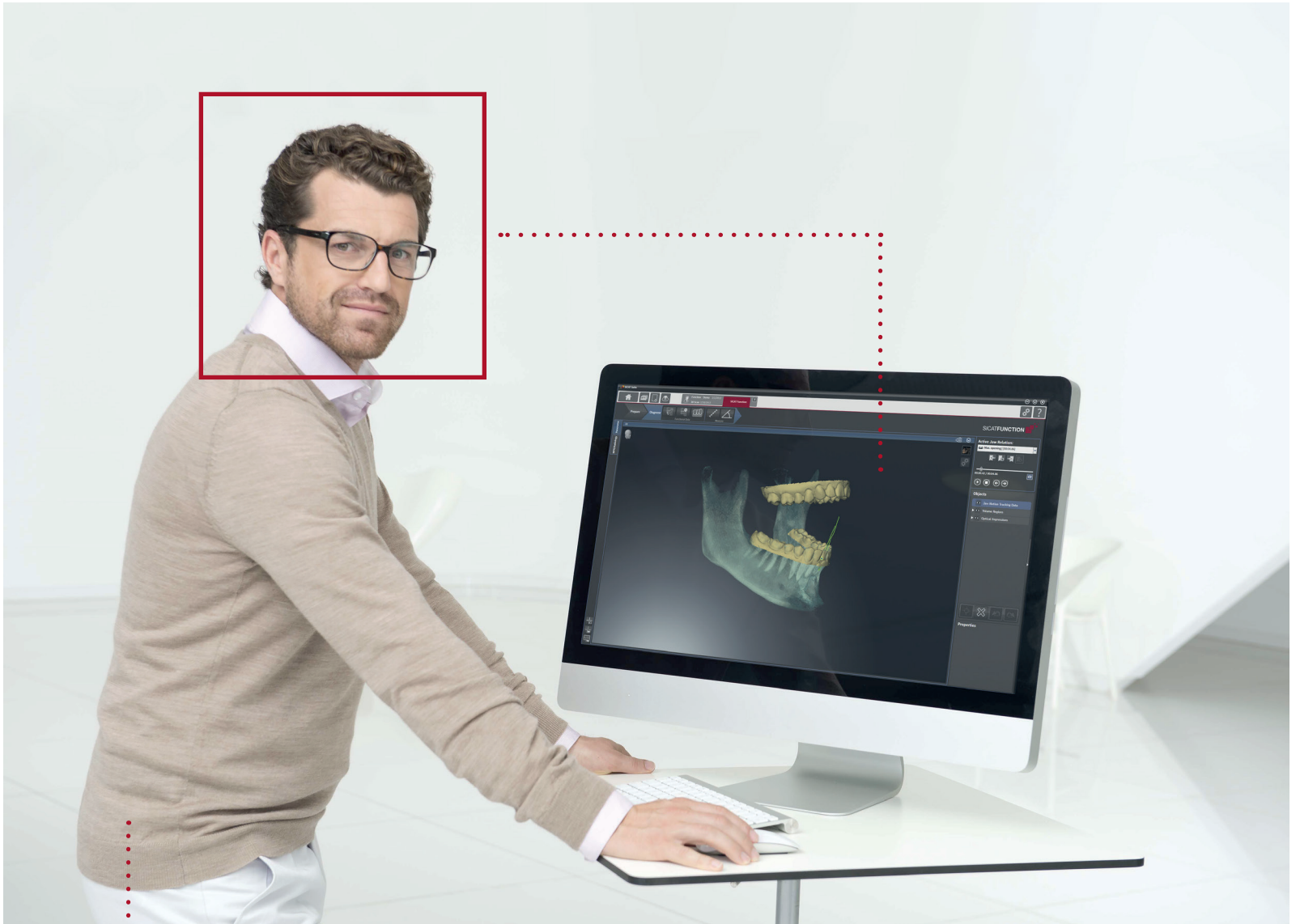# SICAT**FUNCTION**

SICAT FUNCTION *VERSION 1.1*

Instructions for use | English

TABLE OF CONTENTS

1 INTENDED USE

SICAT Function is a software application for the visualization and segmentation of imaging information of the oral-maxillofacial region and for the visualization of mandibular movement.

The imaging data originates from medical scanners such as CT or CBCT scanners and optical impression systems. Jaw motion information originates from jaw motion tracking devices.

SICAT Function is also used as a software system to aid qualified dental professionals with the evaluation of dental treatment options.

The dental professionals' planning data may be exported from SICAT Function and used as input data for CAD or Rapid Prototyping Systems.

2 SYSTEM REQUIREMENTS

⚠️ **CAUTION**	**If your system does not meet the system requirements, the software might not start or work as intended.** ▪ Prior to installing the software, check your system for compliance with the minimum software and hardware requirements.

MINIMUM

Processor	Dual Core 2 GHz
RAM	4 GB
Video card	Dedicated* DirectX 10 or higher 512 MB video memory Shader Model 3 Current driver
Screen	At least 1280x1024 pixel**
Free space on HDD	5 GB
Storage media	Access to external storage media that contains the installation files.
Input devices	Keyboard, mouse
Network	Ethernet, 100 Mbit/s
Operating system	Windows 7 (32 bit or 64 bit) Windows 8 (64 bit) Windows 8.1 (64 bit)
Web browser	Microsoft Internet Explorer 9 or higher Mozilla Firefox 10 or higher Google Chrome 10 or higher Apple Safari 5 or higher JavaScript has to be activated.
PDF viewer	For example, Adobe Reader 8 or higher

RECOMMENDED

Processor	Quad Core 2.3 GHz
RAM	8 GB
Video card	1024 MB video memory
Screen	At least 1920x1080 pixel**
Network	Ethernet, 1000 Mbit/s
Operating system	64 bit

SOFTWARE PREREQUISITES

SICAT Suite requires the following software components and installs them together with SICAT Suite if they are not already available:

- Microsoft .NET Framework 4.5
- Microsoft DirectX Redistributable June 2010
- CodeMeter license management software 5.0
- SQL Server Compact Edition 4.0
- SICAT WebConnector

> **i** *SICAT Suite only supports dedicated video cards (NVIDIA GeForce 670 and ATI Radeon HD 4xxx or newer). Integrated video cards are not supported.
>
> **The resolution must not be higher than 2560x1600 pixel. The screen has to be set up to show the SMPTE test picture correctly. For information about this, see Monitor calibration with the SMPTE test pattern.

3 SAFETY INFORMATION

It is mandatory that you read the following security relevant chapters:

- *Identification of danger levels [▶ Page 9]*
- *Qualification of operating personnel [▶ Page 10]*
- *Safety instructions [▶ Page 115]*

3.1 IDENTIFICATION OF DANGER LEVELS

These instructions for use uses the following warning signs to avoid injuries of operating personnel or patients and material damage:

⚠️ **CAUTION**	**Indicates a hazardous situation that, if not avoided, *could* result in minor injury.**

NOTICE	**Indicates information considered important but not hazard-related.**

3.2 QUALIFICATION OF OPERATING PERSONNEL

⚠️ **CAUTION**	**Use of software by unqualified personnel could result in incorrect diagnosis and treatment.** ▪ The use of the software is restricted to qualified professionals.

Only skilled or properly trained personnel are allowed to use the software.

If you are undergoing education or training, or you are using the software as part of your general training, you may only operate the software under the constant supervision of a qualified person.

You have to fulfill the following prerequisites to be allowed to use the software:

▪ You have read the instructions for use.

▪ You are familiar with the fundamental structure and the functions of the software.

▪ You are able to recognize irregularities in the functioning of the software and implement the appropriate measures where necessary.

CAUTION! Federal Law (USA) restricts use of this device to or on the order of a physician, dentist or licensed practitioner.

4 USED ICONS AND HIGHLIGHTING

ICONS

These instructions for use uses the following icons:

- The hint icon indicates additional information, for example alternative approaches.

HIGHLIGHTING

Texts and names of elements that SICAT Suite shows are highlighted by **bold** fonts. This includes the following objects in the user interface:

- Names of areas
- Names of buttons
- Names of icons
- Texts from hints and on-screen messages

INSTRUCTIONS

Instructions are written as ordered lists:

☑ Prerequisites are marked with this symbol.

1. Steps are marked with numbers.

 ▶ Interim results are marked with this symbol and are indented.

2. Interim results are followed by additional steps.

▶ Final results are marked with this symbol.

- However, if an instruction consists of only one step, the step is marked with this symbol.

5 PRINCIPLES OF OPERATION

SICAT Function combines three different datasets:

- 3D X-ray data, for example from a Sirona GALILEOS
- Jaw motion tracking data, for example from a SICAT JMT⁺
- Digital optical impressions, for example from a Sirona GALILEOS

A typical workflow with SICAT Function is as follows:

1. While the patient is wearing the SICAT Fusion Bite, create a 3D X-ray scan of the patient.

2. Record patient specific jaw motion tracking data. You can find information regarding this in the instructions for use of the jaw motion tracking device.

3. Create optical impressions of the maxilla and the mandible. You can find information regarding this in the instructions for use of the device.

4. Import the 3D X-ray scan into SICAT Suite. You can find information regarding this in the instructions for use of SICAT Suite.

5. Open the 3D X-ray scan in SICAT Function. For information about this, see the SICAT Suite instructions for use and *SICAT Function studies in SICAT Suite [*▶ *Page 15]*.

6. Import and register jaw motion tracking data into SICAT Function. For information about this, see *Importing and registering jaw motion tracking data from jaw motion tracking devices [*▶ *Page 67]*.

7. If desired, segment the mandible and the fossa. For information about this, see *Segmenting the mandible [*▶ *Page 73]* and *Segmenting the fossa [*▶ *Page 75]*.
   ► SICAT Function visualizes imported jaw motion tracking data in the **3D** view.

8. Import and register the optical impressions with the 3D X-ray scan data. For information about this, see *Importing and registering optical impressions [*▶ *Page 78]*.

9. Evaluate the jaw motion in the **3D** view. Use the anatomical traces as an aid, especially if you did not perform a segmentation. For information about this, see *Visualization of the anatomical traces in the 3D view [*▶ *Page 89]*, *Adjusting anatomical traces with the Inspection Window [*▶ *Page 90]*, *Adjusting anatomical traces with the crosshair in a slice view [*▶ *Page 91]*, and *Interacting with jaw motions [*▶ *Page 86]*.

10. Specify a treatment position for the therapeutic appliance. For information about this, see *Specifying the treatment position [*▶ *Page 99]*.

11. Order a therapeutic appliance. For information about this, see *Ordering process [*▶ *Page 98]*.

12. Close SICAT Function.

► SICAT Function saves registered jaw motion tracking data, segmentation and optical impressions in a study that is based on the 3D X-ray scan.

6 INSTALLING SICAT FUNCTION

⚠️ **CAUTION**	**The absence of a backup mechanism for the patient record depots could result in patient data being irreversibly lost.** ▪ Make sure that a regular data backup is created of all patient record depots.

⚠️ **CAUTION**	**Saving SICAT application data in an unreliable or incompatible network file system could result in data loss.** ▪ Together with your network administrator, assure that SICAT application data can be safely stored in the desired network file system.

⚠️ **CAUTION**	**Using SICAT Suite and the contained SICAT applications together with other devices within a computer network or storage network could result in previously unknown risks for patients, users and other persons.** ▪ Make sure policies are established within your organization to determine, analyze, assess and control risks that are related to your network.

⚠️ **CAUTION**	**Changes to your network environment could result in new risks. Examples are changes to your network configuration, connection of additional devices or components to your network, disconnection of devices or components from the network and update or upgrade of network devices or components.** ▪ Perform a new network risk analysis after any network changes.

The SICAT Suite installer installs SICAT Function as a part of SICAT Suite. For information about installing SICAT Suite, see the instructions for use of SICAT Suite.

7 OPENING THE ONLINE HELP

The instructions for use of SICAT Suite and SICAT applications are integrated in the **Support** window in form of an online help.

You can open the **Support** window by clicking the **Support** icon in the **Navigation bar** or by pressing the F1 key.

The SICAT Suite instructions for use are divided into multiple sections:

- General functions like data management that all SICAT applications use are described in the SICAT Suite instructions for use.
- Functions that are available in SICAT applications are described in the additional instructions for use of each SICAT application.

8 SICAT FUNCTION STUDIES IN SICAT SUITE

⚠️ **CAUTION**	**X-ray devices without DICOM conformity could result in incorrect diagnosis and treatment.** ▪ Only use 3D volume data from x-ray devices with DICOM conformity declared.

⚠️ **CAUTION**	**Inappropriate X-ray devices could result in incorrect diagnosis and treatment.** ▪ Only use 3D data from X-ray devices cleared as medical devices.

⚠️ **CAUTION**	**Inappropriate 3D data could result in incorrect diagnosis and treatment.** ▪ Always verify the quality, integrity, and correct orientation of the displayed 3D data.

⚠️ **CAUTION**	**Insufficient visualization quality could result in incorrect diagnosis and treatment.** ▪ Prior to using a SICAT application check for sufficient visualization quality, for example by using the SMPTE test pattern.

⚠️ **CAUTION**	**Insufficient environmental visualization conditions could result in incorrect diagnosis and treatment.** 1. Only perform planning if the environmental conditions allow for sufficient visualization quality. For example, check for appropriate lighting. 2. Check for sufficient visualization quality using the SMPTE test pattern.

NOTICE	To ensure correct diagnosis, correct treatment, and correct registration of jaw motion tracking data, SICAT recommends to only use 3D X-ray data with the following parameters: 1. Slice thickness thinner than 0.7 mm 2. Voxel size smaller than 0.7 mm in all three dimensions
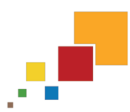
If SICAT Suite runs as a standalone version, managing patient data takes place in SICAT Suite.

The **Patient record browser** shows information for SICAT Function studies if the following prerequisites are fulfilled:

- You use the standalone version of SICAT Suite.
- You have selected a SICAT Function study in the **3D Scans and Planning Projects** area.

1	Selected SICAT Function study	**3** Details area
2	Preview area	

The **Preview** shows the following items:
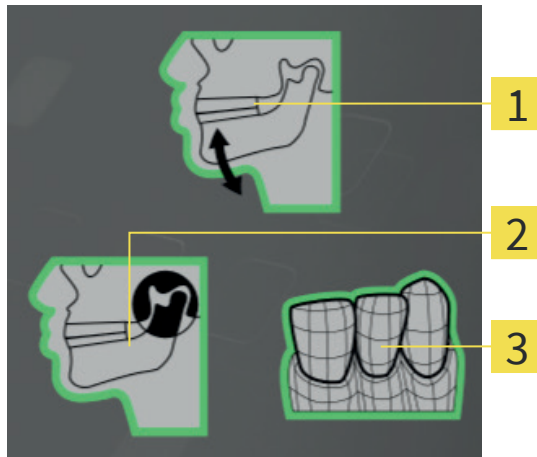
1 Jaw motion tracking data

2 Segmentation

3 Optical impressions

A green frame means that the respective element is available in the study.

The **Details** area shows the following information:

- Availability of optical impressions
- Availability of jaw motion tracking data with recording date
- Availability of a mandibular condyle segmentation with creation date
- Availability of an order with status and date

If SICAT Suite runs as integrated version, managing patient data takes place in the main application.

9 OVERVIEW OF THE SICAT FUNCTION USER INTERFACE

The SICAT Function user interface consists of the following parts:
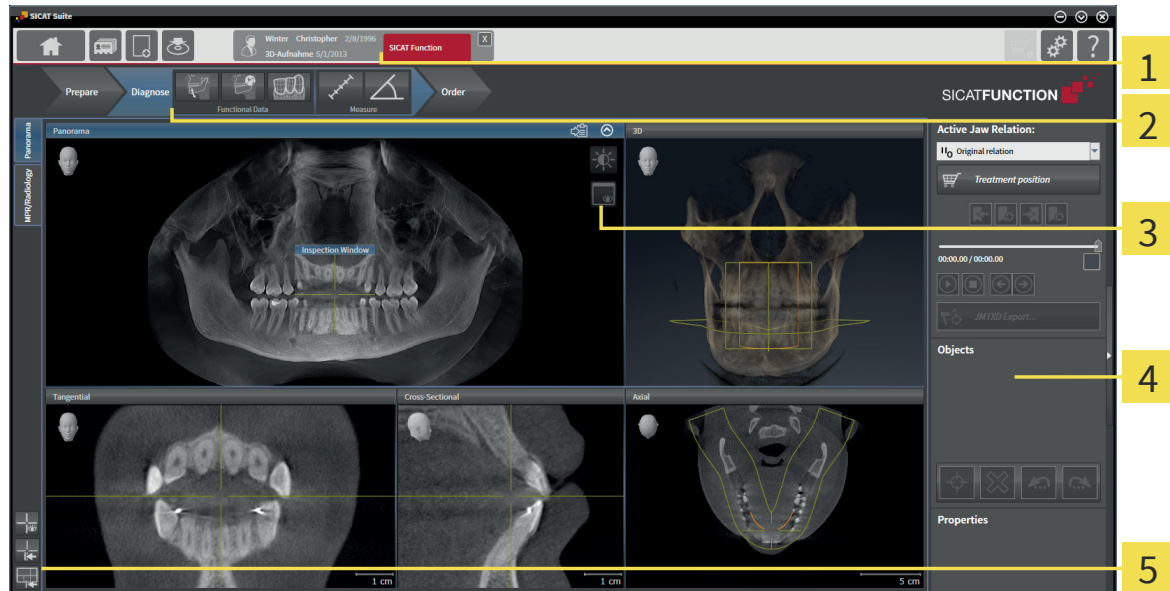
1	**Active patient record** tab	4	**Object bar**
2	**Workflow toolbar**	5	**Workspace toolbar**
3	**View toolbar**		

- The **Active patient record** tab shows attributes of the active patient record. For details, see the SICAT Suite instructions for use.
- The **Workflow toolbar** consists of different workflow steps that contain the main tools of the application workflow. This includes tools with that you can add and import diagnosis objects and planning objects. For information about this, see *Workflow toolbar [▶ Page 19]*.
- The **Workspace area** is the part of the user interface below the **Workflow toolbar**. It shows the active workspace of SICAT Function. Each workspace contains a specific set of views. For information about this, see *Workspaces [▶ Page 26]*.
- Only the active view shows the **View toolbar**. It contains tools for adapting the visualization of the corresponding view. For information about this, see *Adaptation of views [▶ Page 32]* and *Adaptation of the 3D View [▶ Page 44]*.
- The **Object bar** contains tools for managing diagnosis objects and planning objects. For information about this, see *Object bar [▶ Page 21]*.
- The **Workspace toolbar** contains tools for changing general settings of workspaces and all contained views. For information about this, see *Moving, hiding, and showing crosshairs and frames [▶ Page 40]*, *Resetting views [▶ Page 42]*, and *Adapting and resetting the layout of workspaces [▶ Page 30]*.

9.1 WORKFLOW TOOLBAR

In SICAT Function, the **Workflow toolbar** consists of three workflow steps: **Prepare**, **Diagnose**, and **Order**. You can expand and collapse workflow steps.

PREPARE WORKFLOW STEP
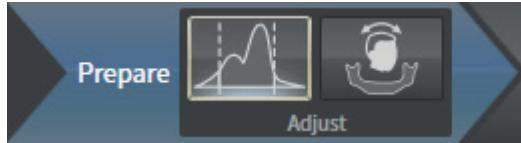
In the **Prepare** workflow step, the following tools are available:

- **Adjust gray values** - for information about this, see *Adjusting gray values [▶ Page 53]*. This tool is only available for volumes from non-Sirona devices.

- **Adjust volume orientation and panoramic region** - for information about this, see *Adjusting the volume orientation [▶ Page 57]* and *Adjusting the panoramic region [▶ Page 62]*.

DIAGNOSE WORKFLOW STEP
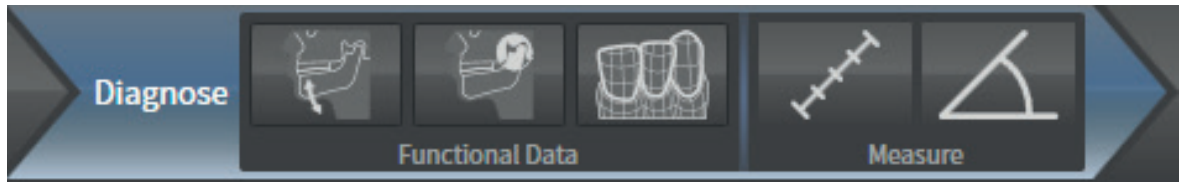
In the **Diagnose** workflow step, the following tools are available:

- **Import and register jaw motion tracking data** - for information about this, see *Importing and registering jaw motion tracking data from jaw motion tracking devices [▶ Page 67]*.

- **Segment condyles and mandible region** - for information about this, see *Segmentation [▶ Page 72]*.

- **Import and register optical impressions** - for information about this, see *Importing and registering optical impressions [▶ Page 78]*.

- **Add distance measurement (D)** - for information about this, see *Adding distance measurements [▶ Page 93]*.

- **Add angle measurement (A)** - for information about this, see *Adding angle measurements [▶ Page 94]*.

ORDER WORKFLOW STEP
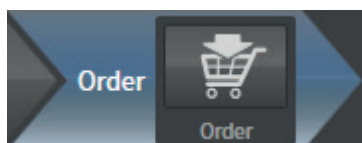
In the **Order** workflow step, the following tools are available:

- **Order therapeutic appliance** - for information about this, see *Adding therapeutic appliances to the shopping cart [▶ Page 100]*.

EXPANDING AND COLLAPSING WORKFLOW STEPS

You can expand and collapse workflow steps by clicking on them.

9.2 OBJECT BAR
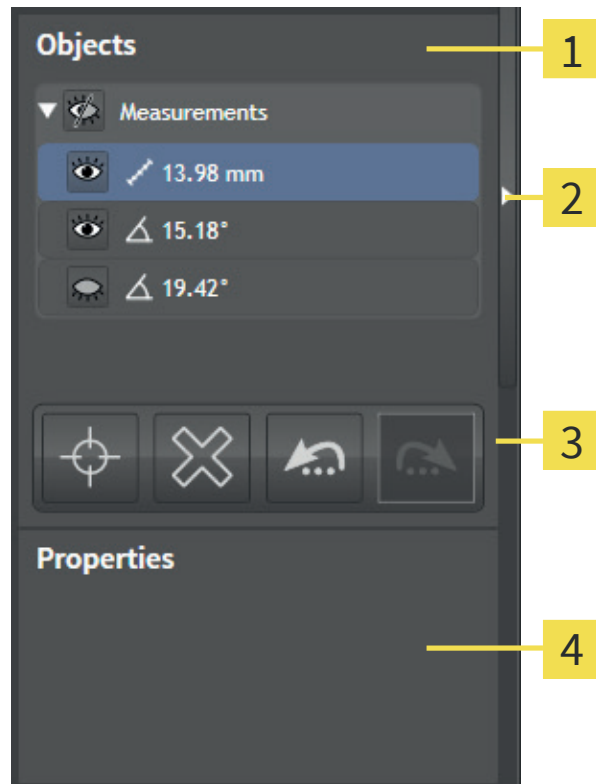
1	**Object browser**
2	**Hide object bar** button or **Show object bar** button
3	**Object toolbar**
4	**Properties** area

The **Object bar** contains the following elements:

- The **Object browser** shows a categorized list of all diagnosis objects and planning objects that you added or imported to the current study. The **Object browser** groups objects automatically. For example, the **Measurements** group contains all measurements. You can collapse and expand object groups, activate objects and object groups, and hide and show objects and object groups. For information about this, see *Managing objects with the Object browser [▶ Page 22]*.

- The **Object toolbar** contains tools to focus on objects, remove objects or object groups, and undo or redo object actions or object group actions. For information about this, see *Managing objects with the Object toolbar [▶ Page 23]*.

- The **Properties** area shows details of the active object.

You can hide and show the **Object bar** by clicking the **Hide object bar** button or the **Show object bar** button at the right-hand side of the **Object bar**.

9.3 MANAGING OBJECTS WITH THE OBJECT BROWSER

> **i** The following functions are only available for specific object types.

COLLAPSING AND EXPANDING OBJECT GROUPS

To collapse and expand an object group, proceed as follows:
☑ The desired object group is currently expanded.

1. Next to the object group, click the **Collapse** icon.
   ▶ The desired object group collapses.

2. Next to the object group, click the **Expand** icon.

▶ The desired object group expands.

ACTIVATING OBJECTS AND OBJECT GROUPS

Some tools are only available for active objects or object groups.

To activate an object or an object group, proceed as follows:
☑ The desired object or object group is currently deactivated.

▪ Click on the desired object or object group.
   ▶ SICAT Function deactivates a previously activated object or object group.
   ▶ SICAT Function activates the desired object or object group.
   ▶ SICAT Function highlights the object or object group in the **Object browser** and in the views.

> **i** In the 2D views, you can also activate specific objects by clicking on the objects.

HIDING AND SHOWING OBJECTS AND OBJECT GROUPS

To hide and show an object or an object group, proceed as follows:
☑ The desired object or object group is currently shown.

1. Next to the desired object or object group, click the **Shown** icon or the **Some Shown** icon.
   ▶ SICAT Function hides the object or object group.
   ▶ Next to the object or object group, SICAT Function displays the **Hidden** icon.

2. Next to the desired object or object group, click the **Hidden** icon.

▶ SICAT Function shows the object or object group.

▶ Next to the object or object group, SICAT Function displays the **Shown** icon.

9.4 MANAGING OBJECTS WITH THE OBJECT TOOLBAR

> ℹ️ The following functions are only available for specific object types.

FOCUSING ON OBJECTS

Use this function to find objects in the views.

To focus on an object, proceed as follows:

☑ The desired object is already active. For information about this, see *Managing objects with the Object browser [*▶ *Page 22]*.

▪ Click the **Focus active object (Ctrl+F)** icon.

▶ SICAT Function moves the focus point of the views to the active object.

▶ SICAT Function visualizes the active object in the views.

> ℹ️ You can also focus on objects by double-clicking on them in the **Object browser** or in a view except for the **3D** view.

REMOVING OBJECTS AND OBJECT GROUPS

To remove an object or an object group, proceed as follows:

☑ The desired object or object group is already active. For information about this, see *Managing objects with the Object browser [*▶ *Page 22]*.

▪ Click the **Remove active object/group (Del)** icon.

▶ SICAT Function removes the object or object group.

UNDOING AND REDOING OBJECT ACTIONS

To undo and redo the last object action or object group action, proceed as follows:

1. Click the **Undo last object/group action (Ctrl+Z)** icon.
   ▶ SICAT Function undoes the last object action or object group action.

2. Click the **Redo object/group action (Ctrl+Y)** icon.

▶ SICAT Function redoes the last undone object action or object group action.

> ℹ️ Undo and redo are available as long as a study is opened in a SICAT application. Undo and redo are not available for all objects.

9.5 SICAT FUNCTION OBJECTS

In the **Object browser**, SICAT Function groups application specific objects as follows:

- **Jaw Motion Tracking Data**
- **Volume Regions**
  - Mandible with the **Mandible Left**, **Mandible Right**, and **Mandible Front** items.
- **Optical impressions**

JAW MOTION TRACKING DATA OBJECT
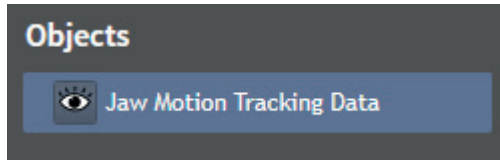
After you have imported jaw motion tracking data, SICAT Function shows a **Jaw Motion Tracking Data** object in the **Object browser**.

If you remove a **Jaw Motion Tracking Data** object, SICAT Function deletes the jaw motion tracking data from the study.

MANDIBLE OBJECT
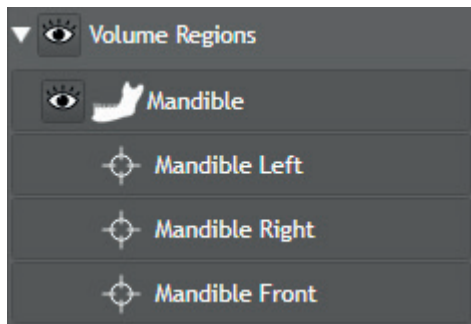
A **Mandible** object contains the following sub-objects:

- **Mandible Left**
- **Mandible Right**
- **Mandible Front**

If you focus on one of the sub-objects, SICAT Function focuses all 2D views onto the selected object.

OPTICAL IMPRESSIONS OBJECT

An **Optical Impressions** object contains the following sub-objects:

- **Maxilla**
- **Mandible**

If you focus on one of the sub-objects, SICAT Function focuses all 2D views onto the selected object.

If you remove a **Maxilla** or a **Mandible** object, SICAT Function deletes all optical impressions from the study.

10 WORKSPACES

SICAT applications visualize studies in different views and arrange collections of views in workspaces.

In SICAT Function, there are two different workspaces:

- **Panorama** workspace - for information about this, see *Overview of the Panorama workspace [▶ Page 27]*.
- **MPR/Radiology** workspace - for information about this, see *Overview of the MPR/Radiology workspace [▶ Page 28]*.

For a description of the different views, see *Views [▶ Page 31]*.

The following actions are available for workspaces and the contained views:

- *Switching the active workspace [▶ Page 29]*.
- *Adapting and resetting the layout of workspaces [▶ Page 30]*.
- *Adaptation of views [▶ Page 32]*.
- There are additional ways to adapt the **3D** view. For information about this, see *Adaptation of the 3D View [▶ Page 44]*.

10.1 OVERVIEW OF THE PANORAMA WORKSPACE
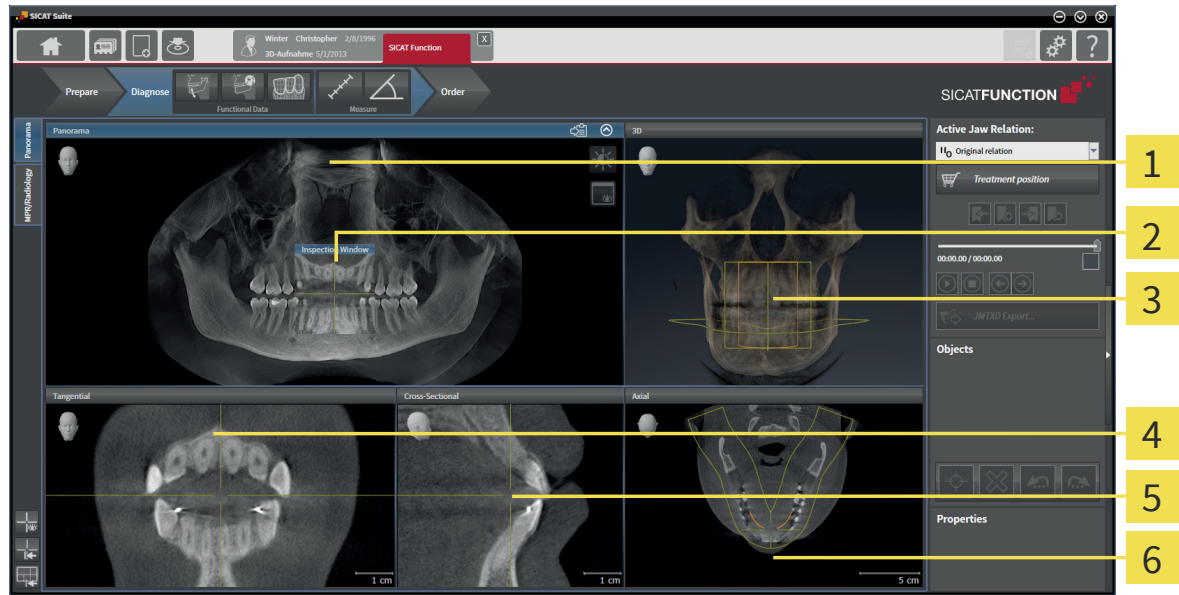
1	**Panorama** view	**4**	**Tangential** view
2	**Inspection Window**	**5**	**Cross-Sectional** view
3	**3D** view	**6**	**Axial** view

The **Panorama** workspace consists of the following views:

- **Panorama** view
- **Inspection Window**
- **3D** view
- **Tangential** view
- **Cross-Sectional** view
- **Axial** view

For a description of the contained views, see *Views [▶ Page 31]*.

10.2 OVERVIEW OF THE MPR/RADIOLOGY WORKSPACE
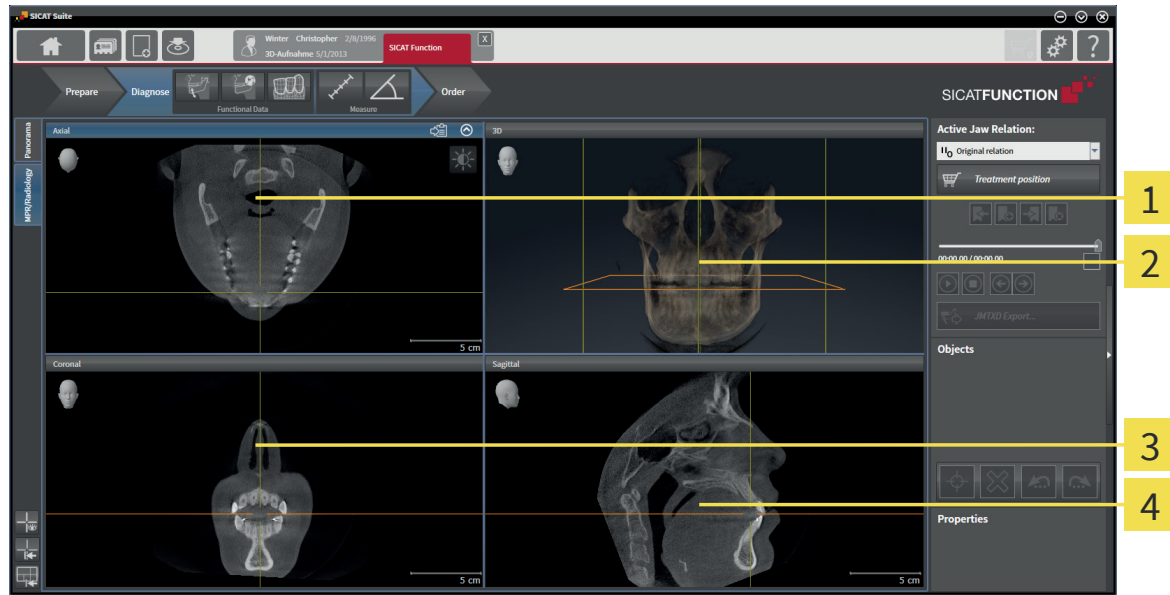
1	**Axial** view	**3**	**Coronal** view
2	**3D** view	**4**	**Sagittal** view

The **MPR/Radiology** workspace consists of the following views:

- **Axial** view
- **3D** view
- **Coronal** view
- **Sagittal** view

For a description of the different views, see *Views [▶ Page 31]*.

10.3 SWITCHING THE ACTIVE WORKSPACE

To switch the active workspace, proceed as follows:
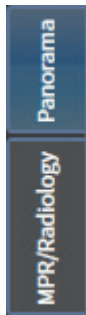
▪ In the upper left corner of the workspace area, click the tab of the desired workspace.

▶ The selected workspace opens.

10.4 ADAPTING AND RESETTING THE LAYOUT OF WORKSPACES

ADAPTING THE LAYOUT OF THE ACTIVE WORKSPACE

To adapt the layout of the active workspace, proceed as follows:

1. Move the mouse pointer over the border between two or more views.
   - ▶ The mouse pointer changes to a two-directional arrow or a cross.

2. Click and hold the left mouse button.

3. Move the mouse.
   - ▶ The position of the border changes.
   - ▶ The sizes of the views on all sides of the border change.

4. Release the left mouse button.

▶ SICAT Function maintains the position of the border and the current sizes of the views on all sides of the border.

RESETTING THE LAYOUT OF THE ACTIVE WORKSPACE

To reset the layout of the active workspace, proceed as follows:

▪ In the **Workspace toolbar**, click the **Reset layout of active workspace** icon.

▶ SICAT Function resets the active workspace to the default layout. This means that the software displays all views in their default sizes.

11 VIEWS

Views are contained in workspaces. For a description of the different workspaces, see *Workspaces [▶ Page 26]*.

Each SICAT application visualizes studies in views that are arranged in workspaces. A workspace contains a specific set of the following views:

Per default, the **Axial** view shows slices from the top. You can switch the viewing direction of the **Axial** view. For information about this, see *Changing visualization settings [▶ Page 110]*.

The **Coronal** view shows slices from the front.

Per default, the **Sagittal** view shows slices from the right. You can switch the viewing direction of the **Sagittal** view. For information about this, see *Changing visualization settings [▶ Page 110]*.

The **Tangential** view shows slices that are tangential to the panoramic curve.

The **Cross-Sectional** view shows slices that are orthogonal to the panoramic curve.

The **Panorama** view corresponds to a virtual orthopantomogram (OPG). It shows an orthogonal projection to the panoramic curve with a specific thickness. You can adjust the panoramic curve and the thickness to both jaws. For information about this, see *Adjusting the panoramic region [▶ Page 62]*.

The **Inspection Window** is embedded inside the **Panorama** view. It adds the third dimension to the **Panorama** view by showing slices parallel to the panoramic curve. You can hide and show the **Inspection Window**. For information about this, see *Moving, hiding, and showing the Inspection Window [▶ Page 41]*.

The **3D** view shows a 3D visualization of the opened study.

You can adapt the views. For information about this, see *Adaptation of views [▶ Page 32]* and *Adaptation of the 3D View [▶ Page 44]*.

11.1 ADAPTATION OF VIEWS

Some tools for adapting views are only available with the active view. For activating a view, see *Switching the active view [▶ Page 34]*.

An active view contains the following elements:
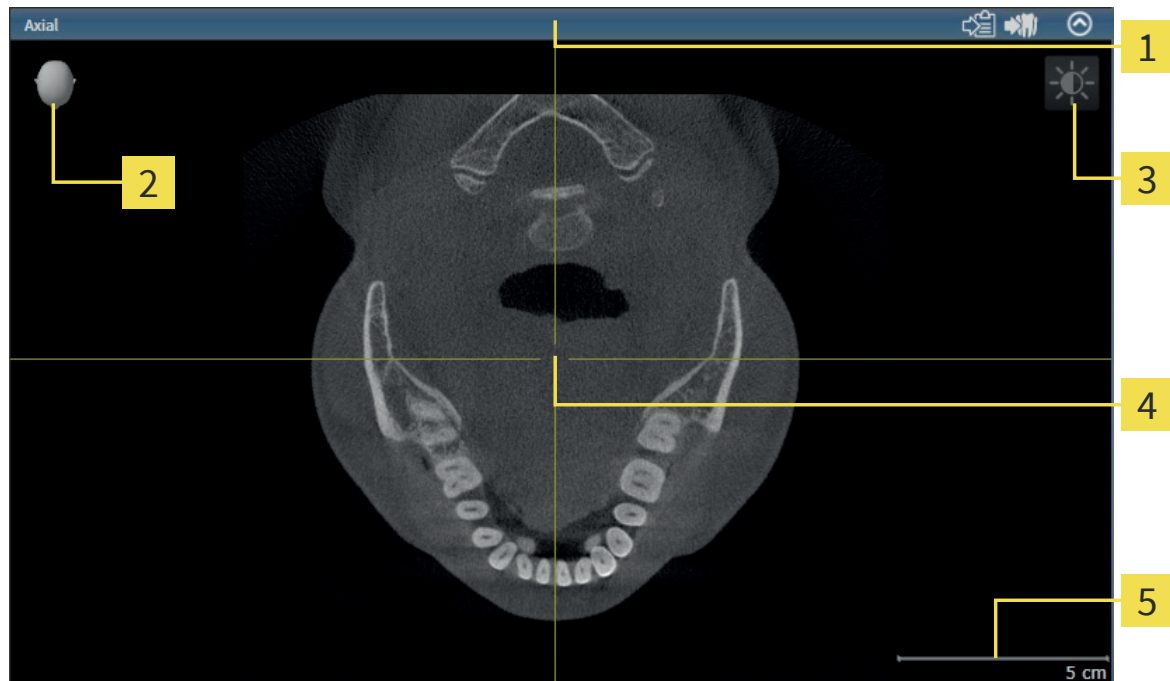
1   Title bar

2   Orientation head

3   View toolbar

4   Crosshair

5   Ruler

2D slice views show crosshairs. Crosshairs are cutlines with other slice views. SICAT Function synchronizes all slice views with each other. That means all crosshairs focus on the same position in the 3D X-ray data. This allows you to associate anatomical structures across views.

The **3D** view shows frames that represent the current positions of the 2D slice views.

2D slice views contain a ruler.

To adapt the views, the following actions are available:

- *Maximizing and restoring views [▶ Page 35]*
- *Adjusting and resetting the brightness and the contrast of 2D views [▶ Page 36]*
- *Zooming and panning views [▶ Page 38]*
- *Scrolling through slices in 2D slice views [▶ Page 39]*
- *Moving, hiding, and showing crosshairs and frames [▶ Page 40]*
- *Moving, hiding, and showing the Inspection Window [▶ Page 41]*
- *Resetting views [▶ Page 42]*

There are additional ways to adapt the **3D** view. For information about this, see *Adaptation of the 3D View [▶ Page 44]*.

You can document the content of an active view. For information about this, see *Documentation [▶ Page 43]*.

11.2 SWITCHING THE ACTIVE VIEW

Only the active view shows the **View toolbar** and the tools in the title bar.

To activate a view, proceed as follows:
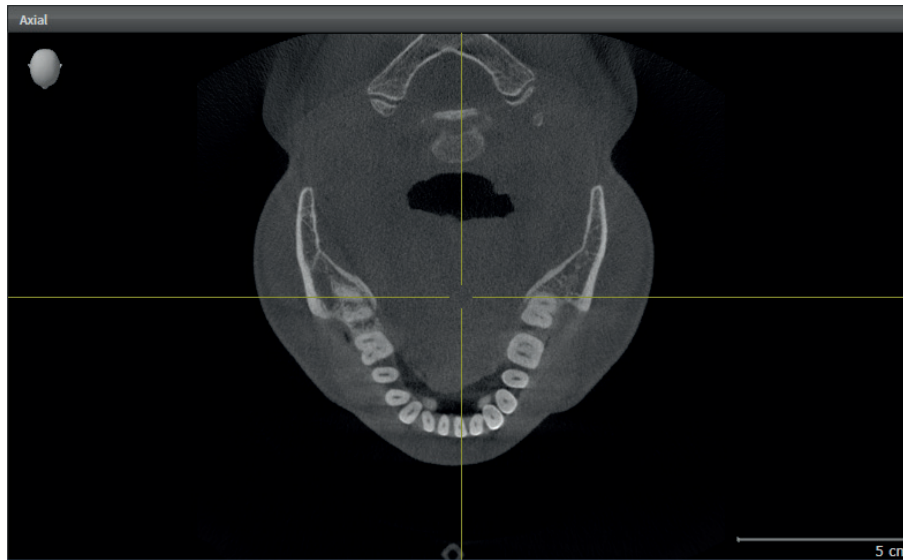
- ▪ Click inside the desired view.

▶ SICAT Function activates the view:
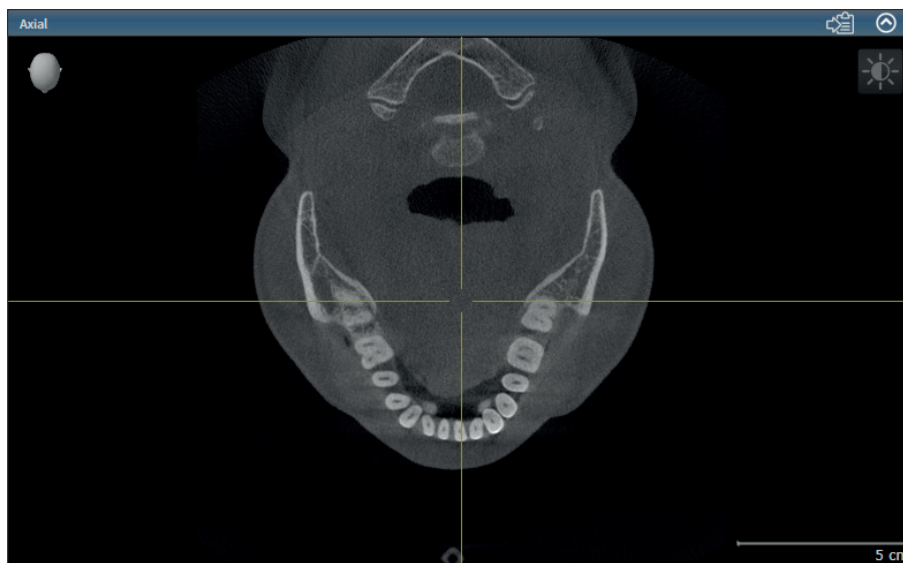
11.3 MAXIMIZING AND RESTORING VIEWS

To maximize a view and restore the previous size a view, proceed as follows:

☑ The desired view is already active. For information about this, see *Switching the active view [▶ Page 34].*

☑ The desired view is not maximized.

1. In the title bar of the desired view, click the **Maximize** icon.
   ▶ SICAT Function maximizes the view.

2. In the title bar of the maximized view, click the **Restore** icon.
   ▶ SICAT Function restores the previous size of the view.

> **i** To maximize views and restore their previous size, the following alternatives are available:
> - To maximize a view, you can also double-click on the title bar of the desired view.
> - To restore the previous size of a view, you can also double-click on the title bar of the maximized view.

11.4 ADJUSTING AND RESETTING THE BRIGHTNESS AND THE CONTRAST OF 2D VIEWS

To adjust the brightness and the contrast of a 2D view, proceed as follows:

☑ The desired 2D view is already active. For information about this, see *Switching the active view [▶ Page 34]*.

1. In the **View toolbar** of the 2D view, move the mouse pointer over the **Adjust brightness and contrast** icon.
   ► The **Adjust brightness and contrast** overlay opens:

2. Move the mouse pointer over the **Brightness** slider.

3. Click and hold the left mouse button and move the mouse pointer up or down.
   ► SICAT Function adjusts the brightness of the 2D view corresponding to the position of the **Brightness** slider.

4. Release the left mouse button.
   ► SICAT Function maintains the current brightness of the 2D view.

5. Move the mouse pointer over the **Contrast** slider.

6. Click and hold the left mouse button and move the mouse pointer up or down.
   ► SICAT Function adjusts the contrast of the 2D view corresponding to the position of the **Contrast** slider.

7. Release the left mouse button.
   ► SICAT Function maintains the current contrast of the 2D view.

8. Move the mouse pointer out of the **Adjust brightness and contrast** overlay.

► The **Adjust brightness and contrast** overlay closes.

To reset the brightness and the contrast of the 2D view to their default values, you can click the **Reset brightness and contrast** icon.

> The brightness and the contrast of all 2D slice views are linked with each other.

11.5 ZOOMING AND PANNING VIEWS

ZOOMING A VIEW

Zooming enlarges or reduces the content of a view.

To zoom a view, proceed as follows:

1. Move the mouse pointer over the desired view.

2. Rotate the mouse wheel forward.
   ► The view zooms in.

3. Rotate the mouse wheel backward.

► The view zooms out.

> **ℹ** You can also click and hold the mouse wheel and move the mouse up or down to zoom in or out.

PANNING A VIEW

To pan a view, proceed as follows:

1. Move the mouse pointer over the desired view.

2. Click and hold the right mouse button.
   ► The mouse pointer changes to a four-directional arrow.

3. Move the mouse.
   ► The view pans corresponding to the movement of the mouse pointer.

4. Release the right mouse button.

► SICAT Function maintains the current detail of the view.

11.6 SCROLLING THROUGH SLICES IN 2D SLICE VIEWS

To scroll through slices in a 2D slice view, proceed as follows:

1. Move the mouse pointer over the desired 2D slice view.

2. Click and hold the left mouse button.

   ► The mouse pointer changes to a two-directional arrow.

3. Move the mouse up or down.

   ► Slices except for the **Cross-Sectional** slice move parallel.

   ► The **Cross-Sectional** slice moves along the panorama curve.

   ► SICAT Function adapts the slices and the crosshairs of other views according to the current focus point.

   ► SICAT Function adapts the frames in the **3D** view corresponding to the current focus point.

4. Release the left mouse button.

► SICAT Function maintains the current slice.

11.7 MOVING, HIDING, AND SHOWING CROSSHAIRS AND FRAMES

MOVING A CROSSHAIR

To move the crosshair in a 2D view, proceed as follows:

☑ All crosshairs and frames are currently shown.

1. In the desired view, move the mouse pointer over the middle of the crosshair.

   ▶ The mouse pointer changes to a crosshair.

2. Click and hold the left mouse button.

3. Move the mouse.

   ▶ The crosshair of the view follows the movement of the mouse.

   ▶ SICAT Function adapts the slices and the crosshairs of other views according to the current focus point.

   ▶ SICAT Function adapts the frames in the **3D** view corresponding to the current focus point.

4. Release the left mouse button.

   ▶ SICAT Function maintains the current crosshair position.

> ℹ To move the crosshair to the position of the mouse pointer immediately, you can also double-click inside a 2D view.

HIDING AND SHOWING CROSSHAIRS AND FRAMES

To hide and show all crosshairs and frames, proceed as follows:

☑ All crosshairs and frames are currently shown.

1. In the **Workspace toolbar**, click the **Hide crosshairs and frames** icon.

   ▶ SICAT Function hides the crosshairs in all views.

   ▶ SICAT Function hides the frames in the **3D** view.

2. Click the **Show crosshairs and frames** icon.

   ▶ SICAT Function shows the crosshairs in all views.

   ▶ SICAT Function shows the frames in the **3D** view.

11.8 MOVING, HIDING, AND SHOWING THE INSPECTION WINDOW

MOVING THE INSPECTION WINDOW

To move the **Inspection Window**, proceed as follows:

☑ The **Panorama** workspace is already opened. For information about this, see *Switching the active workspace [*▶ *Page 29]*.

☑ The **Inspection Window** is already shown:

1. In the **Panorama** view, move the mouse pointer over the title bar of the **Inspection Window**.

   ▶ The mouse pointer changes to a hand.

2. Click and hold the left mouse button.

3. Move the mouse.

   ▶ The **Inspection Window** follows the movement of the mouse pointer.

   ▶ SICAT Function adapts the slices and the crosshairs of other views according to the current focus point.

   ▶ SICAT Function adapts the frames in the **3D** view corresponding to the current focus point.

4. Release the left mouse button.

   ▶ SICAT Function maintains the current **Inspection Window** position.

HIDING AND SHOWING THE INSPECTION WINDOW

To hide and show the **Inspection Window**, proceed as follows:

☑ The **Panorama** workspace is already opened. For information about this, see *Switching the active workspace [*▶ *Page 29]*.

☑ The **Inspection Window** is already shown.

1. In the **View toolbar** of the **Panorama** view, click the **Hide inspection window** icon.

   ▶ SICAT Function hides the **Inspection Window**.

2. In the **View toolbar** of the **Panorama** view, click the **Show inspection window** icon.

   ▶ SICAT Function shows the **Inspection Window**.

11.9 RESETTING VIEWS

To reset all views, proceed as follows:

- In the **Workspace toolbar**, click the **Reset views** icon.

▶ SICAT Function resets all views to the default values for zoom, movement of the details, scrolling, movement of the crosshairs, and the movement of the **Inspection Window**.

▶ SICAT Function resets the viewing direction of the **3D** view to the default value.

11.10 DOCUMENTATION

For documentation purposes, you can copy the content of a view into the Windows clipboard. If you started SICAT Suite from Sirona SIDEXIS, you can also copy the content of a view to the current SIDEXIS exam.

COPYING THE CONTENT OF A VIEW INTO THE WINDOWS CLIPBOARD

To copy the content of a view into the Windows clipboard, proceed as follows:

☑ The desired view is already active. For information about this, see *Switching the active view [*▶ *Page 34]*.

▪ In the title bar of the view, click the **Copy to clipboard (Ctrl+C)** icon.

▶ SICAT Function copies the content of the view to the Windows clipboard.

COPYING THE CONTENT OF A VIEW INTO SIDEXIS

To copy the content of a view into the current exam of SIDEXIS, proceed as follows:

☑ You have started SICAT Suite from SIDEXIS.

☑ The desired view is already active. For information about this, see *Switching the active view [*▶ *Page 34]*.

▪ In the title bar of the view, click the **Export to current exam** icon.

▶ SICAT Function copies the content of the view to the current SIDEXIS exam.

12 ADAPTATION OF THE 3D VIEW

You can always change the viewing direction of the **3D** view. For information about this, see *Changing the viewing direction of the 3D view [*▶ *Page 45]*.

To configure the **3D** view, the following actions are available:

- *Switching the display mode of the 3D view [*▶ *Page 47]*
- *Configuring the active display mode of the 3D view [*▶ *Page 48]*
- *Panning [*▶ *Page 50]*

12.1 CHANGING THE VIEWING DIRECTION OF THE 3D VIEW

There are two ways to change the viewing direction of the **3D** view:

- Interactively
- Selecting a default viewing direction

INTERACTIVELY CHANGING THE VIEWING DIRECTION OF THE 3D VIEW

To change the viewing direction of the **3D** view interactively, proceed as follows:

1. Move the mouse pointer over the **3D** view.

2. Click and hold the left mouse button.
   - ► The mouse pointer changes to a hand.

3. Move the mouse.
   - ► The viewing direction changes according to the movement of the mouse.

4. Release the left mouse button.

► SICAT Function maintains the current viewing direction of the **3D** view.

SELECTING A DEFAULT VIEWING DIRECTION

To select a default viewing direction in the **3D** view, proceed as follows:

1. In the upper left corner of the **3D** view, move the mouse pointer over the Orientation head icon.
   - ► The **Viewing direction** overlay opens:

   - ► In the middle of the **Viewing direction** overlay, the highlighted Orientation head shows the current viewing direction.

2. Click the Orientation head icon that shows the desired default viewing direction.
   - ► The viewing direction of the **3D** view changes corresponding to your selection.

3. Move the mouse pointer out of the **Viewing direction** overlay.

► The **Viewing direction** overlay closes.

12.2 VISUALIZATION MODES OF THE 3D VIEW

For general information about the **3D** view, see *Adaptation of the 3D View [▶ Page 44]*.

SICAT Function provides different display modes for the **3D** view in the **MPR/Radiology** workspace and in the **Panorama** workspace:

- The **Overview** visualization mode shows an overview of the entire 3D X-ray scan.

- The **Clipped** visualization mode only shows a movable clipping of the 3D X-ray scan.

For how to activate a display mode of the **3D** view, see *Switching the display mode of the 3D view [▶ Page 47]*.

For how to configure a display mode, see *Configuring the active display mode of the 3D view [▶ Page 48]*.

12.3 SWITCHING THE DISPLAY MODE OF THE 3D VIEW

All display modes are available in all workspaces.

To switch the display mode of the **3D** view, proceed as follows:

☑ The **3D** view is already active. See *Switching the active view [▶ Page 34]*.

1. In the **View toolbar** of the **3D** view, move the mouse pointer over the **Switch display mode** icon.

   ▶ The **Switch display mode** overlay opens.

2. Click the icon of the desired display mode.

   ▶ SICAT Function activates the desired display mode.

3. Move the mouse pointer out of the **Switch display mode** overlay.

▶ The **Switch display mode** overlay closes.

12.4 CONFIGURING THE ACTIVE DISPLAY MODE OF THE 3D VIEW

> **i** Only configurable display modes show the **Configure active display mode** icon. The **Configure active display mode** overlay only shows settings that are relevant for the active display mode.

To configure the display mode of the **3D** view, proceed as follows:

☑ The **3D** view is already active. For information about this, see *Switching the active view [▶ Page 34]*.

☑ The desired display mode is already active.

☑ The active display mode is configurable.

1. In the **View toolbar** of the **3D** view, move the mouse pointer over the **Configure active display mode** icon.
    ▶ The **Configure active display mode** overlay opens:
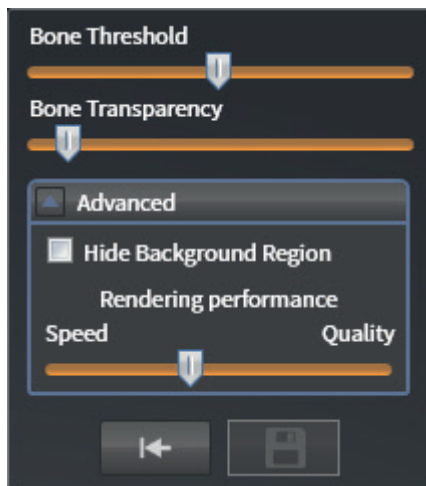
2. Move the desired sliders.
    ▶ SICAT Function adjusts the **3D** view corresponding to the position of the sliders.

3. If available, click the arrow icon next to **Show advanced options**.
    ▶ The **Show advanced options** area expands.

4. Activate or deactivate the available check boxes.
    ▶ SICAT Function adjusts the **3D** view corresponding to the state of the check boxes.

5. Move the desired sliders.
    ▶ SICAT Function adjusts the **3D** view corresponding to the position of the sliders.

6. Move the mouse pointer out of the **Configure active display mode** overlay.

▶ The **Configure active display mode** overlay closes.

You can reset the settings to the default values by clicking the **Reset configuration of active display mode to default values** button.

You can save the current settings as default values by clicking the **Save configuration of active display mode as default values** button.

> **i** If available, position the **Rendering performance** slider into a more left position on slow computers.

12.5 PANNING

For general information about the **3D** view, see *Adaptation of the 3D View [▶ Page 44]*.

With the clipping viewing mode, you can hide parts of the volume in the **3D** view. In that case, SICAT Function only shows a clipping slab of the volume whose position SICAT Function synchronizes with the crosshair. To move the clipping slab, proceed as follows:

☑ You have already activated the clipping viewing mode. For information about this, see *Switching the display mode of the 3D view [▶ Page 47]*.

▪ In the **Axial** view, **Coronal** view, or **Sagittal** view, scroll to the desired slice. For information about this, see *Scrolling through slices in 2D slice views [▶ Page 39]*.

▶ SICAT Function moves the clipping slab corresponding to the selected slice:

13 GRAY VALUES

> **ℹ** You can only adjust the gray values of volumes generated by non-Sirona 3D scanners.

If the visualization of the volume is insufficient, you can adjust the gray values of the volume in the **Adjust Gray Values** window:
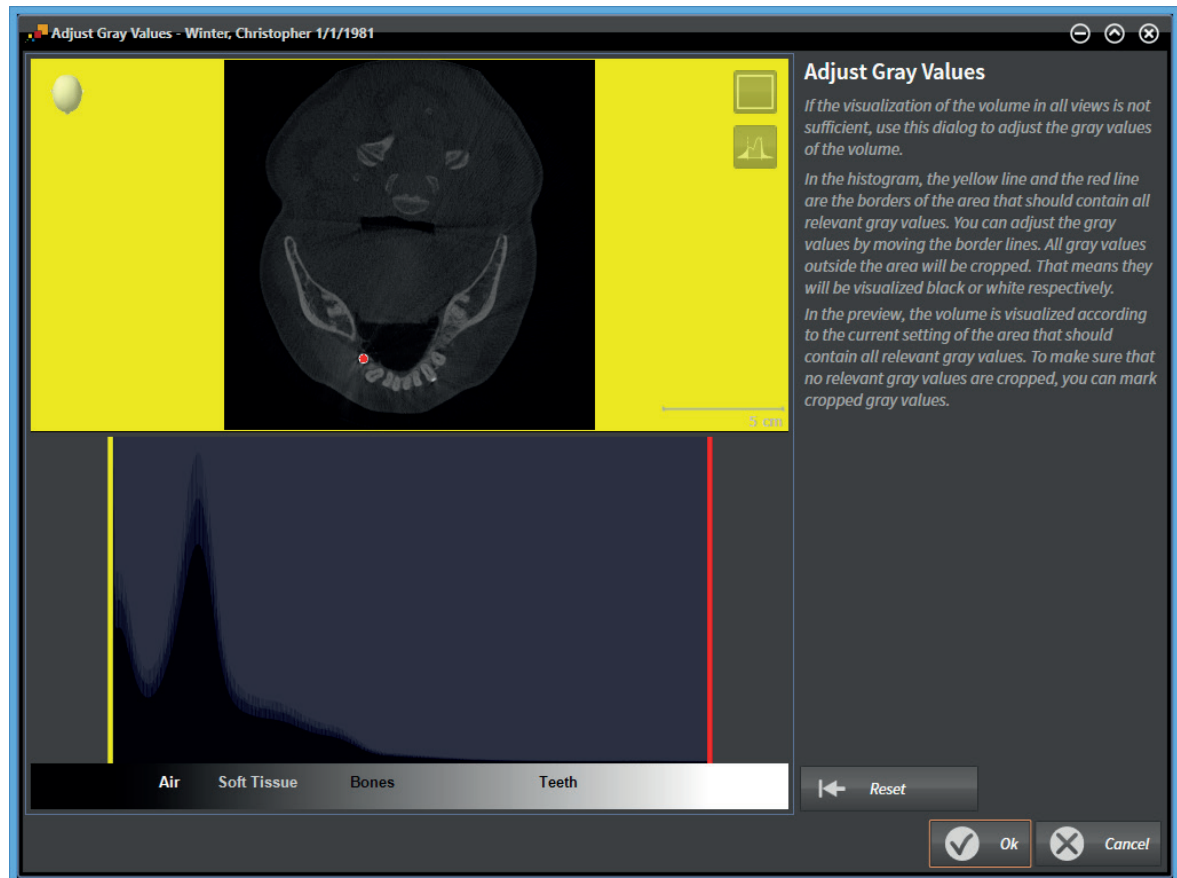
The **Adjust Gray Values** window consists of two parts:

- The upper part shows an **Axial** slice view or a **Coronal** projection view.
- The lower part shows a histogram with the frequency distribution of gray values.

In the histogram, the yellow line and the red line represent the borders of the area that should contain all relevant gray values. You can adjust the gray values by moving the lines. SICAT Function crops all gray values outside the area. That means that the software visualizes them black or white respectively.

SICAT Function visualizes the volume in the **Axial** slice view or in the **Coronal** projection view corresponding to the area that should contain all relevant gray values. To make sure that SICAT Function hides no relevant image information, the software can mark cropped gray values.

In the **Axial** slice view, you can scroll through the slices and check them for cropped gray values individually.

In the **Coronal** projection view, you can check all slices for cropped gray values at a time.

Adjust the gray values only if the visualization of the volume is insufficient in all views. For information about this, see *Adjusting gray values [▶ Page 53]*.

You can adjust the brightness and the contrast of the 2D views. For information about this, see *Adjusting and resetting the brightness and the contrast of 2D views [▶ Page 36]*.

You can adapt the display mode of the **3D** view. For information about this, see *Switching the display mode of the 3D view [▶ Page 47]*, *Configuring the active display mode of the 3D view [▶ Page 48]*, and Switching the clipping mode of the 3D view.

13.1 ADJUSTING GRAY VALUES

For general information about gray values, see *Gray values [*▶ *Page 51]*.

To adjust the gray values of the volume, proceed as follows:

☑ The **Prepare** workflow step is already expanded.

1. Click the **Adjust gray values** icon.
   ▶ The **Adjust Gray Values** window opens:
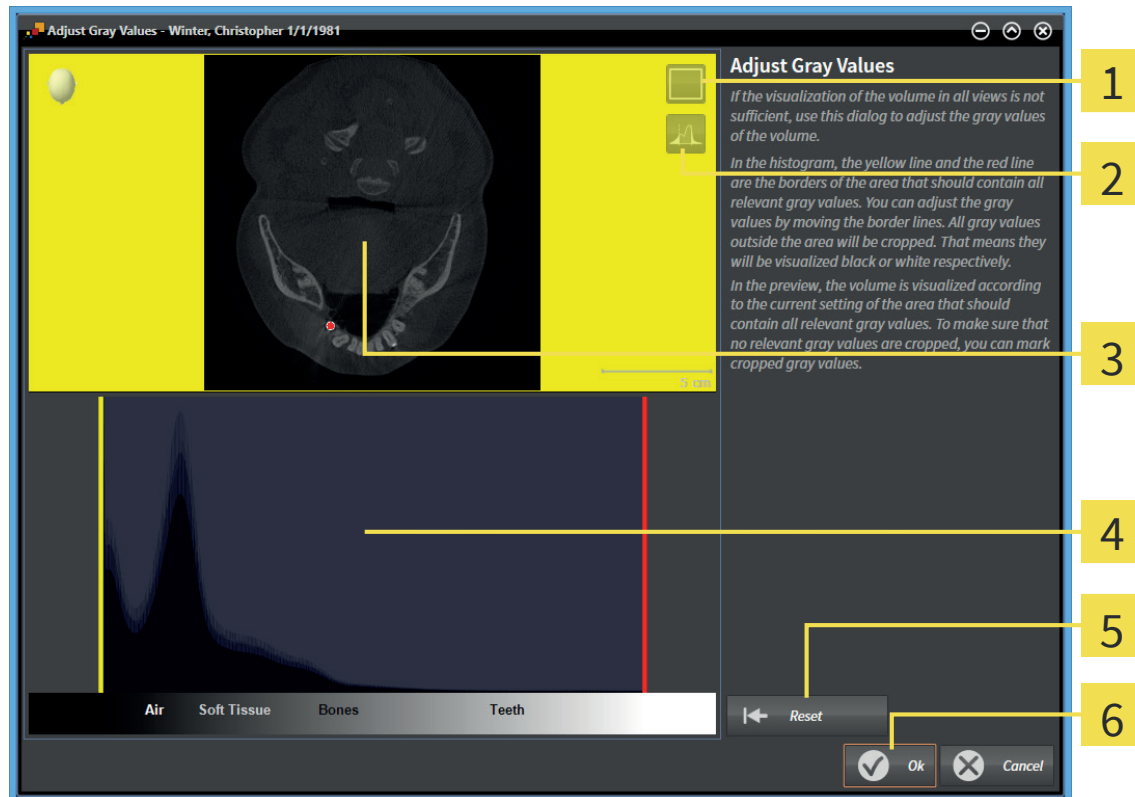
1	**Enable coronal projection mode** icon or **Enable axial slices mode** icon
2	**Unmark cropped gray values** icon or **Mark cropped gray values** icon
3	**Axial** slice view or **Coronal** projection view
4	Histogram
5	**Reset** button
6	**OK** button

2. Make sure that the slices mode is active. If required, click the **Enable axial slices mode** icon.

3. To adjust the lower border of the area that should contain all relevant gray values, move the yellow line.
   ▶ SICAT Function adjusts all gray values in the **Axial** slice view correspondingly.
   ▶ SICAT Function marks gray values below the lowest relevant gray value in yellow.

4. Scroll through the axial slices. Make sure that all relevant gray values are not marked in yellow. If required, move the yellow line again.

5. To adjust the upper border of the area that should contain all relevant gray values, move the red line.

    ▶ SICAT Function adjusts all gray values in the **Axial** slice view correspondingly.

    ▶ SICAT Function marks gray values above the highest relevant gray value in red.

6. Scroll through the axial slices. Make sure that all relevant gray values are not marked in red. If required, move the red line again.

7. Click **OK**.

▶ The **Adjust Gray Values** window closes and SICAT Function visualizes the volume in all views corresponding to the adjusted gray values.

> ℹ️ In addition to the described procedure, the following actions are available in the **Adjust Gray Values** window:
>
> - To evaluate all slices at a time, you can click the **Enable coronal projection mode** icon. By clicking the **Enable axial slices mode** icon, you can switch to the **Axial** slice view again.
> - To move both borders at once, you can click and move the area that should contain all relevant gray values.
> - To reset the area that should contain all relevant gray values to the default settings, you can click the **Reset** button.
> - If you do not want to mark the cropped gray values, you can click the **Unmark cropped gray values** icon.
> - If you do not want to save your changes, you can click **Cancel**.

14 VOLUME ORIENTATION AND PANORAMIC REGION

> ℹ️ If an adjustment of the volume orientation is required, perform it at the beginning of your work with the 3D X-ray scan. If you adjust the volume orientation later, you may have to repeat parts of your diagnosis or planning.

VOLUME ORIENTATION

You can adjust the volume orientation for all views by rotating the volume around the three principal axes. This can be required in the following cases:

- Less-than-ideal positioning of the patient during the 3D scan
- Alignment by application, for example alignment of the axial slices parallel to the Frankfurt plane or parallel to the occlusal plane
- Optimizing the panorama view

If you adjust the volume orientation in SICAT Function, all other SICAT applications take over your adaptations.

You can adjust the volume orientation. For information about this, see *Adjusting the volume orientation* [▶ Page 57].

PANORAMIC REGION

SICAT Function calculates the **Panorama** view based on the volume and the panoramic region. To optimize the **Panorama** view, you should adjust the panoramic region to both jaws of the patient. This is mandatory for an effective and efficient diagnosis and treatment planning.
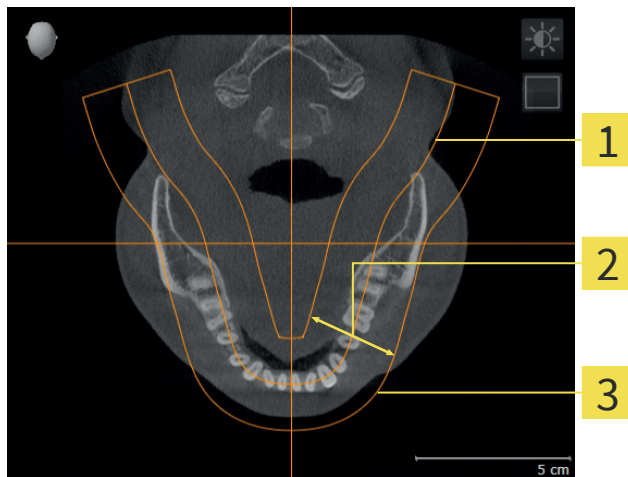
1 Panoramic curve

2 Thickness

3 Panoramic region

The panoramic region is defined by the following two components:

- Panoramic curve
- Thickness

For an optimal adjustment of the panoramic region, the following two conditions have to be met simultaneously:

- The panoramic region has to contain all teeth and both jaws completely.
- The panoramic region should be as thin as possible.

If you adjust the panoramic region in SICAT Function, all other SICAT applications take over your adaptations.

You can adapt the panoramic region. For information about this, see *Adjusting the panoramic region* [▶ *Page 62*].

14.1 ADJUSTING THE VOLUME ORIENTATION

For general information about the volume orientation, see *Volume orientation and panoramic region* [▶ *Page 55*].

Adjusting the volume orientation consists of the following steps:

- Opening the **Adjust Volume Orientation and Panoramic Region** window
- Rotating the volume in the **Sagittal** view
- Rotating the volume in the **Coronal** view
- Rotating the volume in the **Axial** view

OPENING THE "ADJUST VOLUME ORIENTATION AND PANORAMIC REGION" WINDOW

☑ The **Prepare** workflow step is already expanded.

- Click the **Adjust volume orientation and panoramic region** icon.

▶ The **Adjust Volume Orientation and Panoramic Region** window opens:
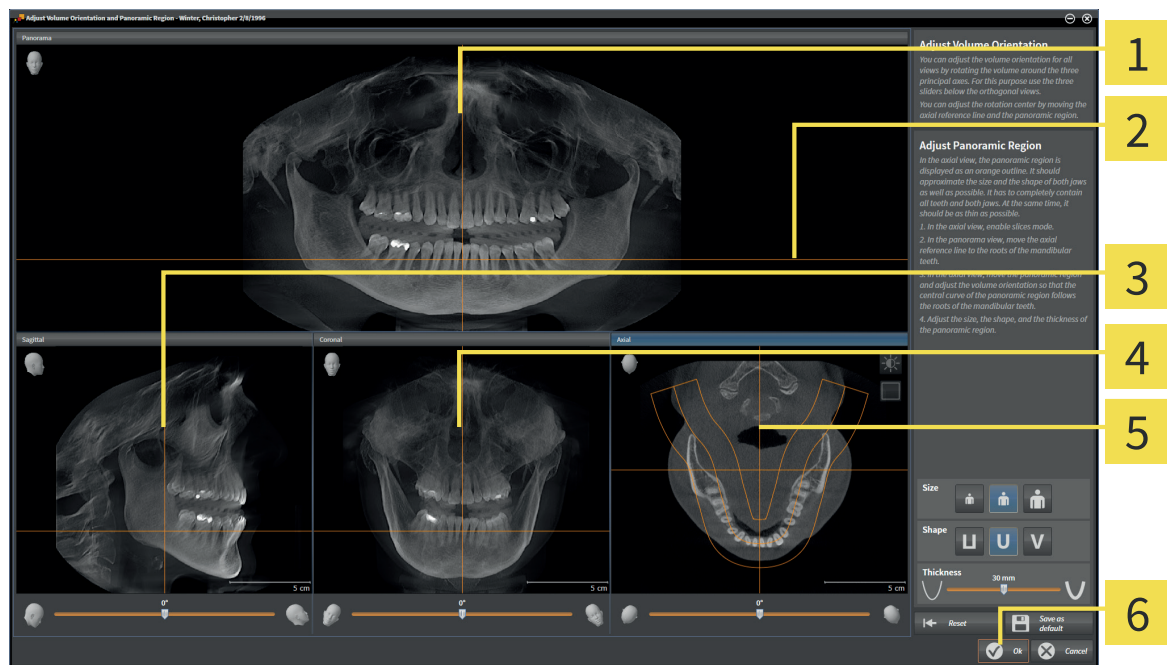
1	**Panorama** view	**4**	**Coronal** view with **Rotation** slider
2	Axial reference line	**5**	**Axial** view with **Rotation** slider
3	**Sagittal** view with **Rotation** slider	**6**	**OK** button

ROTATING THE VOLUME IN THE SAGITTAL VIEW

1. Activate the **Sagittal** view:
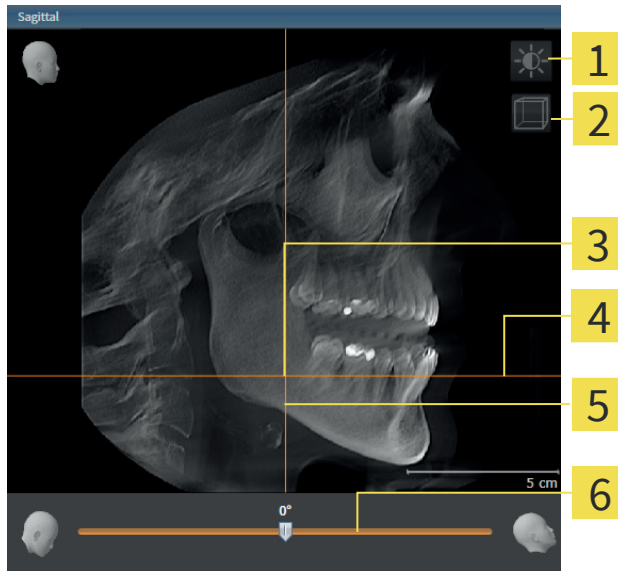
1	**Adjust brightness and contrast** icon	4	Axial reference line
2	**Enable slices mode** icon or **Enable projection mode** icon	5	Coronal reference line
3	Rotation center	6	**Rotation** slider

2. Make sure that the projection mode is active. If required, click the **Enable projection mode** icon.

3. If required, move the axial reference line by clicking on the axial reference line with the left mouse button and moving the mouse up and down while holding the left mouse button.

4. Move the mouse pointer over the **Rotation** slider.

5. Click and hold the left mouse button.

6. Move the mouse to the left or to the right.

   ▶ SICAT Function rotates the volume in the **Sagittal** view circularly around the rotation center and in the other views correspondingly.

7. When you have set up the desired rotation of the volume, release the left mouse button. Orientate yourself towards the axial reference line and the coronal reference line.

ROTATING THE VOLUME IN THE CORONAL VIEW

1. Activate the **Coronal** view:
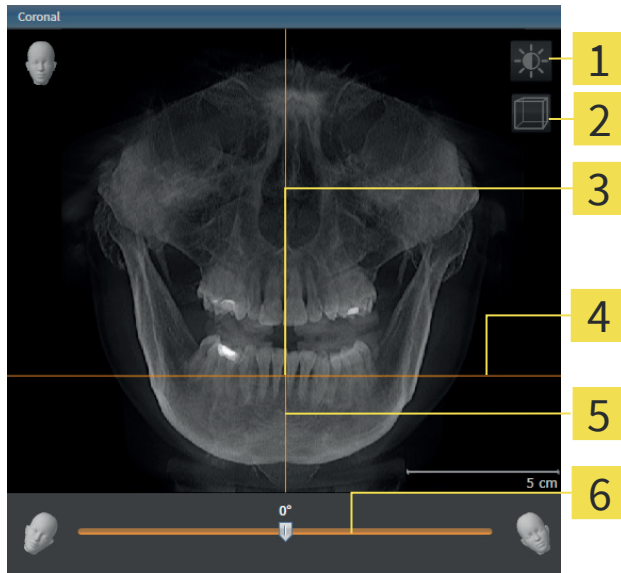
1	**Adjust brightness and contrast** icon	**4**	Axial reference line
2	**Enable slices mode** icon or **Enable projection mode** icon	**5**	Sagittal reference line
3	Rotation center	**6**	**Rotation** slider

2. Make sure that the projection mode is active. If required, click the **Enable projection mode** icon.

3. If required, move the axial reference line by clicking on the axial reference line with the left mouse button and moving the mouse up and down while holding the left mouse button.

4. Move the mouse pointer over the **Rotation** slider.

5. Click and hold the left mouse button.

6. Move the mouse to the left or to the right.

   ► SICAT Function rotates the volume in the **Coronal** view circularly around the rotation center and in the other views correspondingly.

7. When you have set up the desired rotation of the volume, release the left mouse button. Orientate yourself towards the axial reference line and the sagittal reference line.

ROTATING THE VOLUME IN THE AXIAL VIEW

1. Activate the **Axial** view:
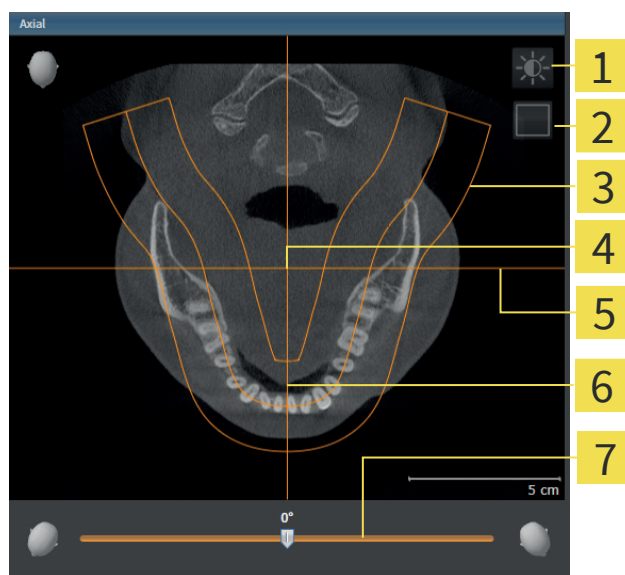

1	**Adjust brightness and contrast** icon	**5**	Coronal reference line
2	**Enable projection mode** icon or **Enable slices mode** icon	**6**	Sagittal reference line
3	Panoramic region	**7**	**Rotation** slider
4	Rotation center		

2. Make sure that the slice mode is active. If required, click the **Enable slices mode** icon.

3. Scroll to a slice that shows the roots of the mandibular teeth, for example by clicking on the axial reference line in the panorama view with the left mouse button and moving the mouse up or down while holding the left mouse button.

4. If required, move the panoramic region in the **Axial** view by clicking on the panoramic region with the left mouse button and moving the mouse while holding the left mouse button. SICAT Function moves the coronal reference line and the sagittal reference line correspondingly.

5. Move the mouse pointer over the **Rotation** slider.

6. Click and hold the left mouse button.

7. Move the mouse to the left or to the right.

    ► SICAT Function rotates the volume in the **Axial** view circularly around the rotation center and in the other views correspondingly.

8. When you have set up the desired rotation of the volume, release the left mouse button. Orientate yourself towards the panoramic region, the coronal reference line and the sagittal reference line.

9. To save your adjustments, click **OK**.

► SICAT Function saves the adjusted volume orientation and shows the volume in all views orientated correspondingly.

> **i** In addition to the described procedure, the following actions are available in the **Adjust Volume Orientation and Panoramic Region** window:
> - You can adjust the brightness and the contrast of a 2D view by activating the desired view and clicking on the **Adjust brightness and contrast** icon. For information about this, see *Adjusting and resetting the brightness and the contrast of 2D views [▶ Page 36]*.
> - To reset the volume orientation and the panoramic region, you can click the **Reset** button.
> - To save the current volume orientation and the current panoramic region as default, you can click the **Save as default** button.
> - If you do not want to save your adjustments, you can click **Cancel**.

14.2 ADJUSTING THE PANORAMIC REGION

For general information about the panoramic region, see *Volume orientation and panoramic region* [▶ *Page 55*].

Adjusting the panoramic region consists of the following steps:

- Opening the **Adjust Volume Orientation and Panoramic Region** window
- Adjusting the slice position of the **Axial** view
- Moving the panoramic region
- Rotating the volume in the **Axial** view
- Adjusting **Size**, **Shape**, and **Thickness** of the panoramic region

OPENING THE "ADJUST VOLUME ORIENTATION AND PANORAMIC REGION" WINDOW

☑ The **Prepare** workflow step is already expanded.

- Click the **Adjust volume orientation and panoramic region** icon.

▶ The **Adjust Volume Orientation and Panoramic Region** window opens:
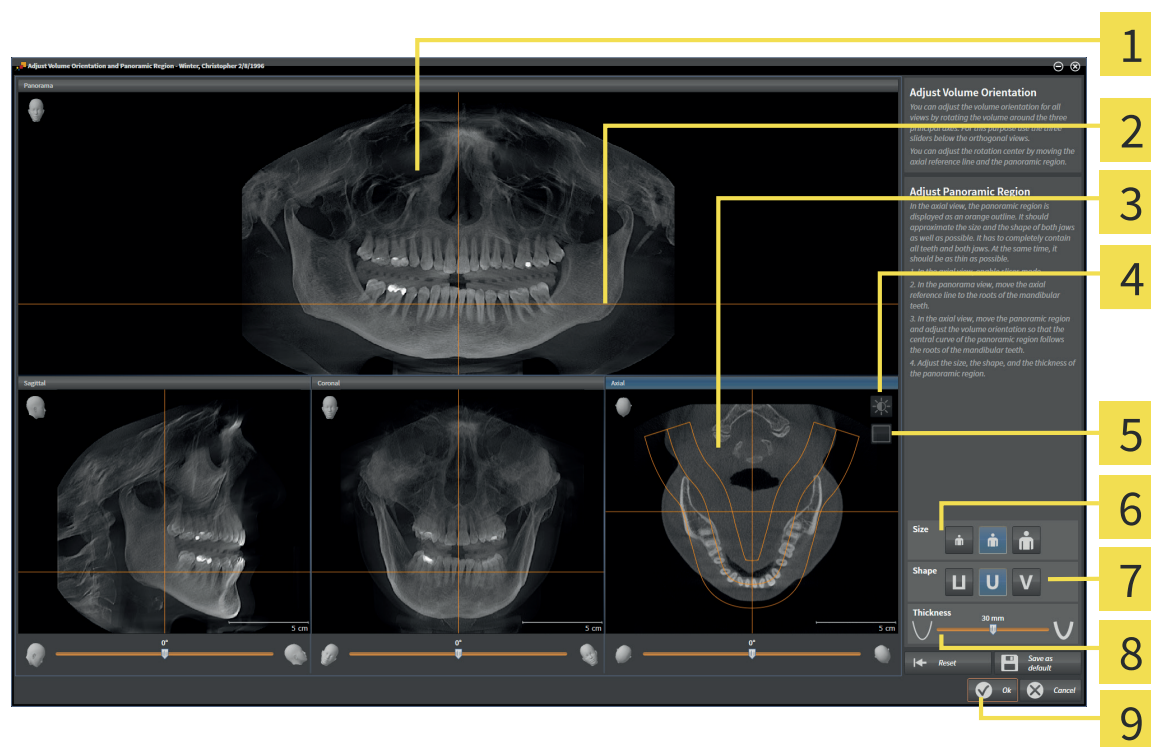
1	**Panorama** view	**6**	**Size** buttons
2	Axial reference line	**7**	**Shape** buttons
3	**Axial** view with **Rotation** slider	**8**	**Thickness** slider
4	**Adjust brightness and contrast** icon	**9**	**OK** button
5	**Enable projection mode** icon or **Enable slices mode** icon		

ADJUSTING THE SLICE POSITION OF THE AXIAL VIEW

1. In the **Axial** view, make sure that the slices mode is enabled. If required, click the **Enable slices mode** icon.

2. In the **Panorama** view, move the mouse pointer over the axial reference line. The axial reference line shows the current slice position of the **Axial** view.

3. Click and hold the left mouse button.

4. Move the mouse up or down.
   ▶ The slice of the **Axial** view adapts to the position of the axial reference line in the **Panorama** view.

5. When the axial reference line is located on the roots of the mandibular teeth, release the left mouse button.
   ▶ The **Axial** view maintains the current slice.

MOVING THE PANORAMIC REGION

1. In the **Axial** view, move the mouse pointer over the panoramic region.

2. Click and hold the left mouse button.

3. Move the mouse.
   ▶ SICAT Function moves the panoramic region corresponding to the position of the mouse pointer.

4. When the central curve of the panoramic region follows the roots of the mandibular teeth, release the left mouse button.
   ▶ The panoramic region maintains its current position.

ROTATING THE VOLUME IN THE AXIAL VIEW

1. In the **Axial** view, move the mouse pointer over the **Rotation** slider.

2. Click and hold the left mouse button.

3. Move the mouse to the left or to the right.
   ▶ SICAT Function rotates the volume in the **Axial** view circularly around the rotation center and in the other views correspondingly.

4. When the roots of the mandibular teeth follow the central curve of the panoramic region, release the left mouse button.

ADJUSTING SIZE, SHAPE, AND THICKNESS OF THE PANORAMIC REGION

1. Select the **Size** of the panoramic region that matches best to the mandible of the patient by clicking on the corresponding **Size** button.

2. Select the **Shape** of the panoramic region that matches best to the mandible of the patient by clicking on the corresponding **Shape** button.

3. In the **Axial** view, make sure that the projection mode is enabled. If required, click the **Enable projection mode** icon.

4. Select the **Thickness** of the panoramic region by adjusting the **Thickness** slider. Make sure that the panoramic region contains all teeth and both jaws completely. Keep the thickness as thin as possible.

5. To save your adjustments, click **OK**.

▶ SICAT Function saves the adjusted volume orientation and the adjusted panoramic region and visualizes the **Panorama** view correspondingly.

> In addition to the described procedure, the following actions are available in the **Adjust Volume Orientation and Panoramic Region** window:
> - You can adjust the brightness and the contrast of a 2D view by activating the desired view and clicking on the **Adjust brightness and contrast** icon. For information about this, see *Adjusting and resetting the brightness and the contrast of 2D views [▶ Page 36]*.
> - To reset the volume orientation and the panoramic region, you can click the **Reset** button.
> - To save the current volume orientation and the current panoramic region as default, you can click the **Save as default** button.
> - If you do not want to save your adjustments, you can click **Cancel**.

15 JAW MOTION TRACKING DATA

Patient specific jaw motions and jaw positions provide information regarding the chewing dynamics of the patient. You can use this information for analysis and diagnosis of the patient. Furthermore, you can integrate this data in a therapy planning of the patient.

SICAT Function visualizes patient specific jaw motions and jaw positions. The application supports the following sources of jaw motion tracking data:

- Movement data from jaw motion tracking (JMT) devices
- Static positions from jaw motion tracking devices
- Buccal bite positions recorded with an intraoral camera

For a list of compatible jaw motion tracking devices, see *Compatible jaw motion tracking devices [▶ Page 66]*.

You can import buccal bite positions together with optical impressions. For information about this, see *Optical impressions [▶ Page 77]*.

Besides importing jaw motion tracking data, you have to perform additional steps to prepare the visualization of jaw motion tracking data. For information about this, see *Principles of operation [▶ Page 12]*.

After you prepared all required data, the following actions are available for jaw motion tracking data:

- *Interacting with jaw motions [▶ Page 86]*
- *Visualization of the anatomical traces in the 3D view [▶ Page 89]*
- *Adjusting anatomical traces with the Inspection Window [▶ Page 90]*
- *Adjusting anatomical traces with the crosshair in a slice view [▶ Page 91]*

ACCURACY INFORMATION

Jaw motion data visualization accuracy	< 0.6 mm

15.1 COMPATIBLE JAW MOTION TRACKING DEVICES

⚠️ **CAUTION**	**Use of jaw tracking devices with an inappropriate intended use could result in wrong diagnosis and treatment.** ▪ Only use jaw tracking data from devices with an intended use that covers the use of the jaw motion tracking data with SICAT Function.

⚠️ **CAUTION**	**Use of unsupported jaw motion tracking devices or incompatible registration devices could result in wrong diagnosis and treatment.** ▪ Only use jaw tracking data that has been acquired with a supported combination of a jaw motion tracking device and a compatible registration device.

Make sure that you only acquire jaw motion data with a compatible jaw motion tracking device in combination with a supported registration device. Only import jaw motion tracking data into SICAT Function that originates from compatible jaw motion tracking devices. You can only import jaw motion tracking data into SICAT Function that was acquired with jaw motion tracking devices supporting the SICAT JTI format V1.0 interface.

SICAT Function currently supports the following combinations of jaw motion tracking devices and jaw motion registration devices:

- SICAT JMT⁺ in combination with a jaw motion registration device of type "zebris", manufacturer: SICAT GmbH & Co. KG, Brunnenallee 6, 53347 Bonn, Germany
- zebris JMT⁺ in combination with a jaw motion registration device of type "zebris", manufacturer: zebris Medical GmbH, Max-Eyth-Weg 43, 88316 Isny im Allgäu, Germany

15.2 IMPORTING AND REGISTERING JAW MOTION TRACKING DATA FROM JAW MOTION TRACKING DEVICES

⚠️

CAUTION

Use of other data than 3D X-ray data as the only source of information could result in incorrect diagnosis and treatment.

1. Use 3D X-ray data as the ultimate source of information for diagnosis and planning.
2. Use other data, for example optical impression data, only as an auxiliary source of information.

⚠️

CAUTION

Inappropriate jaw tracking devices could result in incorrect diagnosis and treatment.

- Only use jaw tracking data from devices cleared as medical devices.

⚠️

CAUTION

Incorrect acquisition of jaw tracking data and 3D volume data could result in incorrect diagnosis and treatment.

- Assure jaw tracking data and 3D X-ray data have been acquired according to the instructions of the device manufacturer. Use the specified type of reference body.

⚠️

CAUTION

Jaw tracking data that does not match patient and date of visualized 3D X-ray data could result in incorrect diagnosis and treatment.

- Assure patient and date of imported jaw tracking data match patient and date of the visualized 3D X-ray data.

⚠️

CAUTION

Insufficient integrity or quality of jaw tracking data could result in incorrect diagnosis and treatment.

- Verify the integrity and quality of the imported jaw tracking data.

⚠️

CAUTION

Insufficient quality, precision, and resolution of jaw tracking data could result in incorrect diagnosis and treatment.

- Only use jaw tracking data with sufficient quality, resolution, and precision that allows for the intended diagnosis and therapy.

⚠️

CAUTION

Excessive artifacts, insufficient resolution, or insufficient quality of the 3D X-ray data could result in a failure of the marker and reference body detection mechanism. Examples of excessive artifacts in 3D X-ray data are motion or metal artifacts.

- Only use 3D X-ray data that allows for a correct marker and reference body detection.

⚠️ CAUTION	**Incorrect position, type, and alignment of the reference body could result in incorrect diagnosis and treatment.**
	▪ After the JMT wizard identified the reference body, verify the correct position, type and alignment of the reference body with respect to the 3D X-ray data.

⚠️ CAUTION	**Wrong alignment of registered jaw tracking data and 3D X-ray data could result in incorrect diagnosis and treatment.**
	▪ Verify that registered jaw tracking data is correctly aligned with 3D X-ray data.

NOTICE	To ensure correct registration of jaw motion tracking data, SICAT recommends the use of 3D X-ray data with the following parameters:
	1. Slice thickness thinner than 0.7 mm
	2. Voxel size smaller than 0.7 mm in all three dimensions

ℹ️	Before recorded jaw motion data can be imported into SICAT Function, you need to export the data from the software of the jaw motion tracking device. For how to export files that are suitable for SICAT Function, see the instructions for use of the jaw motion tracking device.

ℹ️	During the import process of jaw motion tracking data into SICAT Function, you need to identify and mark three spherical markers within the **Axial** view of the **Import and Register Jaw Motion Tracking Data** wizard.

For general information about jaw motion tracking data, see *Jaw motion tracking data [*▶ *Page 65]*.

To import and register jaw motion tracking data, proceed as follows:

☑ The **Diagnose** workflow step is already expanded. For information about this, see *Workflow toolbar [*▶ *Page 19]*.

1. Click the **Import and Register Jaw Motion Tracking Data** icon.
   ▶ The **Import and Register Jaw Motion Tracking Data** wizard with the **Import** step opens.

2. In the **Import and Register Jaw Motion Tracking Data** wizard, click the **Browse** button.
   ▶ The **Load JMT Export File** window opens.

3. In the **Load JMT Export File** window, browse to the desired jaw motion tracking file, select the file and click **Open**.
   ▶ The **Load JMT Export File** window closes and SICAT Function transfers the path to the selected jaw motion tracking file to the **Path** field.
   ▶ The **Bite fork** view shows a preview of the bite fork that was used during the acquisition of the jaw motion tracking data.

▶ The **Patient** area and the **Acquisition** area show information from the jaw motion tracking file:
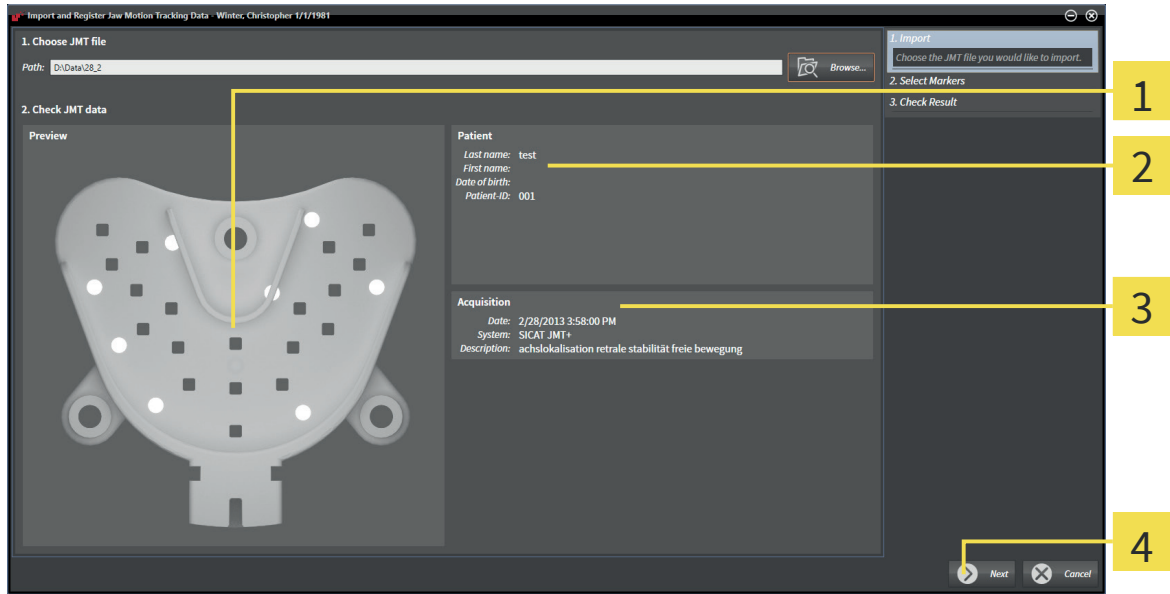
1	**Bite fork** view	**3**	**Acquisition** area
2	**Patient** area	**4**	**Next** button

4. Make sure that the jaw motion tracking file corresponds to the active study.

5. Click **Next**.

▶ The **Select Markers** step opens:
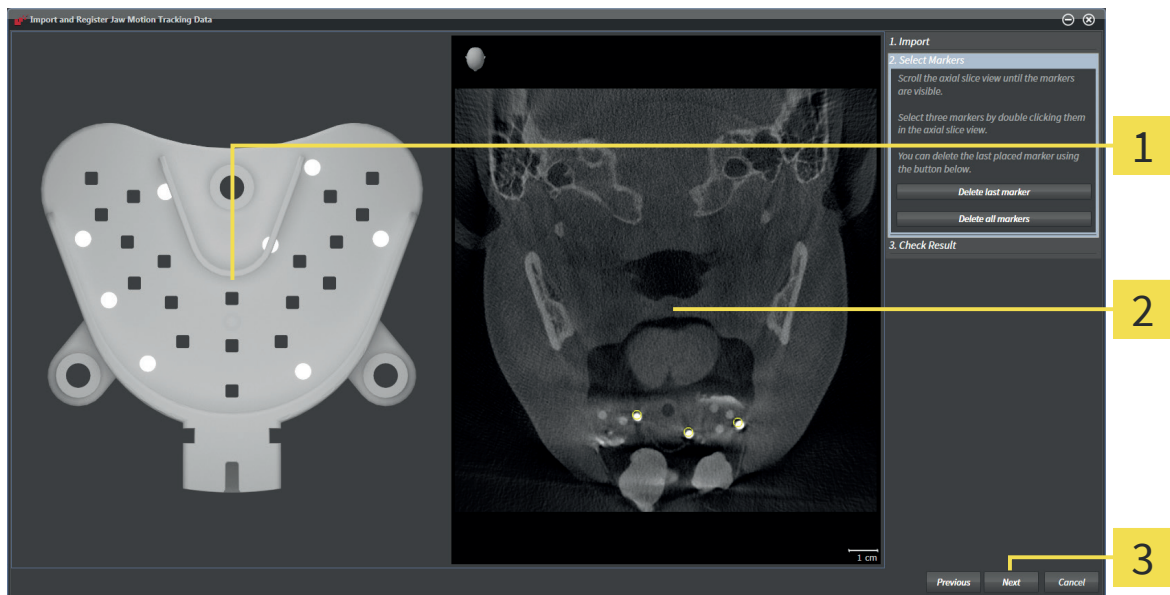
1	**Bite fork** view
2	**Axial** view
3	**Next** button

6. Scroll through the axial slices until the **Axial** slice view shows at least one spherical marker.

7. In the **Axial** slice view, double-click on a spherical marker.

    ▶ SICAT Function marks the spherical marker.

8. Repeat the last step until three spherical markers are marked.

9. Click **Next**.

    ▶ SICAT Function registers the jaw motion tracking data.

    ▶ The **Check Result** step opens:
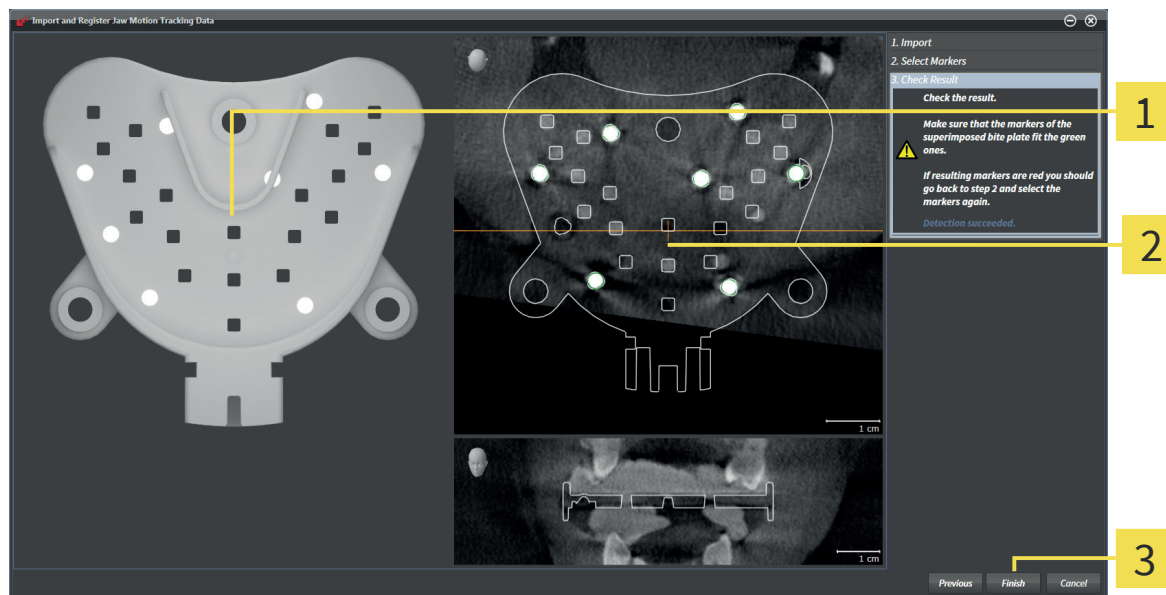
	Bite fork view
1	
2	**Axial** slice view
3	**Finish** button

10. Make sure that the spherical markers on the **Bite fork** in the **Axial** slice view match.

11. Click **Finish**.

▶ SICAT Function imports the registered jaw motion tracking data.

> ℹ In addition to the described procedure, the following actions are available in the **Import and Register Jaw Motion Tracking Data** wizard:
> - If you are inconvenient with the last marker, you can click the **Delete last marker** button.
> - If the **Bite fork** is imprecisely aligned with the X-ray data, click the **Previous** button and repeat the **Select Markers** step with markers at different positions.
> - If you want to abort importing and registering jaw motion tracking data, you can click **Cancel**.

> **ⓘ** If the opened study already contains registered jaw motion tracking data, you need to confirm that SICAT Function removes this data when you open the **Import and Register Jaw Motion Tracking Data** wizard again.

16 SEGMENTATION

⚠️ **CAUTION**	**Excessive artifacts or insufficient resolution of 3D X-ray data could result in a failure of the segmentation process or inadequate results. Examples of excessive artifacts in 3D X-ray data can be motion artifacts or metal artifacts.** ▪ Only use 3D X-ray data that allows for a sufficient quality of the segmentation of the relevant anatomical structures.

⚠️ **CAUTION**	**Insufficient quality of segmentation could result in incorrect diagnosis and treatment.** ▪ Verify that the quality of segmentation is sufficient for the intended use.

To visualize the movement of the mandible, SICAT Function has to separate it from the rest of the 3D X-ray data. This is called segmentation. In SICAT Function, segmentation is a semi-automatic process. With the **Mandible Segmentation** wizard, you can segment both the mandible and the fossa of the patient.

Semi-automatic process means that you need to mark parts of mandible and fossa manually with the drawing tools in the **Mandible Segmentation** wizard. After a marking, the segmentation wizard calculates similar areas automatically.

The following actions are available for segmenting mandible and fossa:

▪ *Segmenting the mandible [*▶*Page 73]*

▪ *Segmenting the fossa [*▶*Page 75]*

After segmentation of the mandible, you can perform the following actions:

▪ Visualize and playback individual anatomic patient movements in the **3D** view. For information about this, see *Interacting with jaw motions [*▶*Page 86]*.

▪ Visualize individual anatomical traces of movement of the patient in the **3D** view. For information about this, see *Visualization of the anatomical traces in the 3D view [*▶*Page 89]*.

16.1 SEGMENTING THE MANDIBLE

> ℹ️ The **Segment Condyles and Mandible Region** wizard pre-processes the segmentation on every start. The duration of pre-processing depends on the performance of your computer.

> ℹ️ The segmentation of SICAT Function works with areas instead of anatomical contours. Therefore, it is rarely required that you trace anatomical contours exactly.

For general information about segmentation, see *Segmentation [▶ Page 72]*.

To segment the mandible, proceed as follows:

☑ The **Diagnose** workflow step is already expanded. For information about this, see *Workflow toolbar [▶ Page 19]*.

1. Click the **Segment condyles and mandible region** icon.
   ▶ The **Mandible Segmentation** wizard opens:

① **Drawing tools** area

② **Undo** button and **Redo** button

③ **Ok** button

   ▶ The **Mandible Segmentation** wizard pre-processes the segmentation.

2. Adjust the **Axial** view, **Coronal** view, or **Sagittal** view so that mandible and fossa are visible.

3. Click the **Mandible** button.

4. In the desired 2D slice view, move the mouse pointer over the mandible.
   ▶ The mouse pointer changes to a pencil.

5.   Click and hold the left mouse button.

6.   Follow the mandible with the mouse pointer.

 ▶   SICAT Function shows your marking by a blue line.

7.   Release the left mouse button.

 ▶   SICAT Function segments the mandible based on your stroke.

8.   If you want to add additional areas to the mandible, click the **Navigation** icon, navigate to the desired structures within a 2D view and make strokes on them as described before.

9.   If the segmentation fits your needs, click the **Ok** button.

▶ The **Mandible Segmentation** wizard closes.

▶ The **3D** view shows the segmentation result.

You can use the **Background** drawing tool either to mark areas as background or to fine-tune the result of the semi-automatic segmentation.

You can scroll through the 2D slice views by activating the **Navigation** mode.

> In addition to the described procedure, the following actions are available in the **Segment Condyles and Mandible Region** window:
>
> - The **Segment Condyles and Mandible Region** window provides special keyboard shortcuts. For information about this, see *Keyboard shortcuts [*▶ *Page 113]*.
> - If the segmentation does not correspond to the anatomical conditions, you can click the **Undo** button.
> - If you unintentionally clicked the **Undo** button, you can click the **Redo** button.
> - In rare cases, it can happen that the pre-processing of the dataset does not provide an ideal result. In such a case, click on **Show advanced options** and deactivate the **Auto detect background** check box. Mark locations with the **Background** drawing tool that do not belong to the mandible or to the fossa with at least one stroke.
> - If you want to abort segmenting condyles and mandible region, you can click **Cancel**.

16.2 SEGMENTING THE FOSSA

The **Segment Condyles and Mandible Region** wizard pre-processes the segmentation on every start. The duration of pre-processing depends on the performance of your computer.

The segmentation of SICAT Function works with areas instead of anatomical contours. Therefore, it is rarely required that you trace anatomical contours exactly.
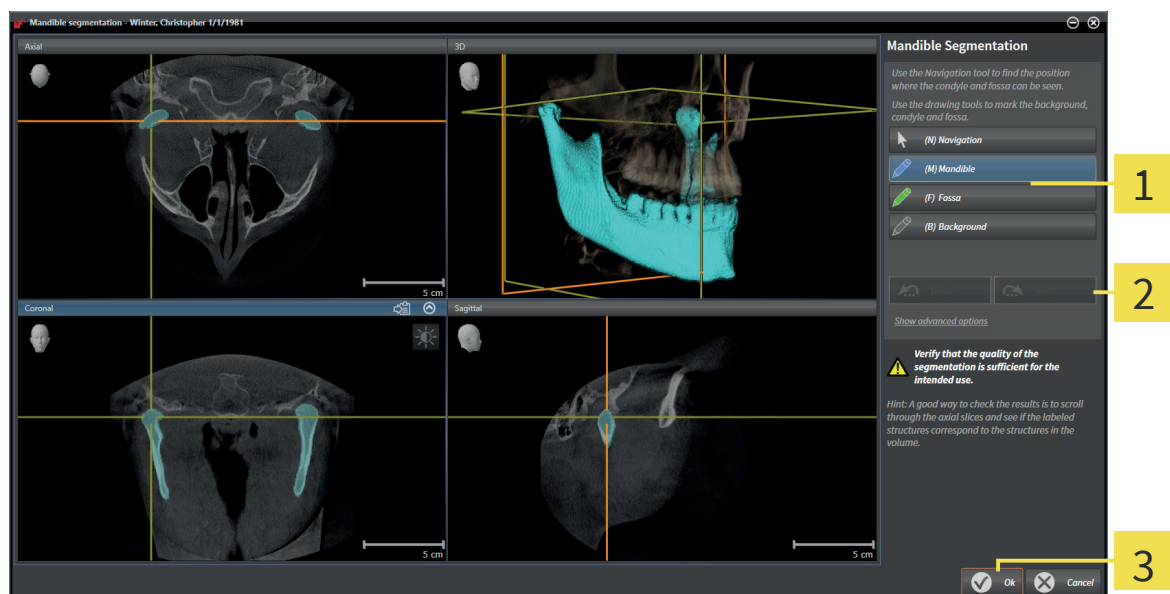
For general information about segmentation, see *Segmentation [*▶*Page 72]*.

To segment the fossa, proceed as follows:

☑ The **Diagnose** workflow step is already expanded. For information about this, see *Workflow toolbar [*▶ *Page 19]*.

1. Click the **Segment condyles and mandible region** icon.
   ▶ The **Mandible Segmentation** wizard opens:
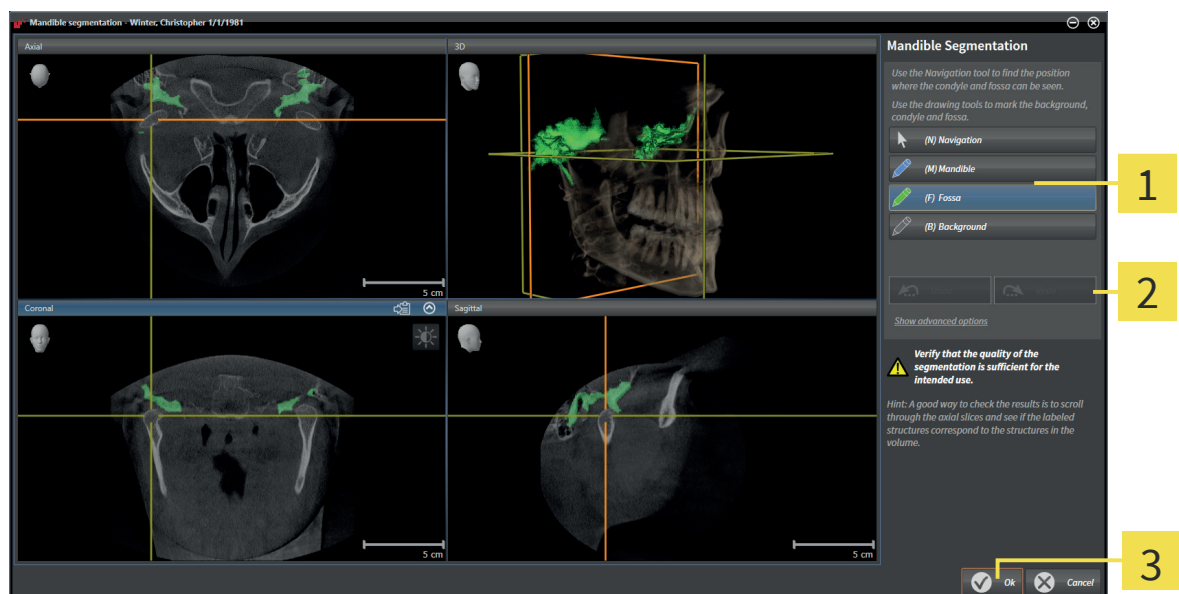
1 **Drawing tools** area

2 **Undo** button and **Redo** button

3 **Ok** button

   ▶ The **Mandible Segmentation** wizard pre-processes the segmentation.

2. Adjust the **Axial** view, **Coronal** view, or **Sagittal** view so that mandible and fossa are visible.

3. Click the **Fossa** button.

4. In the desired 2D slice view, move the mouse pointer over the fossa.
   ▶ The mouse pointer changes to a pencil.

5. Click and hold the left mouse button.

6. Follow the fossa with the mouse pointer.

    ► SICAT Function shows your marking by a green line.

7. Release the left mouse button.

    ► SICAT Function segments the fossa based on your stroke.

8. If you want to add additional areas to the fossa, click the **Navigation** icon, navigate to the desired structures within a 2D view and make strokes on them as described before.

9. If the segmentation fits your needs, click the **Ok** button.

► The **Mandible Segmentation** wizard closes.

► The **3D** view shows the segmentation result.

You can use the **Background** drawing tool either to mark areas as background or to fine-tune the result of the semi-automatic segmentation.

You can scroll through the 2D slice views by activating the **Navigation** mode.

> In addition to the described procedure, the following actions are available in the **Segment Condyles and Mandible Region** window:
>
> • The **Segment Condyles and Mandible Region** window provides special keyboard shortcuts. For information about this, see *Keyboard shortcuts [► Page 113]*.
>
> • If the segmentation does not correspond to the anatomical conditions, you can click the **Undo** button.
>
> • If you unintentionally clicked the **Undo** button, you can click the **Redo** button.
>
> • In rare cases, it can happen that the pre-processing of the dataset does not provide an ideal result. In such a case, click on **Show advanced options** and deactivate the **Auto detect background** check box. Mark locations with the **Background** drawing tool that do not belong to the mandible or to the fossa with at least one stroke.
>
> • If you want to abort segmenting condyles and mandible region, you can click **Cancel**.

17 OPTICAL IMPRESSIONS

> **i** You can only import and register optical impressions to X-ray data generated by Sirona 3D scanners.

SICAT Function can simultaneously visualize X-ray data and optical impressions of the same patient. The combined visualization provides additional information for analysis and diagnosis. Furthermore, the therapy realization is based on optical impressions.

The following actions are required to use optical impression data in SICAT Function:

- Import of an optical impression file that contains optical impression data from an optical impression system, for example CEREC
- Registration of optical impressions with 3D X-ray data

SICAT Function supports the following optical impression file formats:

- SIXD files that contain one optical impression of the maxilla and one optical impression of the mandible
- SSI files that contain one optical impression of the maxilla and one optical impression of the mandible
- STL files that contain one optical impression of the mandible

The tool for importing and registering optical impressions is located in the **Diagnose** step of the **Workflow toolbar**. When you import and register optical impressions, SICAT Function adds the optical impressions to the **Optical Impressions** group in the **Object browser**.

After you have imported and registered optical impressions in another SICAT application, you can reuse them for the same 3D scan in SICAT Function.

The following tools for optical impressions are available:

- *Importing and registering optical impressions [*▶ *Page 78]*
- *Reusing optical impressions from other SICAT applications [*▶ *Page 83]*
- Activating, hiding, and showing optical impressions - for information about this, see *Managing objects with the Object browser [*▶ *Page 22]*.
- Focusing on optical impressions and removing optical impressions - for information about this, see *Managing objects with the Object toolbar [*▶ *Page 23]*.

> **i** SICAT Function only supports STL files with an additional license.

17.1 IMPORTING AND REGISTERING OPTICAL IMPRESSIONS

⚠ **CAUTION**	**Use of other data than 3D X-ray data as the only source of information could result in incorrect diagnosis and treatment.** 1. Use 3D X-ray data as the ultimate source of information for diagnosis and planning. 2. Use other data, for example optical impression data, only as an auxiliary source of information.

⚠ **CAUTION**	**Inappropriate optical impression devices could result in incorrect diagnosis and treatment.** ▪ Only use optical impression data from devices cleared as medical devices.

⚠ **CAUTION**	**Optical impression data that does not match patient and date of 3D X-ray data could result in incorrect diagnosis and treatment.** ▪ Assure patient and date of the imported optical impression data match patient and date of the visualized 3D X-ray data.

⚠ **CAUTION**	**Insufficient integrity or quality of optical impression data could result in incorrect diagnosis and treatment.** ▪ Verify the integrity and quality of the imported optical impression data.

⚠ **CAUTION**	**Insufficient quality and precision of optical impression data could result in incorrect diagnosis and treatment.** ▪ Only use optical impression data with sufficient quality and precision that allow for intended diagnosis and therapy.

⚠ **CAUTION**	**Excessive artifacts, insufficient resolution, or absence of registration landmarks could result in a failure of the registration process of optical impressions. Examples of excessive artifacts in 3D X-ray data are motion or metal artifacts.** ▪ Only use optical impression data and 3D X-ray data that allow for an adequate registration.

⚠ **CAUTION**	**Selecting markers in the registration process of optical impressions that do not correspond to each other could result in an incorrect diagnosis and treatment.** ▪ When you register optical impressions, choose corresponding markers in the 3D X-ray data and in the optical impressions.

⚠ **CAUTION**	**Wrong alignment of optical impression data and 3D X-ray data after registration could result in an incorrect diagnosis and treatment.** ▪ Verify that the registered optical impression data is correctly aligned with the 3D X-ray data.

> ℹ️ You can use the **Inspection Window** for checking if an optical impression is precisely aligned to the X-ray data. You can move the **Inspection Window** and scroll through the slices in the **Inspection Window**.
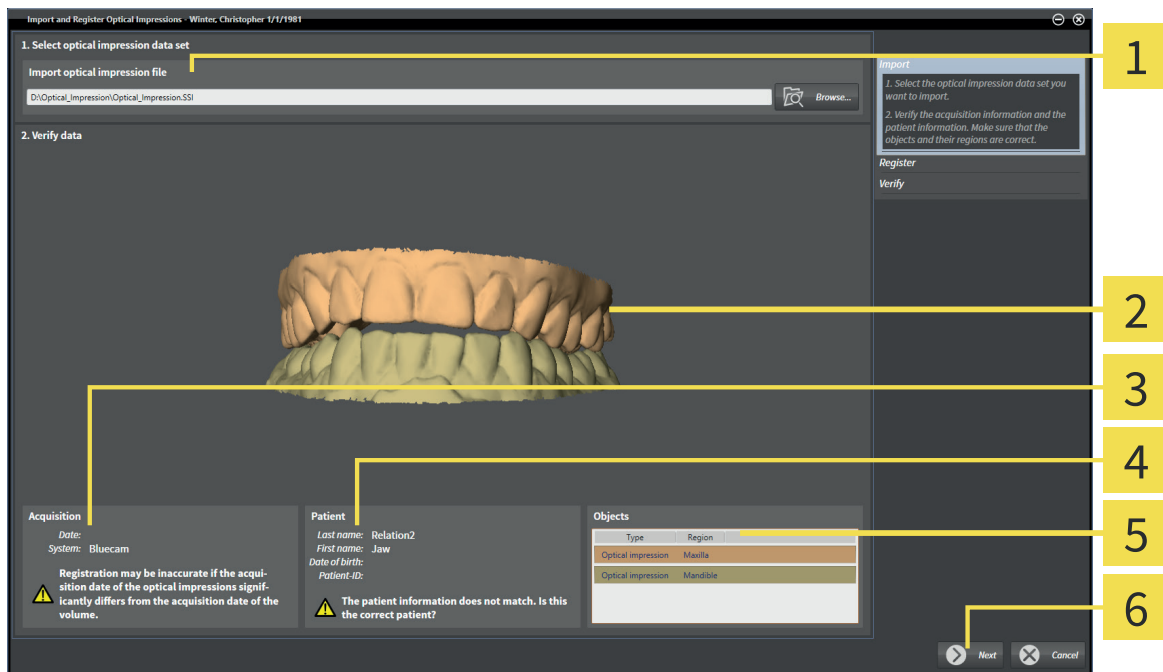
For general information about optical impressions, see *Optical impressions [▶ Page 77]*.

To import and register optical impressions, proceed as follows:

☑ The **Diagnose** workflow step is already expanded.

1. Click the **Import and Register Optical Impressions** icon.
    - ▶ The **Import and Register Optical Impressions** wizard with the **Import** step opens.

2. Click the **Browse** button.
    - ▶ The **Open Optical Impression File** window opens.

3. In the **Open Optical Impression File** window, browse to the desired optical impression file, select the file and click **Open**.
    - ▶ The **Open Optical Impression File** window closes.
    - ▶ SICAT Function imports the selected optical impression file:

1	**Import optical impression file** area	**4**	Patient information
2	**3D** view	**5**	List of objects
3	Acquisition information	**6**	**Next** button

4. Verify the acquisition information and the patient information. Make sure that the objects and their regions are correct. The background color in the list of objects corresponds to the color of objects in the **3D** view.

5. Click **Next**.

▶ The **Register** step opens for the first optical impression:
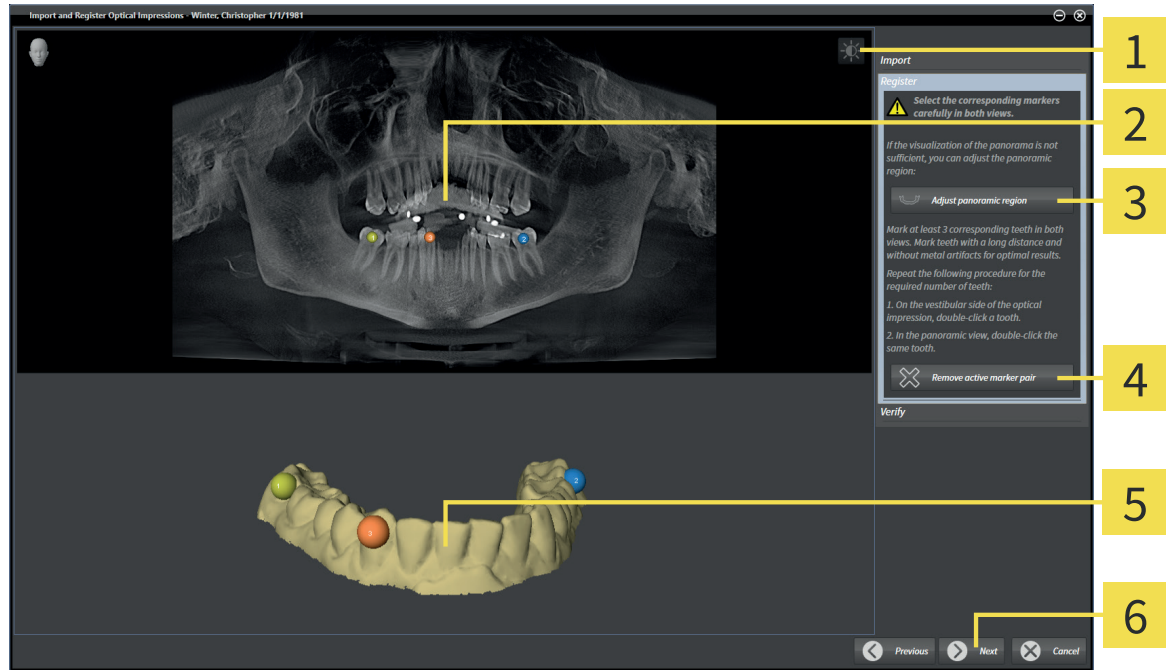
1	**Adjust brightness and contrast** icon	**4**	**Remove active marker pair** button
2	**Panorama** view	**5**	**3D** view that shows the first optical impression
3	**Adjust panoramic region** button	**6**	**Next** button

6. For the first optical impression, double-click on the same tooth both in the **Panorama** view and on the vestibular side of the optical impression in the **3D** view. Mark teeth with a long distance and without metal artifacts. Repeat this step until you marked at least three corresponding teeth in both views.

   ▶ In both views, markers with different colors and numbers show the assigned teeth of the first optical impression.

7. Click **Next**.

   ▶ SICAT Function calculates the registration of the first optical impression with the X-ray data.

▶ The **Verify** step opens for the first optical impression:
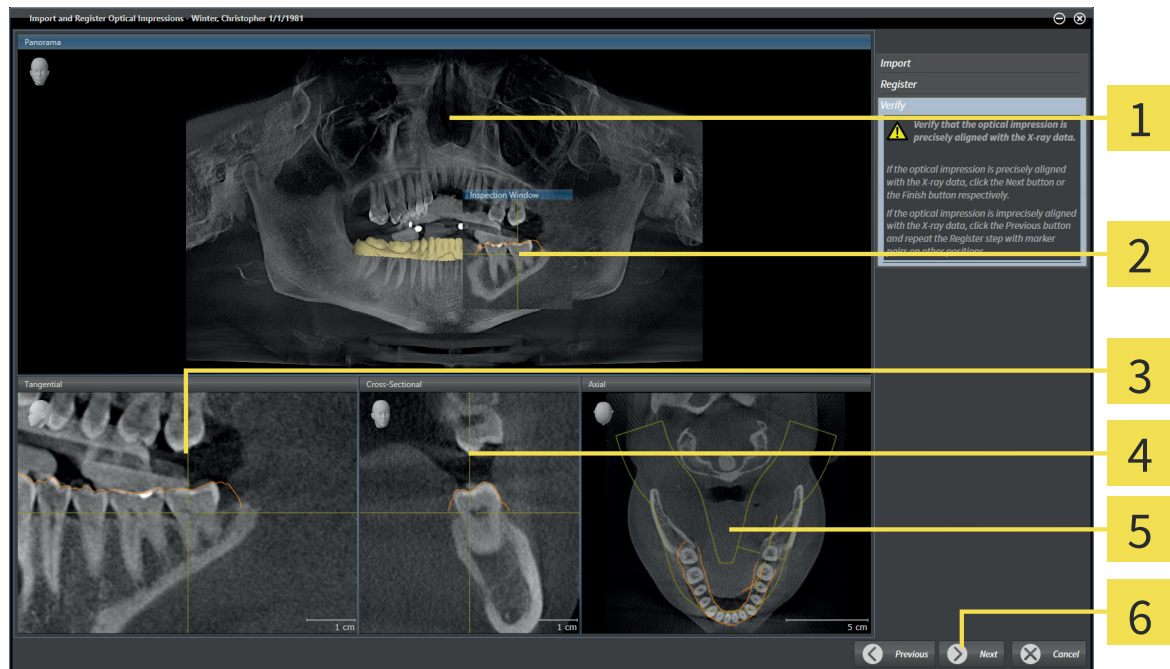
1	**Panorama** view		**4**	**Cross-Sectional** view
2	**Inspection Window**		**5**	**Axial** view
3	**Tangential** view		**6**	**Next** button

8. In the 2D slice views, verify that the optical impression is precisely aligned with the X-ray data. Scroll through the slices and check the visualized contours.

9. If the optical impression is imprecisely aligned with the X-ray data, click the **Previous** button and repeat the **Register** step with marker pairs at different positions.

10. If the first optical impression is precisely aligned with the X-ray data, click the **Next** button.
    ▶ The **Register** step opens for the second optical impression.

11. For the second optical impression, double-click on the same tooth both in the **Panorama** view and on the vestibular side of the optical impression in the **3D** view. Mark teeth with a long distance and without metal artifacts. Repeat this step until you marked at least three corresponding teeth in both views.
    ▶ In both views, markers with different colors and numbers show the assigned teeth of the second optical impression.

12. Click **Next**.
    ▶ SICAT Function calculates the registration of the second optical impression with the X-ray data.
    ▶ The **Verify** step opens for the second optical impression.

13. In the 2D slice views, verify that the optical impression is precisely aligned with the X-ray data. Scroll through the slices and check the visualized contours.

14. If the optical impression is imprecisely aligned with the X-ray data, click the **Previous** button and repeat the **Register** step with marker pairs at different positions.

15. If the second optical impression is precisely aligned with the X-ray data, click the **Finish** button.

▶ The **Import and Register Optical Impressions** wizard closes.

▶ SICAT Function adds the selected optical impressions to the **Object browser**.

▶ SICAT Function visualizes the registered optical impressions.

> **i** In addition to the described procedure, the following actions are available in the **Import and Register Optical Impressions** wizard:
>
> - You can adjust the brightness and the contrast of a 2D view by clicking the **Adjust brightness and contrast** icon. For information about this, see *Adjusting and resetting the brightness and the contrast of 2D views [▶ Page 36]*.
>
> - You can adjust the panoramic region by clicking the **Adjust panoramic region** icon. For information about this, see *Adjusting the panoramic region [▶ Page 62]*.
>
> - If you want to remove a specific marker pair in the **Register** step, you can select a marker of the pair and click the **Remove active marker pair** button.
>
> - If you want to abort importing and registering optical impressions, you can click **Cancel**.

17.2 REUSING OPTICAL IMPRESSIONS FROM OTHER SICAT APPLICATIONS

⚠️ **CAUTION**	**Use of other data than 3D X-ray data as the only source of information could result in incorrect diagnosis and treatment.** 1. Use 3D X-ray data as the ultimate source of information for diagnosis and planning. 2. Use other data, for example optical impression data, only as an auxiliary source of information.
⚠️ **CAUTION**	**Inappropriate optical impression devices could result in incorrect diagnosis and treatment.** ▪ Only use optical impression data from devices cleared as medical devices.
⚠️ **CAUTION**	**Optical impression data that does not match patient and date of 3D X-ray data could result in incorrect diagnosis and treatment.** ▪ Assure patient and date of the imported optical impression data match patient and date of the visualized 3D X-ray data.
⚠️ **CAUTION**	**Insufficient integrity or quality of optical impression data could result in incorrect diagnosis and treatment.** ▪ Verify the integrity and quality of the imported optical impression data.
⚠️ **CAUTION**	**Insufficient quality and precision of optical impression data could result in incorrect diagnosis and treatment.** ▪ Only use optical impression data with sufficient quality and precision that allow for intended diagnosis and therapy.
⚠️ **CAUTION**	**Wrong alignment of optical impression data and 3D X-ray data after registration could result in an incorrect diagnosis and treatment.** ▪ Verify that the registered optical impression data is correctly aligned with the 3D X-ray data.

For general information about optical impressions, see *Optical impressions [*▶ *Page 77]*.

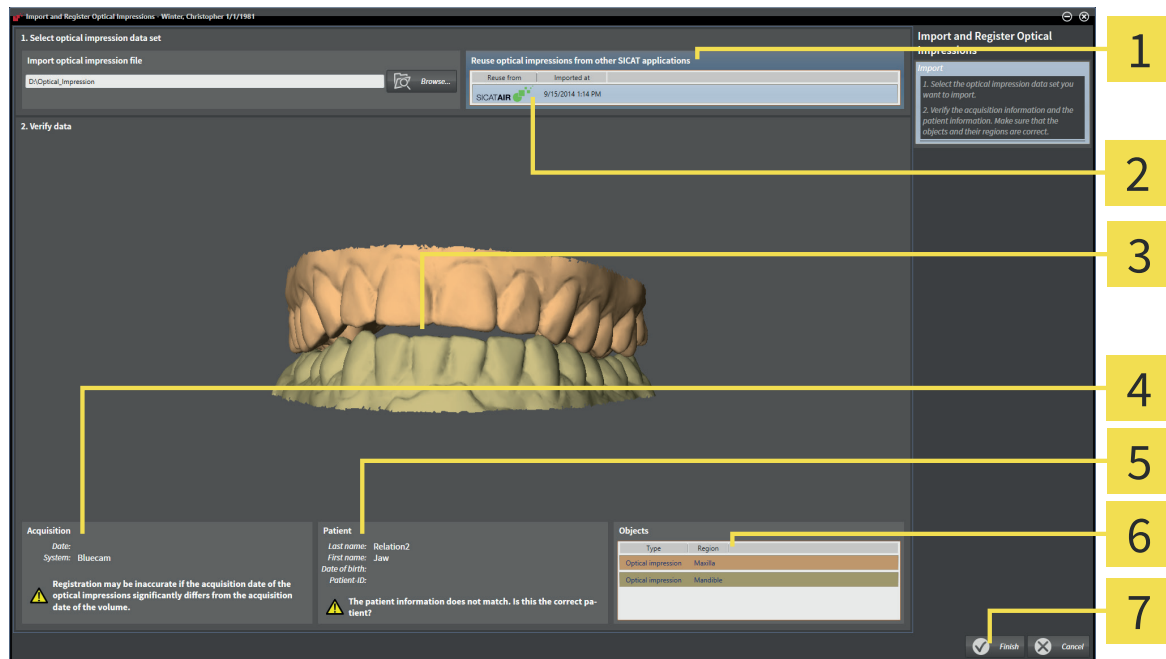To reuse optical impressions from another SICAT application, proceed as follows:

☑ The **Diagnose** workflow step is already expanded.

☑ You have already imported optical impressions for the opened study in another SICAT application that you do not reuse in SICAT Function yet.

1. Click the **Import and Register Optical Impressions** icon.

   ▶ The **Import and Register Optical Impressions** wizard with the **Import** step opens.

2. In the **Reusing optical impressions from other SICAT applications** area, click on the row that contains the desired optical impressions.

3. SICAT Function visualizes the selected optical impressions:

1	**Reusing optical impressions from other SICAT applications** area	**5**	Patient information
2	List with optical impressions from other SICAT applications	**6**	List of objects
3	**3D** view	**7**	**Finish** button
4	Acquisition information		

4. Verify the acquisition information and the patient information. Make sure that the objects and their regions are correct. The background color in the list of objects corresponds to the color of objects in the **3D** view.

5. Click the **Finish** button.

▶ The **Import and Register Optical Impressions** wizard closes.

▶ SICAT Function adds the selected optical impressions to the **Object browser**.

▶ SICAT Function visualizes the selected optical impressions.

If you want to abort importing optical impressions from another SICAT application, you can click **Cancel**.

18 ANATOMICAL TRACES

SICAT Function visualizes anatomical traces of a patient by matching 3D X-ray data with data obtained from a jaw motion tracking (JMT) device. You can use this data to review individual anatomical traces of a patient anywhere on the mandible.

SICAT Function requires the following data for the visualization of anatomical traces:

- Segmented 3D X-ray data - for information about this, see *Segmentation [*▶ *Page 72]*.
- Registered jaw motion tracking data - for information about this, see *Jaw motion tracking data [*▶ *Page 65]*.

SICAT Function can use optical impressions as an additional source of information. For example, you can analyze the movement of a patient just before total occlusion. For ordering a therapeutic appliance, optical impressions are mandatory. For information about this, see *Optical impressions [*▶ *Page 77]*.

You can review individual anatomical traces of a patient by using these tools:

- **JMT Player** - for information about this, see *Interacting with jaw motions [*▶ *Page 86]*. You can use the JMT Player to playback the individual movement of the mandible of a patient within the **3D** view. In addition, you can export jaw motion tracking data with the JMT Player.
- **3D** view - for information about this, see *Views [*▶ *Page 31]*.
- **Inspection Window** - for information about this, see *Moving, hiding, and showing the Inspection Window [*▶ *Page 41]*.
- Crosshairs - for information about this, see *Moving, hiding, and showing crosshairs and frames [*▶ *Page 40]*.

To review an individual movement on the mandible of a patient, you can place the crosshair in a 2D slice view on the selected position on the mandible. Alternatively, you can place the **Inspection Window** on the selected position on the mandible. For information about this, see *Visualization of the anatomical traces in the 3D view [*▶ *Page 89]*. In the **3D** view, SICAT Function indicates with different colors if the selected position is on or off the segmented mandible. For information about this, see *Adjusting anatomical traces with the Inspection Window [*▶ *Page 90]* and *Adjusting anatomical traces with the crosshair in a slice view [*▶ *Page 91]*.

18.1 INTERACTING WITH JAW MOTIONS

To show jaw motions, SICAT Function contains the JMT Player:
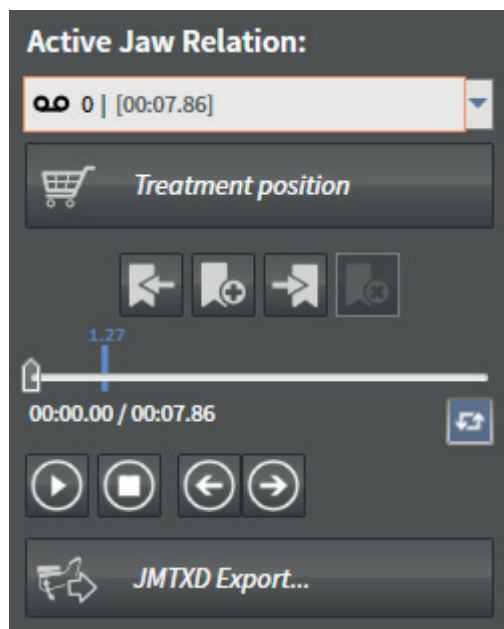
With the JMT Player, you can perform the following actions:

- Selecting static jaw relations or jaw motions
- Interacting with jaw motions
- Managing JMT Player labels
- Specifying the treatment position
- Exporting jaw motion tracking data

SELECTING STATIC JAW RELATIONS OR JAW MOTIONS

To select a **Static jaw relation** or a **Dynamic jaw relation**, proceed as follows:

1. Click on the **Active Jaw Relation** list.
   ► The **Active Jaw Relation** list opens.

2. Select the desired **Static jaw relation** or **Dynamic jaw relation**.

► The **Active Jaw Relation** list shows the selected jaw relation.

► The **3D** view shows the selected jaw relation.

INTERACTING WITH JAW MOTIONS

To interact with jaw motions, proceed as follows:

☑ Jaw motion tracking data has already been imported. For information about this, see *Importing and registering jaw motion tracking data from jaw motion tracking devices [*► *Page 67]*.

1. To start the JMT Player, click the **Start** icon.

2. To stop the JMT Player, click the **Stop** icon.

3. To skip one frame forward, click the **Skip forward** icon.

4. To skip one frame backward, click the **Skip backward** icon.

5. To switch between single and continuous play, click the **Switch play mode** icon.

6. To move the time position manually, click the JMT Player slider, move the mouse and release the left mouse button at the desired position.

MANAGING JMT PLAYER LABELS

To manage JMT Player labels, proceed as follows:

1. To add a label at the current time position of the JMT Player slider, click the **Add label** icon.

2. To delete a label at the current time position, click the **Delete label** icon.

3. To move the JMT Player slider to the position of the next label, click the **Skip to next label** icon.
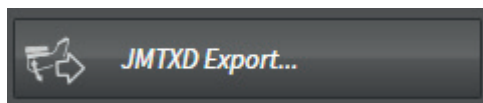
4. To move the JMT Player slider to the position of the previous label, click the **Skip to previous label** icon.

EXPORTING JAW MOTION TRACKING DATA

To export jaw motion tracking data, proceed as follows:

☑ You already imported and registered jaw motion tracking data.

☑ You already imported and registered optical impressions of both jaws.

1. Click the **JMTXD Export** button.
   - ► A Windows File Explorer window opens.

2. Select a target directory and change the file name, if required.

3. Click the **Save** button.

▶ SICAT Function closes the Windows File Explorer window.

▶ SICAT Function exports the jaw motion tracking data and the optical impressions into the specified file.

> ℹ︎ You can export jaw motion tracking data anonymized by activating the anonymization in the options. You can find information regarding this in the instructions for use of SICAT Suite.

18.2 VISUALIZATION OF THE ANATOMICAL TRACES IN THE 3D VIEW

To visualize anatomical traces in the **3D** view, you need to perform the following steps:

- Register jaw motion tracking data with 3D X-ray data - for information about this, see *Jaw motion tracking data [▶ Page 65]*.
- Segment 3D X-ray data - for information about this, see *Segmentation [▶ Page 72]*.

You can select individual anatomical traces of a patient in the JMT player and review them in the **3D** view. For information about the JMT player, see *Interacting with jaw motions [▶ Page 86]*.

After you have imported jaw motion tracking data and segmented 3D X-ray data, the **3D** view visualizes the original relations of the 3D X-ray scan. If you select a recorded movement, the **3D** view visualizes traces.

SICAT Function marks the position of the traces by different colors:

- If an anatomical trace is located on the mandible of the patient, SICAT Function marks it in green.
- If an anatomical trace is not located on the mandible of the patient, SICAT Function marks it in red.

You can place the anatomical trace on the mandible of the patient. For information about this, see *Adjusting anatomical traces with the Inspection Window [▶ Page 90]* and *Adjusting anatomical traces with the crosshair in a slice view [▶ Page 91]*.

You can choose a display mode for the **3D** view and adapt it to your needs. For information about this, see *Adaptation of the 3D View [▶ Page 44]*.

18.3 ADJUSTING ANATOMICAL TRACES WITH THE INSPECTION WINDOW

To use the **Inspection Window** to analyze the individual movement of the patient anywhere on the mandible, proceed as follows:

☑ The **Panorama** workspace is already active. For information about this, see *Switching the active workspace* [▶ *Page 29*].

☑ The **Panorama** view is already active. For information about this, see *Switching the active view* [▶ *Page 34*].

☑ The **Inspection Window** is already shown. For information about this, see *Moving, hiding, and showing the Inspection Window* [▶ *Page 41*].

▪ Move the **Inspection Window** to the anatomical region of interest.

▶ SICAT Function updates the position of the anatomical trace in the **3D** view corresponding to the **Inspection Window** position.

▶ The anatomical trace is located at the new position.

If the anatomical trace is located outside the mandible of the patient, you can position the anatomical trace in the mandible of the patient. For information about this, see *Adjusting anatomical traces with the crosshair in a slice view* [▶ *Page 91*].

> ℹ To move the **Inspection Window** to the region of interest immediately, you can double-click at the desired position in the **Panorama** view.

18.4 ADJUSTING ANATOMICAL TRACES WITH THE CROSSHAIR IN A SLICE VIEW

To use crosshairs to analyze the individual movement of the patient anywhere on the mandible, proceed as follows:

☑ The crosshairs are currently shown in the 2D slice views. For information about this, see *Moving, hiding, and showing crosshairs and frames [▶ Page 40]*.

1. Activate the desired 2D slice view. For information about this, see *Switching the active view [▶ Page 34]*.

2. Move the crosshair to the anatomical region of interest. For information about this, see *Moving, hiding, and showing crosshairs and frames [▶ Page 40]*.

▶ SICAT Function updates the position of the anatomical trace in the **3D** view to the position of the crosshair.

▶ The anatomical trace is located at the new position.

> ℹ In the **3D** view, SICAT Function marks the anatomical trace in red if you select a position outside the mandible of the patient.

> ℹ To move the crosshair to the position of the mouse pointer immediately, you can also double-click inside a 2D view.

19 DISTANCE AND ANGLE MEASUREMENTS

There are two different types of measurements in SICAT Function:

- Distance measurements
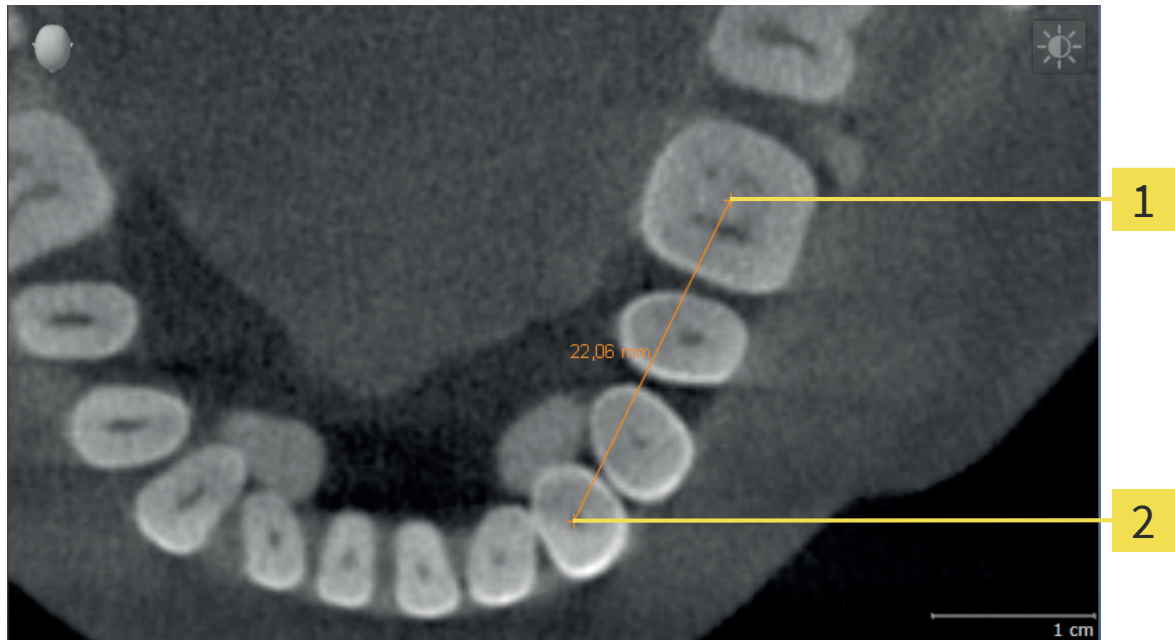- Angle measurements

The tools for adding measurements are located in the **Diagnose** step of the **Workflow toolbar**. You can add measurements in all 2D slice views except for the **Inspection Window**. Every time you add a measurement, SICAT Function also adds it to the **Measurements** group in the **Object browser**.

The following actions for measurements are available:

- *Adding distance measurements [▶ Page 93]*
- *Adding angle measurements [▶ Page 94]*
- *Moving measurements, single measurement points, and measurement values [▶ Page 96]*
- Activating, hiding, and showing measurements - for information about this, see *Managing objects with the Object browser [▶ Page 22]*.
- Focusing on measurements, removing measurements, and undoing and redoing measurement actions - for information about this, see *Managing objects with the Object toolbar [▶ Page 23]*.

19.1 ADDING DISTANCE MEASUREMENTS

1 Starting point

2 Ending point

To add a distance measurement, proceed as follows:
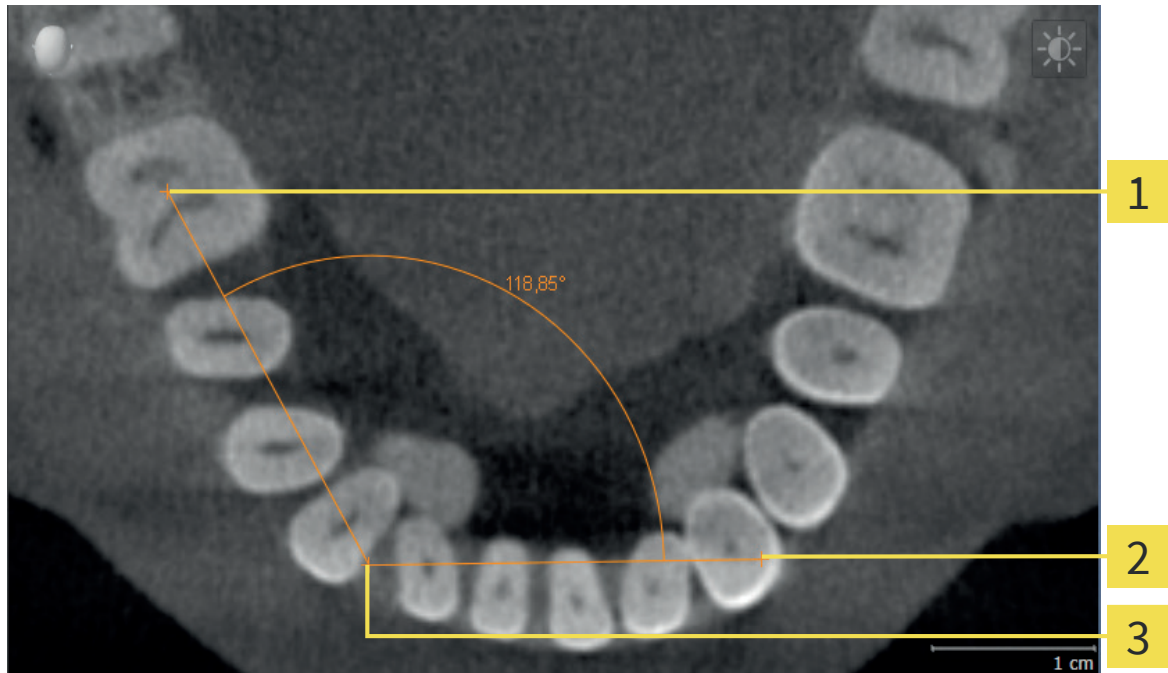
☑ The **Diagnose** workflow step is already expanded.

1. In the **Diagnose** workflow step, click the **Add distance measurement (D)** icon.
   ▶ SICAT Function adds a new distance measurement to the **Object browser**.

2. Move the mouse pointer over the desired 2D slice view.
   ▶ The mouse pointer changes to a cross.

3. Click on the starting point of the distance measurement.
   ▶ SICAT Function shows the starting point by a small cross.
   ▶ SICAT Function shows a distance line from the starting point to the mouse pointer.
   ▶ SICAT Function shows the current distance between the starting point and the mouse pointer at the middle of the distance line and in the **Object browser**.

4. Move the mouse pointer to the ending point of the distance measurement and click the left mouse button.

▶ SICAT Function shows the ending point by a small cross.

> ℹ You can always cancel adding measurements by pressing **ESC**.

19.2 ADDING ANGLE MEASUREMENTS

1 Starting point

2 Ending point

3 Apex

To add an angle measurement, proceed as follows:

☑ The **Diagnose** workflow step is already expanded.

1. In the **Diagnose** workflow step, click the **Add angle measurement (A)** icon.
   ► SICAT Function adds a new angle measurement to the **Object browser**.

2. Move the mouse pointer over the desired 2D slice view.
   ► The mouse pointer changes to a cross.

3. Click on the starting point of the angle measurement.
   ► SICAT Function shows the starting point by a small cross.
   ► SICAT Function shows the first arm of the angle measurement by a line from the starting point to the mouse pointer.

4. Move the mouse pointer to the apex of the angle measurement and click the left mouse button.
   ► SICAT Function shows the apex by a small cross.
   ► SICAT Function shows the second arm of the angle measurement by a line from the apex to the mouse pointer.
   ► SICAT Function shows the current angle between the two arms of the angle measurement and in the **Object browser**.

5. Move the mouse pointer to the ending point of the second arm and click the left mouse button.

▶ SICAT Function shows the ending point by a small cross.

> ℹ️ You can always cancel adding measurements by pressing **ESC**.

19.3 MOVING MEASUREMENTS, SINGLE MEASUREMENT POINTS, AND MEASUREMENT VALUES

MOVING MEASUREMENTS

To move a measurement, proceed as follows:

☑ SICAT Function already visualizes the desired measurement in a 2D slice view. For information about this, see *Managing objects with the Object browser [*▶ *Page 22]* and *Managing objects with the Object toolbar [*▶ *Page 23]*.

1. Move the mouse pointer over a line of the measurement.
   ▶ The mouse pointer changes to a cross.

2. Click and hold the left mouse button.

3. Move the mouse pointer to the new position of the measurement.
   ▶ The measurement follows the movement of the mouse pointer.

4. Release the left mouse button.

▶ SICAT Function maintains the current position of the measurement.

MOVING SINGLE MEASUREMENT POINTS

To move a single measurement point, proceed as follows:

☑ SICAT Function already visualizes the desired measurement in a 2D slice view. For information about this, see *Managing objects with the Object browser [*▶ *Page 22]* and *Managing objects with the Object toolbar [*▶ *Page 23]*.

1. Move the mouse pointer over the desired measurement point.
   ▶ The mouse pointer changes to a cross.

2. Click and hold the left mouse button.

3. Move the mouse pointer to the new position of the measurement point.
   ▶ The measurement point follows the movement of the mouse pointer.
   ▶ The measurement value changes while you move the mouse.

4. Release the left mouse button.

▶ SICAT Function maintains the current position of the measurement point.

MOVING MEASUREMENT VALUES

To move a measurement value, proceed as follows:

☑ SICAT Function already visualizes the desired measurement in a 2D slice view. For information about this, see *Managing objects with the Object browser [*▶ *Page 22]* and *Managing objects with the Object toolbar [*▶ *Page 23]*.

1. Move the mouse pointer over the measurement value.
   ▶ The mouse pointer changes to a cross.

2. Click and hold the left mouse button.

3. Move the mouse pointer to the new position of the measurement value.

    ▶ The measurement value follows the movement of the mouse pointer.

    ▶ SICAT Function shows a dotted line between the measurement value and the corresponding measurement.

4. Release the left mouse button.

▶ SICAT Function maintains the current position of the measurement value.

> **i** After moving the value of a measurement, SICAT Function fixes the value at an absolute position. To make the position of the value relative to the measurement again, you can double-click the value.

20 ORDERING PROCESS

To order therapeutic appliances, proceed as follows:

- In SICAT Function, specify a treatment position and add the desired planning data for therapeutic appliances to the shopping cart. For information about this, see *Specifying the treatment position [▶ Page 99]* and *Adding therapeutic appliances to the shopping cart [▶ Page 100]*.

- Check the shopping cart in SICAT Suite and start the order. For information about this, see *Checking the shopping cart and finalizing an order [▶ Page 103]*.

- Finalize the order directly on the computer that runs SICAT Suite or on another computer with an active Internet connection. For information about this, see *Finalizing orders with an active Internet connection [▶ Page 104]* or *Finalizing orders without an active Internet connection [▶ Page 105]*.

- The SICAT Portal allows you to submit your order via your web browser to qualified vendors and shows you the prices of the products. For a description of the ordering steps that take place in SICAT Portal, see *Performing ordering steps in the SICAT Portal [▶ Page 108]*.

If you have completed the order, SICAT WebConnector or your web browser transfers the order data using an encrypted Internet connection.

If you have started SICAT Suite as standalone version, you can add multiple therapeutic appliances to the shopping cart per order that are based on different patients and 3D scans. The contents of the shopping cart are saved when closing SICAT Suite.

If you have started SICAT Suite from SIDEXIS, you can only add orders to the shopping cart that are based on the same 3D scan. You have to perform the ordering process afterwards completely, because the contents of the shopping cart are deleted on closing SICAT Suite.

> If the computer that runs SICAT Suite has an active Internet connection, SICAT Suite WebConnetor automatically transfers the encrypted order data to the SICAT server. In this case, multiple therapeutic appliances per order are possible. If the computer that runs SICAT Suite does not have an active Internet connection, the transmission is performed via an XML file and a zip archive that you can upload onto another computer with an active Internet connection. In this case, SICAT Suite exports all therapeutic appliances in the shopping cart at once and creates a separate folder per patient. In SICAT Portal, you can upload one therapeutic appliance per patient afterwards.

20.1 SPECIFYING THE TREATMENT POSITION

To specify the treatment position, proceed as follows:

☑ You already imported jaw motion tracking data. For information about this, see *Importing and registering jaw motion tracking data from jaw motion tracking devices [*▶ *Page 67]*.

☑ You already imported optical impressions. For information about this, see *Importing and registering optical impressions [*▶ *Page 78]* and *Reusing optical impressions from other SICAT applications [*▶ *Page 83]*.

1. If you want to specify the treatment position based on a static jaw relation, select a static jaw relation from the **Active Jaw Relation** list. For information about this, see *Interacting with jaw motions [*▶ *Page 86]*.

2. If you want to specify the treatment position based on a jaw movement, select a jaw movement from the **Active Jaw Relation** list. Skip to the desired position, create a label and select that label. For information about this, see *Interacting with jaw motions [*▶ *Page 86]*.

3. Click the **Treatment position** button.

▶ SICAT Function saves the selected treatment position for ordering a therapeutic appliance.

> If you have already determined a treatment position, SICAT Function opens a message window with the following content: **You already have defined a treatment position If you continue, this treatment position will be replaced with the currently selected static jaw relation**. Click **Resume** if you really want to overwrite the treatment position. Otherwise, click **Cancel**.

Proceed with *Adding therapeutic appliances to the shopping cart [*▶ *Page 100]*.

20.2 ADDING THERAPEUTIC APPLIANCES TO THE SHOPPING CART

⚠️ **CAUTION**	**Wrong data in an order could result in a wrong order.**
	▪ If you perform an order, make sure that you select and transmit the correct data for the order.

For general information about the ordering process, see *Ordering process [▶ Page 98]*.

In the first part of the ordering process in SICAT Function, you add a therapeutic appliance to the shopping cart. To add a therapeutic appliance to the shopping cart, you have to fulfill certain prerequisites: If you have not fulfilled all prerequisites, SICAT Function points this out.

IF YOU DID NOT FULFILL ALL PREREQUISITES

☑ The **Order** workflow step is already expanded. For information about this, see *Workflow toolbar [▶ Page 19]*.

1. Click the **Order therapeutic appliance** icon.

   ▶ The **Order incomplete** window opens:
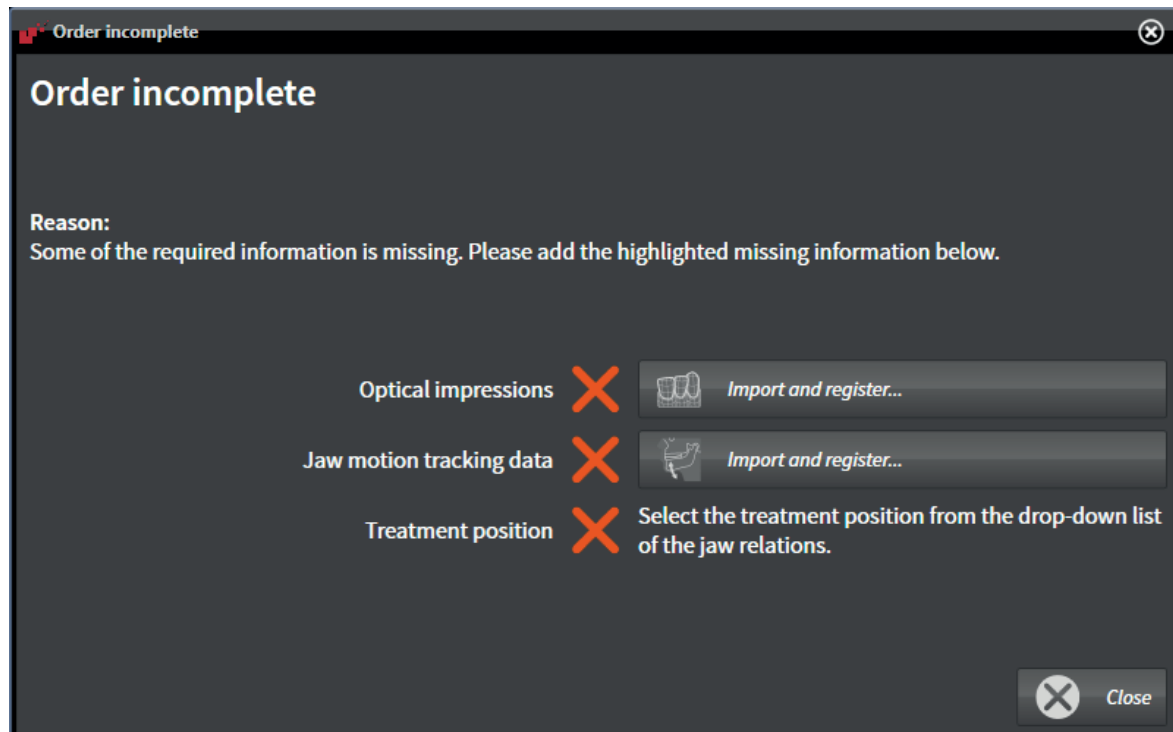
2. If you have not already imported optical impressions corresponding to the 3D X-ray scan, click the **Import and register** button and import optical impressions. For information about this, see *Importing and registering optical impressions [▶ Page 78]*.

3. If you have not already imported jaw motion tracking data, click the **Import and register** button and import jaw motion tracking data. For information about this, see *Importing and registering jaw motion tracking data from jaw motion tracking devices [▶ Page 67]*.

4. If you have not already specified a treatment position, close the **Order incomplete** window and specify a treatment position. For information about this, see *Specifying the treatment position* [▶ *Page 99*].

> ℹ️ Under certain circumstances, you have to adapt the volume orientation and the panoramic curve before importing optical impressions. You can open the **Adjust Volume Orientation and Panoramic Region** window directly from the **Import and Register Optical Impressions** window by clicking the **Adjust panoramic region** button. For information about this, see *Adjusting the panoramic region* [▶ *Page 62*].

IF YOU HAVE FULFILLED THE PREREQUISITES

☑ You already imported optical impressions.

☑ You already imported jaw motion tracking data.

☑ You have already determined a treatment position.

☑ The **Order** workflow step is already expanded. For information about this, see *Workflow toolbar* [▶ *Page 19*].

▪ Click the **Order therapeutic appliance** icon.

▶ The **Order a therapeutic appliance** window opens.

CHECK YOUR ORDER IN THE "ORDER A THERAPEUTIC APPLIANCE" WINDOW

☑ The **Order a therapeutic appliance** window is already opened:
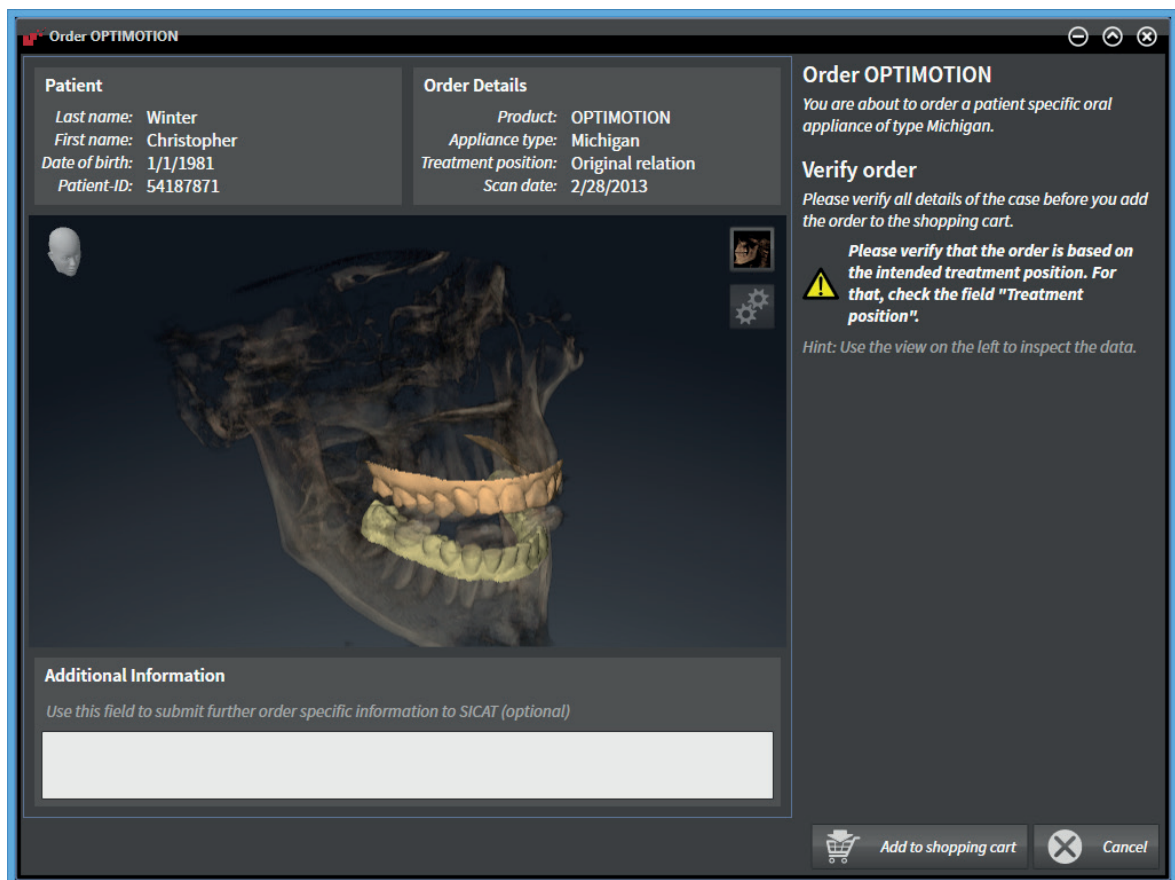
1. In the **Patient** area and in the **Order Details** area, check that the patient information and the scan information are correct.

2. In the **3D** view, check that the treatment position is correct.

3. If desired, type additional information for SICAT into the **Additional information** field.

4. Click the **Add to shopping cart** button.

▶ The **Order a therapeutic appliance** window closes.

▶ The desired planning data for therapeutic appliances is located inside the shopping cart.

> **i** As long as an order is located inside the shopping cart, you cannot overwrite optical impressions, jaw motion tracking data and the treatment position of a planning anymore. This is possible again when you have finished or deleted the order. If you overwrite or delete optical impressions, jaw motion tracking data or the treatment position of a planning, you cannot order the same therapeutic appliance again.

Proceed with *Checking the shopping cart and finalizing an order [▶ Page 103]*.

20.3 CHECKING THE SHOPPING CART AND FINALIZING AN ORDER

☑ The shopping cart contains at least one therapeutic appliance.

1. If the shopping cart is not already opened, in the **Navigation bar**, click the **Shopping cart** button.

   ▶ The **Shopping cart** window opens and shows all therapeutic appliances grouped by patients that are currently included in the shopping cart.
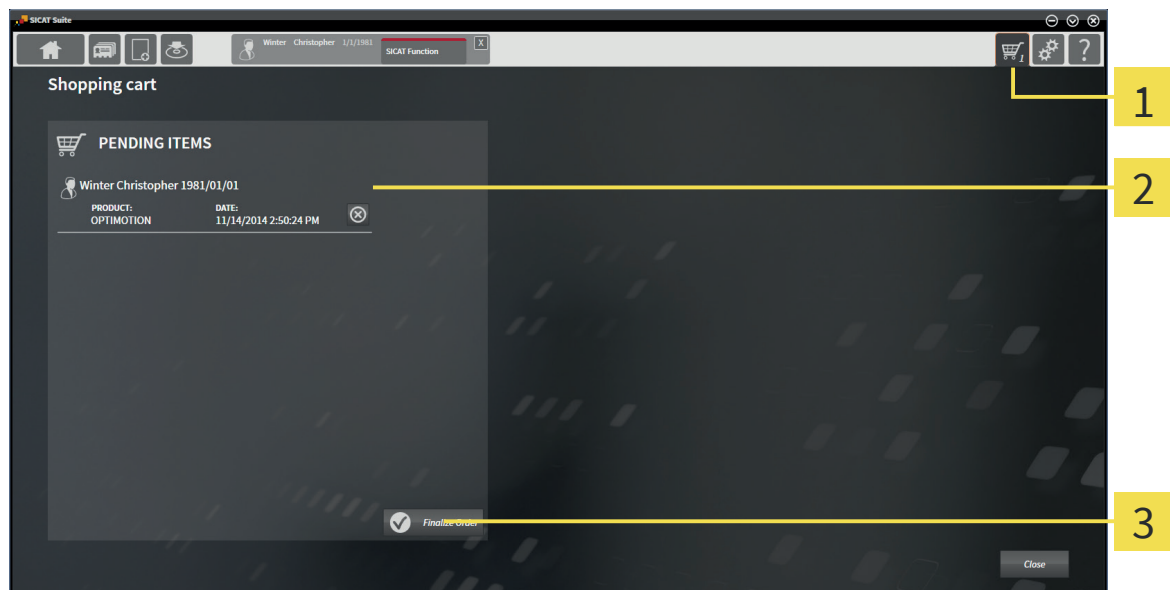
1 **Shopping cart** tab

2 **PENDING ITEMS** list

3 **Finalize Order** button

2. In the **Shopping cart** window, check if the desired therapeutic appliances are included.

3. Click the **Finalize Order** button.

   ▶ SICAT Suite changes the status of the order to **Preparing** and establishes a connection to the SICAT server.

   ▶ In the case of orders with an active Internet connection, changes on the order are only possible in SICAT Portal.

> ℹ You can click the **Delete** icon to remove therapeutic appliances from the shopping cart.

Proceed with one of the following actions:

- *Finalizing orders with an active Internet connection [▶ Page 104]*
- *Finalizing orders without an active Internet connection [▶ Page 105]*

20.4 FINALIZING ORDERS WITH AN ACTIVE INTERNET CONNECTION

☑ The computer that runs SICAT Suite has an active internet connection.

☑ SICAT Portal has been automatically opened in your web browser.

1. If not already done, log on to SICAT Portal with your SICAT ID and your password.

   ▶ The order overview opens and shows the contained therapeutic appliances and the corresponding prices grouped by patients.

2. Follow the orders under *Performing ordering steps in the SICAT Portal [*▶ *Page 108]*.

▶ SICAT Suite prepares the order data for the upload.

▶ When the preparation has been completed, SICAT WebConnector transmits the order data using an encrypted connection to the SICAT server.

▶ The status of the order in the shopping cart changes to **Uploading**.

You can remove patients and the corresponding therapeutic appliances from the SICAT Portal by selecting a patient and clicking on the button for removing patients. Afterwards, you have full access to the compilation of therapeutic appliances in the shopping cart of SICAT Suite again.

> If you log off from Windows during the upload, SICAT WebConnector pauses the process. The software continues with the upload process automatically after logging on again.
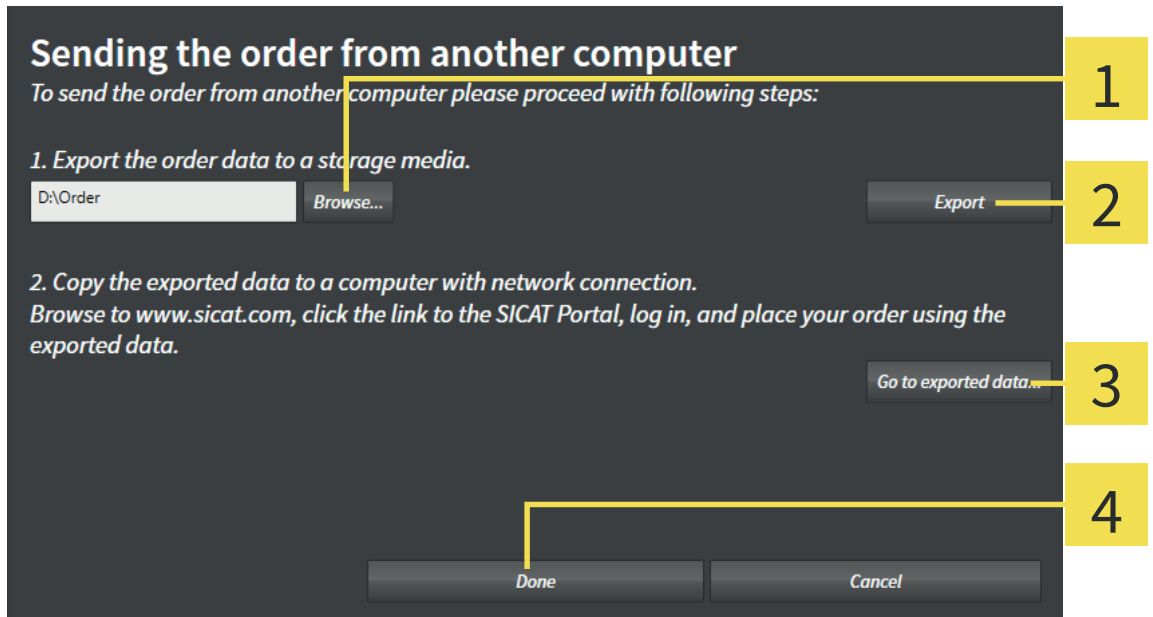
20.5 FINALIZING ORDERS WITHOUT AN ACTIVE INTERNET CONNECTION

☑ The computer that runs SICAT Suite does not have an active internet connection.

☑ The window shows the following message: **Unable to connect to the SICAT server**
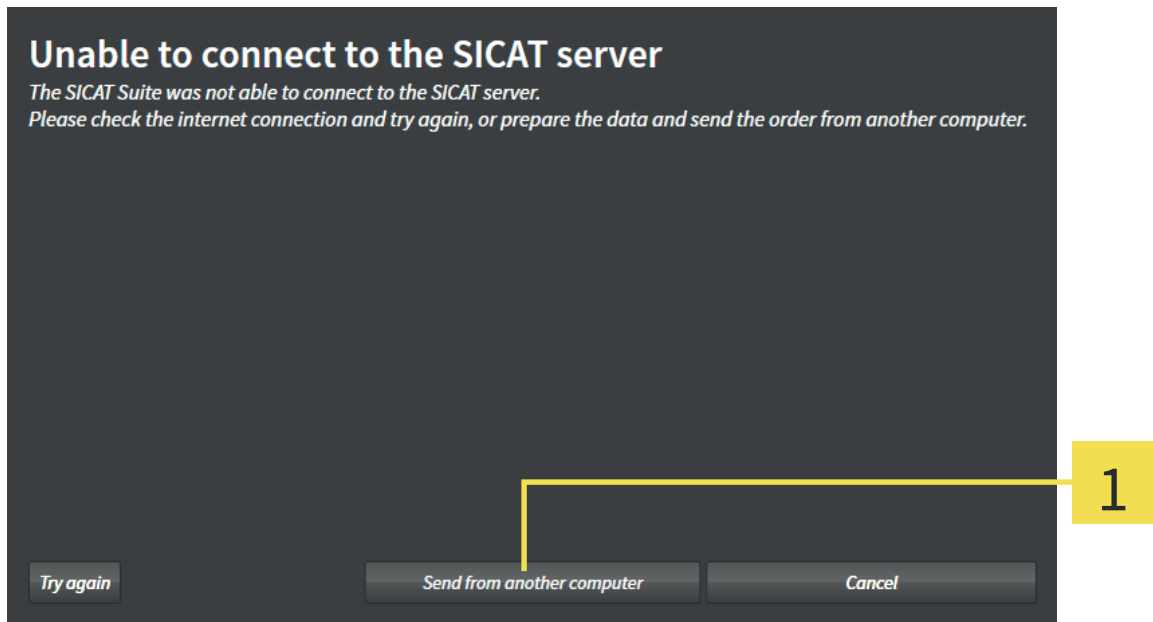
1 **Send from another computer** button

1. Click the **Send from another computer** button.

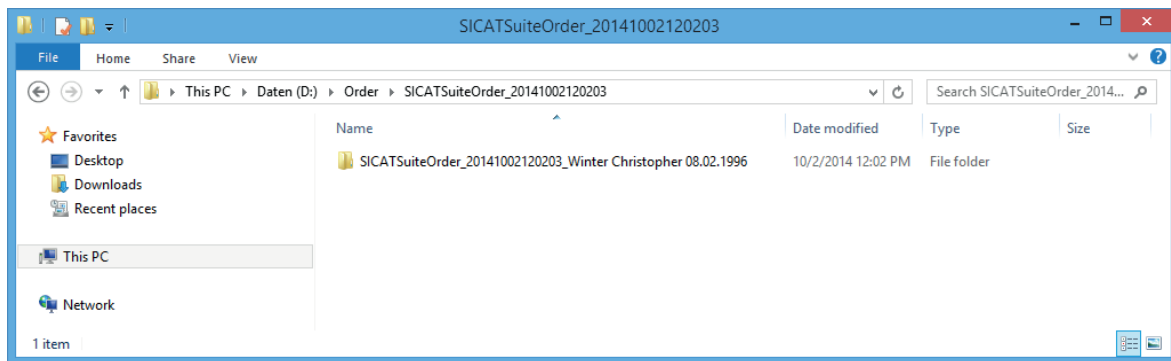   ▶ The **Sending the order from another computer** window opens:

1 **Browse** button   **3** **Go to exported data** button

2 **Export** button   **4** **Done** button

2. Click the **Browse** button.

   ▶ A Windows File Explorer window opens.

3. Choose an existing folder or create a new folder and click **OK**.

4. Click the **Export** button.

   ▶ SICAT Suite exports all data into the selected folder that is required for ordering the content of the shopping cart. SICAT Suite creates a sub folder for each patient.

5. Click the **Go to exported data** button.

   ▶ A Windows File Explorer window opens and shows the directory with the exported data:

6. Copy the folder that contains the data of the desired therapeutic appliance to a computer with an active Internet connection, for example with the help of a USB flash drive.

7. In the **Sending the order from another computer** window, click **Done**.

   ▶ SICAT Suite closes the **Sending the order from another computer** window.

   ▶ SICAT Suite removes all therapeutic appliances that are included in the order from the shopping cart.

8. On the computer with an active Internet connection, open a web browser and open the http://www.sicat.com web page.

9. Click on the link to the SICAT Portal.

   ▶ The SICAT Portal opens.

10. If not already done, log on to SICAT Portal with your SICAT ID and your password.

11. Click on the button for uploading the order.

12. Choose the desired order on the computer with an active Internet connection. It is the XML file that has a file name starting with **SICATSuiteOrder**.

    ▶ The order overview opens and shows the contained patient, the corresponding therapeutic appliance and the price.

13. Follow the orders under *Performing ordering steps in the SICAT Portal [*▶ *Page 108]*.

14. Click on the button for uploading the therapeutic appliance data.

15. Choose the corresponding therapeutic appliance data on the computer with an active Internet connection. It is the zip archive that is contained in the same folder as the previously uploaded XML file and has a file name starting with **SICATSuiteExport**.

▶ If you have performed the order, your web browser transfers the archive with the therapeutic appliance data using an encrypted connection to the SICAT server.

> ℹ SICAT Suite does not delete exported data automatically. If an ordering process is completed, you should delete exported data manually for security reasons.

20.6 PERFORMING ORDERING STEPS IN THE SICAT PORTAL

1. Check if the desired therapeutic appliances are included.

2. If required, remove the patients and thus all corresponding therapeutic appliances from the order overview.

3. Check if the billing address and the delivery address are correct. If required, make changes.

4. Select the desired shipping method.

5. Accept the general terms and conditions and submit the order.

21 SETTINGS

Common SICAT Suite settings are described in the instructions for use of SICAT Suite. These instructions for use describe settings for SICAT Function.

To change general visualization settings, see *Changing visualization settings [*▶ *Page 110]*.

21.1 CHANGING VISUALIZATION SETTINGS

| ⚠️ **CAUTION**	**Insufficient visualization quality could result in incorrect diagnosis and treatment.** ▪ Prior to using a SICAT application check for sufficient visualization quality, for example by using the SMPTE test pattern.

⚠️ **CAUTION**	**Insufficient environmental visualization conditions could result in incorrect diagnosis and treatment.** 1. Only perform planning if the environmental conditions allow for sufficient visualization quality. For example, check for appropriate lighting. 2. Check for sufficient visualization quality using the SMPTE test pattern.

Visualization settings determine the visualization of the volume, the diagnosis objects, and the planning objects in all SICAT applications.

To change the visualization settings, proceed as follows:

1. Click the **Settings** icon.

   ▶ The **Settings** window opens.

2. Click the **Visualization** tab.

   ▶ The **Visualization** window opens:
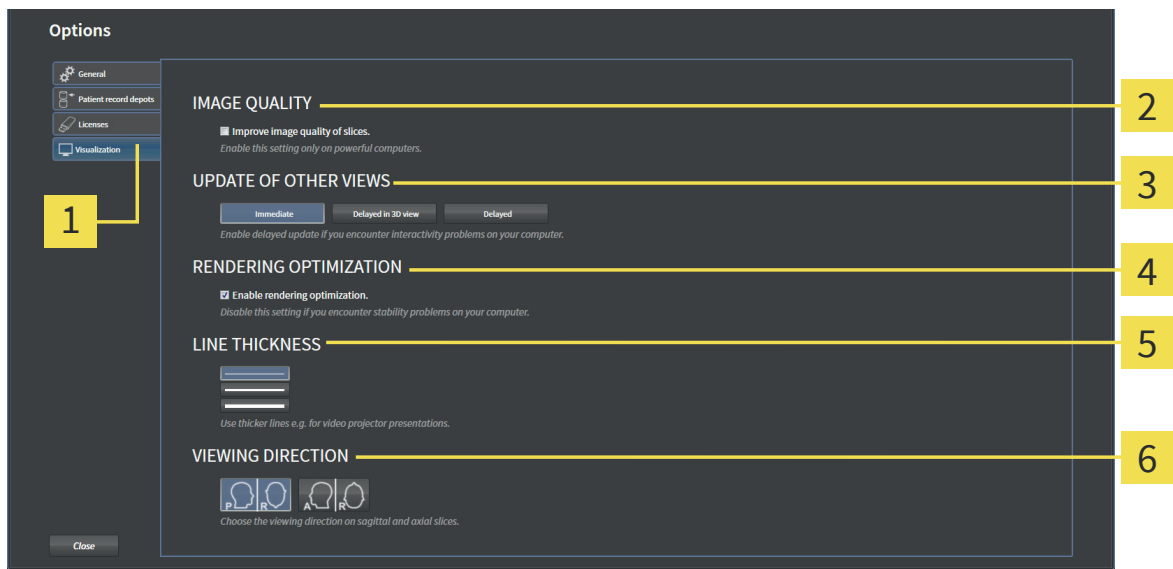
1	**Visualization** tab	**4**	**RENDERING OPTIMIZATION** area
2	**IMAGE QUALITY** area	**5**	**LINE THICKNESS** area
3	**UPDATE OF OTHER VIEWS** area	**6**	**VIEWING DIRECTION** area

3. Select the desired visualization settings.

▶ Changes on visualization settings take effect immediately.

The options are:

- **IMAGE QUALITY** - Improves the image quality of slices by averaging nearby slices. Enable this setting only on powerful computers.

- **UPDATE OF OTHER VIEWS** - Delayed update improves interactivity of the view you are working with at the cost of delayed update of other views. Enable delayed update only if you encounter interactivity problems on your computer.

- **RENDERING OPTIMIZATION** - Disables the rendering optimization. Disable this setting only if you encounter stability problems on your computer.

- **LINE THICKNESS** - Changes the thickness of lines. Thicker lines are useful for presentations on video projectors.

- **VIEWING DIRECTION** - Switches the viewing direction of the **Axial** slice view and the **Sagittal** slice view.

22 CLOSING SICAT FUNCTION

To close SICAT Function, proceed as follows:

▪ In the active patient record area, click the **Close** button.

▶ SICAT Suite saves the active patient record.

▶ SICAT Suite closes SICAT Function.

▶ SICAT Suite closes the active patient record.

23 KEYBOARD SHORTCUTS

The following keyboard shortcuts are available in all SICAT applications:

KEYBOARD SHORTCUTS	DESCRIPTION
A	Add angle measurement
D	Add distance measurement
Ctrl + C	Copy content of active view to clipboard
Ctrl + F	Focus on active object
Ctrl + Z	Undo last object action
Ctrl + Y	Redo last undone object action
Del	Remove active object or object group
ESC	Cancel current action (for example, adding a measurement)
F1	Opening the **Support** window

The following keyboard shortcuts are available in the **Mandible Segmentation** window of SICAT Function:

KEYBOARD SHORTCUTS	DESCRIPTION
N	Navigation
M	Segment mandible
F	Segment fossa
W	Segment background

24 ACCURACY

The following table shows the accuracy values in all SICAT applications:

Measurement accuracy for distance measurements	< 100 µm
Measurement accuracy for angle measurements	< 1 degree
Visualization accuracy	< 20 µm

25 SAFETY INSTRUCTIONS

3D X-RAY DATA

⚠ CAUTION	**X-ray devices without DICOM conformity could result in incorrect diagnosis and treatment.** ▪ Only use 3D volume data from x-ray devices with DICOM conformity declared.

⚠ CAUTION	**Inappropriate X-ray devices could result in incorrect diagnosis and treatment.** ▪ Only use 3D data from X-ray devices cleared as medical devices.

⚠ CAUTION	**Inappropriate 3D data could result in incorrect diagnosis and treatment.** ▪ Always verify the quality, integrity, and correct orientation of the displayed 3D data.

NETWORK

⚠ CAUTION	**Saving SICAT application data in an unreliable or incompatible network file system could result in data loss.** ▪ Together with your network administrator, assure that SICAT application data can be safely stored in the desired network file system.

⚠ CAUTION	**Using SICAT Suite and the contained SICAT applications together with other devices within a computer network or storage network could result in previously unknown risks for patients, users and other persons.** ▪ Make sure policies are established within your organization to determine, analyze, assess and control risks that are related to your network.

⚠ CAUTION	**Changes to your network environment could result in new risks. Examples are changes to your network configuration, connection of additional devices or components to your network, disconnection of devices or components from the network and update or upgrade of network devices or components.** ▪ Perform a new network risk analysis after any network changes.

SAFETY

⚠ CAUTION	**Cyber security problems could result in access to your patient data and impose risks to the privacy and integrity of your patient data.** ▪ If you suspect cyber security related problems with your system, contact SICAT GmbH & Co. KG immediately.

⚠ **CAUTION**	**Security leaks in your information system environment could result in unauthorized access to your patient data and put the privacy or integrity of your patient data at risk.** 1. Make sure policies are established within your organization to prevent security threats to your information system environment. 2. Install and run an up-to-date virus scanner. 3. Make sure the pattern files of the virus scanner are updated on a regular basis.

⚠ **CAUTION**	**Unauthorized access to your workstation could result in risks to the privacy and integrity of your patient data.** ▪ Limit the access to your workstation to authorized individuals only.

JAW MOTION TRACKING DATA

⚠ **CAUTION**	**Use of other data than 3D X-ray data as the only source of information could result in incorrect diagnosis and treatment.** 1. Use 3D X-ray data as the ultimate source of information for diagnosis and planning. 2. Use other data, for example optical impression data, only as an auxiliary source of information.

⚠ **CAUTION**	**Inappropriate jaw tracking devices could result in incorrect diagnosis and treatment.** ▪ Only use jaw tracking data from devices cleared as medical devices.

⚠ **CAUTION**	**Use of jaw tracking devices with an inappropriate intended use could result in wrong diagnosis and treatment.** ▪ Only use jaw tracking data from devices with an intended use that covers the use of the jaw motion tracking data with SICAT Function.

⚠ **CAUTION**	**Use of unsupported jaw motion tracking devices or incompatible registration devices could result in wrong diagnosis and treatment.** ▪ Only use jaw tracking data that has been acquired with a supported combination of a jaw motion tracking device and a compatible registration device.

⚠ **CAUTION**	**Incorrect acquisition of jaw tracking data and 3D volume data could result in incorrect diagnosis and treatment.** ▪ Assure jaw tracking data and 3D X-ray data have been acquired according to the instructions of the device manufacturer. Use the specified type of reference body.

⚠ CAUTION	**Jaw tracking data that does not match patient and date of visualized 3D X-ray data could result in incorrect diagnosis and treatment.** ▪ Assure patient and date of imported jaw tracking data match patient and date of the visualized 3D X-ray data.
⚠ CAUTION	**Insufficient integrity or quality of jaw tracking data could result in incorrect diagnosis and treatment.** ▪ Verify the integrity and quality of the imported jaw tracking data.
⚠ CAUTION	**Insufficient quality, precision, and resolution of jaw tracking data could result in incorrect diagnosis and treatment.** ▪ Only use jaw tracking data with sufficient quality, resolution, and precision that allows for the intended diagnosis and therapy.
⚠ CAUTION	**Excessive artifacts, insufficient resolution, or insufficient quality of the 3D X-ray data could result in a failure of the marker and reference body detection mechanism. Examples of excessive artifacts in 3D X-ray data are motion or metal artifacts.** ▪ Only use 3D X-ray data that allows for a correct marker and reference body detection.
⚠ CAUTION	**Incorrect position, type, and alignment of the reference body could result in incorrect diagnosis and treatment.** ▪ After the JMT wizard identified the reference body, verify the correct position, type and alignment of the reference body with respect to the 3D X-ray data.
⚠ CAUTION	**Wrong alignment of registered jaw tracking data and 3D X-ray data could result in incorrect diagnosis and treatment.** ▪ Verify that registered jaw tracking data is correctly aligned with 3D X-ray data.

SEGMENTATION

⚠ CAUTION	**Excessive artifacts or insufficient resolution of 3D X-ray data could result in a failure of the segmentation process or inadequate results. Examples of excessive artifacts in 3D X-ray data can be motion artifacts or metal artifacts.** ▪ Only use 3D X-ray data that allows for a sufficient quality of the segmentation of the relevant anatomical structures.
⚠ CAUTION	**Insufficient quality of segmentation could result in incorrect diagnosis and treatment.** ▪ Verify that the quality of segmentation is sufficient for the intended use.

OPTICAL IMPRESSIONS

⚠️ **CAUTION**	**Use of other data than 3D X-ray data as the only source of information could result in incorrect diagnosis and treatment.** 1. Use 3D X-ray data as the ultimate source of information for diagnosis and planning. 2. Use other data, for example optical impression data, only as an auxiliary source of information.

⚠️ **CAUTION**	**Inappropriate optical impression devices could result in incorrect diagnosis and treatment.** • Only use optical impression data from devices cleared as medical devices.

⚠️ **CAUTION**	**Optical impression data that does not match patient and date of 3D X-ray data could result in incorrect diagnosis and treatment.** • Assure patient and date of the imported optical impression data match patient and date of the visualized 3D X-ray data.

⚠️ **CAUTION**	**Insufficient integrity or quality of optical impression data could result in incorrect diagnosis and treatment.** • Verify the integrity and quality of the imported optical impression data.

⚠️ **CAUTION**	**Insufficient quality and precision of optical impression data could result in incorrect diagnosis and treatment.** • Only use optical impression data with sufficient quality and precision that allow for intended diagnosis and therapy.

⚠️ **CAUTION**	**Excessive artifacts, insufficient resolution, or absence of registration landmarks could result in a failure of the registration process of optical impressions. Examples of excessive artifacts in 3D X-ray data are motion or metal artifacts.** • Only use optical impression data and 3D X-ray data that allow for an adequate registration.

⚠️ **CAUTION**	**Selecting markers in the registration process of optical impressions that do not correspond to each other could result in an incorrect diagnosis and treatment.** • When you register optical impressions, choose corresponding markers in the 3D X-ray data and in the optical impressions.

⚠️ **CAUTION**	**Wrong alignment of optical impression data and 3D X-ray data after registration could result in an incorrect diagnosis and treatment.** • Verify that the registered optical impression data is correctly aligned with the 3D X-ray data.

ORDERS

⚠️ **CAUTION**	**Wrong data in an order could result in a wrong order.** ▪ If you perform an order, make sure that you select and transmit the correct data for the order.

QUALIFICATION OF OPERATING PERSONNEL

⚠️ **CAUTION**	**Use of software by unqualified personnel could result in incorrect diagnosis and treatment.** ▪ The use of the software is restricted to qualified professionals.

VISUALIZATION CONDITIONS

⚠️ **CAUTION**	**Insufficient visualization quality could result in incorrect diagnosis and treatment.** ▪ Prior to using a SICAT application check for sufficient visualization quality, for example by using the SMPTE test pattern.

⚠️ **CAUTION**	**Insufficient environmental visualization conditions could result in incorrect diagnosis and treatment.** 1. Only perform planning if the environmental conditions allow for sufficient visualization quality. For example, check for appropriate lighting. 2. Check for sufficient visualization quality using the SMPTE test pattern.

GLOSSARY

Bite fork
A bite fork is a bite plate with radiopaque spherical markers that SICAT uses to match 3D X-ray data with jaw motion tracking data.

Crosshairs
Crosshairs are cutlines with other slice views.

Frames
In the 3D view, frames show the position of 2D slice views.

Optical impressions
An optical impression is the result of a 3D surface scan of teeth, impression materials, or stone models.

Registration
Spatial alignment

SICAT ID
A SICAT ID is a user name for SICAT Portal.

SICAT JMT$^+$
SICAT JMT$^+$ records the motion of the lower jaw.

SICAT Portal
SICAT Portal is a web page, where you can order therapeutic appliances from SICAT among other things.

SIXD
Data format for exchanging optical impressions.

SSI
Data format for exchanging optical impressions.

STL
Surface Tessellation Language, standard file format for exchanging mesh data that can, for example contain optical impressions.

Study
A study consists of a 3D scan and the corresponding planning projects.

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