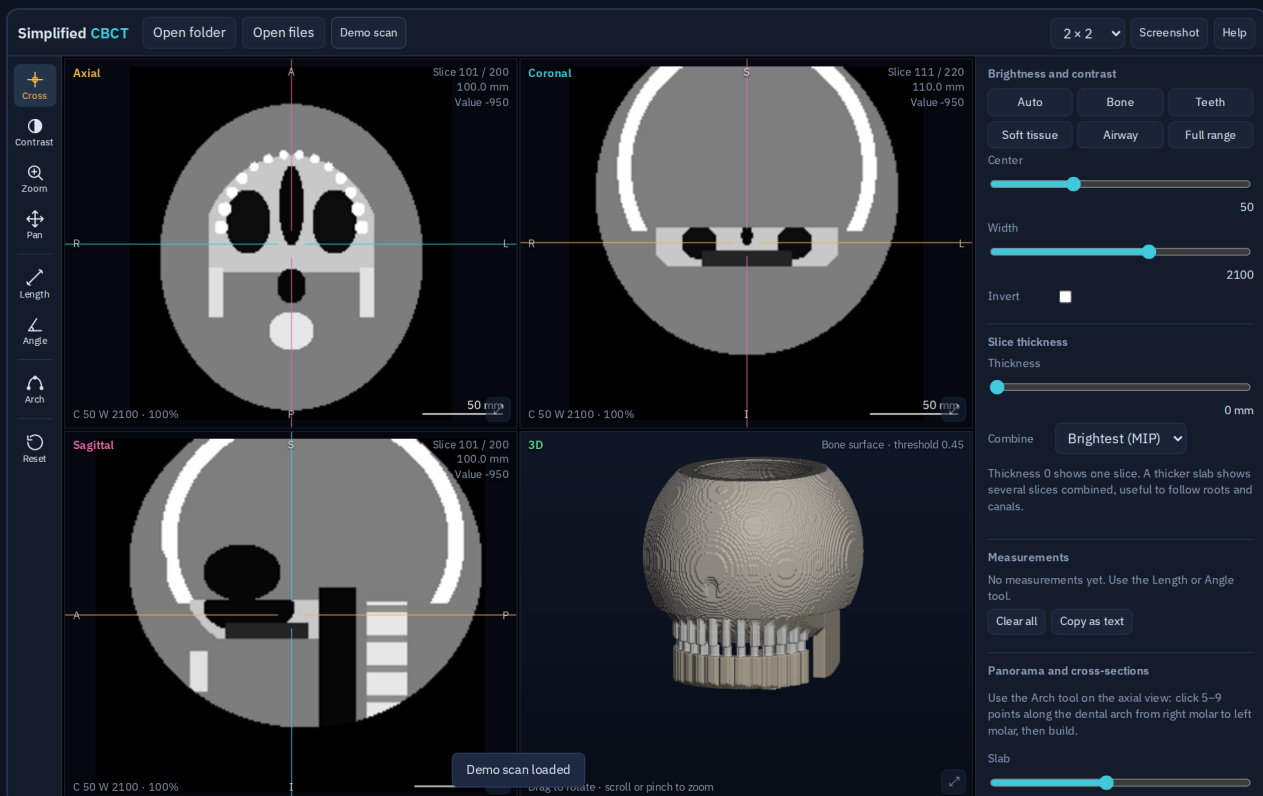


Simplified CBCT

User manual

Open a cone-beam CT scan on your own device, look through it from any direction, measure it in true millimetres, and rebuild the panorama and the ceph. Every screen and button explained in plain words.



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1. What Simplified CBCT does

Simplified CBCT is a viewer for **cone-beam CT scans**. CBCT (Cone Beam Computed Tomography) is a 3D X-ray of the head and jaws. Instead of one flat picture, the machine records hundreds of thin slices, and the viewer lets you look through them from any direction, measure them in real millimetres, and rebuild the flat images you already know: the panorama and the lateral ceph.

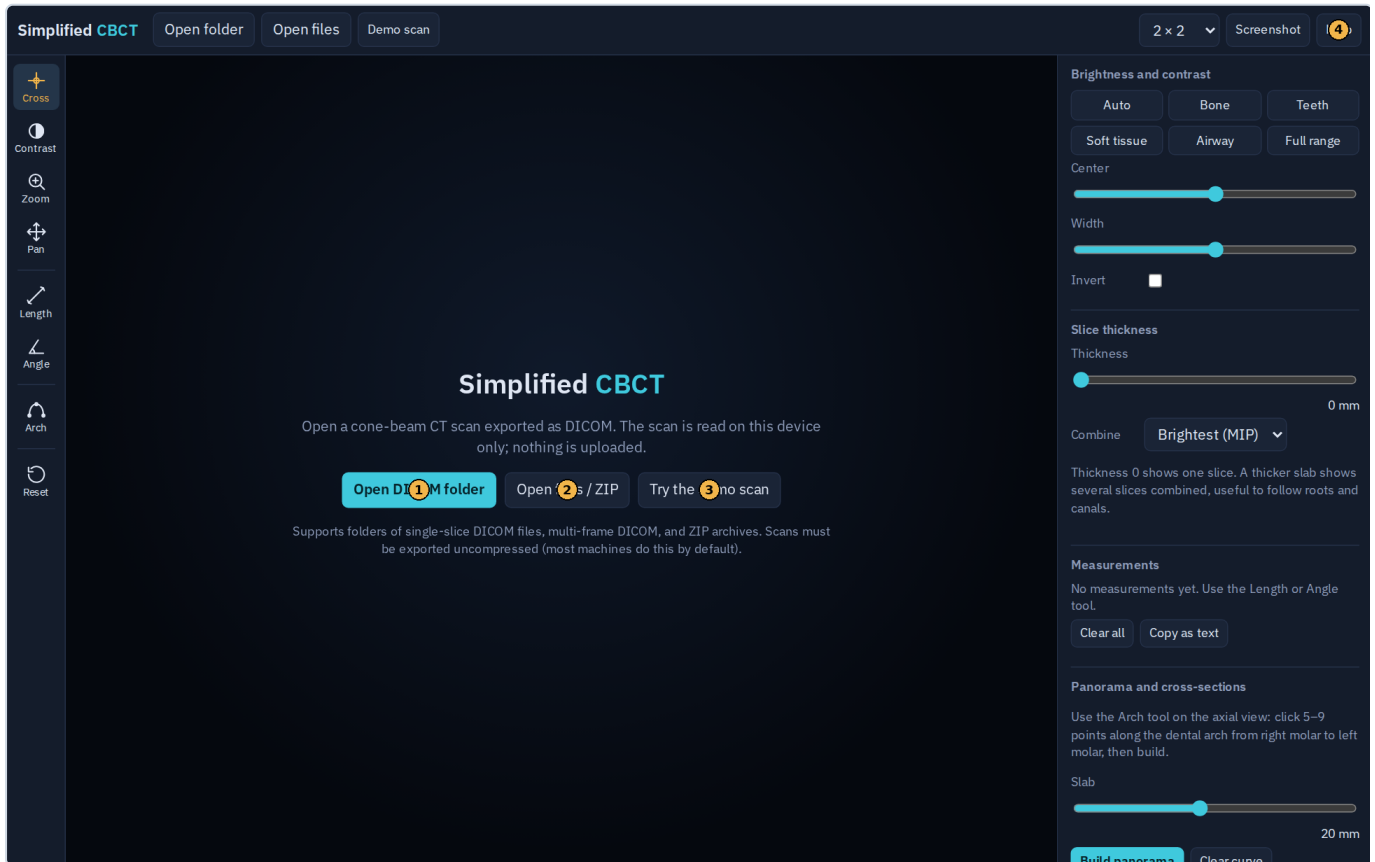
- The scan is opened **on your own computer or phone**. Nothing is uploaded and nothing is stored inside the app. Close the page and the scan is gone from the browser.
- Only the small things you create are worth keeping: measurements, screenshots, the panorama, the synthetic ceph and the 3D surface file. Save those to your patient file in Simplified Practice.
- All three linked views, the 3D picture and every calculation run inside the browser. No internet is needed after the page has loaded.

CBCT gray values are **not calibrated** like hospital CT (there are no true Hounsfield units). Use the scan for shape, position and distances. Do not judge bone density from how bright it looks.

Words used in this manual

Term	Plain meaning
DICOM	The standard file format for medical images. A CBCT export is either a folder full of .dcm files (one per slice) or a single large file holding all slices.
Voxel	A 3D pixel: the tiny cube the scan is made of. Typical CBCT voxels are 0.1–0.4 mm.
Field of view (FOV)	How much of the head the scan covers. Small: a few teeth. Medium: both jaws. Large: the whole skull. Only a large field of view gives a complete ceph.
Axial / coronal / sagittal	The three standard slice directions: from above, from the front, and from the side.
MPR	Multi-planar reconstruction: showing those three directions at the same time, linked by one crosshair.
MIP / slab	A slab combines several slices into one picture. MIP (maximum intensity projection) keeps the brightest voxel along the way, which makes bone and teeth stand out.
Window (center / width)	Brightness and contrast for gray-scale medical images. Center = brightness, width = contrast.
STL	A 3D model file. Simplified Cast and 3D printers open STL files.

2. Opening a scan



The start screen. Everything happens on this device.

- 1 Open DICOM folder:** choose the folder the radiology centre gave you. It usually contains hundreds of files named like *IMG0001.dcm*. The viewer reads all of them and picks the largest series automatically.
- 2 Open files / ZIP:** choose one or many DICOM files, or a single ZIP archive of the folder. Use this on phones, where picking a folder is not always possible.
- 3 Try the demo scan:** loads a built-in synthetic head so you can learn every tool without a patient scan. It is schematic and not anatomically exact.
- 4 Help:** a short in-app reminder of the controls.

You can also drag a folder or files from your computer and drop them anywhere on the dark area.

What the viewer accepts

Export type	Supported?
Folder of single-slice DICOM files	Yes. The most common export.
One multi-frame DICOM file	Yes. All slices inside one file.
ZIP of the DICOM folder	Yes. Handy for phones and for e-mail attachments.
DICOMDIR from a CD	Yes: open the whole CD folder; the index file is ignored and the images are read.
Compressed DICOM (JPEG, JPEG 2000)	Not yet. The viewer tells you and asks you to export again as <i>uncompressed</i> DICOM. Most machines do this by default.

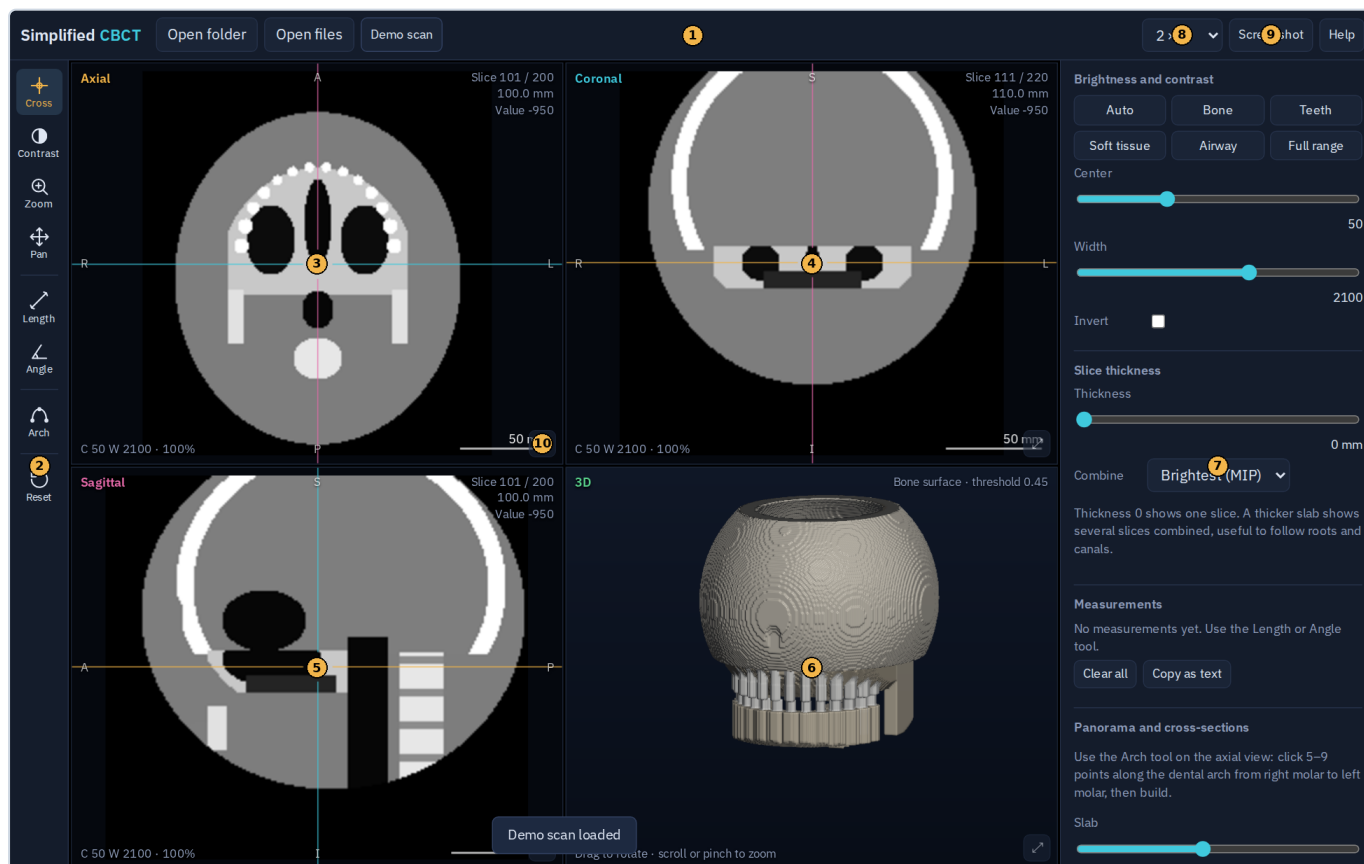
Proprietary formats (.pln, .vol, machine-specific)

No. In the machine software choose *Export* → *DICOM* first (Planmeca Romexis, Carestream CS 3D, Vatech EzDent, Sirona Sidexis all have it).

While the scan is loading, a thin blue bar at the bottom of the viewing area shows progress. Large scans (500 MB and more) take up to a minute on a computer and may be too big for a phone.

The patient name inside the files is never shown. The scan information panel shows only the machine, date and geometry.

3. The screen



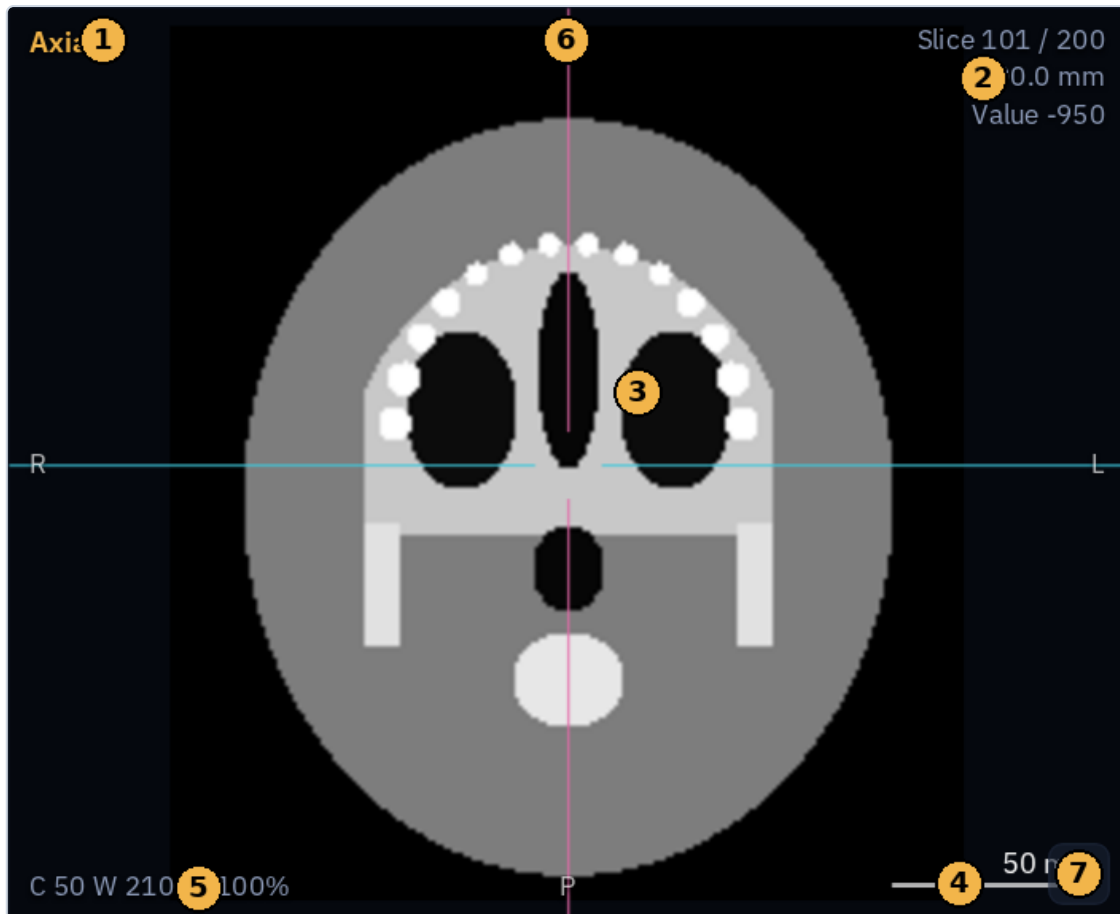
The main layout after a scan has loaded (here the demo scan).

- 1 **Header:** open buttons, layout choice, screenshot and help.
- 2 **Tool rail:** which tool your mouse or finger uses on the images. Explained in the next section.
- 3 **Axial view** (from above). Orange tag. Patient right is on the left of the screen, like a radiograph.
- 4 **Coronal view** (from the front). Blue tag. Top of the picture is the top of the head.
- 5 **Sagittal view** (from the side). Pink tag. The face points left.
- 6 **3D view.** Green tag. Rotates with the mouse or a finger.
- 7 **Side panel:** brightness, slab thickness, measurements, panorama, synthetic X-rays, 3D and scan information.
- 8 **Layout:** **2 × 2** shows all four views, **1 + 3** shows one big view and three small, **Single** shows one view only.

-
- 9 Screenshot:** saves the active view as a PNG image, with the crosshair, measurements and scale bar exactly as you see them.
-
- 10 Expand:** on every view, the small arrow in the corner switches that view to full size and back.
-

Press **1**, **2**, **3** or **4** on the keyboard to make the axial, coronal, sagittal or 3D view the active one. The active view is the one that keyboard arrows and the screenshot button act on.

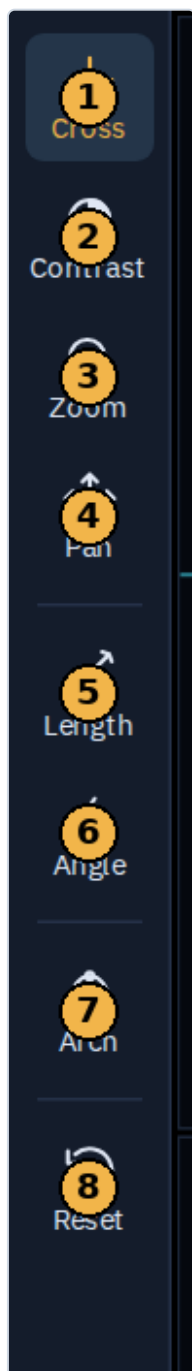
Inside one view



The axial view and its labels.

-
- 1** View name, in its colour. The same colour is used for its crosshair line in the other two views.
-
- 2** Slice number and its position in millimetres, the slab thickness if any, and the gray value under the crosshair.
-
- 3** Crosshair. The vertical pink line is where the sagittal slice is; the horizontal blue line is where the coronal slice is. Move the crosshair and both other views jump to the same point.
-
- 4** Scale bar in millimetres. It changes when you zoom.
-
- 5** Current window (C = center, W = width) and zoom percentage.
-
- 6** Orientation letters: A anterior (front), P posterior (back), R right, L left, S superior (top), I inferior (bottom).
-
- 7** Expand button.
-

4. Tools



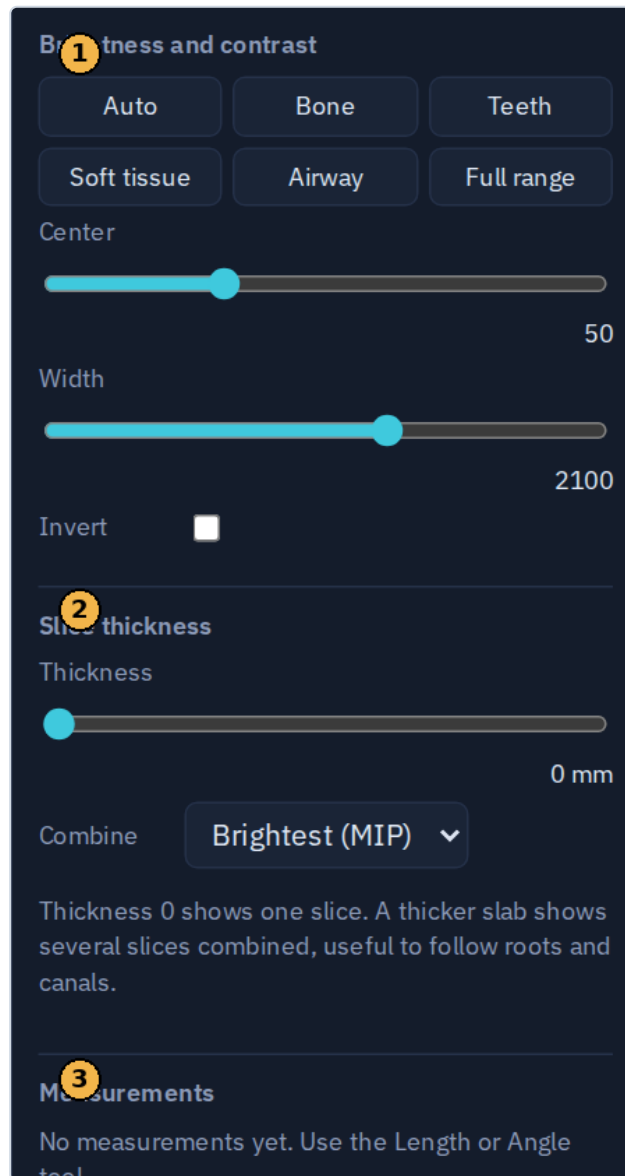
The tool rail.

- 1 **Cross** (navigate). Click or drag on any view to move the crosshair. The mouse wheel changes slice. This is the tool you will use most.
- 2 **Contrast**. Drag left and right to change contrast, up and down to change brightness. The right mouse button does the same with any tool.
- 3 **Zoom**. Drag up to enlarge, down to shrink. With a mouse you can also hold **Ctrl** and roll the wheel. On a touch screen, pinch with two fingers.
- 4 **Pan**. Drag to move the picture. The middle mouse button does the same with any tool; on a touch screen drag with two fingers.
- 5 **Length**. Click two points. The distance is shown in millimetres and listed in the side panel.
- 6 **Angle**. Click three points. The middle click is the corner of the angle.
- 7 **Arch**. Click points along the dental arch on the axial view to prepare a panorama (see the Panorama section).
- 8 **Reset**. Puts zoom and pan back to the starting position in every view. **R** on the keyboard does the same.

Shortcut	Effect
Mouse wheel	Next / previous slice
Ctrl + wheel	Zoom around the mouse pointer
Right button drag	Brightness and contrast
Middle button drag	Pan
↑ / ↓	Next / previous slice in the active view

1 – 4	Activate a view
R	Reset zoom and pan
Esc	Cancel a half-finished measurement, close a dialog
Two-finger pinch	Zoom (touch)
Two-finger drag	Pan (touch)

5. Brightness, contrast and slab thickness



Top of the side panel.

- 1 Brightness and contrast.** Six presets, then two sliders for fine control, and an *Invert* box that turns the picture into a negative.
- 2 Slice thickness.** A slab of 0 mm shows one slice. Larger values combine several slices into one picture.
- 3 Measurements** list (next section).

The presets

Because CBCT machines all use different gray scales, the presets are worked out from the scan itself the moment it loads. They therefore behave the same on every machine.

Preset	When to use it
Auto	A balanced view of everything. This is what you get when the scan opens.
Bone	Bone bright, soft tissue dark. Best for cortical outlines and roots.
Teeth	Only enamel and dense bone stay bright. Good for crowns and impacted teeth.
Soft tissue	Skin, muscle and airway visible; bone is washed out.
Airway	Air is black and everything else is light. Use it to follow the nose and pharynx.
Full range	The whole gray scale of the file, for checking exports.

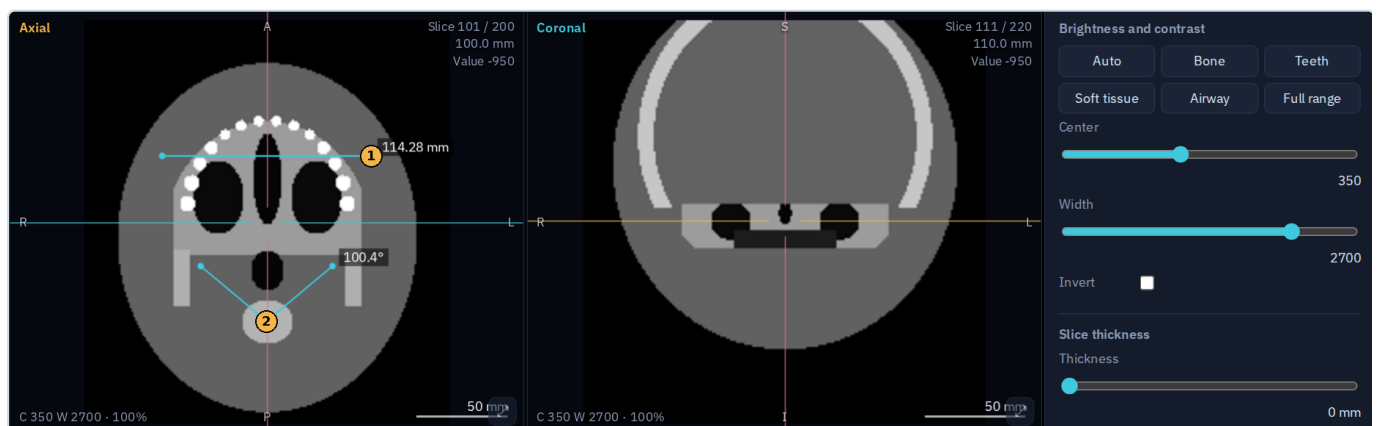
Slab thickness

Choose how many millimetres to combine and how to combine them:

- **Brightest (MIP)** keeps the brightest voxel. Bone and enamel jump out; great for following a canal, a root or a fractured line across several slices.
- **Average** smooths noise and looks like a thick conventional slice.
- **Darkest (MinIP)** keeps the darkest voxel, which makes air spaces continuous: use it for the airway and the sinuses.

Measurements you make on a slab are stored with the slab range and stay visible while that range is on screen.

6. Measuring



A length and an angle on the axial view, and the measurement list.

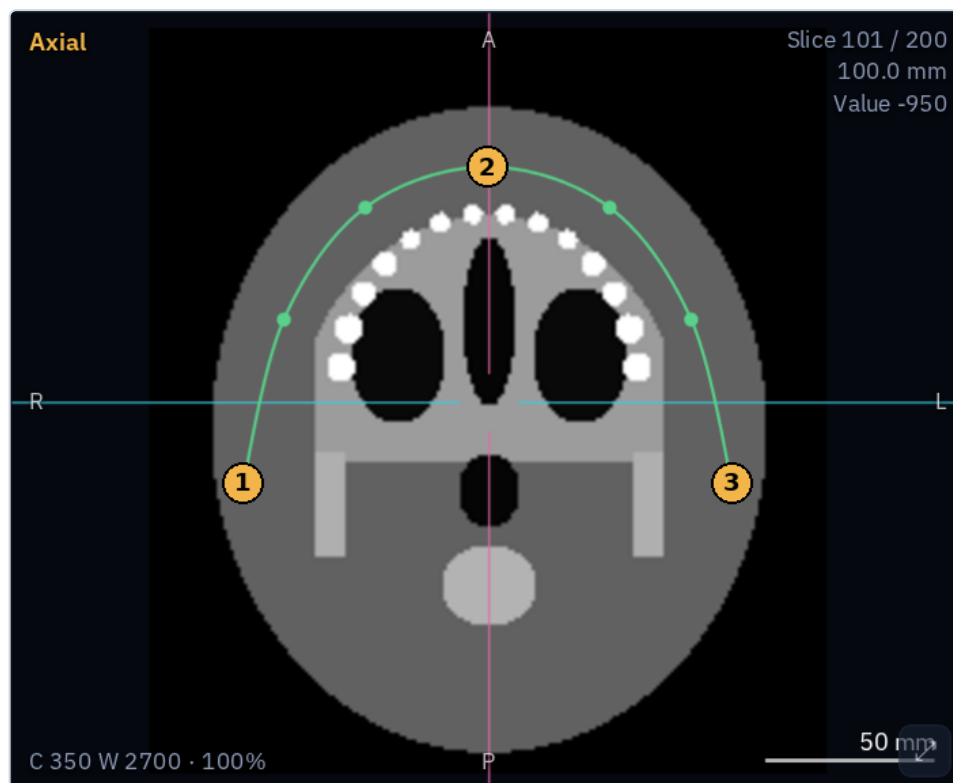
- 1 A length: two clicks. The value appears next to the second point.
- 2 An angle: three clicks. The middle click is the corner (vertex).
- 3 The list in the side panel. Click a line to jump to the slice where that measurement was made. The ✕ deletes it.

- Every measurement remembers its view and its slice. Scroll away and it disappears; scroll back and it returns.
- Values are in true millimetres and degrees because the DICOM file carries the voxel size. No calibration is needed.
- **Clear all** removes every measurement. **Copy as text** copies the whole list to the clipboard, ready to paste into the patient notes in Simplified Practice.
- To keep a picture of a measurement, press **Screenshot** while that view is active.

Landmark placement in CBCT has an error of roughly one voxel (0.2–0.4 mm). For alveolar bone thickness and inter-radicular spaces, measure on a slab of 0 mm and zoom in until single voxels are visible.

7. Panorama and cross-sections

The viewer can rebuild a panoramic image from the scan, and cut cross-sections at right angles to the arch, exactly like implant-planning software.

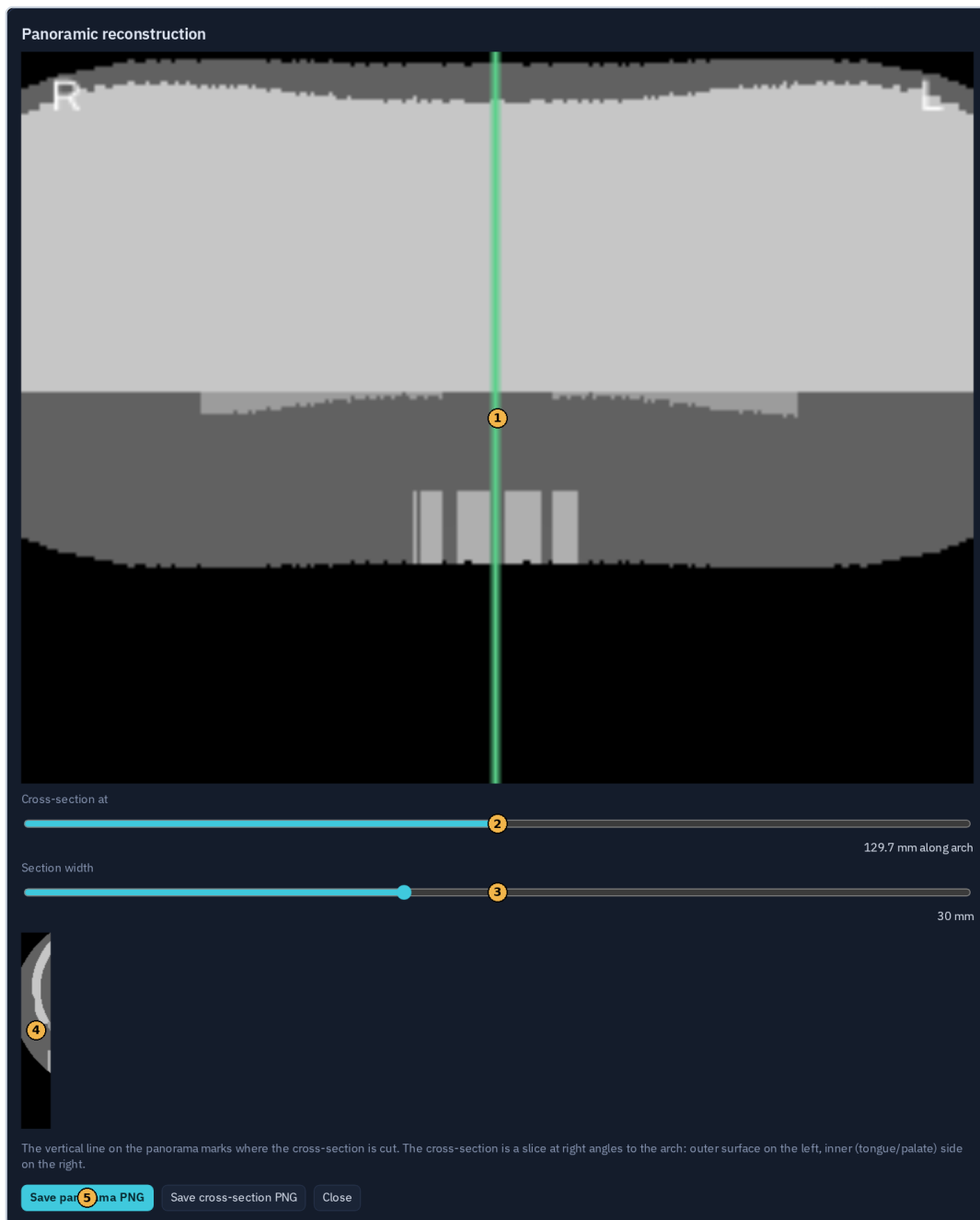


Placing the arch curve with the Arch tool.

- 1 Start at the right molar region.
- 2 Follow the middle of the arch through the incisors.
- 3 End at the left molar region. Five to nine points are enough; the curve is smoothed automatically.

1. Scroll the axial view to a slice through the roots of the teeth (about mid-root height).
2. Pick the **Arch** tool and click the points as shown. Clicking on a different slice starts a new curve. **Clear curve** removes it.
3. Set the **Slab** for the panorama. 20 mm is a good default; it must be thick enough to contain the whole arch as it curves through the slices.

4. Press **Build panorama**.



The panorama dialog with a cross-section.

- 1 The panoramic image. R and L mark the patient side. The green line is where the cross-section is cut.
- 2 **Cross-section at:** slide to move along the arch. The number is the distance in millimetres from the right end of the curve.
- 3 **Section width:** how wide the cross-section is (10–60 mm).
- 4 The cross-section: a slice at right angles to the arch. Outer (cheek) side is on the left, inner (tongue or palate) side on the right. The white line on the axial view shows the same cut.
- 5 Save the panorama or the cross-section as a PNG image. The file name records the millimetres per pixel.

Use cross-sections to see an impacted canine relative to the incisor roots, to measure buccal and palatal bone

before expansion or retraction, and to check inter-radicular space for a mini-screw (TAD).

8. Synthetic lateral and PA ceph

A synthetic radiograph is made by looking straight through the whole scan and adding up everything along the way, which is what a real X-ray does. The result opens in Simplified Ceph like any other cephalogram.

In the side panel press **Lateral ceph** for the side view or **PA ceph** for the front view. Building takes a few seconds on a large scan.

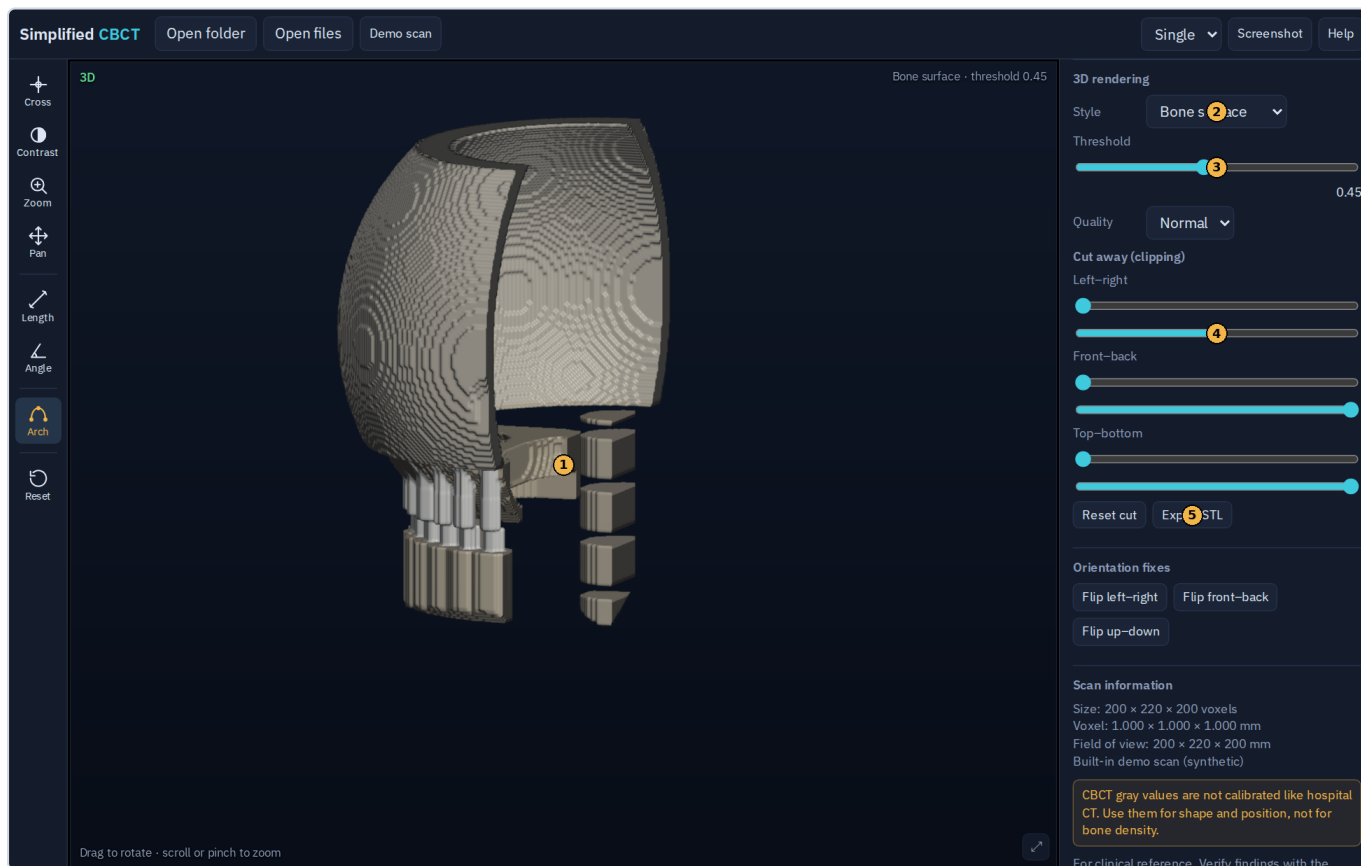


The synthetic lateral ceph dialog.

- 1 The radiograph. Bone and teeth are white as on film.
- 2 **Contrast:** move right for a darker, more contrasted picture; move left to see soft tissue.
- 3 **Flip left-right:** standard cephs face right; use this if the export was mirrored.
- 4 **Save PNG for Simplified Ceph:** saves the image. The file name contains the pixel size, for example *ceph_lateral_0.300mm_per_px.png*. In Simplified Ceph, enter that value when it asks for calibration, or draw the calibration line on any known distance.

Point	What it means
Magnification	None. A film ceph is enlarged by about 8–10 %; the synthetic ceph is at true size, so millimetre values need no correction. Angles are the same either way.
Field of view	A complete ceph needs a large field of view (roughly 16 × 17 cm or more). A small scan gives a partial picture and the dialog warns you.
Head position	The picture follows the head position in the scanner. If the head was tilted, use the orientation buttons and, in Simplified Ceph, rely on angular measurements to the Frankfort plane rather than to the picture edges.

9. 3D rendering and STL export



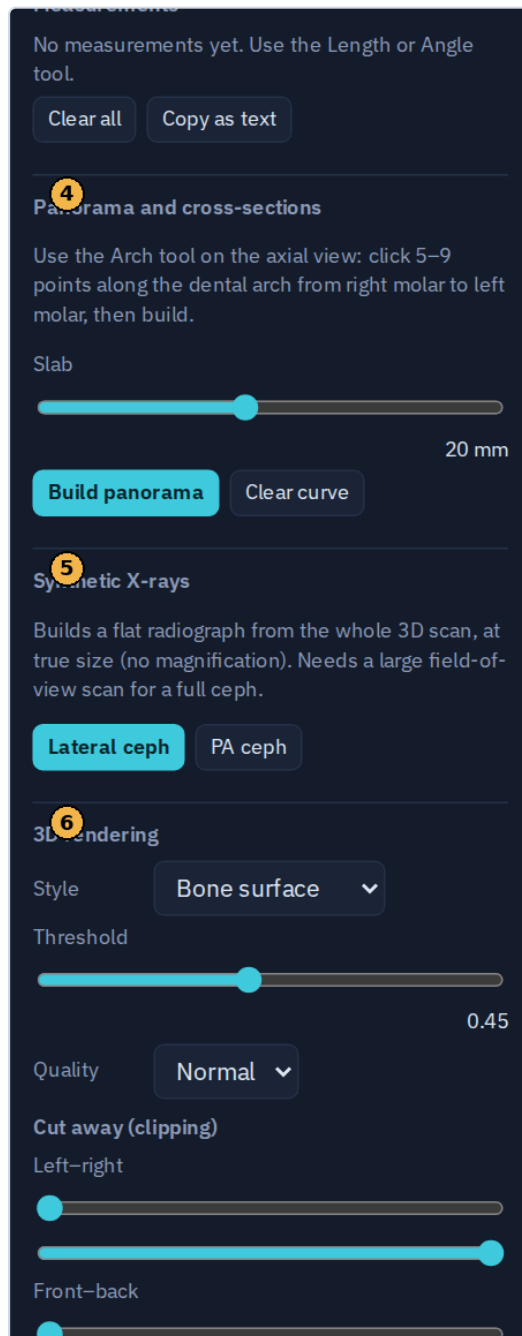
The 3D view in Single layout, with a cut-away on the left-right axis.

- 1** The 3D picture. Drag to rotate, wheel or pinch to zoom, right-button drag (or the Pan tool) to move. Bone and teeth are shaded ivory; brighter, denser structures are whiter.
- 2** **Style.** **Bone surface** shows a solid surface. **Brightest (MIP)** shows an X-ray-like glow of the densest structures. **X-ray** looks through everything like a radiograph.
- 3** **Threshold.** How bright a voxel must be to count as surface. Lower it to include thin bone; raise it to leave only teeth.
- 4** **Cut away.** Six sliders remove the left/right, front/back and top/bottom parts of the scan so you can look inside: at an impacted tooth, a condyle or the airway. **Reset cut** restores the whole scan.
- 5** **Export STL.** Writes the surface at the current threshold and cut as an STL file in millimetres. Open it in Simplified Cast, in any 3D printing slicer, or in a surgical planning program.

- Set the threshold and cut away the soft tissue first; the STL then contains only bone and teeth.
- **Quality** changes how many steps the 3D picture uses. Use **Fast** on a phone or an old laptop.
- The 3D view needs WebGL2, which every modern browser has. If the view stays black, update the browser or use another device.

The demo scan is built from simple shapes at 1 mm, so its 3D looks blocky. A real 0.2–0.3 mm scan renders smoothly.

10. Orientation fixes and scan information

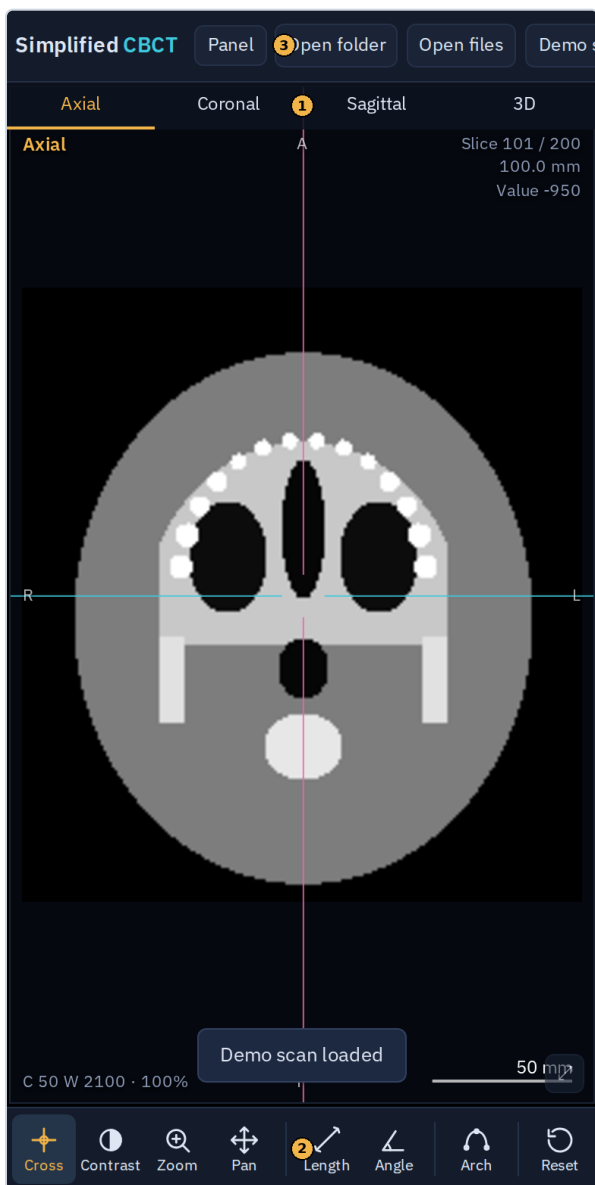


Lower part of the side panel.

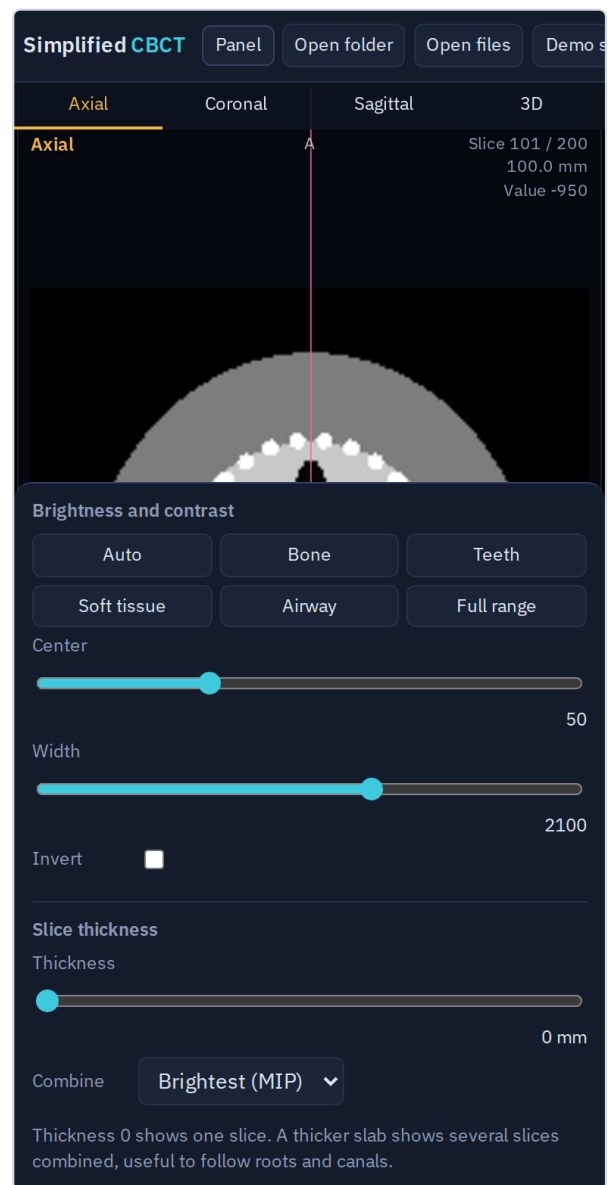
- 1 Panorama and cross-sections (previous sections).
- 2 Synthetic X-rays.
- 3 3D rendering and cut-away.
- 4 **Orientation fixes:** three buttons that mirror the scan left–right, front–back or up–down. Use them if an export arrives upside down or mirrored. Measurements and the arch curve are cleared when you flip.
- 5 **Scan information:** size in voxels, voxel size, field of view, machine and date, plus the reminder about gray values.

How to check orientation quickly: on the axial view the nose must point up (A at the top) and the letter R must be on the left of the screen; on the coronal and sagittal views the skull must be at the top.

11. Using it on a phone



Phone layout.



The side panel slides up from the bottom.

- 1 Tabs switch between the axial, coronal, sagittal and 3D views; only one is shown at a time.
- 2 The tool rail moves to the bottom.
- 3 The **Panel** button opens and closes the side panel.

- One finger uses the chosen tool. Two fingers always zoom and pan, whatever tool is chosen.
- Phones have limited memory: scans above roughly 300 MB may fail to load. Use a computer for those, or ask the radiology centre for a smaller field of view.
- Choose **Fast** quality for the 3D view.

12. Working with the other Studio tools

Tool	How they connect
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Simplified Ceph	Save the synthetic lateral or PA ceph as PNG, open it in Simplified Ceph, enter the pixel size from the file name as the calibration.
Simplified Cast	Export the STL of the teeth and jaws and open it in Simplified Cast to compare the roots with the intraoral scan.
Simplified Practice	Attach the panorama, ceph, cross-section screenshots and the copied measurement text to the patient file. Do not attach the CBCT itself; keep the original files from the radiology centre.

CBCT scans are not synced to Google Drive. Only the small results you save are. This keeps your storage free and the patient data on your own device.

13. Troubleshooting

Problem	What to do
"No readable DICOM images found"	The files are not DICOM, or they are the machine's own format. Export again as DICOM from the machine software.
"This scan is compressed"	The export used JPEG or JPEG 2000 compression. Export again and choose <i>uncompressed</i> (sometimes called <i>raw</i> or <i>explicit little endian</i>).
The picture is upside down or mirrored	Use the three Orientation fix buttons.
Only part of the head is in the scan	That is the field of view the centre used; the viewer cannot add what was not scanned.
The scan loads but looks all black or all white	Press Auto in Brightness and contrast, then try Full range .
The 3D view is black	The browser has no WebGL2. Update it, or open the page in Chrome or Edge.
Loading is slow or the page reloads	The scan is too large for the device memory. Use a computer, or a ZIP with only the series you need.
Measurements vanished	They are attached to a slice. Click the measurement in the list to jump back to its slice. Flipping the scan clears them.
The ZIP does not open	The page was opened without internet the first time, so the ZIP helper did not load. Unzip the folder and open it instead.

Simplified CBCT is a viewing and measuring aid for clinical reference. Always read the CBCT together with the radiologist's report, and do not rely on gray values for bone density. The screenshots in this manual use a synthetic demonstration scan, not a patient.