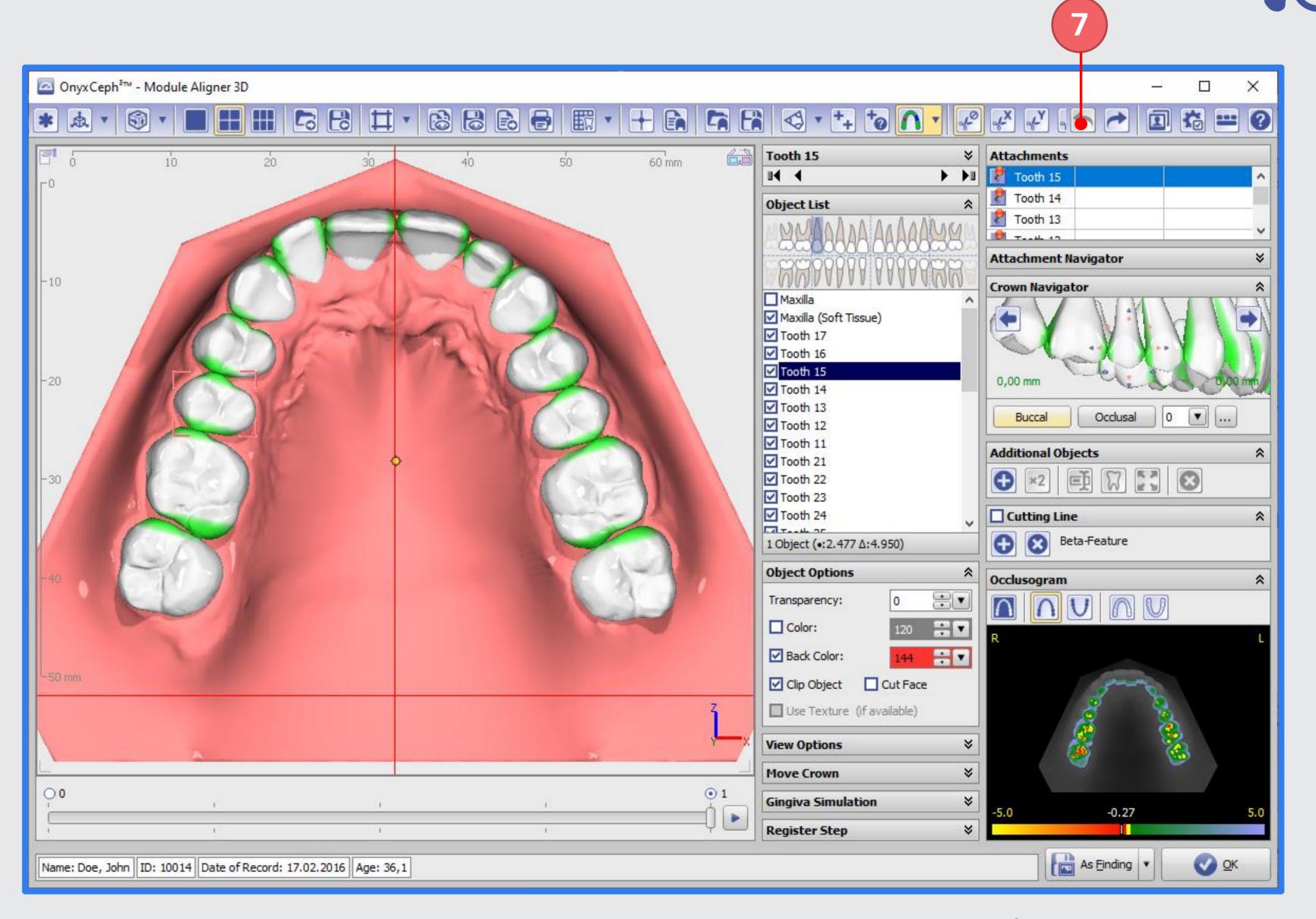
Aligner 3D > Undo / Redo Movements

7 To reset or repeat a crown movement, use buttons [Undo] and [Redo].
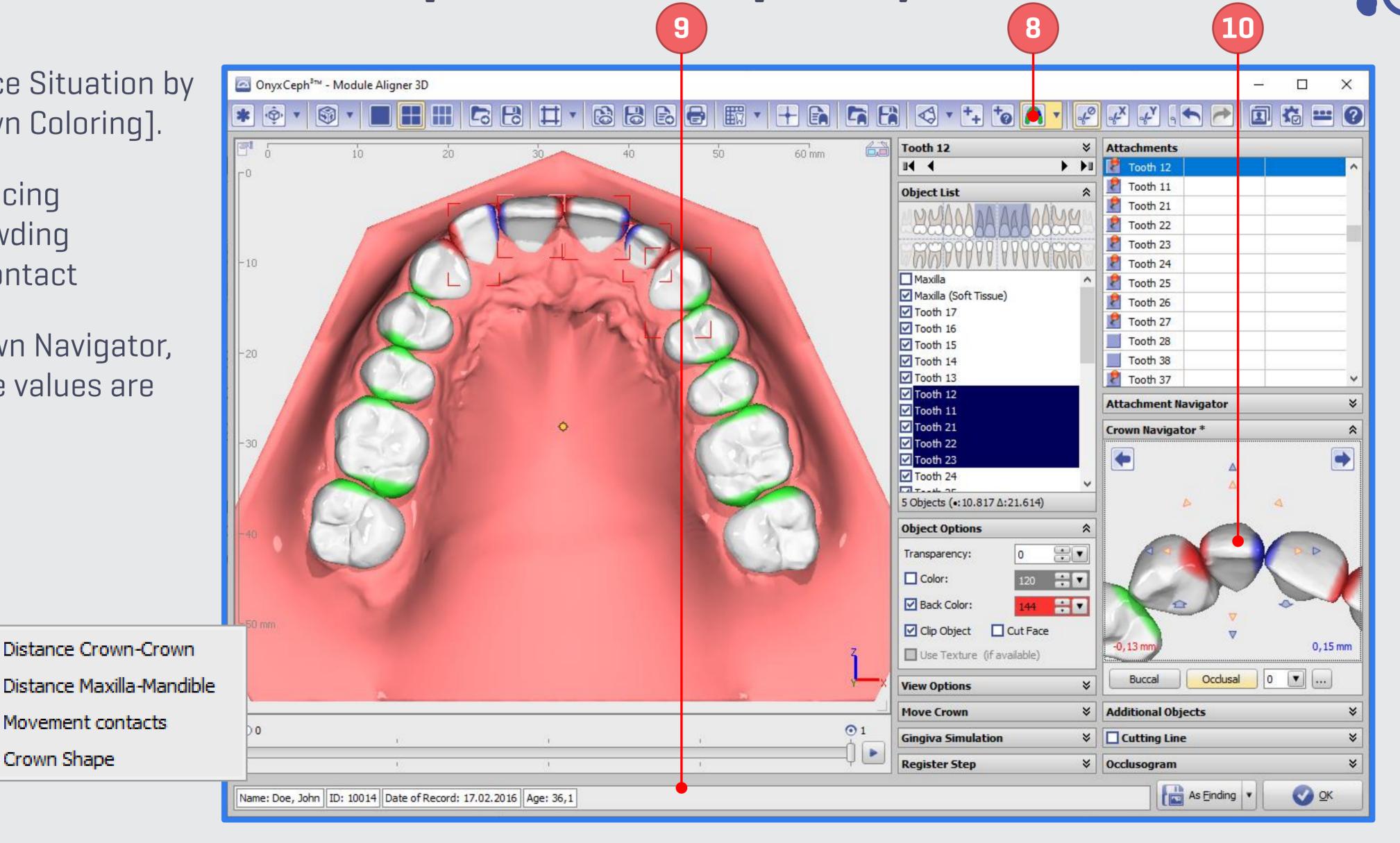
Aligner 3D > Vizualize Space Discrepancy

8 Analyze Space Situation by button [Crown Coloring].

9
- **Blue = Spacing**
- **Red = Crowding**
- **Green = Contact**

10 In panel Crown Navigator, m/d distance values are displayed.

Aligner 3D > Collision Compensation
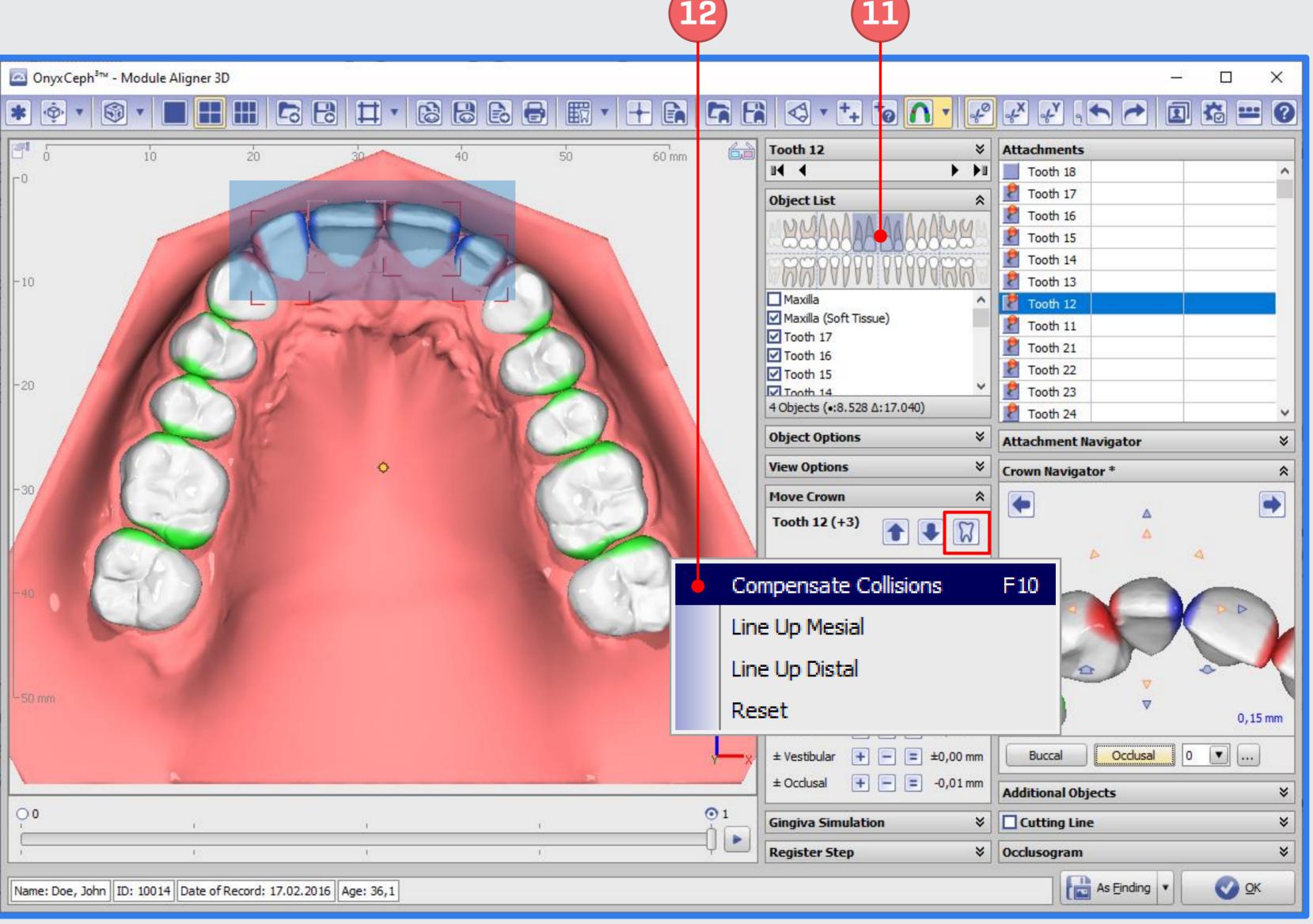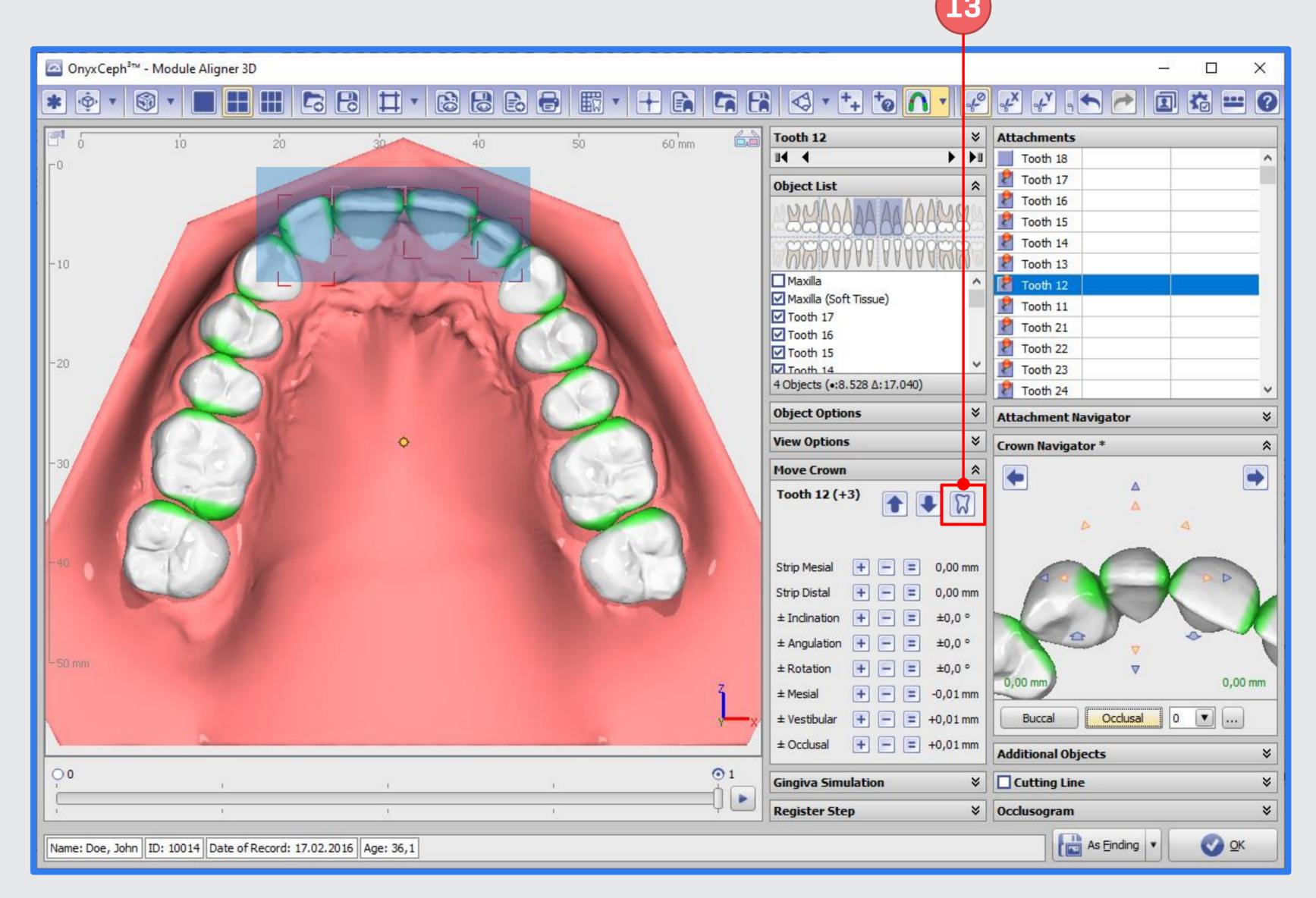
11 Select Crowns for Collision Compensation in panel Object List or 3D-View.

12 Use menu [Compensate Collisions] in Panel Move Crowns to equalize space between selected teeth.

Aligner 3D > Collision Compensation
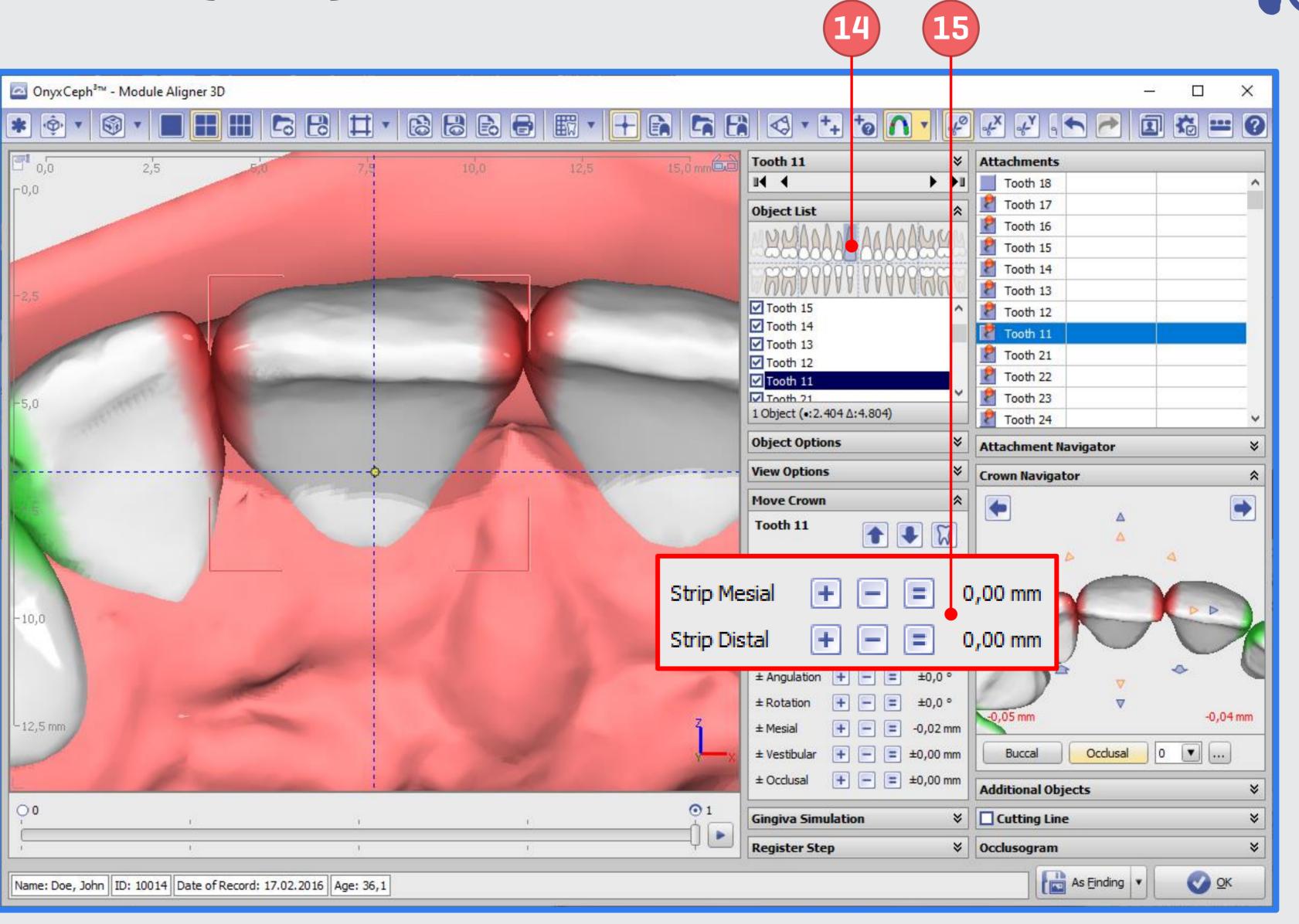
13 Distances are equalized for marked crowns.

Aligner 3D > Stripping (IPR)
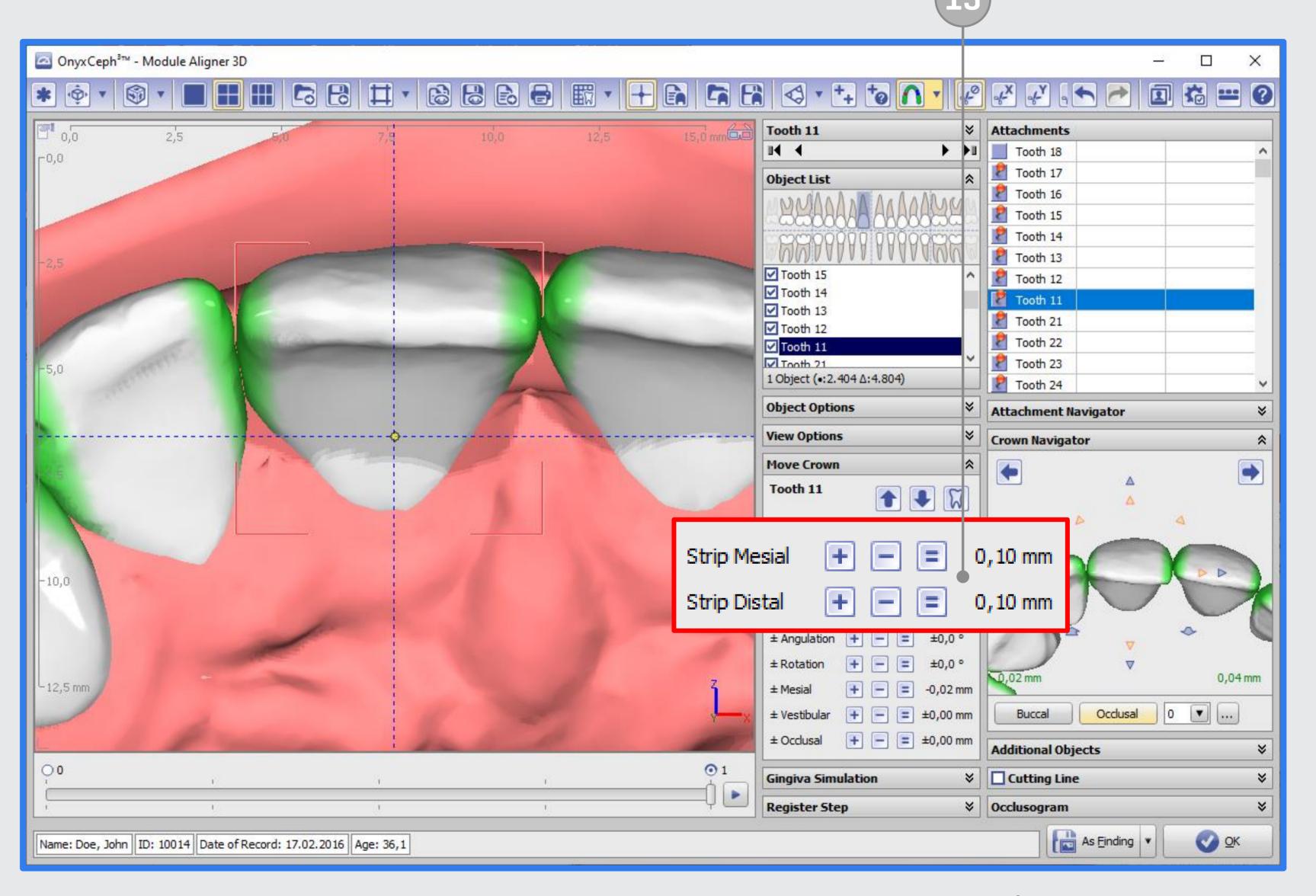
14 Mark crowns for IPR in panel Object List in panel 3D-View.

15 Assign absolut [=] or differential [+]/[–] IPR values (separately for mesial and distal side of each crown).

Aligner 3D > Stripping (IPR)

15 Assign absolut [=] or differential [+]/[-] IPR values (separately for mesial and distal side of each crown).

Aligner 3D > Vizualize Occlusal Distance
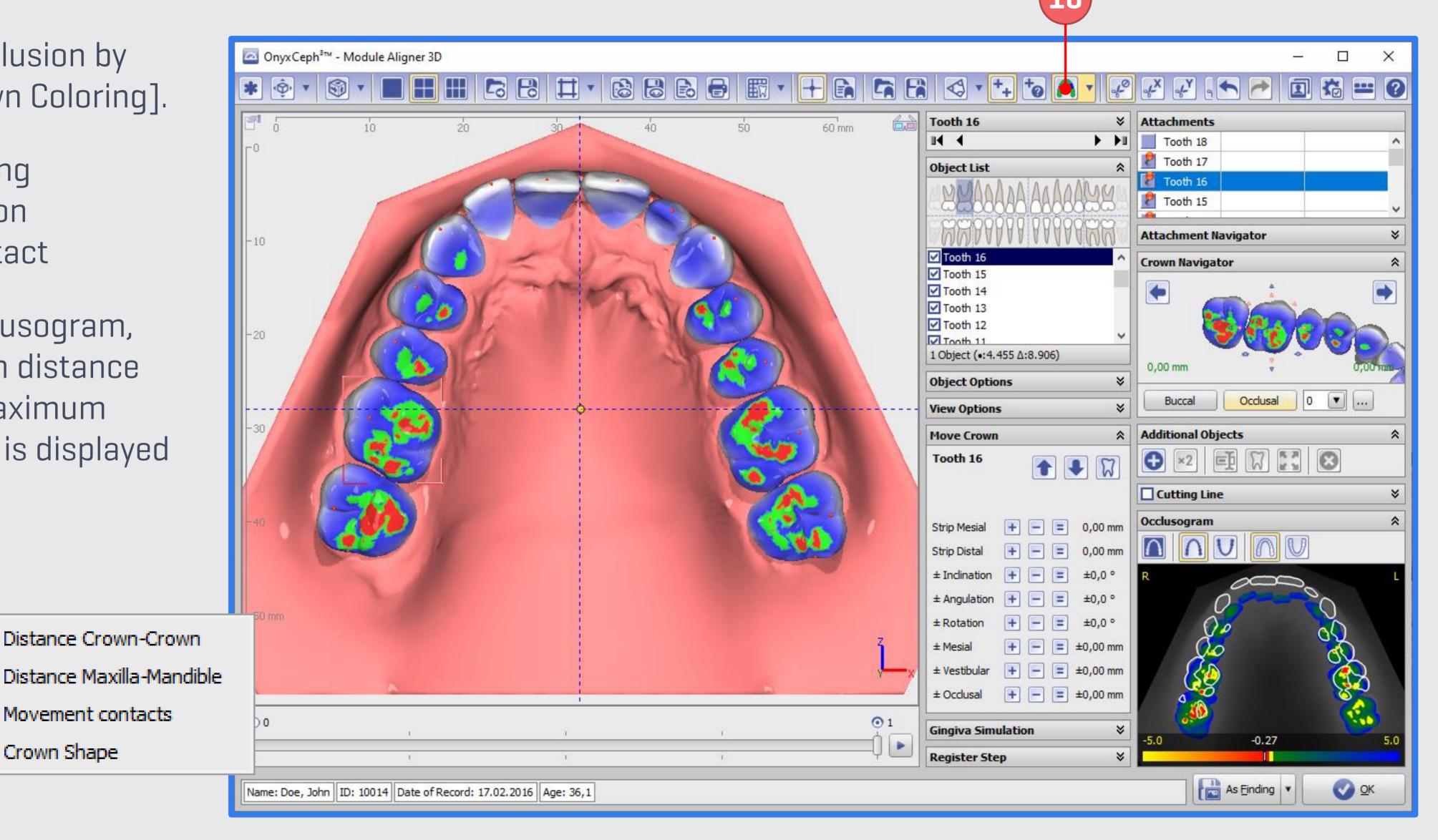
16 Visualize occlusion by button [Crown Coloring].

Blue = Spacing
Red = Collision
Green = Contact

In panel Occlusogram, the minimum distance (resp. the maximum penetration) is displayed numerically.

Aligner 3D > Vizualize Movement Contacts
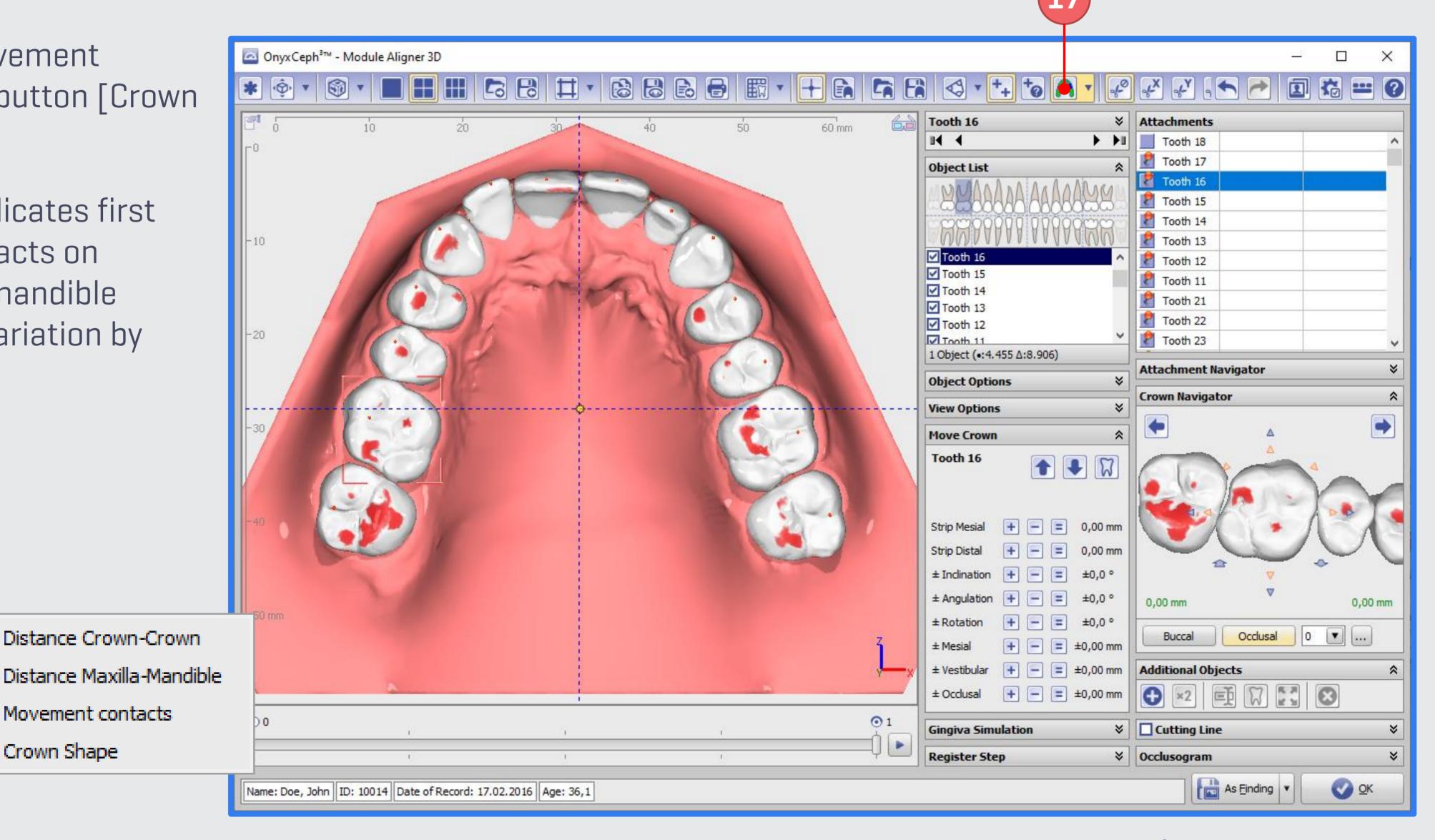
17 Visualize Movement Contacts by button [Crown Coloring].

Red color indicates first closure contacts on transversal mandible movement variation by +/- 1mm.

Aligner 3D > Vizualize Crown Shape
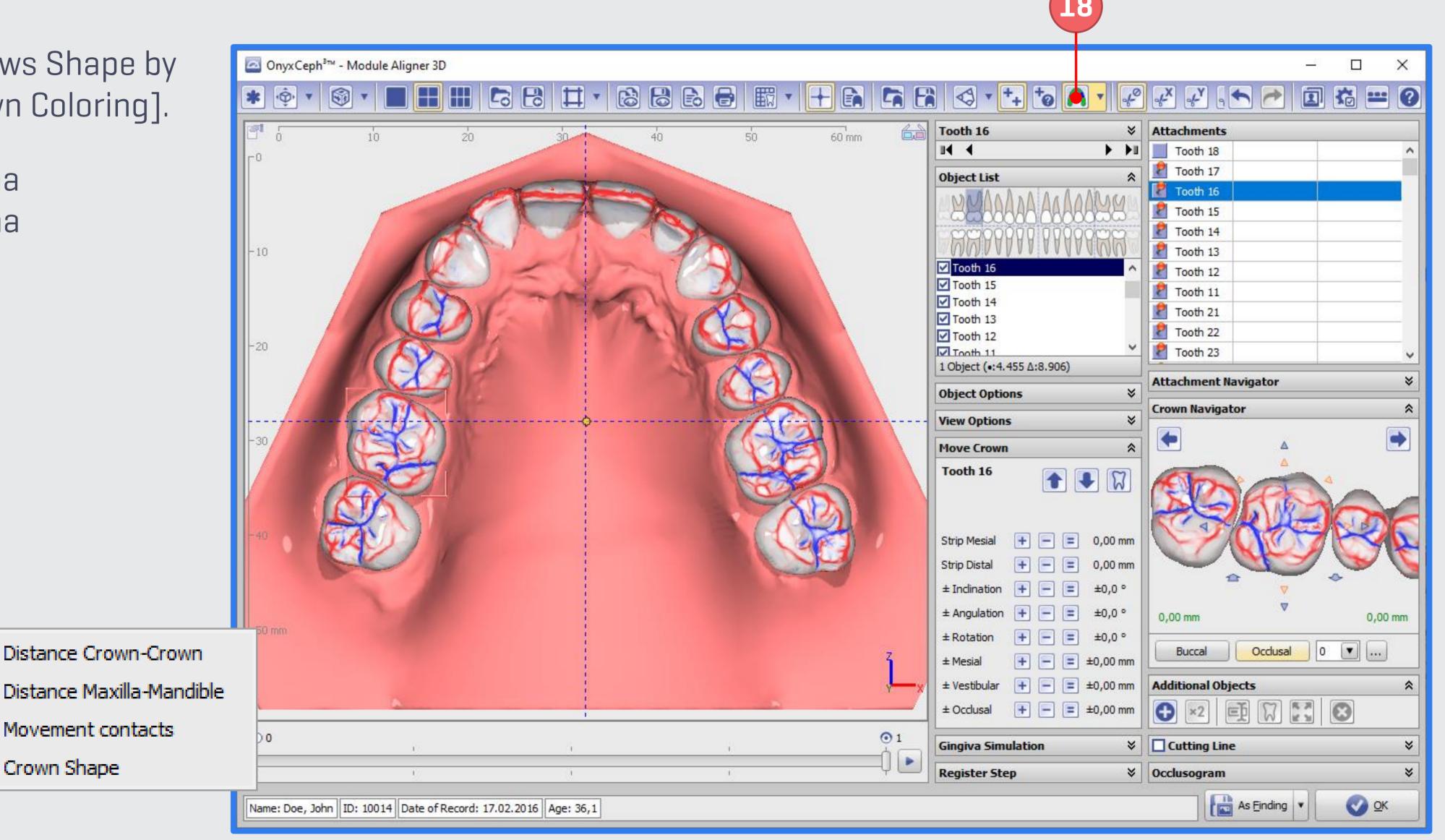
18 Visualize Crows Shape by button [Crown Coloring].

Red = Maxima
Blue = Minima
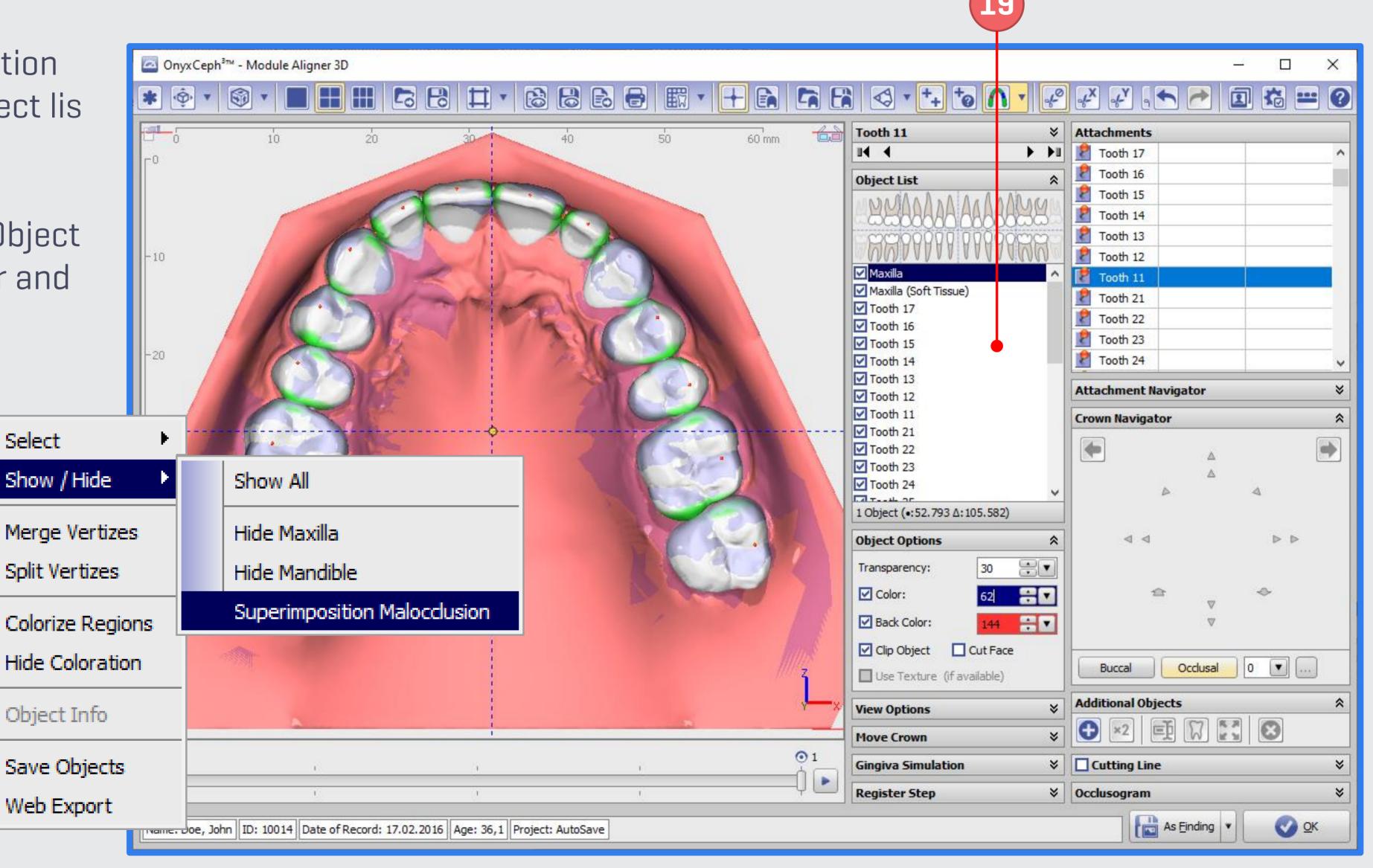
Aligner 3D > Superimposition Malocclusion

19

19 Select [Superimposition Malocclusion] in object lis context menu.

Optionally, in panel Object Options, adjust Color and transparency.

Aligner 3D > Table Tooth Movement (Total)

[20] Display current IPR and tooth movement values in table [Tooth Movement (Total)].
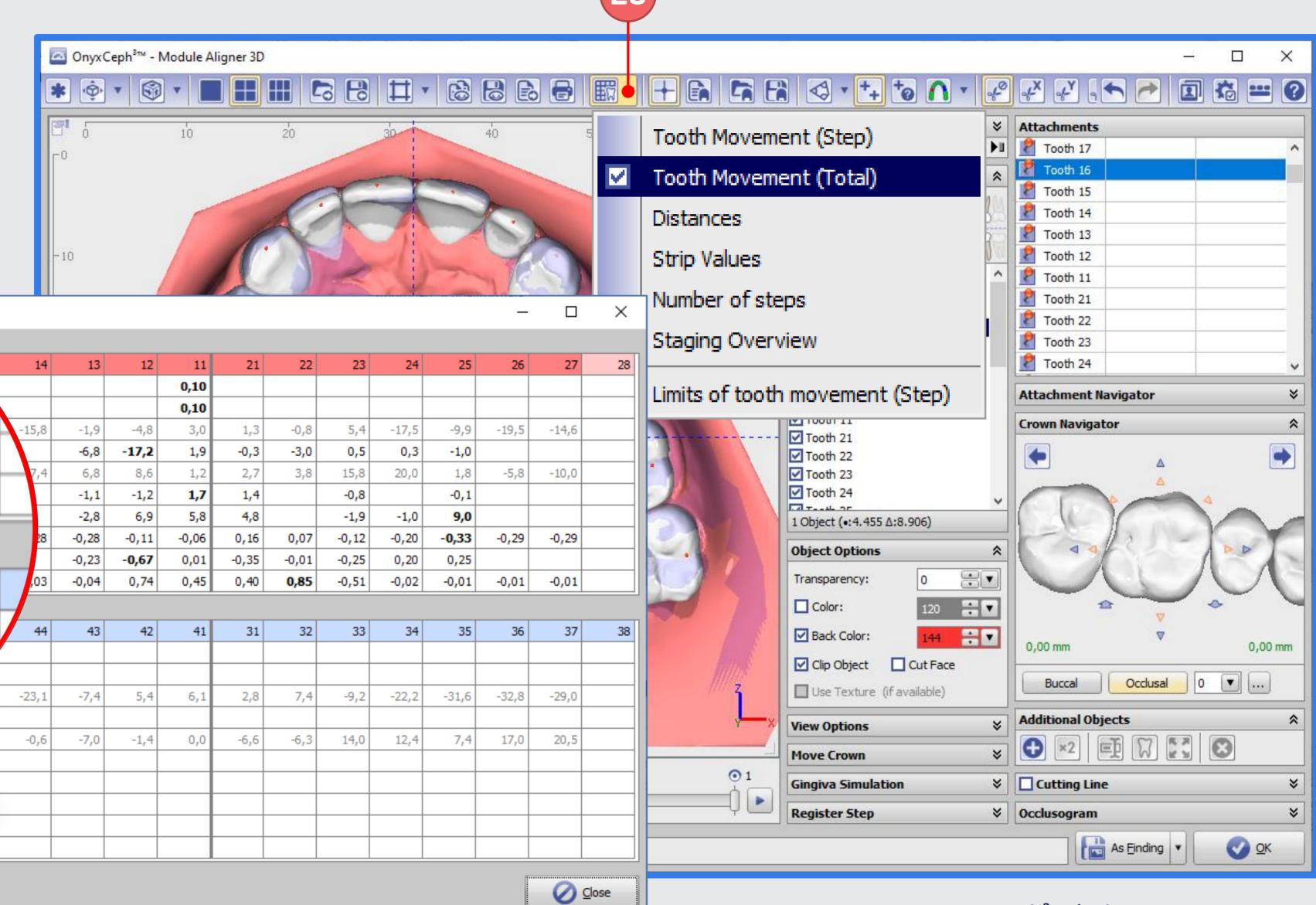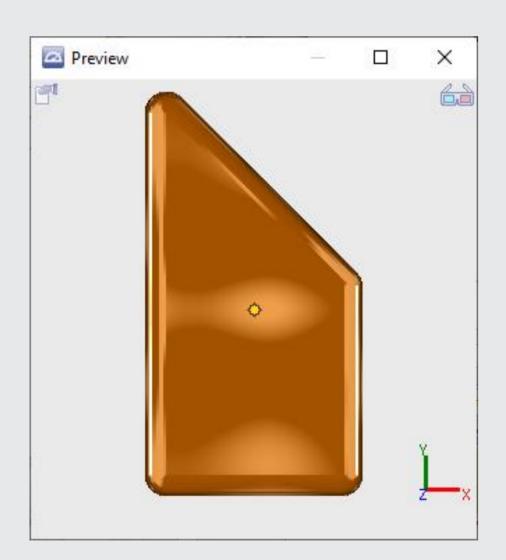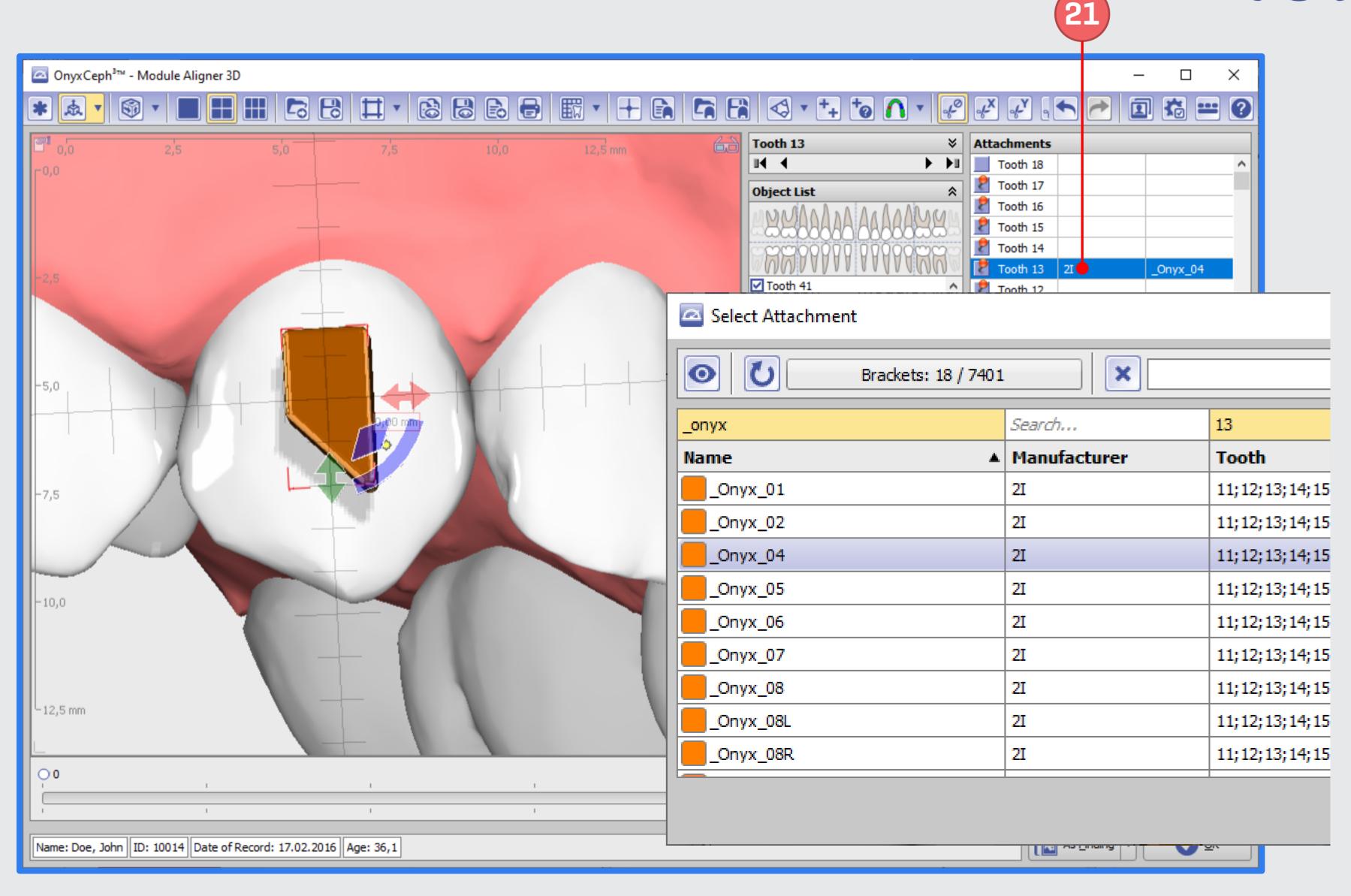
Aligner 3D > Attachments

21 If useful, place one or multiple attachements on crowns.
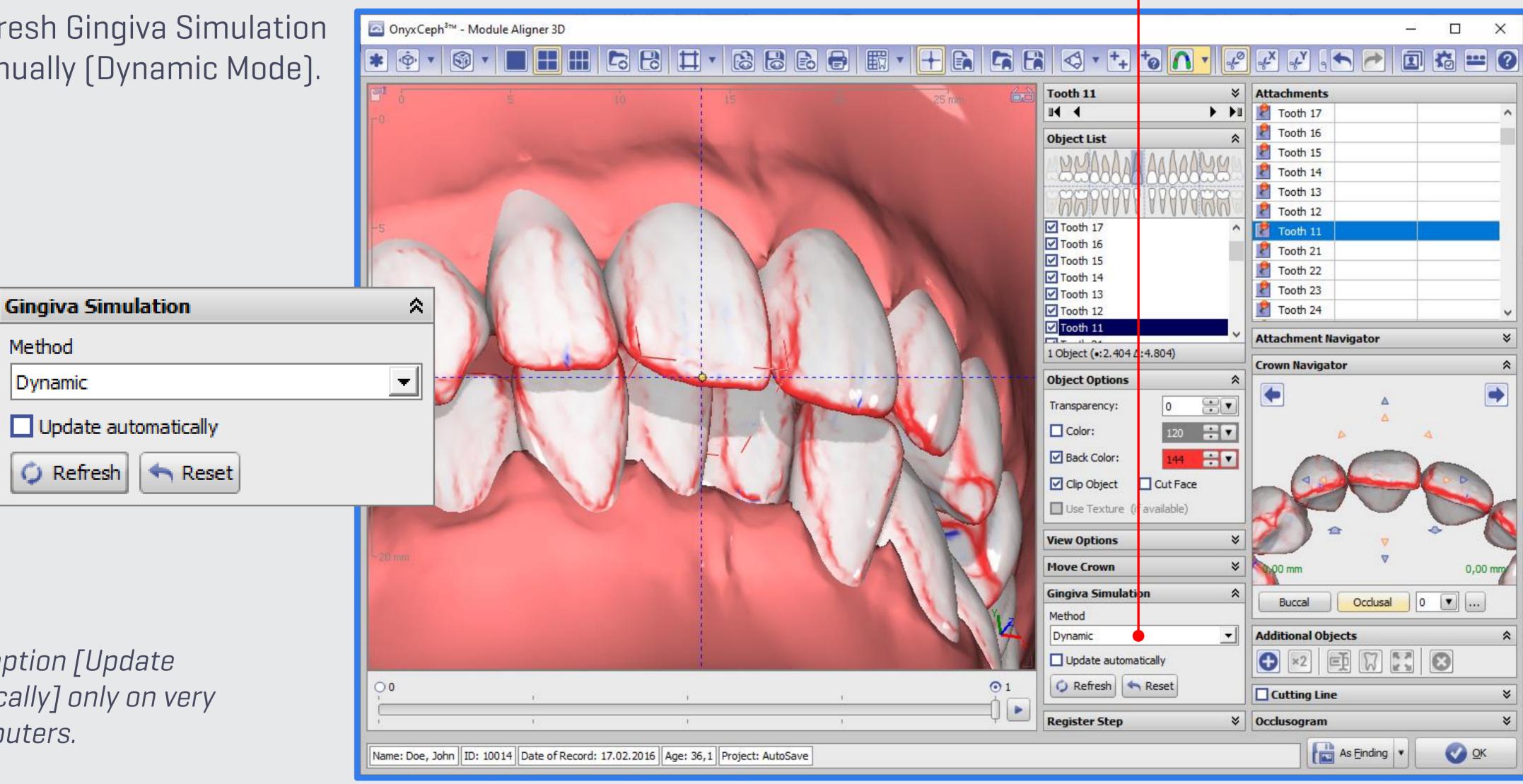
The attachement library can be opened by double clicking on a tooth number in panel [Attachments].

Aligner 3D > Gingiva Simulation

22 Refresh Gingiva Simulation manually [Dynamic Mode].

Activate option [Update automatically] only on very fast computers.

Aligner 3D > Zahnfleisch rekonstruieren

22 Refresh Gingiva Simulation manually [Dynamic Mode].

Activate option [Update automatically] only on very fast computers.

Aligner 3D > Save Project

23 Saving Tx Goal situation as project*

*Note:
Projects are always saved together with the „parent finding" which was used to open the module – not with a "child finding" saved by button [As Finding]

Even if continuing with the step planning procedure immediately after completion of the Tx Goal planning part without leaving the module, it is recommended to save the goal planning situation as a separate project.

Save Project

Available Objects

Object Name

project name

☐ Approved

☐ Send as Container

Save   Cancel

Aligner 3D > Save [As Finding]

24 For several purpose (e.g., approval, education, for use by other modules), the treatment goal can also be exported [As Finding].
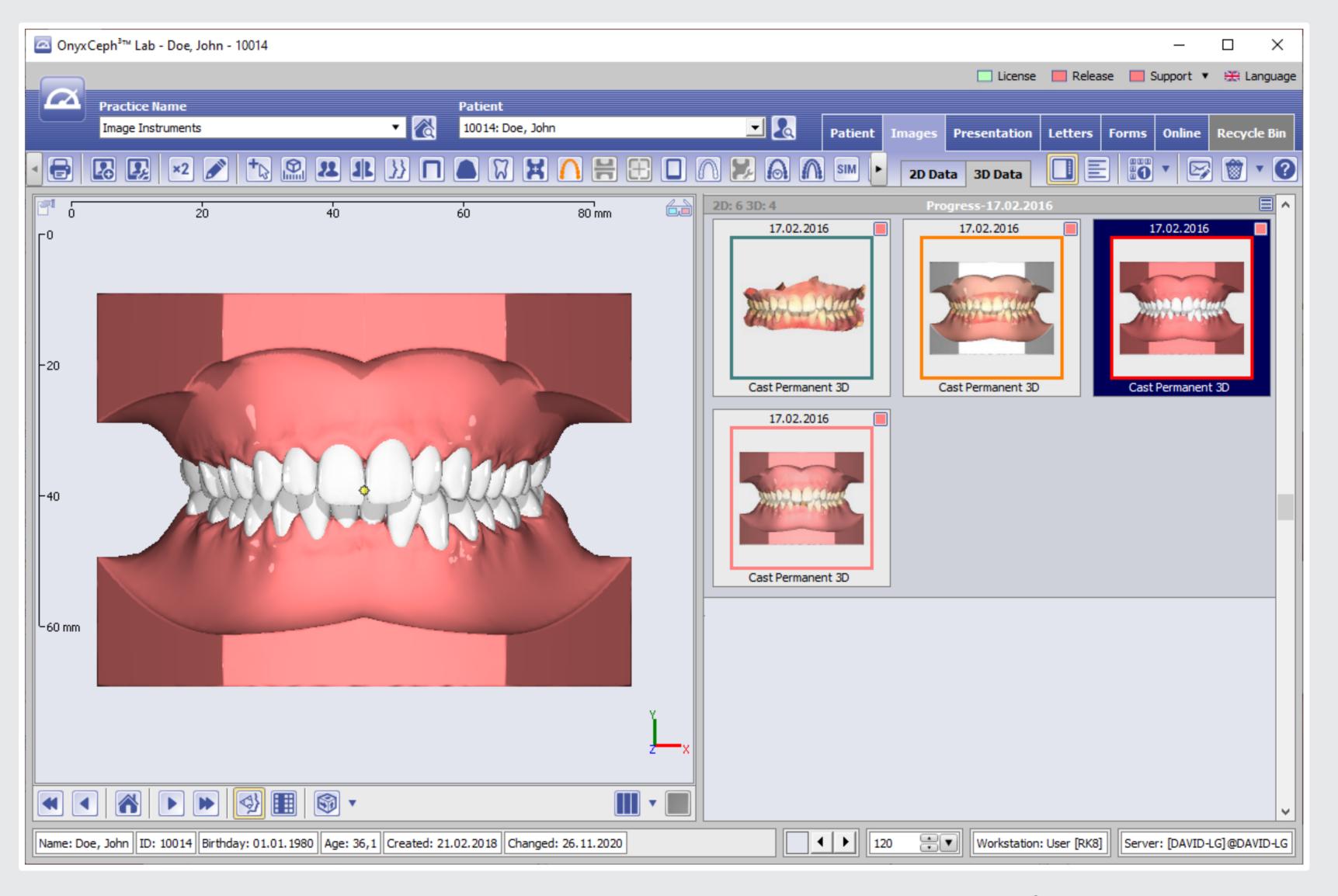
Depending on its purpose, the situation exported as finding can include the tooth movement animation and optionally used attachemnts as well.
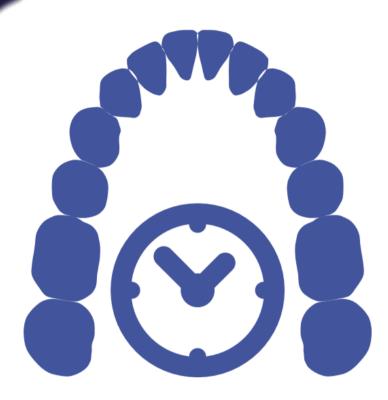
Aligner 3D

📌
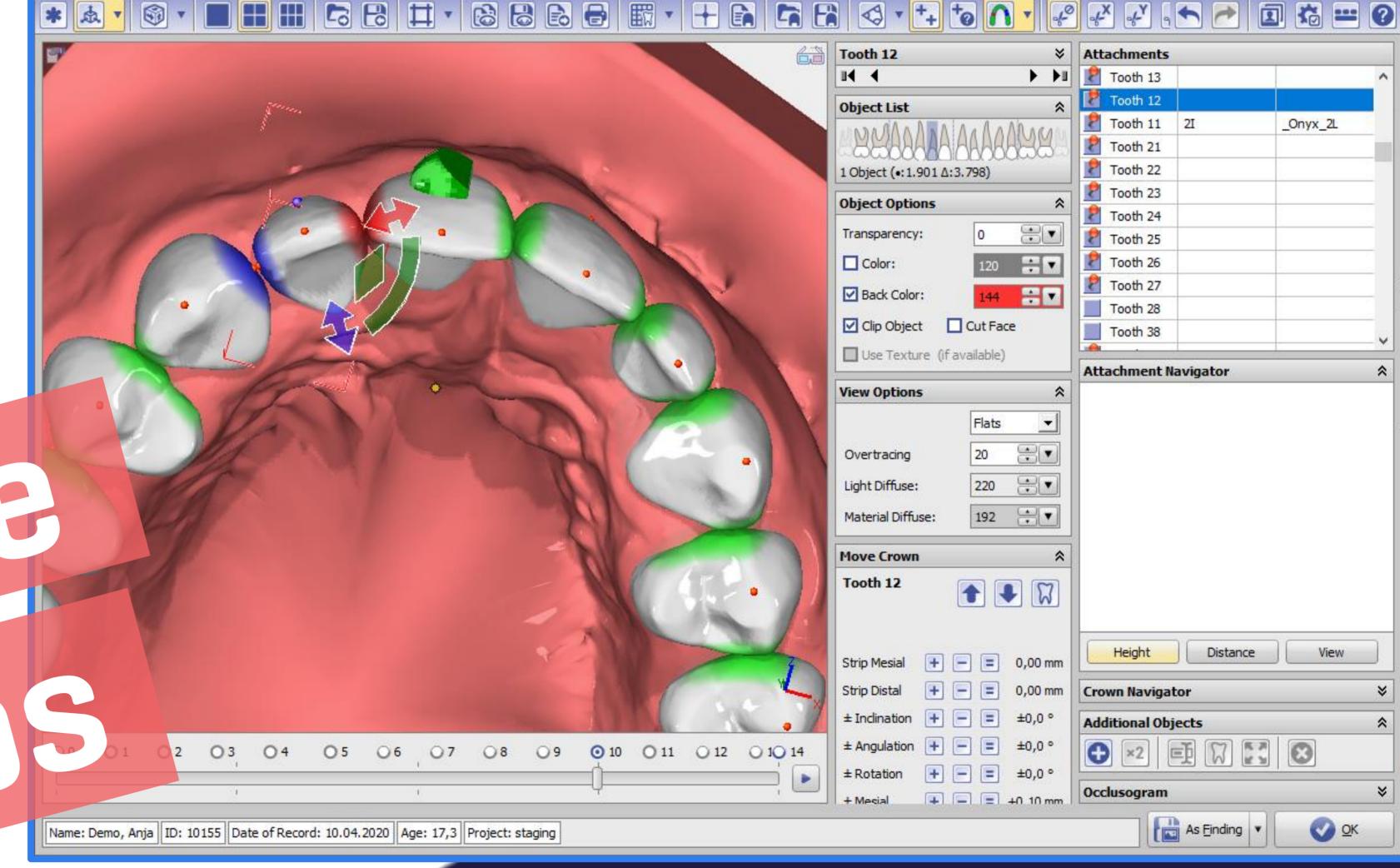
Setting up the Tx goal in module Aligner 3D is completed at this point.

The user can continue with the definition of stages and steps immeadely w/o closing the module or later after reloading the planning project.
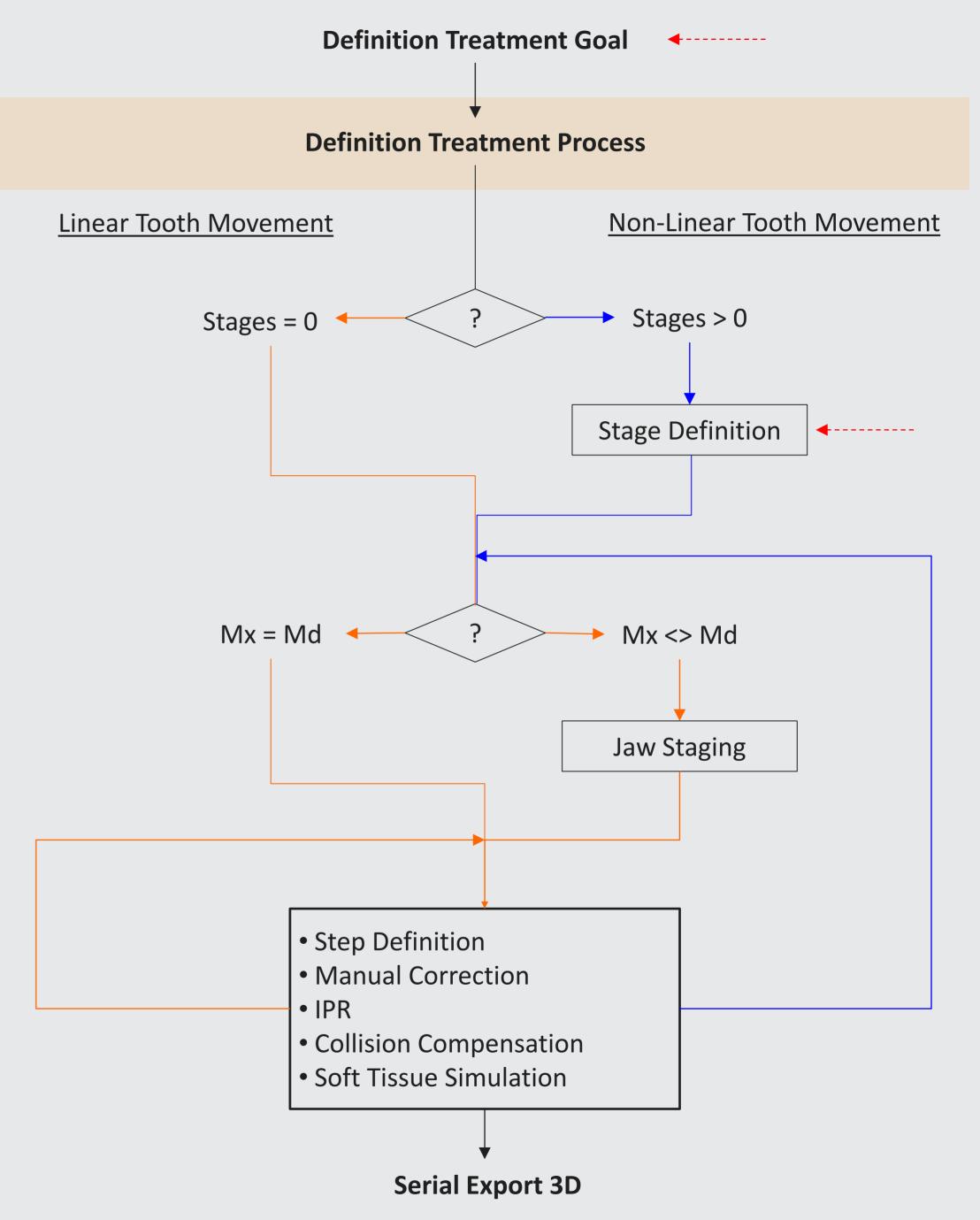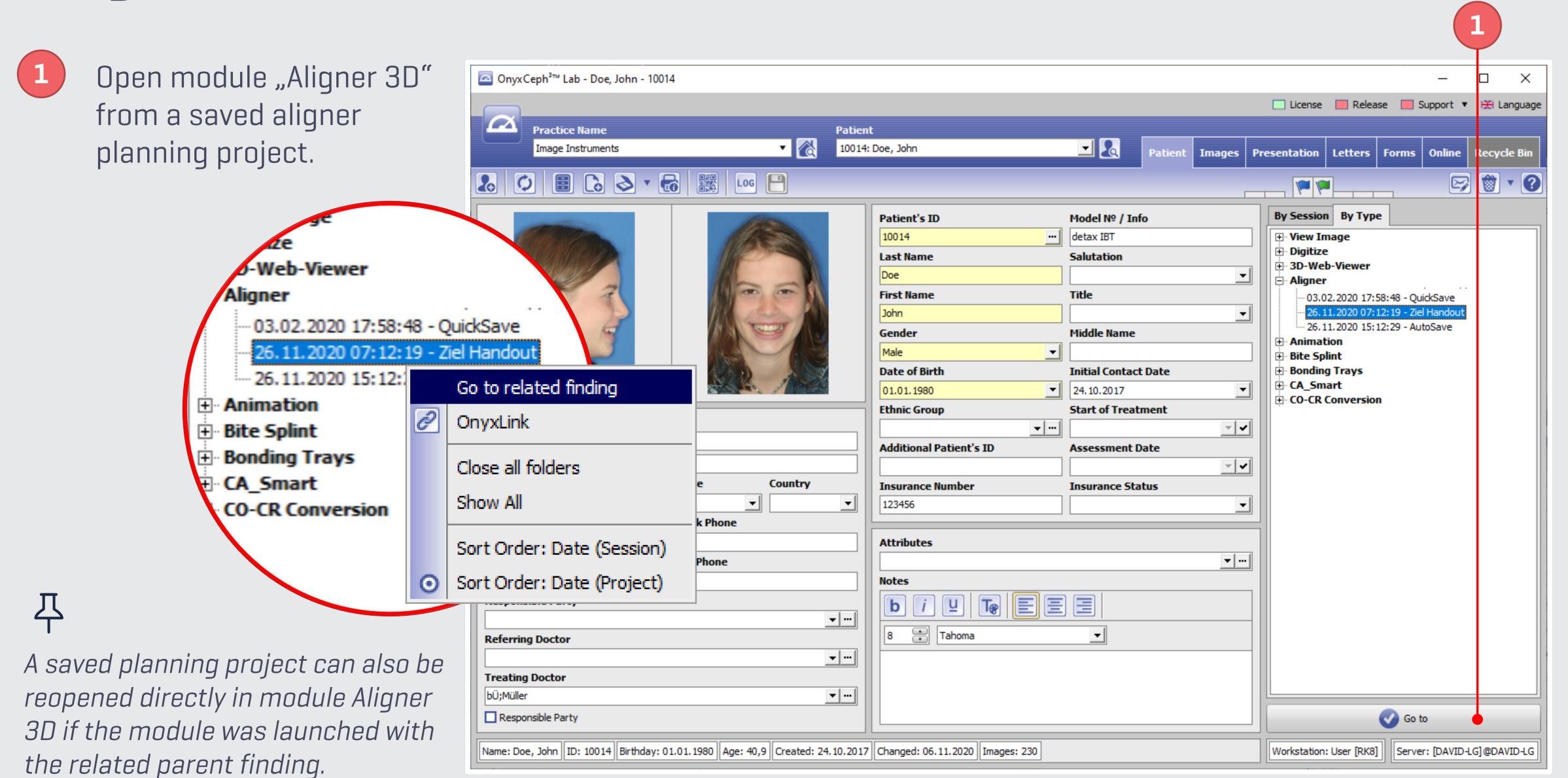
Aligner 3D > Step Planning

The main purpose of module Aligner 3D is to define intermediate treatment goals (stages) and their subdivision into sub-steps in order to achieve a treatment goal which was set up in the Aligner 3D module before or was taken over from module V.T.O.3D. This can be done in accordance with the usual procedure for aligner treatments, while each user can follow up his individual treatment strategy.

The responsibility for the medically correct use of the software for case planning purposes lies with the treating doctor.

In this handout, only some basic tools provided by the module are explained. A detailed description of the Aligner planning workflow can be found in the Quick Reference Guide Modul Aligner 3D which can be requested for download on product website www.onyxceph.com by licensees.

Definition Treatment Goal

Definition Treatment Process

Linear Tooth Movement   Non-Linear Tooth Movement

Stages = 0   ?   Stages > 0

Stage Definition

Mx = Md   ?   Mx <> Md

Jaw Staging

- Step Definition
- Manual Correction
- IPR
- Collision Compensation
- Soft Tissue Simulation

Serial Export 3D

Aligner 3D > Reload Treatment Goal

1 Open module „Aligner 3D" from a saved aligner planning project.

A saved planning project can also be reopened directly in module Aligner 3D if the module was launched with the related parent finding.
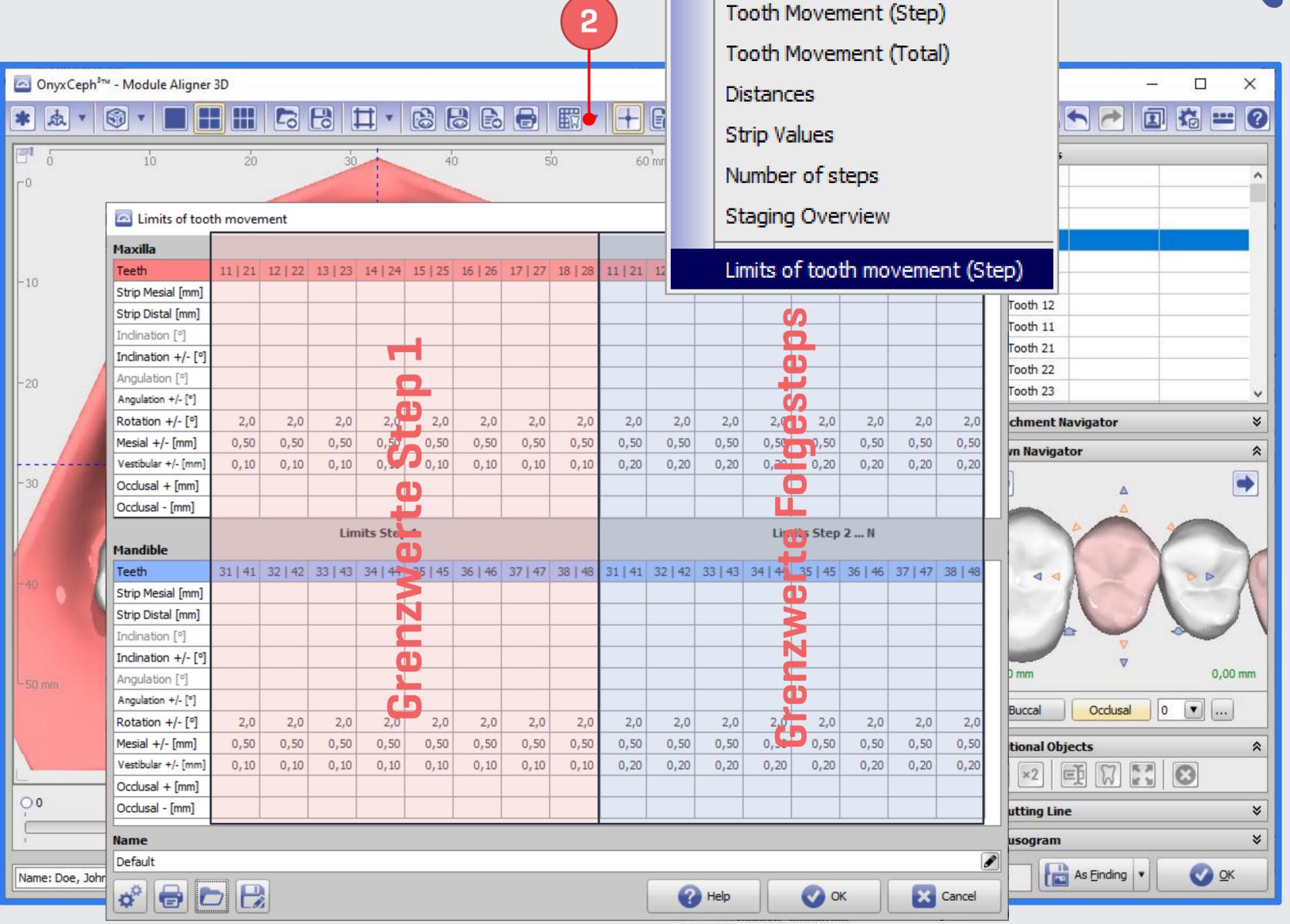
Aligner 3D > Define Movement Limits

2 The limits for tooth movement components per step jaws can be pre-defined for both jaws by templates [separately for step1 and subsequent steps].

📌
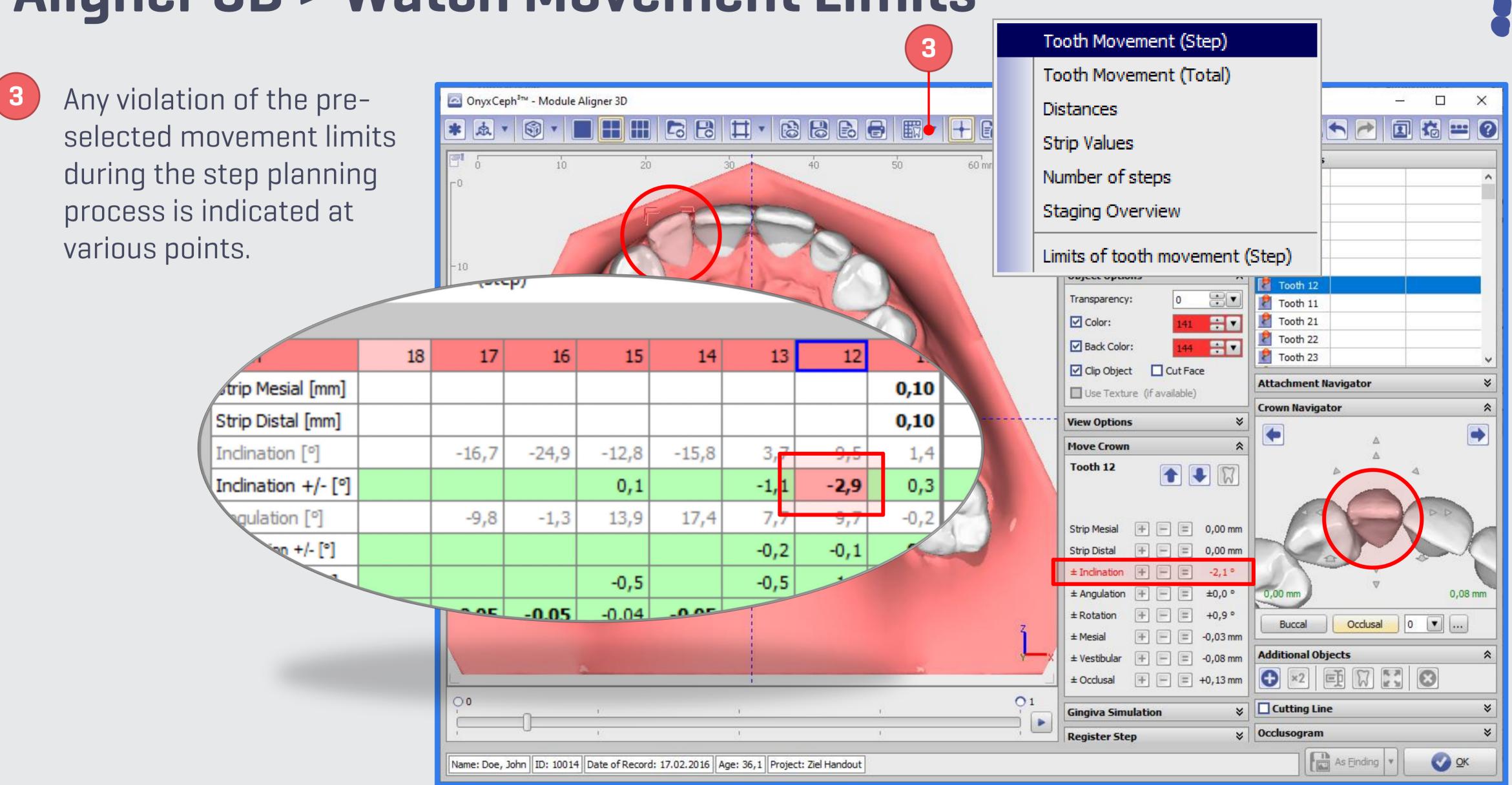
The standard template table is initially empty. The user is responsible for specifying the values, taking into account the specific circumstances.

We recommend monitoring only significant movement components using limit values.
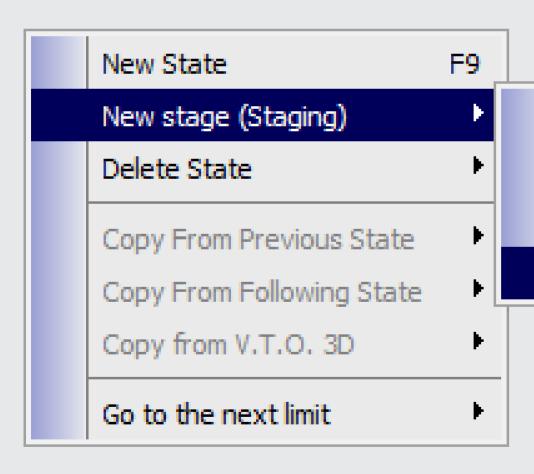
Aligner 3D > Watch Movement Limits

3 Any violation of the pre-selected movement limits during the step planning process is indicated at various points.

Aligner 3D > Staging

4 If the planned total tooth movement cannot be achieved by subdivision in linear steps, stages (intermediate Tx goals) should be introduced.
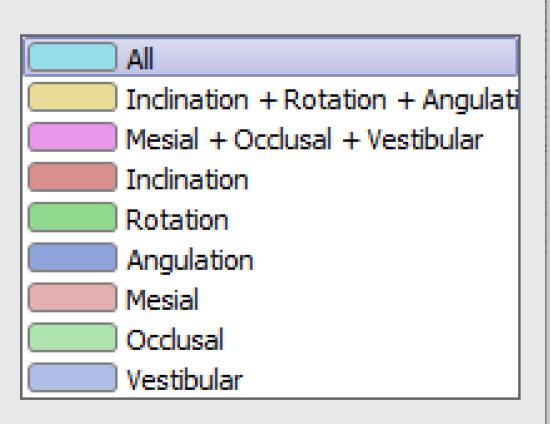
Staging can be required e.g. for distal molar movements or for over corrections.

Aligner 3D > Staging
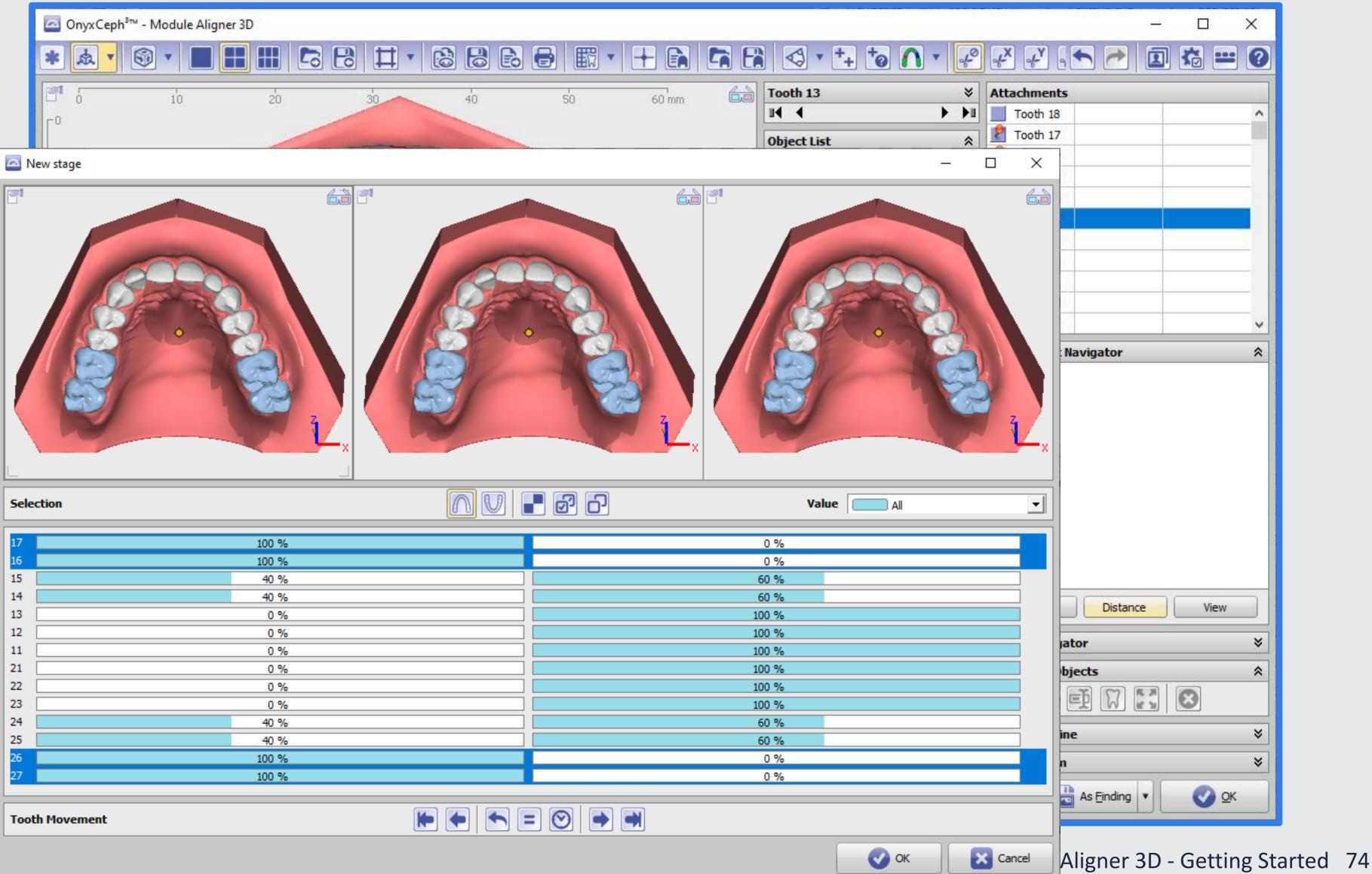
4 In the staging window, for each crown the amount of total movement between neighbouring steps can be defined –
also separately for single movement components.

Aligner 3D > Evaluate Step Numbers

5 The total number of linear steps needed for each stage is assessed by the selected movement limits and can be displayed via table menu.

Menu options:
- Tooth Movement (Step)
- Tooth Movement (Total)
- Distances
- Strip Values
- **Number of steps**
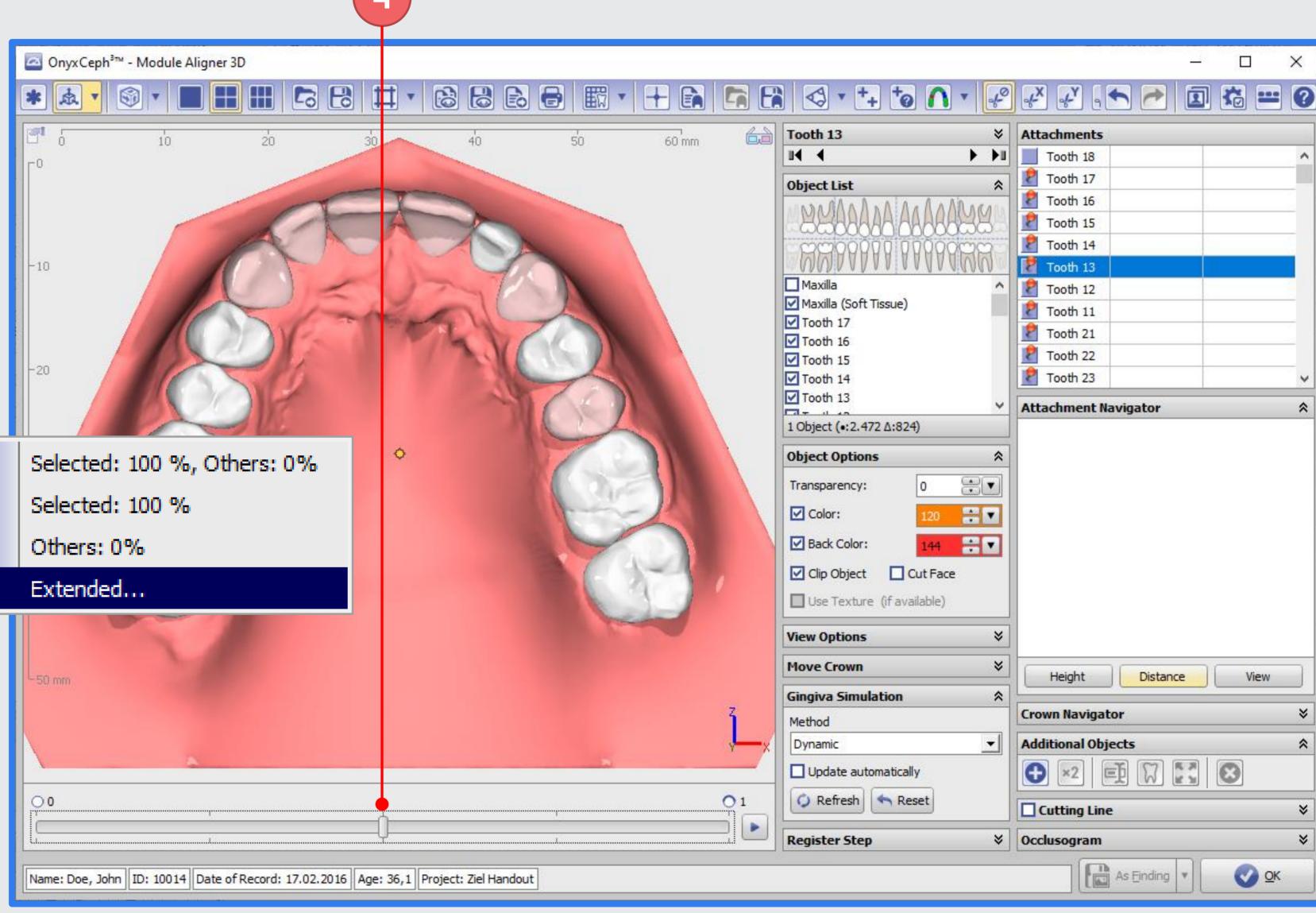- Staging Overview
- Limits of tooth movement (Step)

Protocol Number of steps

Maxilla

Tooth	17	16	15	14	13	12	26	27	Maximum
Step 0 - Relatively -	0,6	0,6	0,8	0,3			0,6	0,6	**2,3**
	Mesial	Mesial	Rotation	Mesial			Mesial	Mesial	
Total	0,6	0,6	0,8	0,3			0,6	0,6	**2,3**
	Mesial	Mesial	Rotation	Mesial			Mesial	Mesial	

Mandible

Tooth	47	46	45	44	43	42	36	37	Maximum
Step 0 - Relatively -	2,4	**2,5**	1,0	1,2	0,4	1,1	2,1	2,0	**2,5**
	Mesial	**Mesial**	Mesial	Vestibular	Mesial	Vestibular	Mesial	Mesial	
Total	2,4	**2,5**	1,0	1,2	0,4	1,1	2,1	2,0	**2,5**
	Mesial	**Mesial**	Mesial	Vestibular	Mesial	Vestibular	Mesial	Mesial	

Close

Maxilla
Maxilla (Soft Tissue)
Tooth 17
Tooth 16
Tooth 15
Tooth 14
Tooth 13
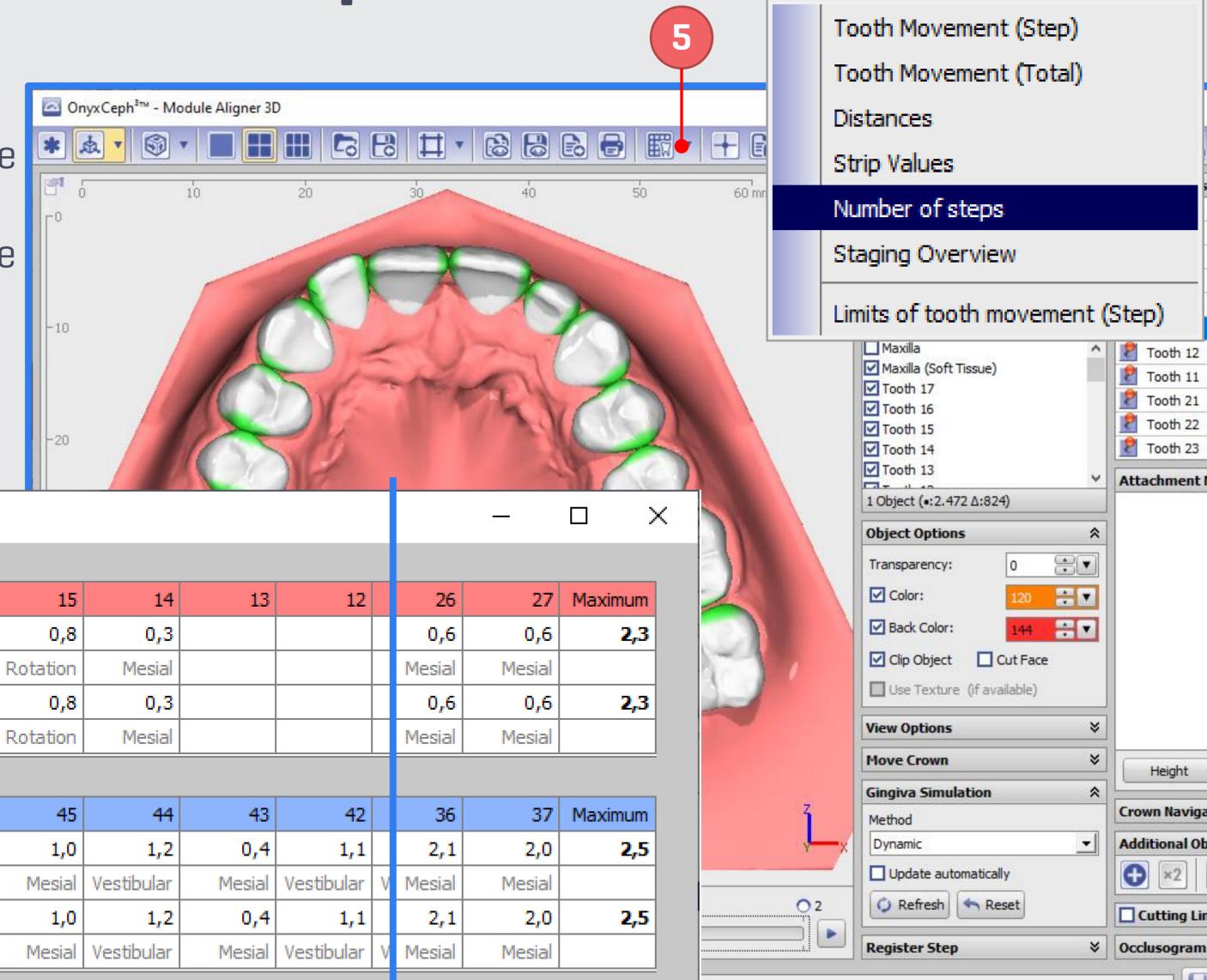
Tooth 12
Tooth 11
Tooth 21
Tooth 22
Tooth 23

1 Object (•:2.472 Δ:824)

Object Options
Transparency: 0
☑ Color: 120
☑ Back Color: 144
☑ Clip Object   ☐ Cut Face
☐ Use Texture (if available)

View Options
Move Crown
Gingiva Simulation
Method
Dynamic
☐ Update automatically
Refresh   Reset

Register Step

Attachment Navigator

Height | Distance | View

Crown Navigator
Additional Objects
☐ Cutting Line
Occlusogram

As Finding   OK

Aligner 3D > Define Steps

6 Using the selected tooth movement limits, each stage can be subdivided into linear steps via time-line context menu.

Aligner 3D > Define Steps
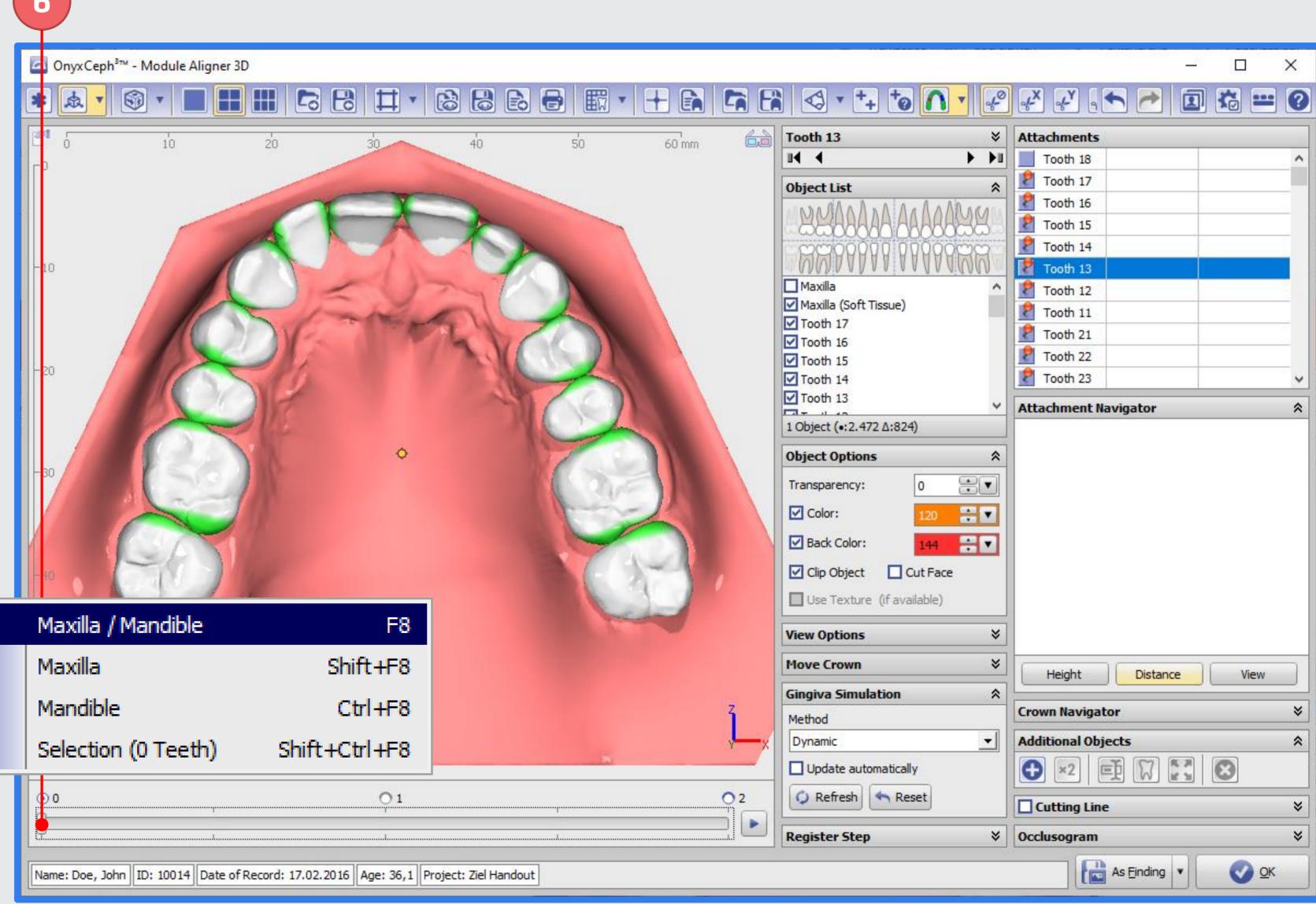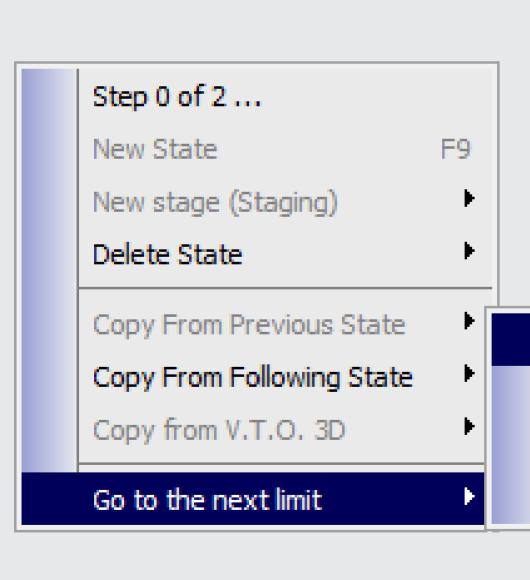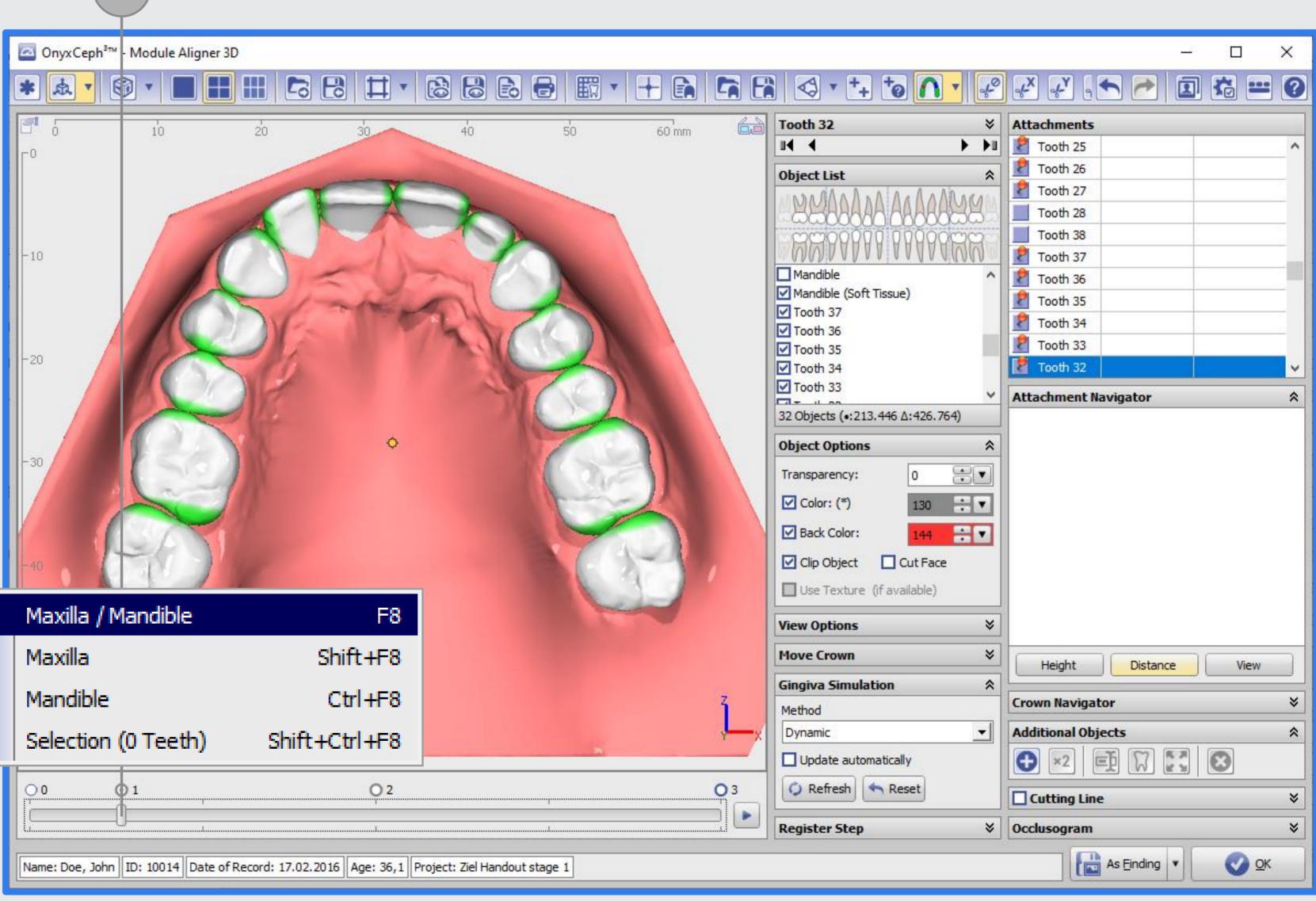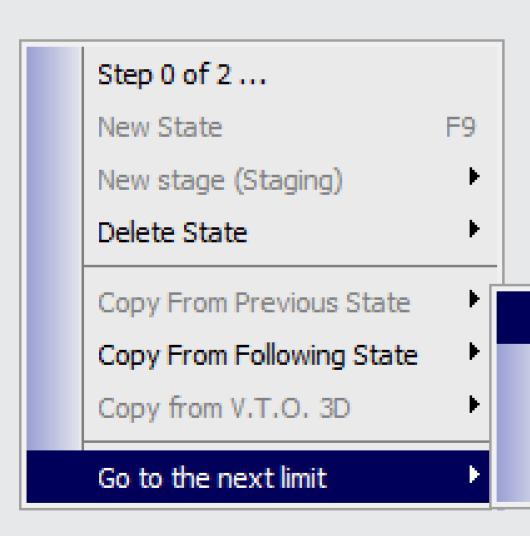
6 Using the selected tooth movement limits, each stage can be subdivided into linear steps via time-line context menu.

Aligner 3D > Define Steps
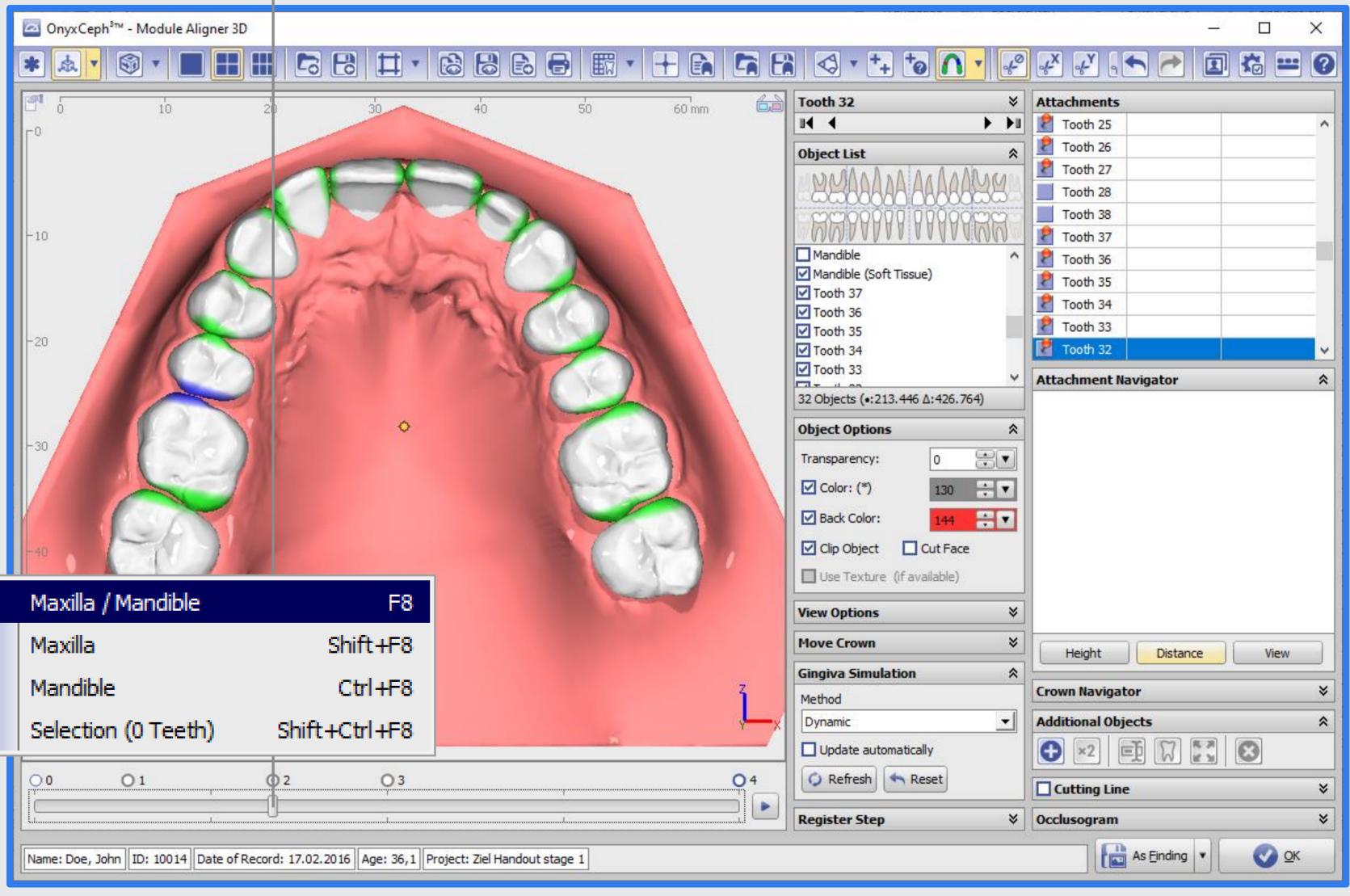
6 Using the selected tooth movement limits, each stage can be subdivided into linear steps via time-line context menu.

Aligner 3D > Define Steps

6 Using the selected tooth movement limits, each stage can be subdivided into linear steps via time-line context menu.

Aligner 3D > Jaw Staging

7 If the number of calculated total steps per stage is significantly different for maxilla and mandible, the step sequence should be adjusted by Jaw Staging.
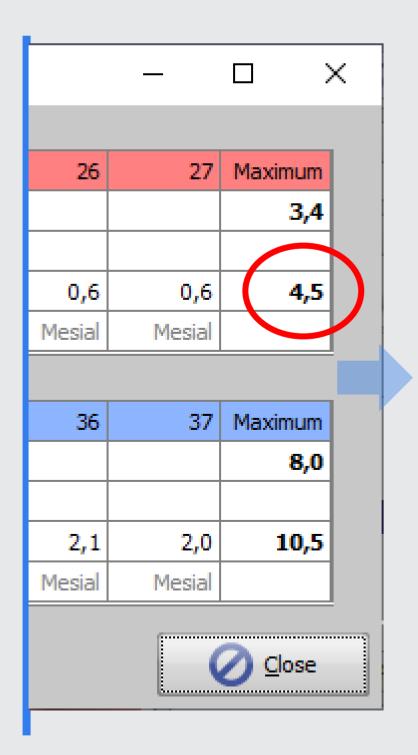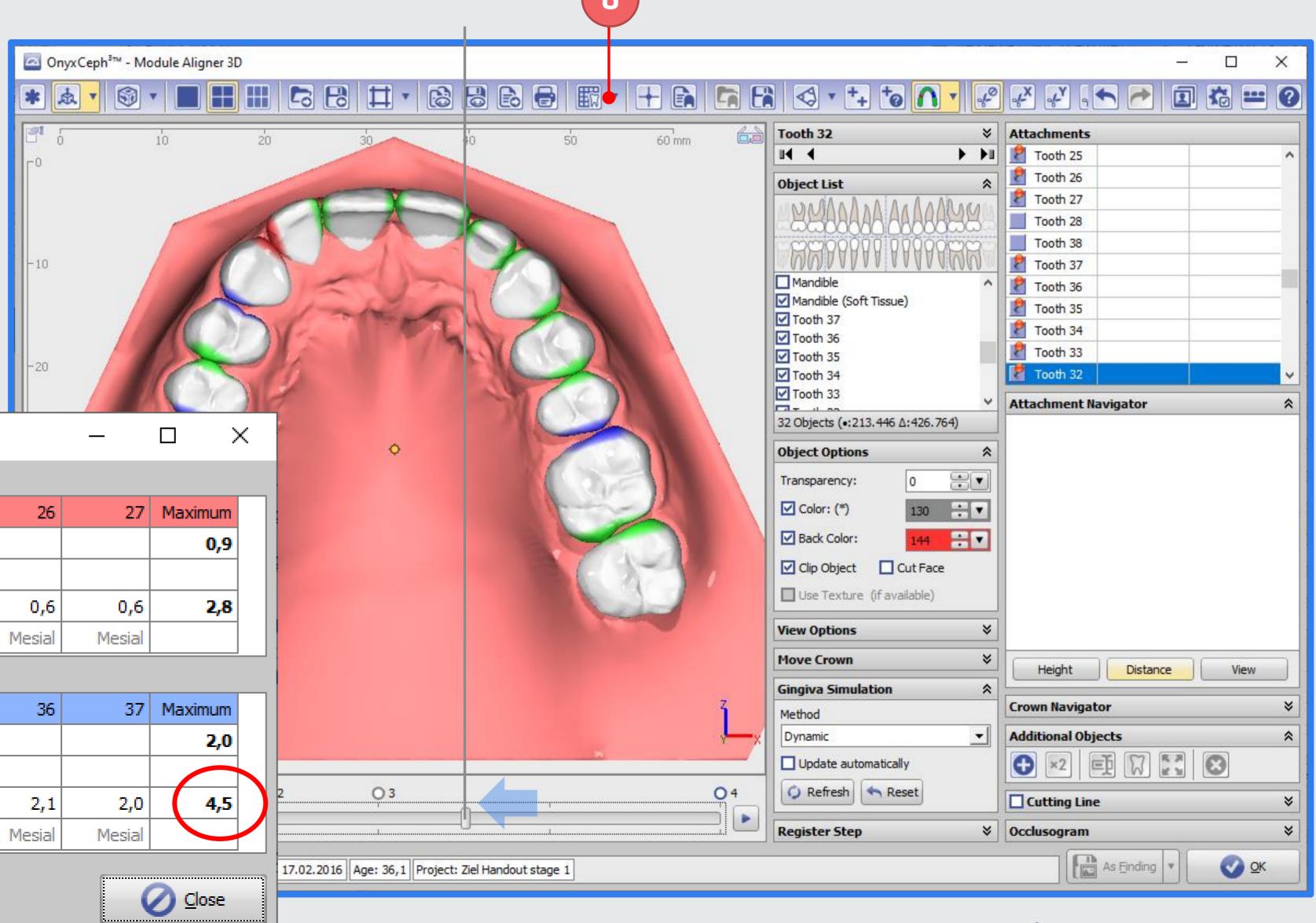
Aligner 3D > Jaw Staging

8 Move the slider to the time-line position where the [Mandible]* shows the number of total steps for the opposite jaw.
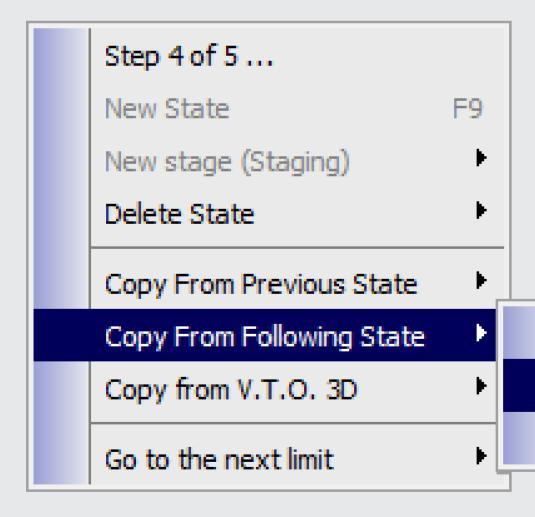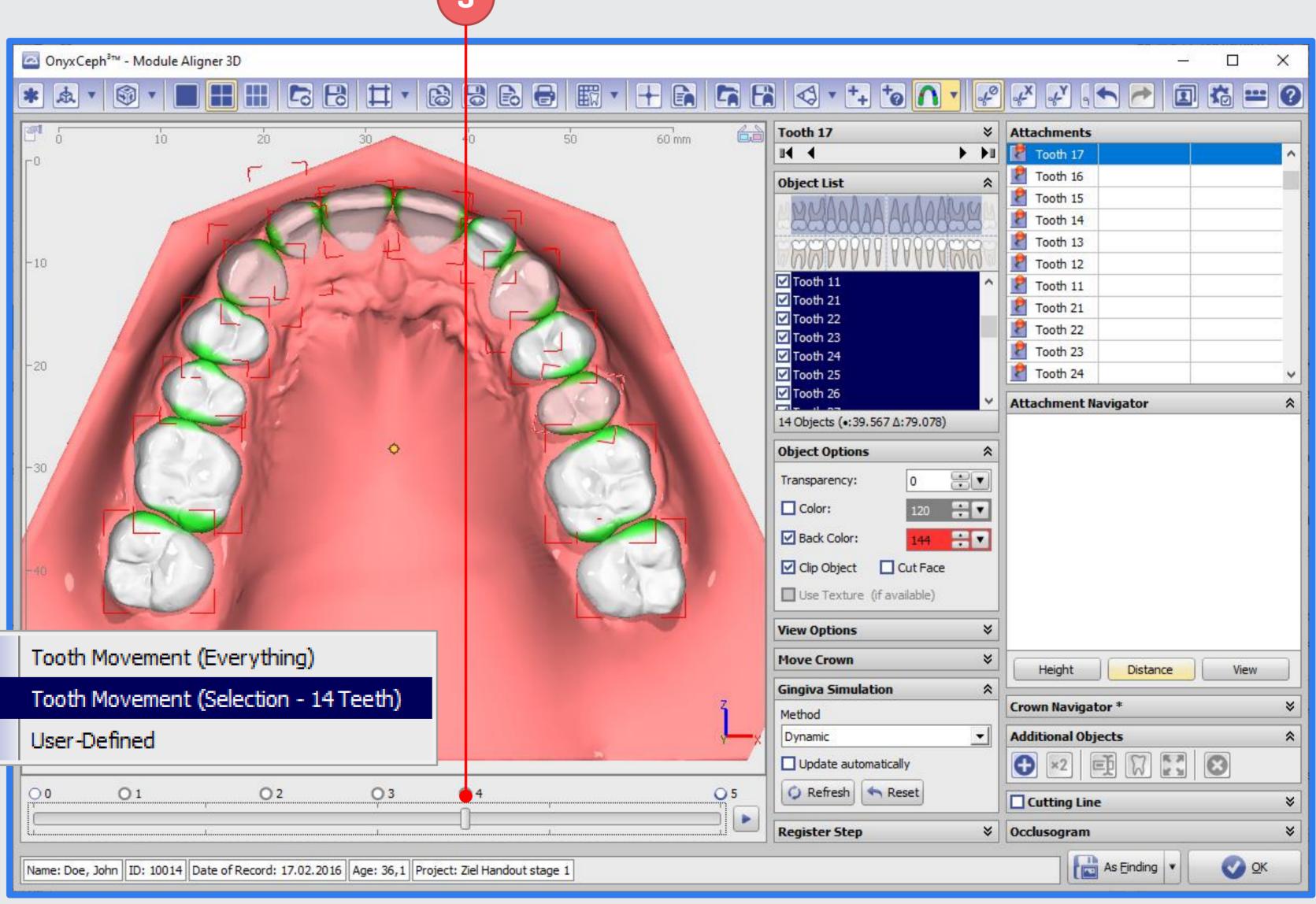
* resp. the jaw that has the larger movement need

Aligner 3D > Jaw Staging

9 Copy movement of all crowns of the [Maxilla]* from the following state to this timeline position.

*resp. the jaw that has the lower movement need

Aligner 3D > Define Steps

10 Thereafter, subdivide both Stages* again by using the preset movement limits into linear steps via time-line context menu.

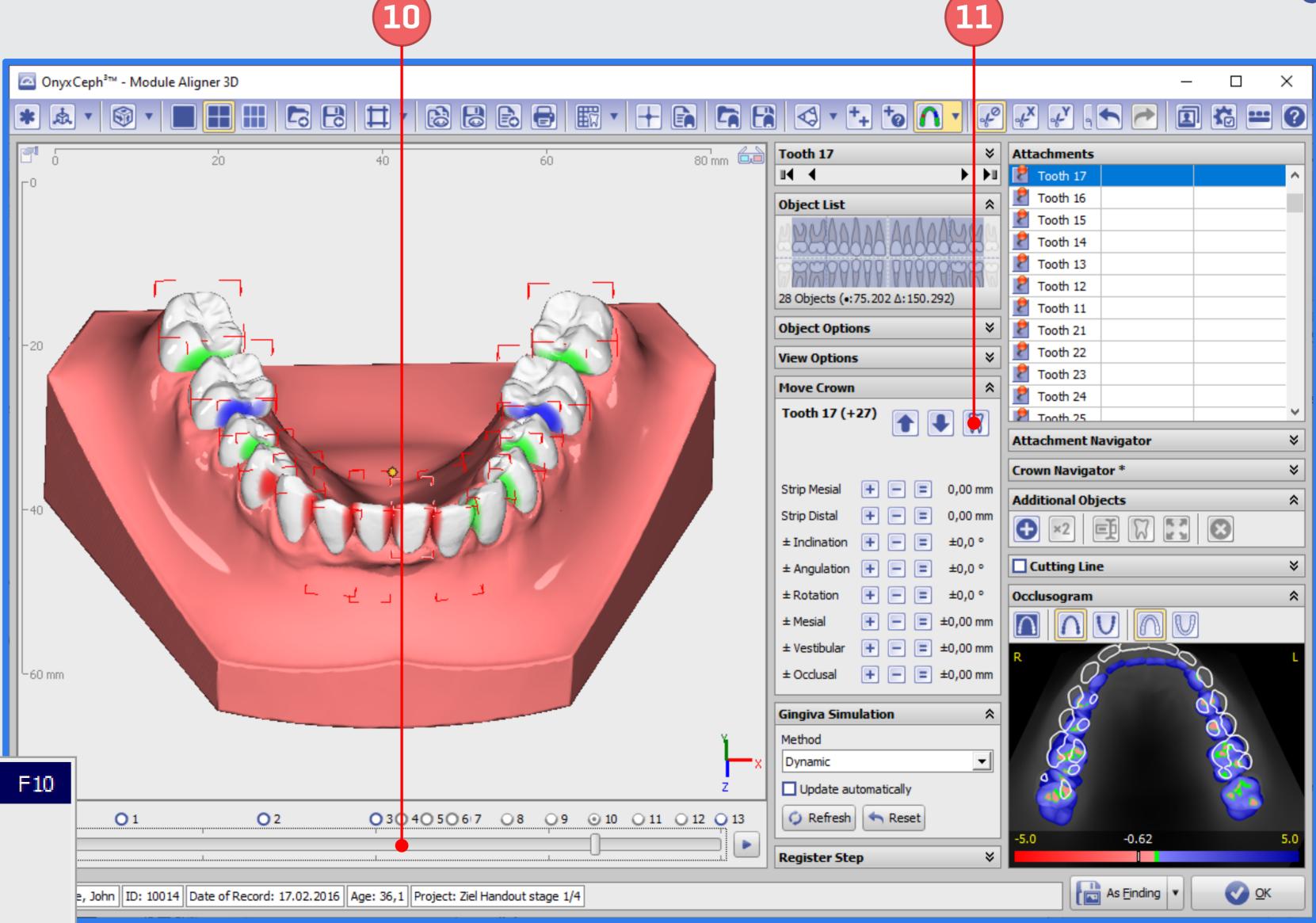**11** If needed, for each step, compensate collisions.

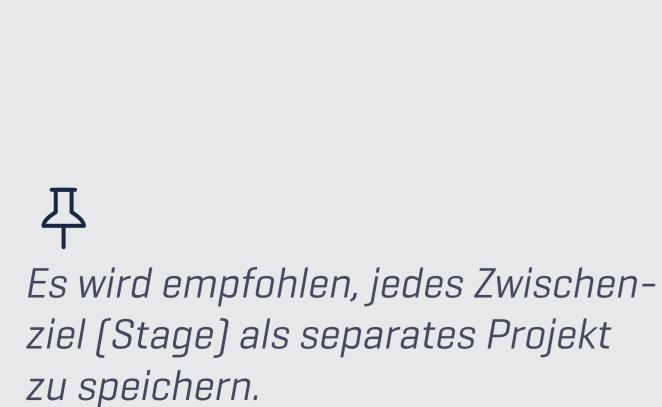*In the 1st jaw stage, the crowns of both jaws are moving while in the 2nd stage, only the [mandible] will move.
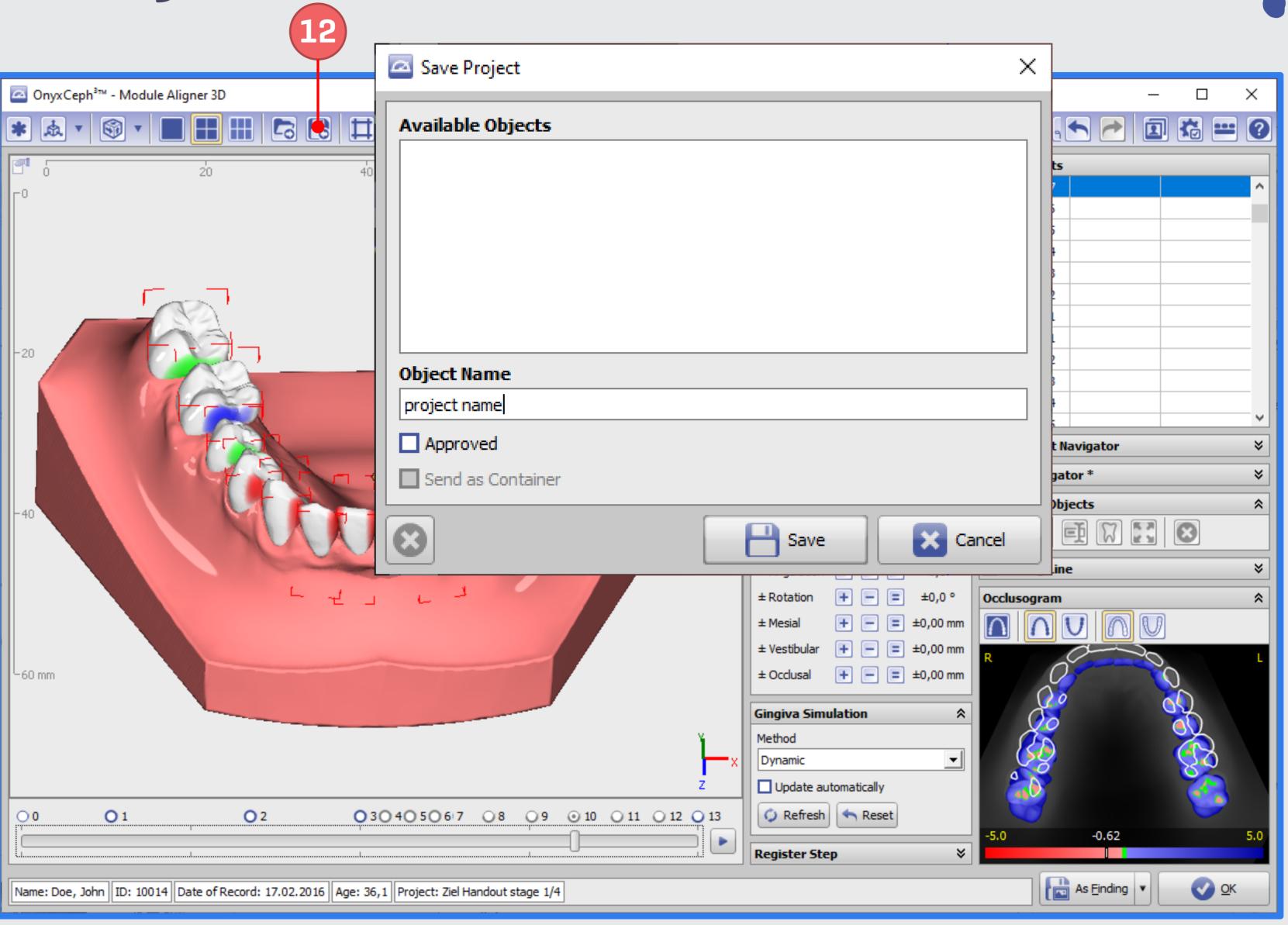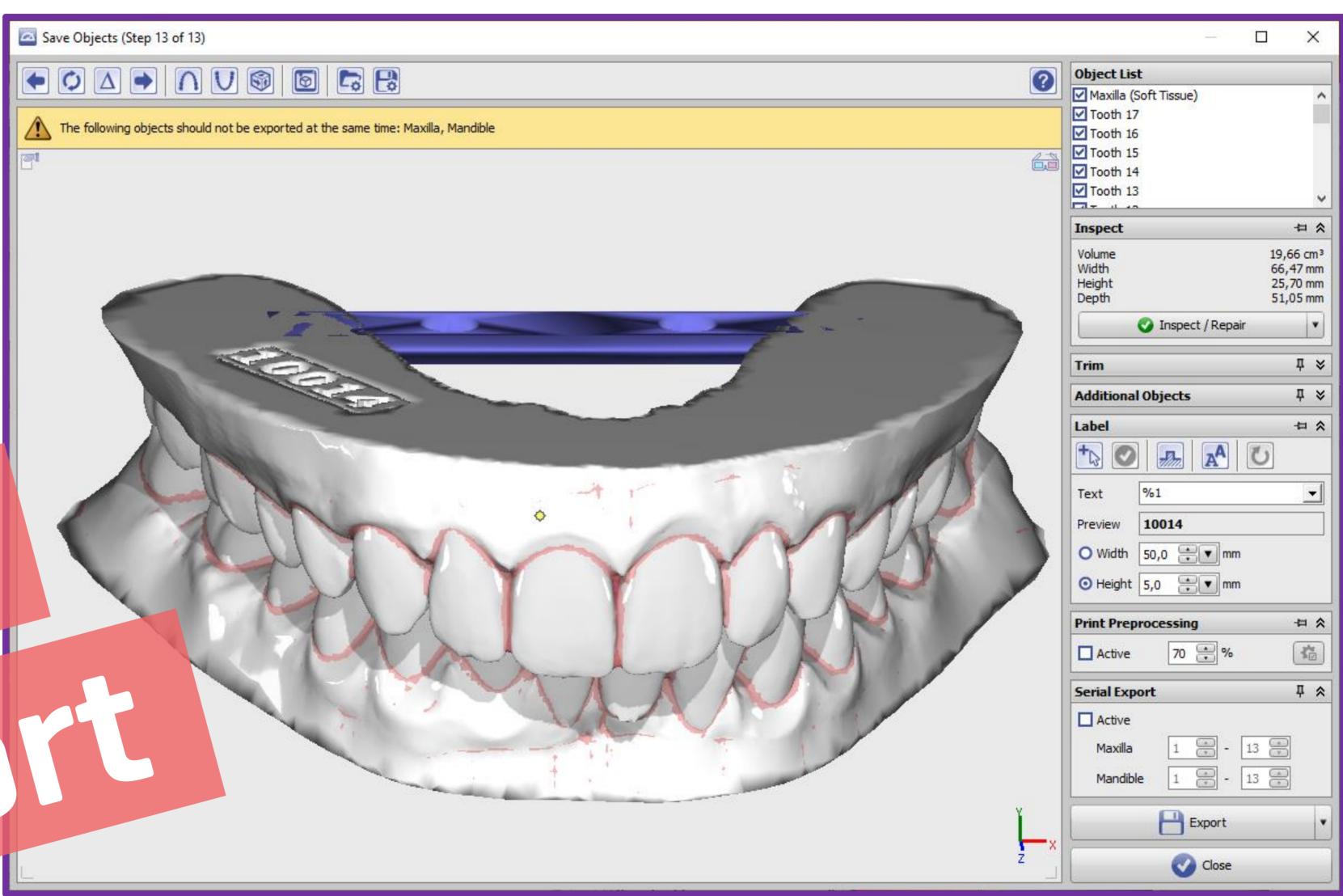
Aligner 3D > Save Project

12 Save completed step planning as project*

*Note:
Projects are always saved together with the „parent finding" which was used to open the module – not with a "child finding" saved by button [As Finding]
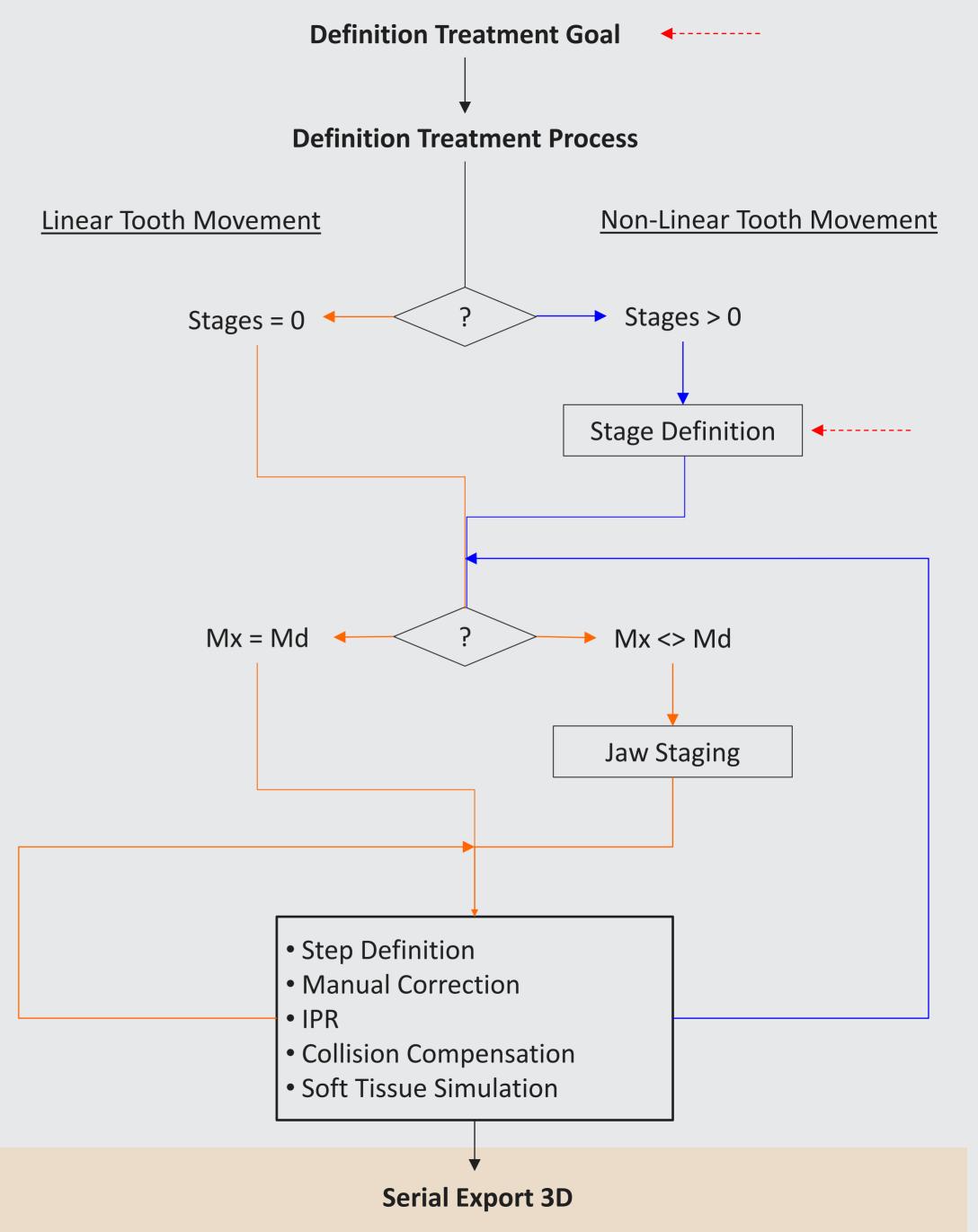
Es wird empfohlen, jedes Zwischen-ziel [Stage] als separates Projekt zu speichern.

Aligner 3D > Serial Export

The main purpose of module Aligner 3D is to define intermediate treatment goals (stages) and their subdivision into sub-steps in order to achieve a treatment goal which was set up in the Aligner 3D module before or was taken over from module V.T.O.3D. This can be done in accordance with the usual procedure for aligner treatments, while each user can follow up his individual treatment strategy.

The responsibility for the medically correct use of the software for case planning purposes lies with the treating doctor.

In this handout, only some basic tools provided by the module are explained. A detailed description of the Aligner planning workflow can be found in the Quick Reference Guide Modul Aligner 3D which can be requested for download on product website www.onyxceph.com by licensees.

Definition Treatment Goal

Definition Treatment Process

Linear Tooth Movement | Non-Linear Tooth Movement

Stages = 0 ← ? → Stages > 0

Stage Definition

Mx = Md ← ? → Mx <> Md

Jaw Staging

- Step Definition
- Manual Correction
- IPR
- Collision Compensation
- Soft Tissue Simulation

Serial Export 3D

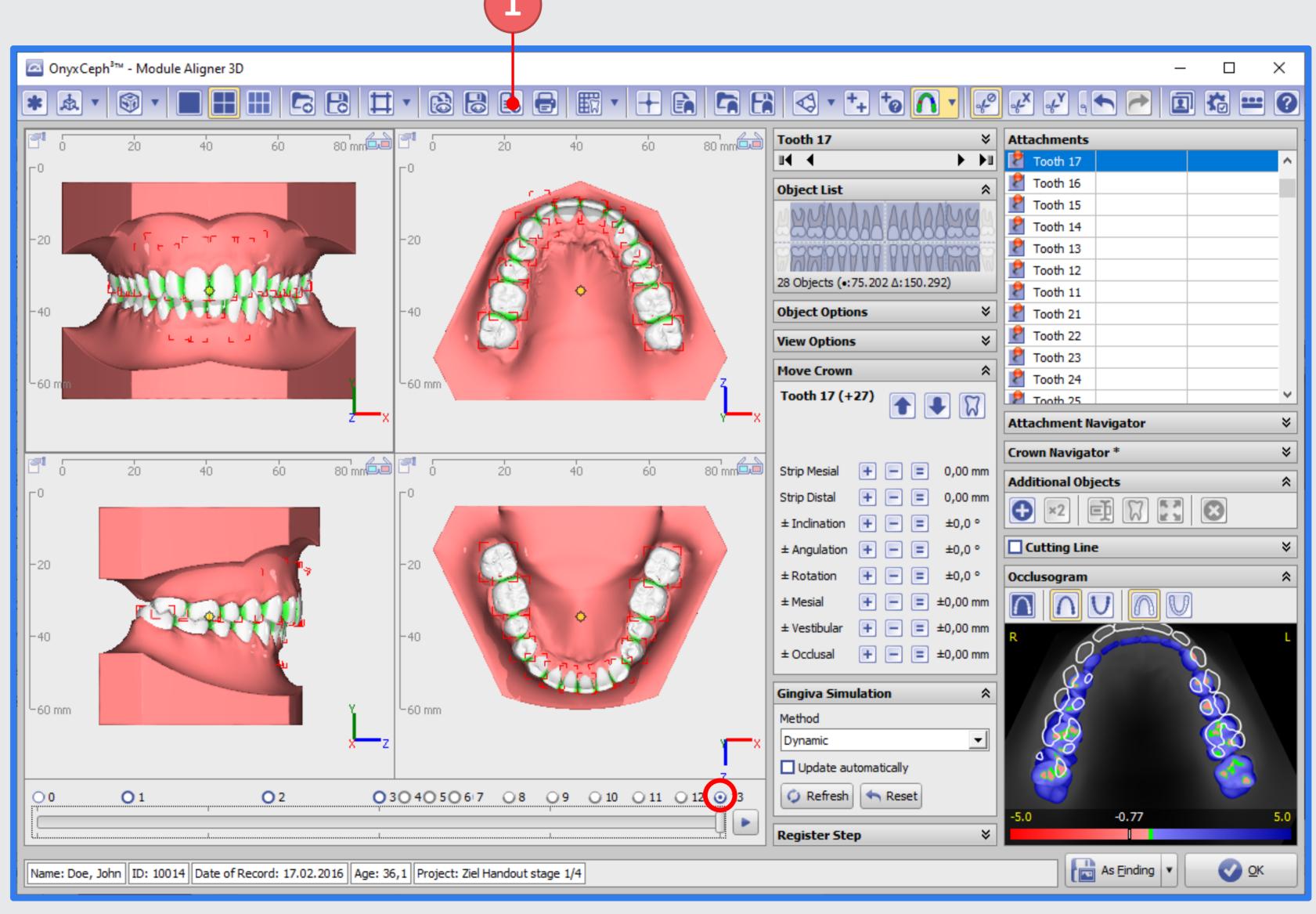# Aligner 3D > Open 3D-Export Window

1 Select [Save Objects] to open the 3D-Export window.

📌

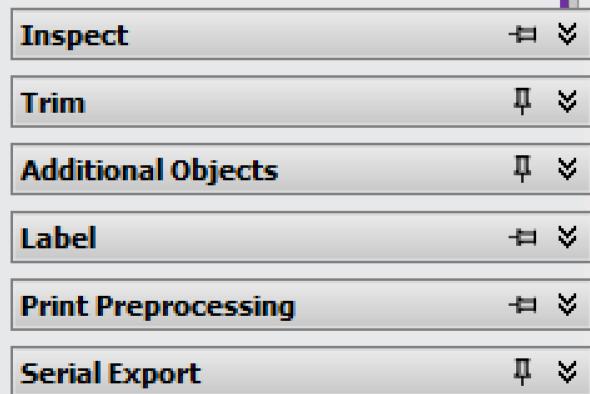*The serial export of aligner arches is only possible if directly launched in module Aligner 3D.*
It is recommneded to set the timeline slider to the goal position before opening the export window.
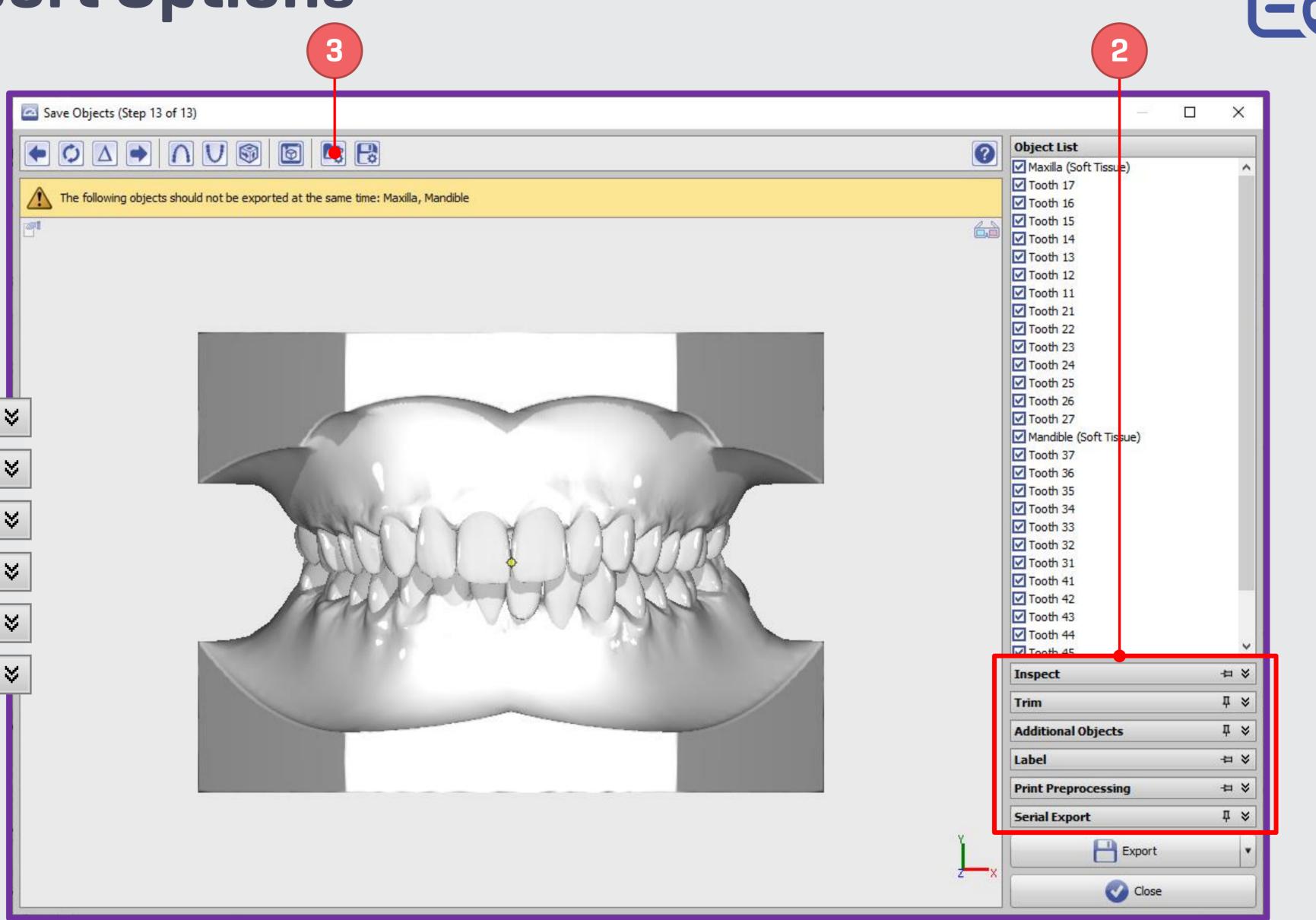
Aligner 3D > Export Options

2 Select and apply export options.
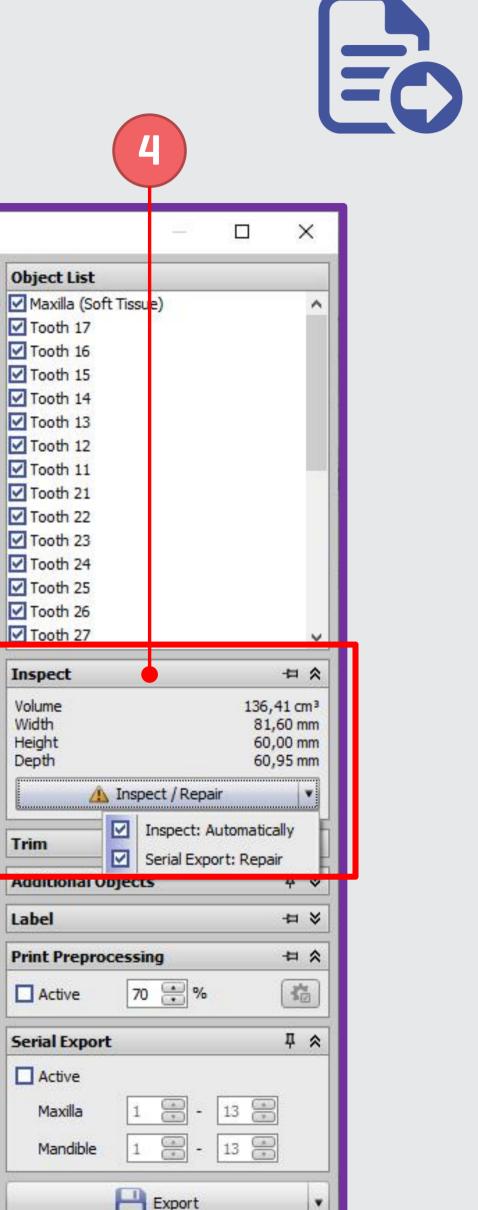
3 Alternatively: Reload saved export settings.

All export options defined here will be applied to all steps accordingly in case serial export is activated.
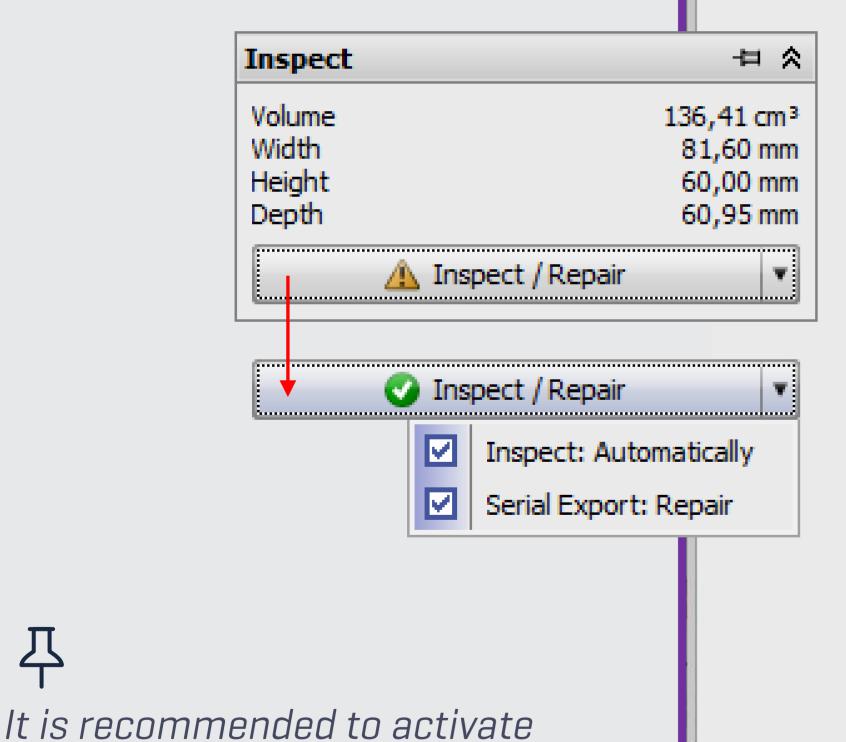
Aligner 3D > Panel Inspect

4 Panel <u>Inspect</u>:
Find and repair mesh defects.

It is recommended to activate options [Inspect: Automatically] and [Serial Export: Repair].

Aligner 3D > Panel Trim
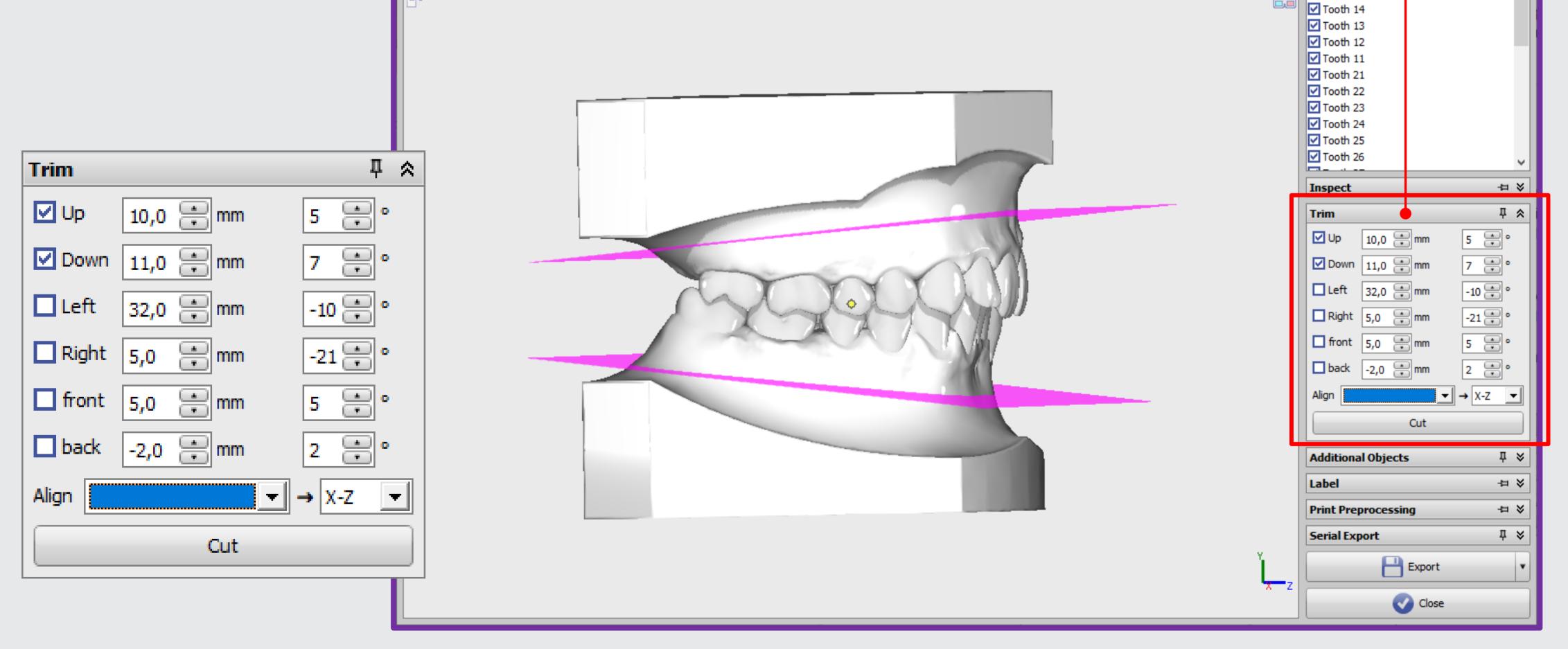
5 Panel Trim:
Trim arch and set export orientation.

Aligner 3D > Panel Trim
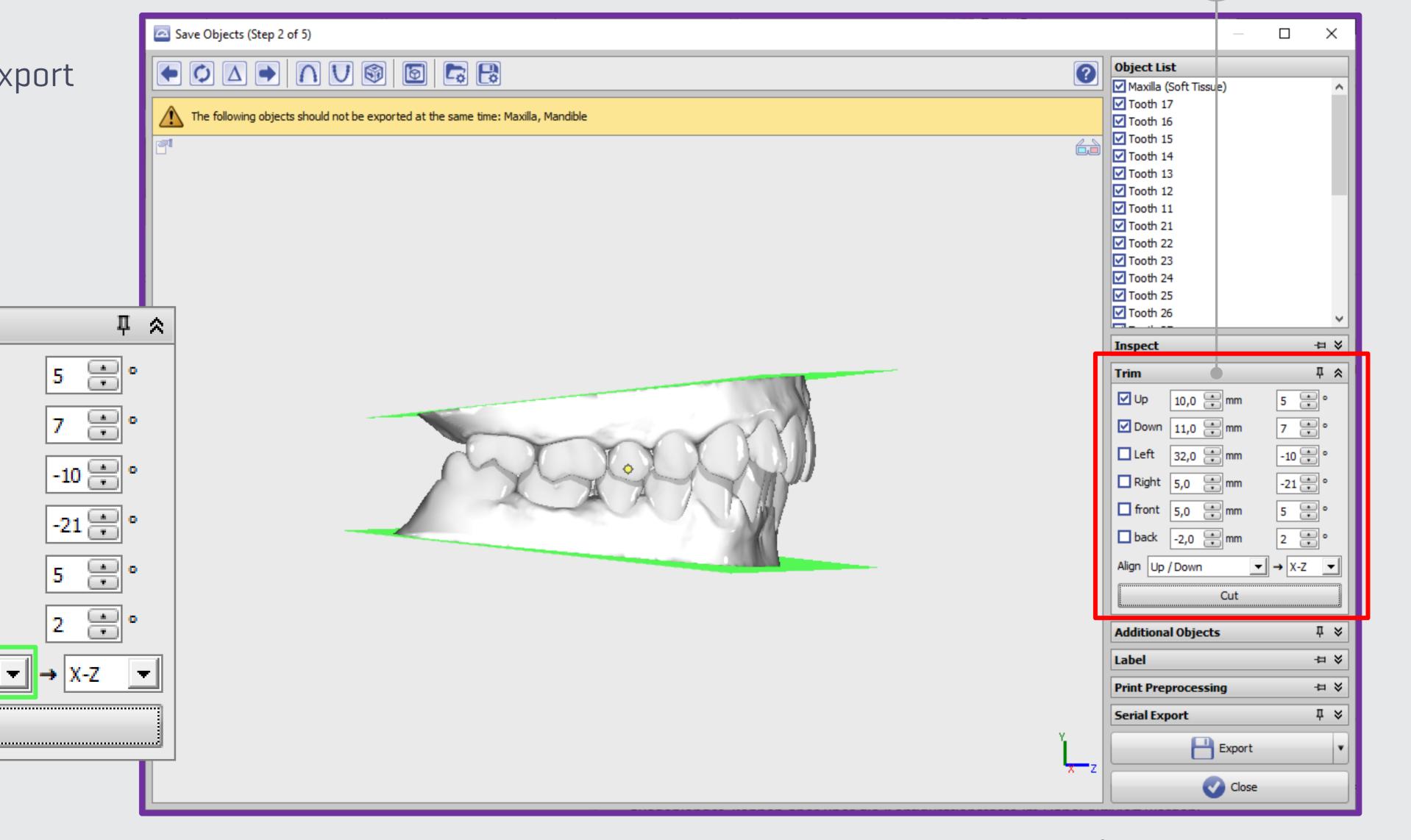
5 Panel <u>Trim</u>:
Trim arch and set export orientation.

Aligner 3D > Option Additional Objects
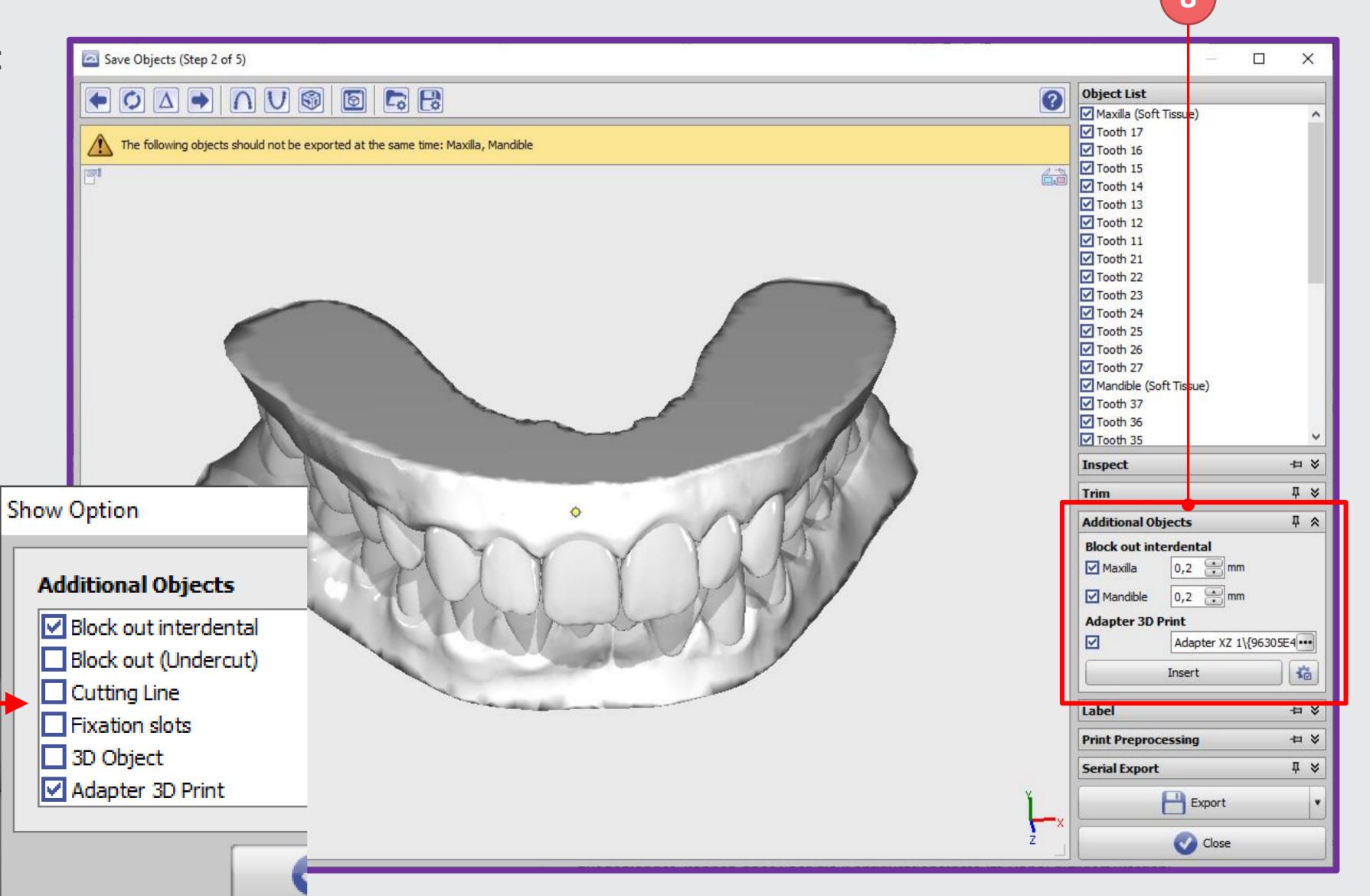
6 Panel <u>Additional Objects</u>: Select options for Additional Objects and define parameters.

Aligner 3D > Option Additional Objects

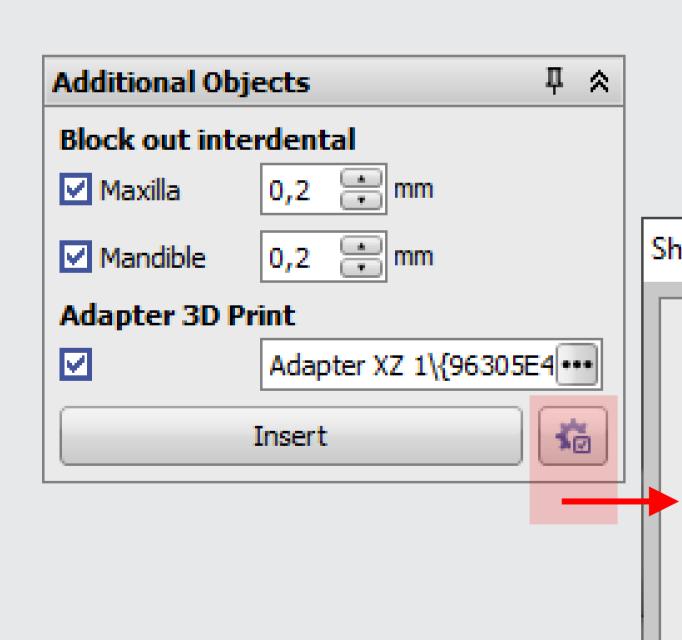**6** Panel <u>Additional Objects</u>: Select options for Additional Objects and define parameters.

Aligner 3D > Panel Label

7 Panel <u>Label</u>:
Define, place and apply labels or space holders[1]

1] <u>Space holders:</u>

%1 → Patient-ID
%2 → Name
%3 → Surname
%4 → DoB - format YYYYMMDD
%5 → Gender
%A → Cast number
%D → Social insurance number
%S → Step number
%X → Time stamp YYYYMMDDHHMMSS

Aligner 3D > Panel Label

7   Panel <u>Label</u>:
Define, place and apply
labels or space holders[1]

[1] <u>Space holders:</u>

%1 → Patient-ID
%2 → Name
%3 → Surname
%4 → DoB - format YYYYMMDD
%5 → Gender
%A → Cast number
%D → Social insurance number
%S → Step number
%X → Time stamp YYYYMMDDHHMMSS

Aligner 3D > Options Print Preprocessing
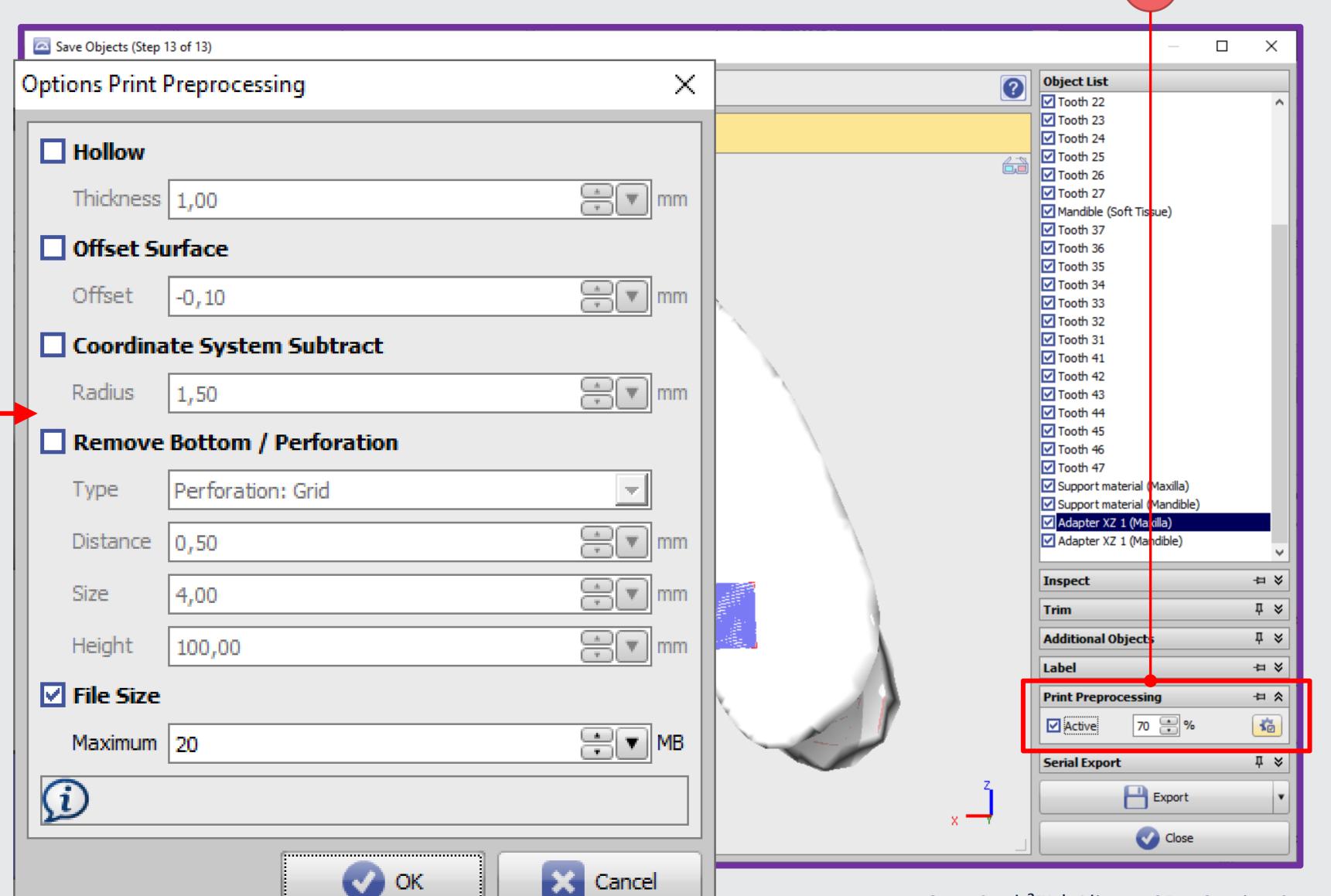
8 Panel <u>Print Preprocessing</u>:
Activate optionally and set
export options[1]

Print Preprocessing

☑ Active   70 %
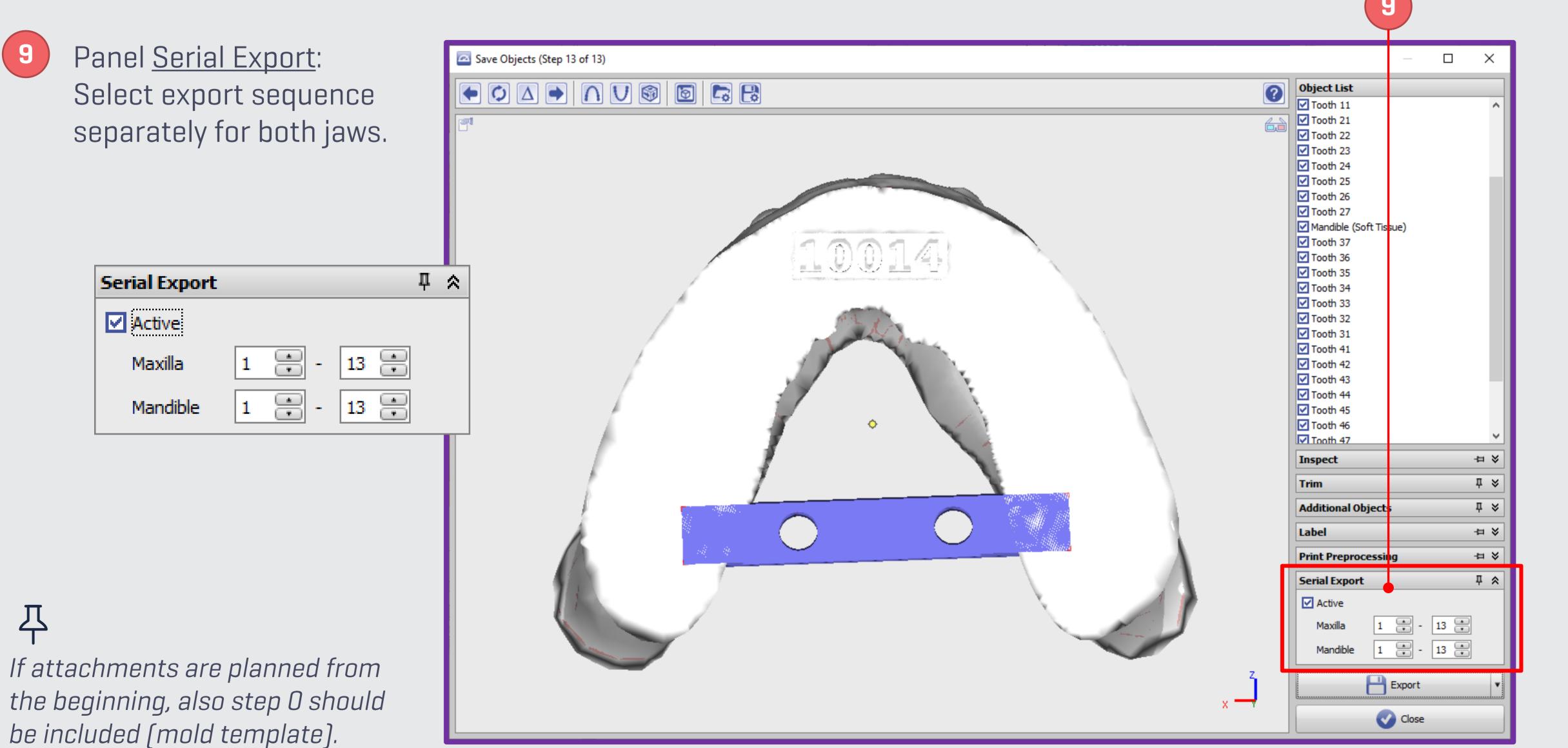
[1] <u>Export options</u>:

- Print Hollow
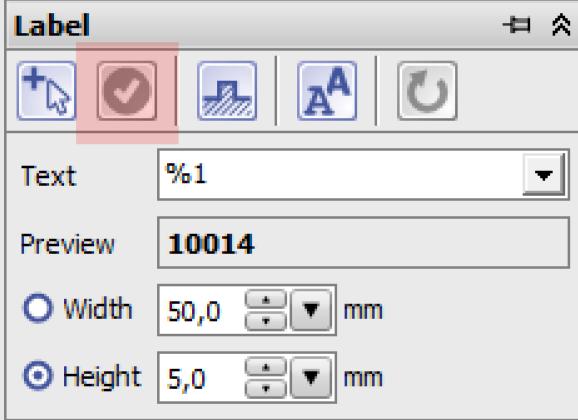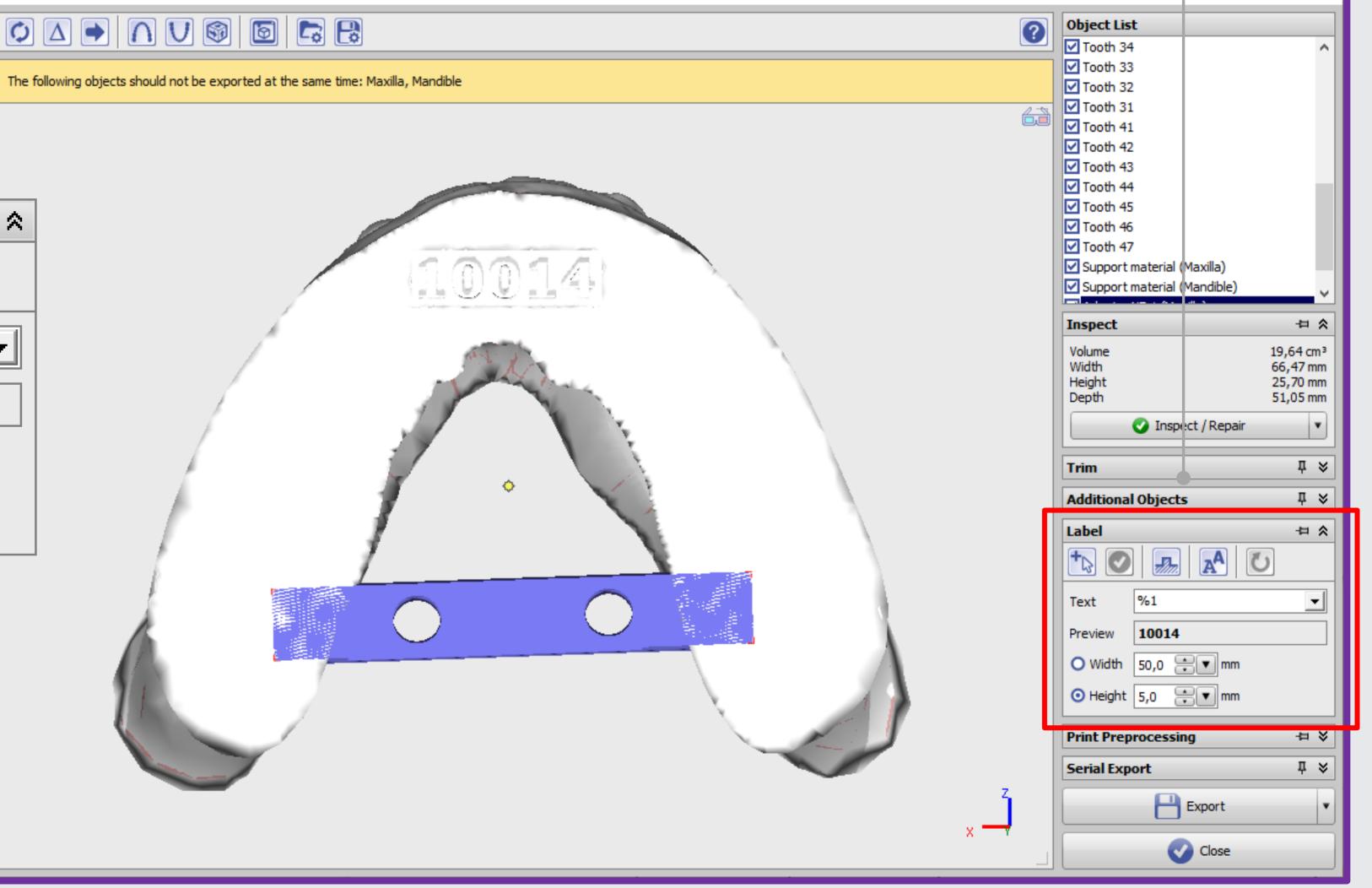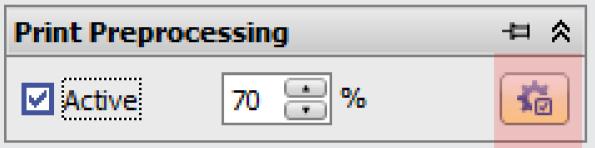- Offset Surface
- Coordinate System Subtract
- Remove Button / Perforation
- Maximum File Size

Save Objects (Step 13 of 13)

Options Print Preprocessing

☐ **Hollow**

Thickness   1,00   mm

☐ **Offset Surface**

Offset   -0,10   mm

☐ **Coordinate System Subtract**

Radius   1,50   mm

☐ **Remove Bottom / Perforation**

Type   Perforation: Grid

Distance   0,50   mm

Size   4,00   mm

Height   100,00   mm

☑ **File Size**

Maximum   20   MB

OK   Cancel

Object List

☑ Tooth 22
☑ Tooth 23
☑ Tooth 24
☑ Tooth 25
☑ Tooth 26
☑ Tooth 27
☑ Mandible (Soft Tissue)
☑ Tooth 37
☑ Tooth 36
☑ Tooth 35
☑ Tooth 34
☑ Tooth 33
☑ Tooth 32
☑ Tooth 31
☑ Tooth 41
☑ Tooth 42
☑ Tooth 43
☑ Tooth 44
☑ Tooth 45
☑ Tooth 46
☑ Tooth 47
☑ Support material (Maxilla)
☑ Support material (Mandible)
☑ Adapter XZ 1 (Maxilla)
☑ Adapter XZ 1 (Mandible)

Inspect
Trim
Additional Objects
Label

Print Preprocessing

☑ Active   70 %

Serial Export

Export

Close

Aligner 3D > Option Serial Export

9 Panel <u>Serial Export</u>:
Select export sequence
separately for both jaws.

*If attachments are planned from
the beginning, also step 0 should
be included (mold template).*

Aligner 3D > Export

10 Execute Export.

Export folder location and file name/s can be pre-defined in system options.

Export

Close

ph³™ | Aligner 3D - Getting Started 98
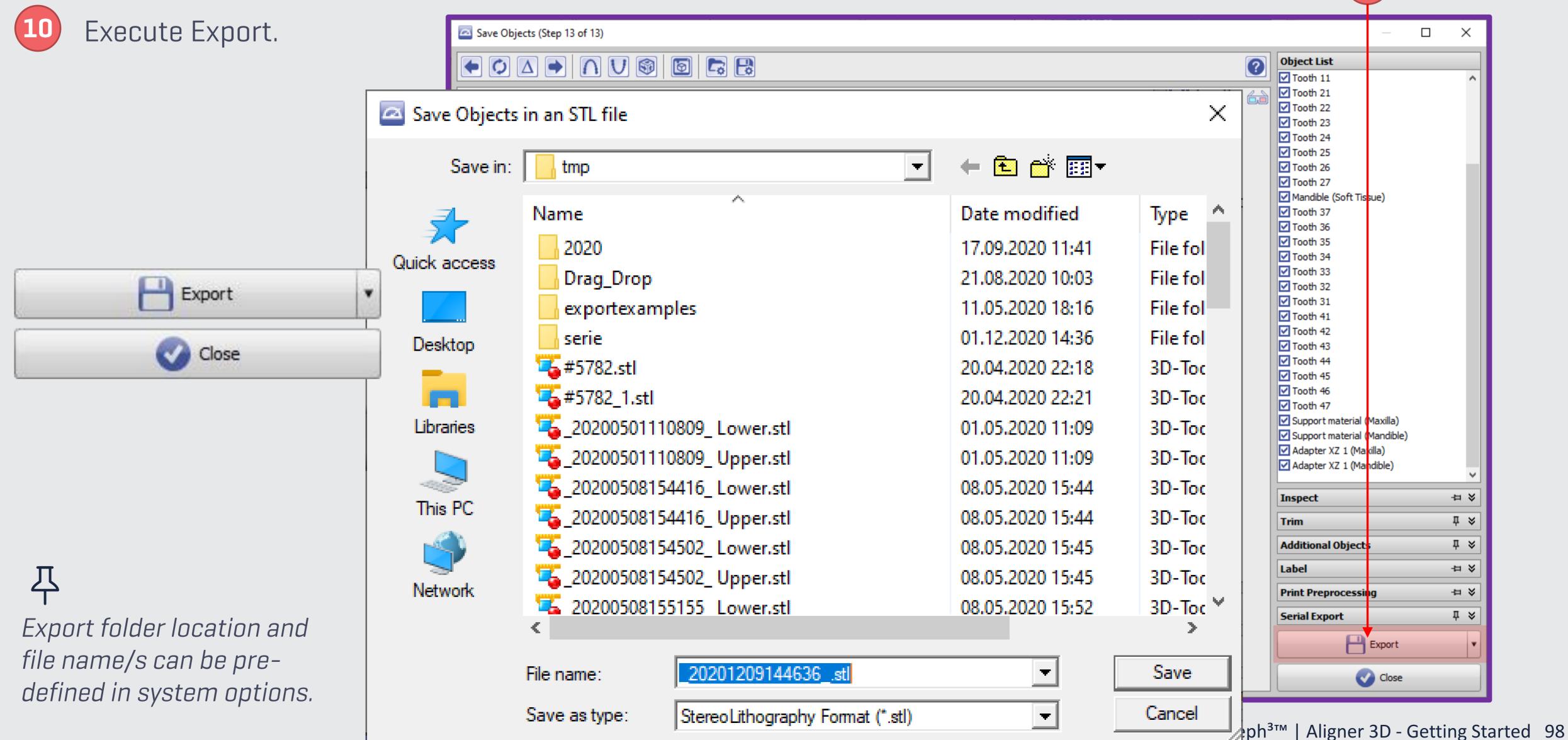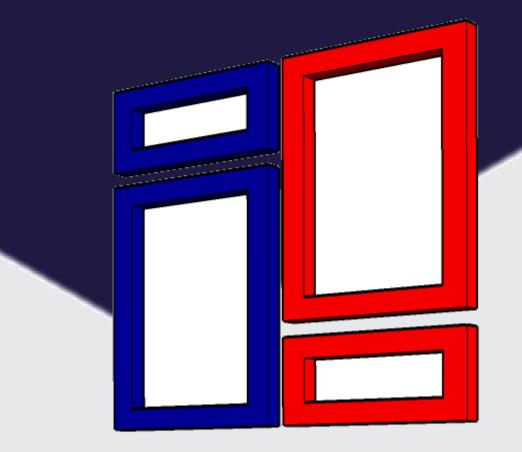
|OnyxCeph³™

Dental Imaging Software 2D|3D
Orthodontic Software

Additional Information

www.onyxceph.com

www.onyxwiki.net

Image Instruments GmbH
Niederwaldstraße 3
09123 Chemnitz
Germany

www.image-instruments.de
info@image-instruments.de
+49 (0) 371 9093 140