

CraniumPy

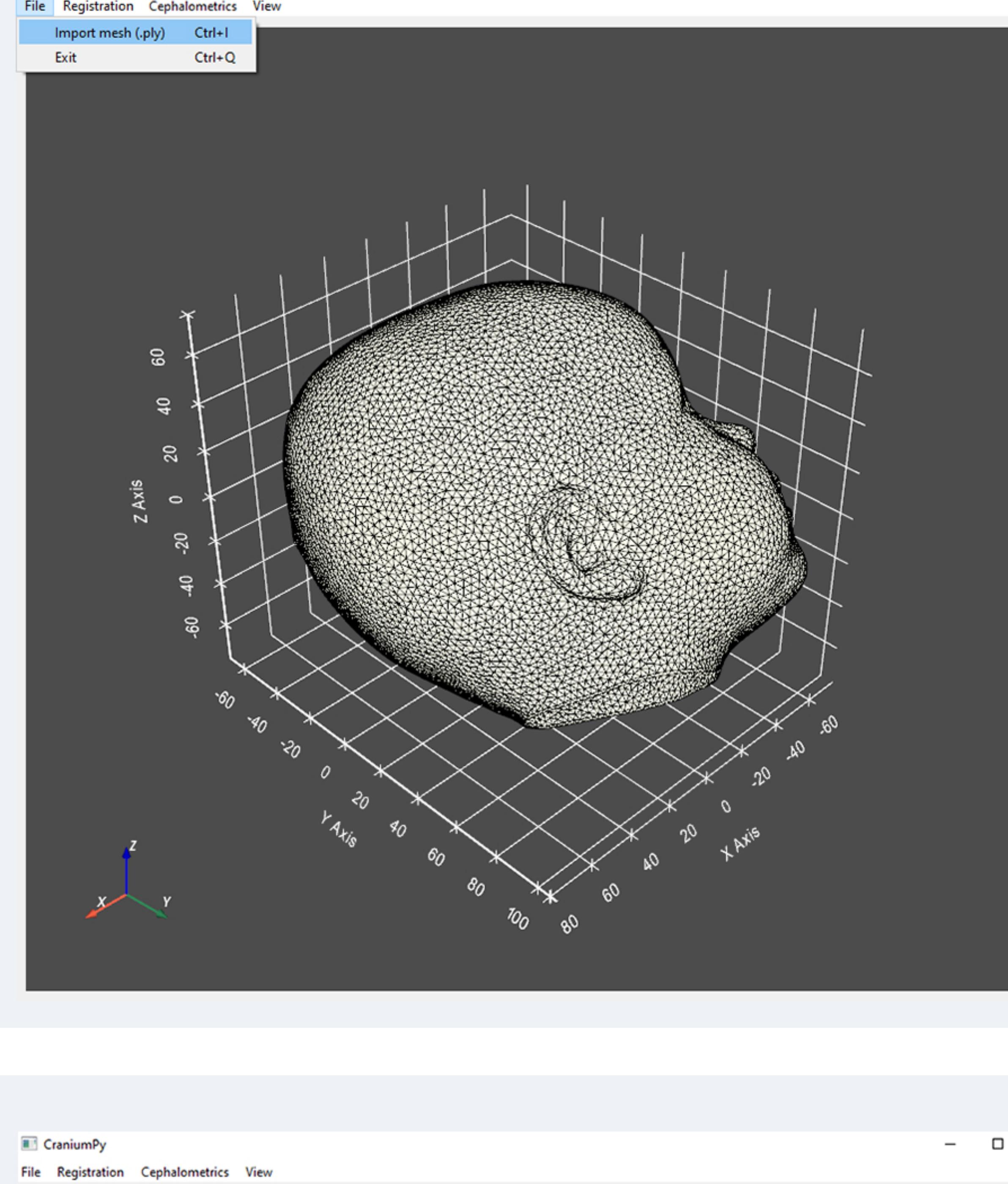
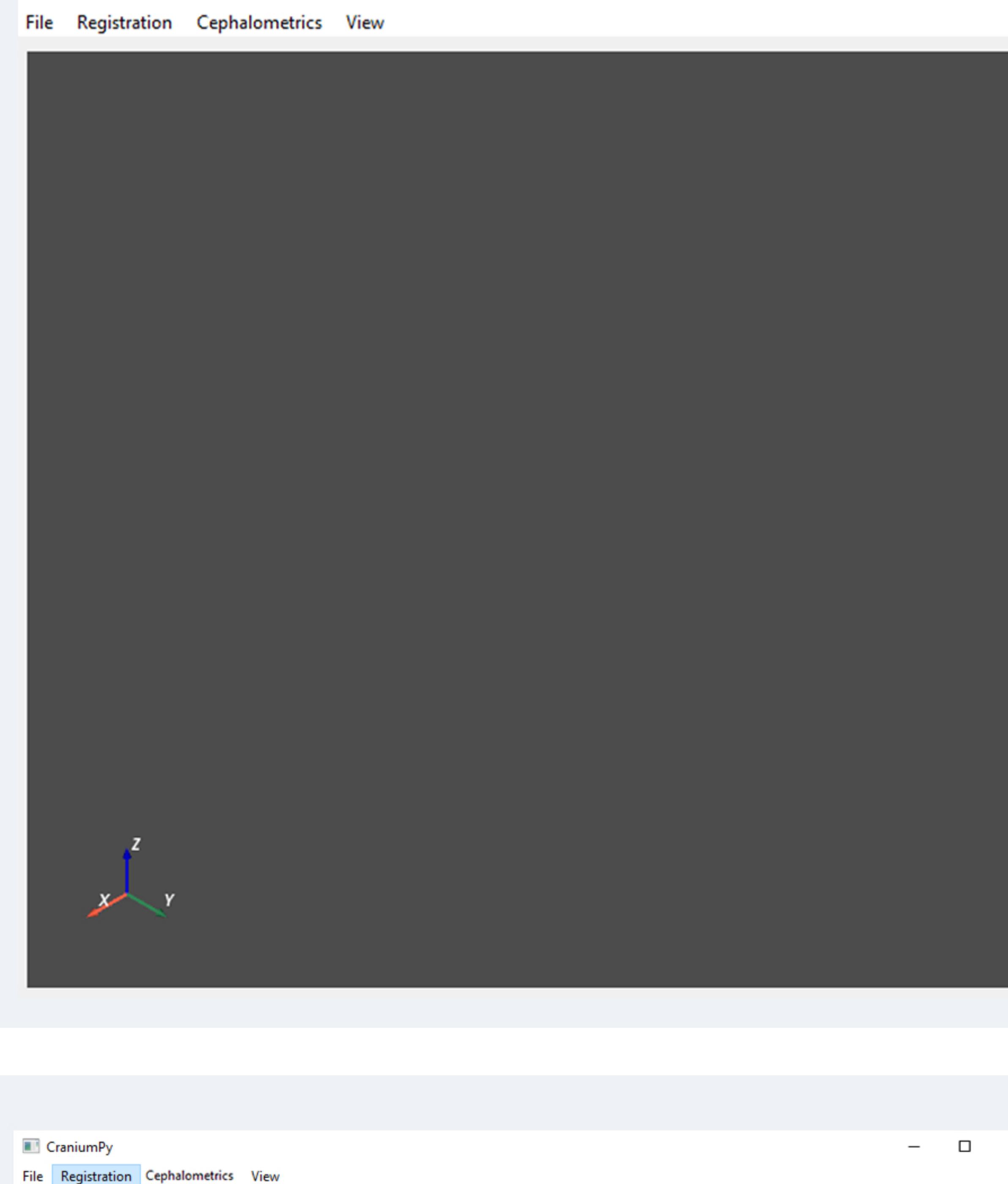
T. Abdel-Alim

Import mesh

File > Import mesh

Default file format: .ply
Tested with .ply, .stl, and .obj

All pre-processed images are saved as .ply objects.



Mesh registration:

Registration > Enable picking (ctrl+P)

With picking enabled, hover over one of the following three landmarks and press P to toggle a red pointer

Landmarks:

- Nasion: ctrl+N to confirm
- Left Tragus: ctrl+L to confirm
- Right Tragus: ctrl+R to confirm

After confirmation, the red dot will turn green and the landmark coordinates will appear in the top right corner.

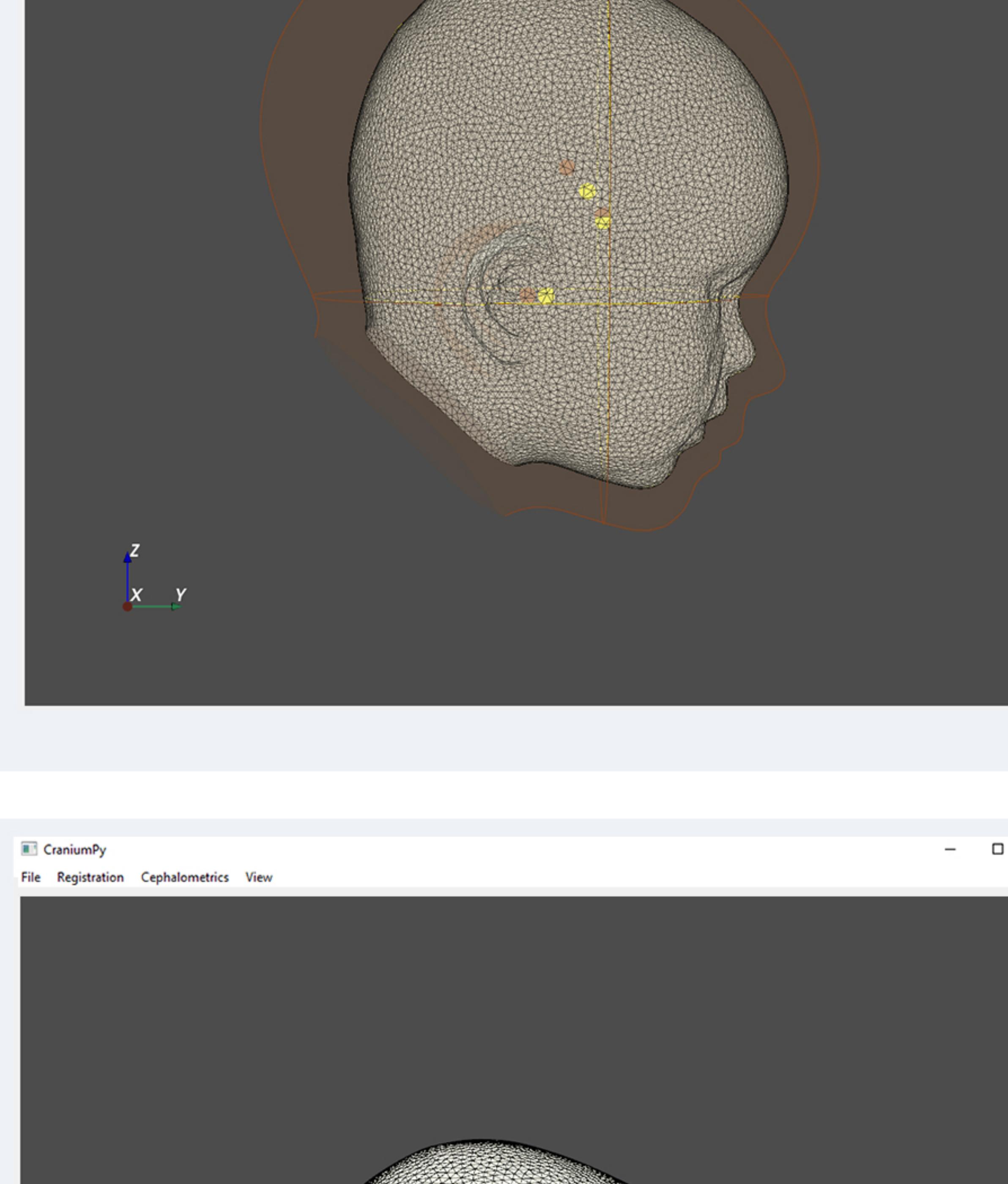
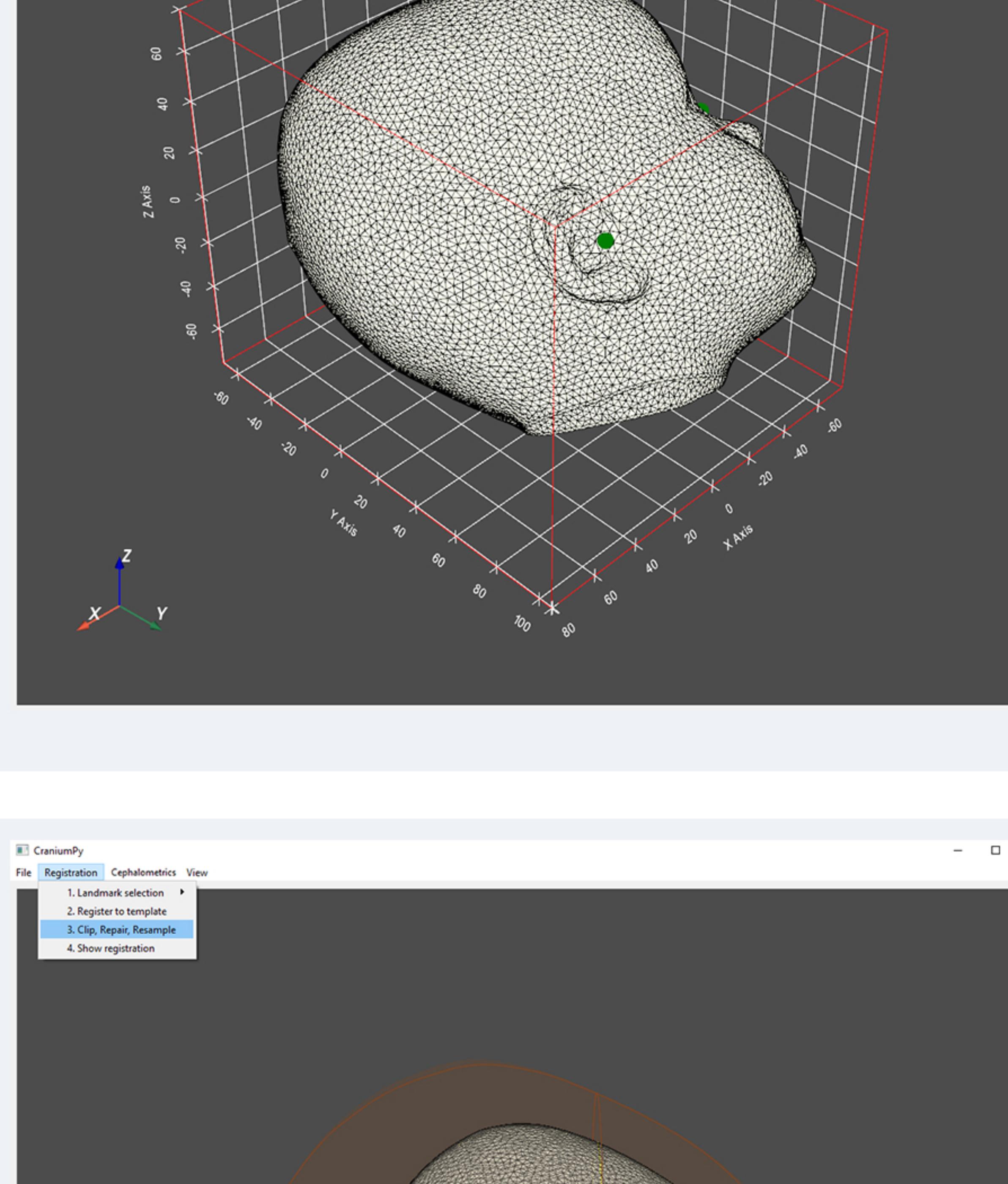
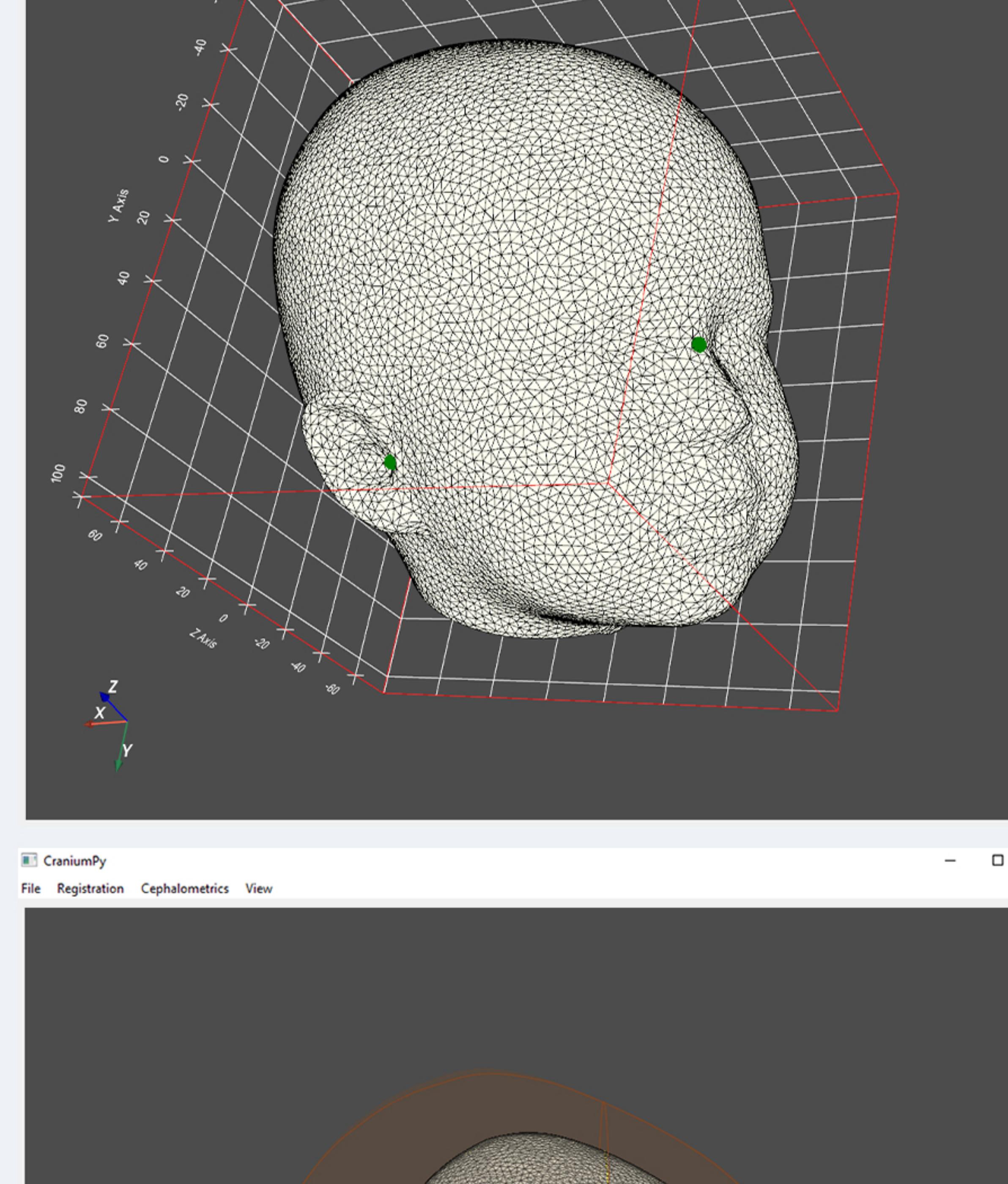
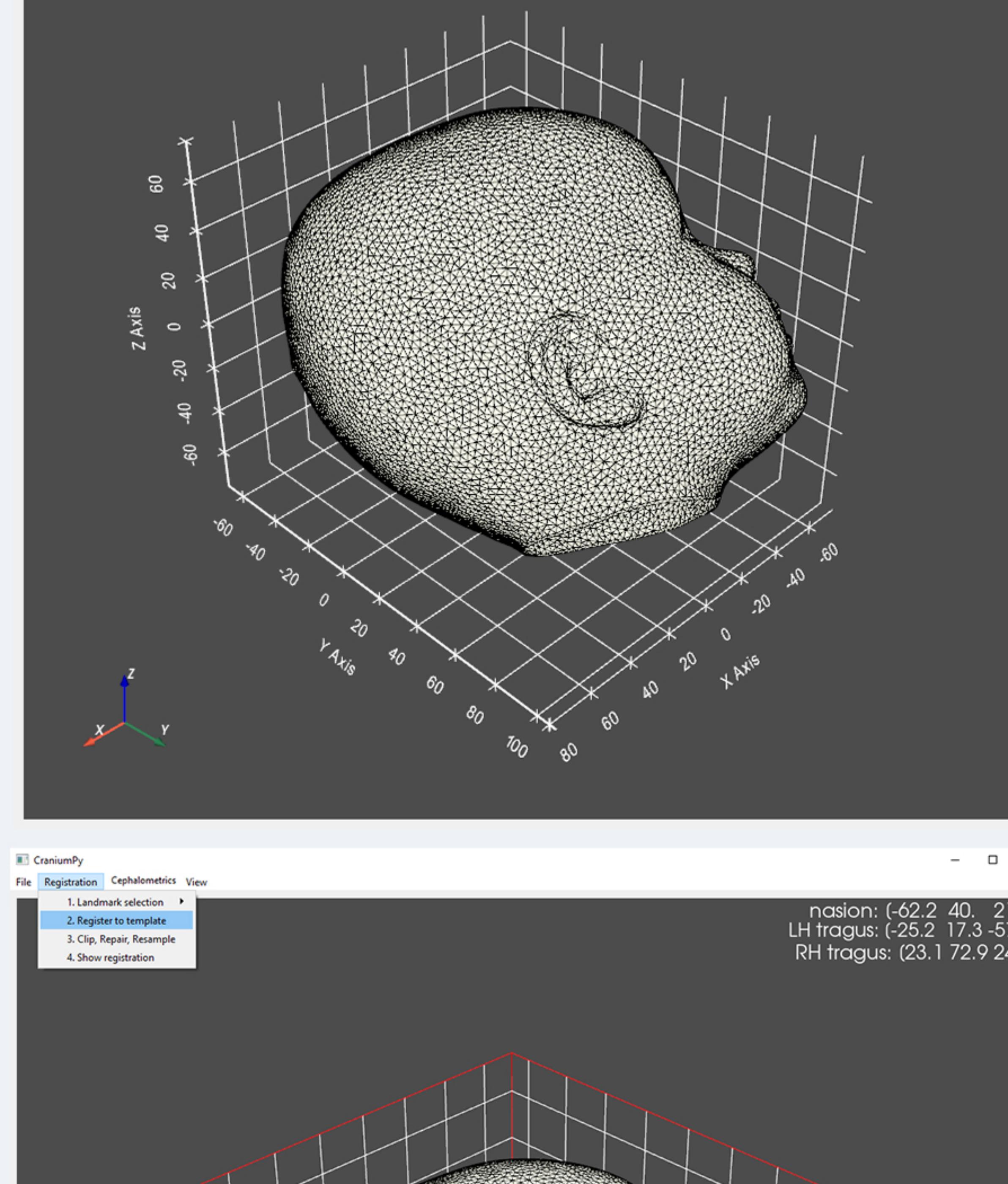
When the three landmarks have been confirmed (3 green dots) register the mesh to the template (in orange):

Registration > Register to template

The registration uses the centroid of the three landmarks (translation) and the normal vectors (rotation).

The centroid serves as the origin of the reference plane and nears the location of the sella turcica, a well known anatomical landmark and the (hypothesized) center of gravity of the skull.

Registered mesh saved as:
"filename_rg.ply"



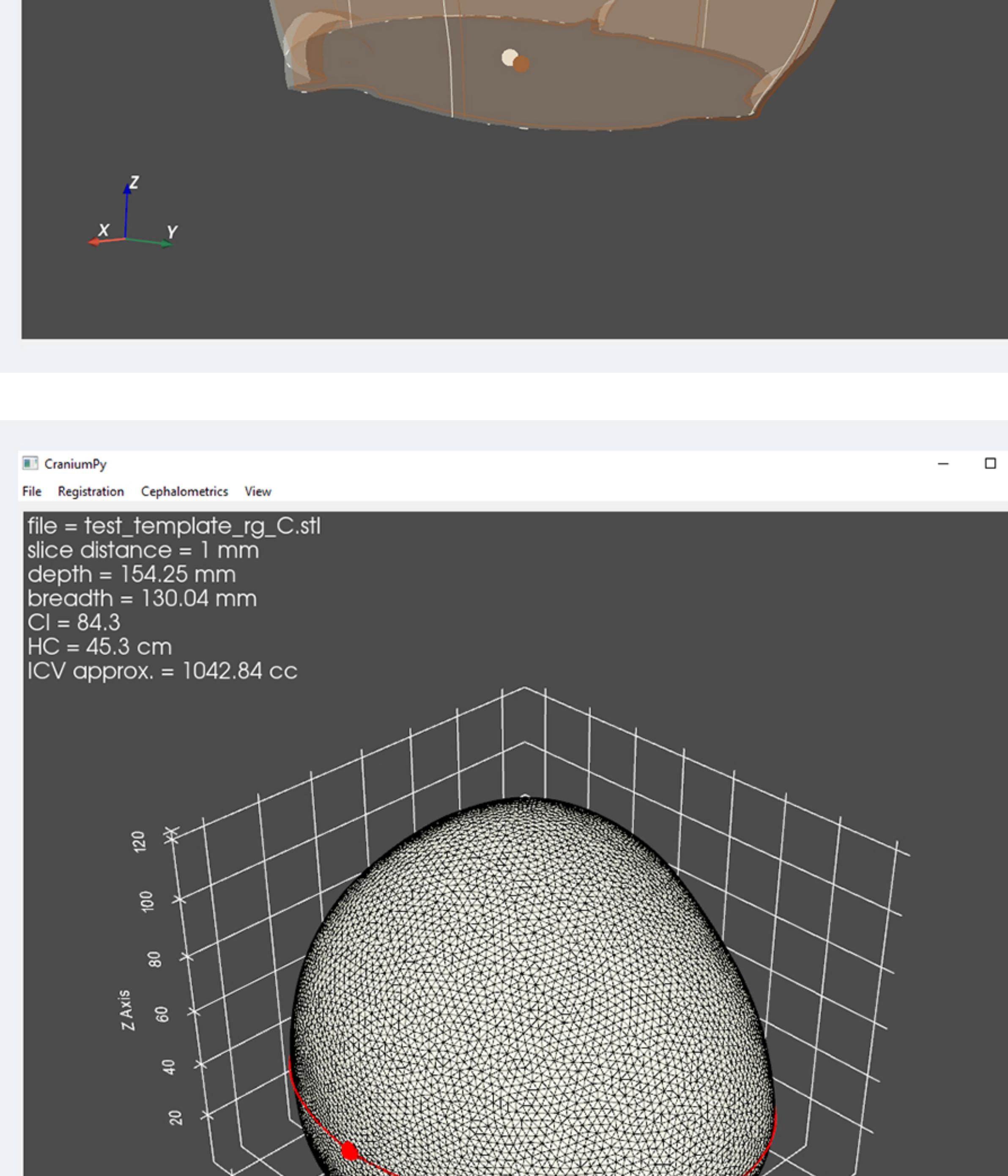
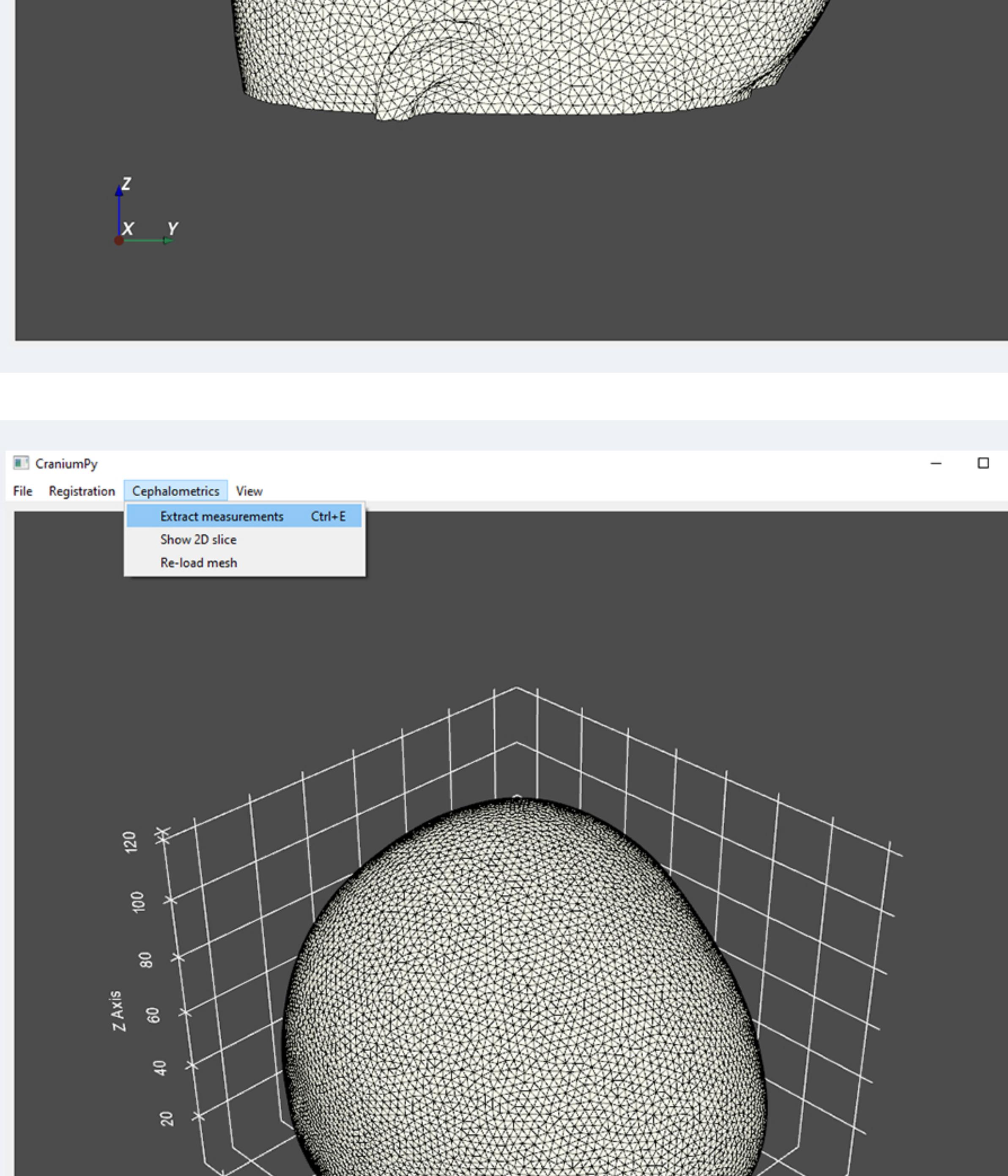
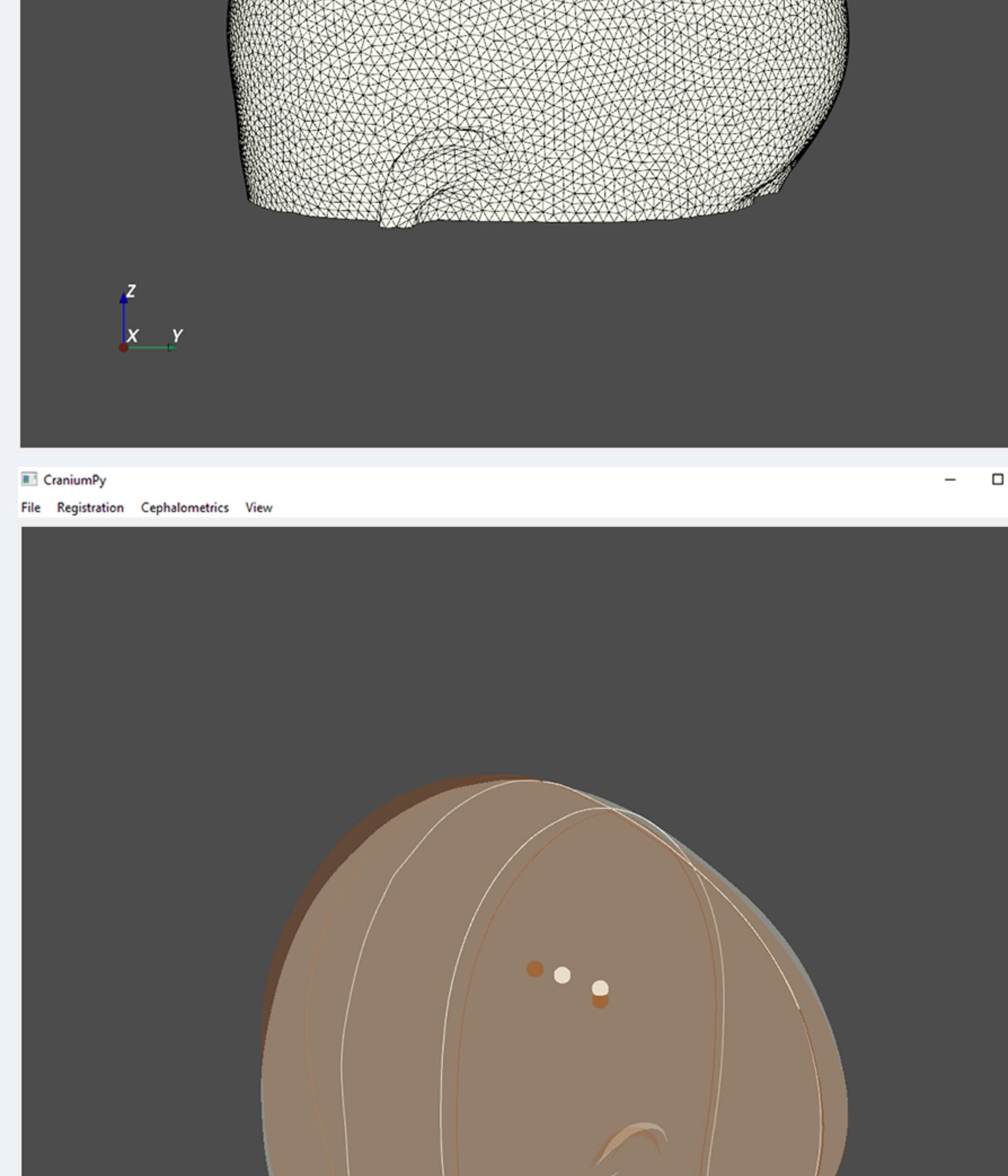
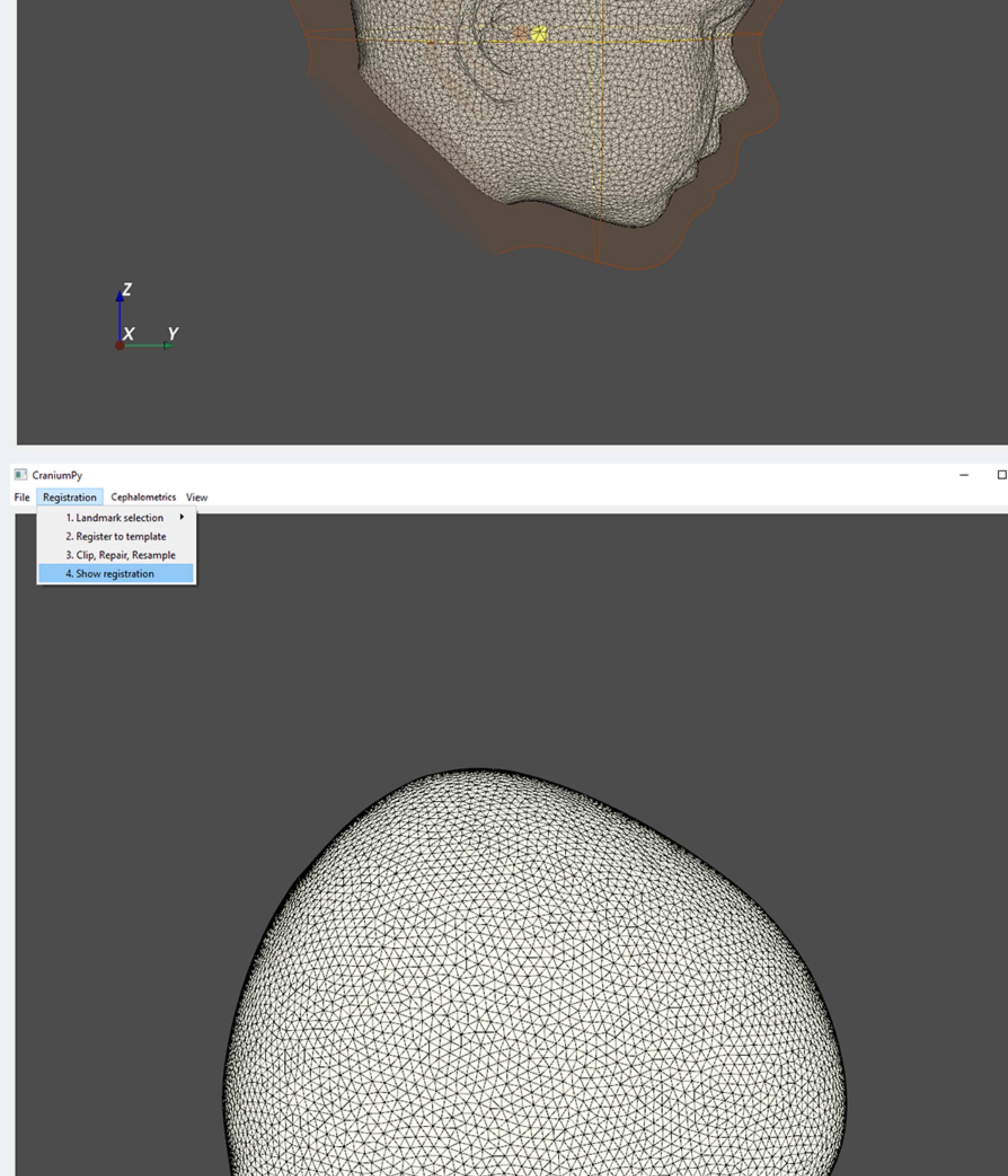
Mesh clipping and optimization:

Registration > Clip, Repair, Resample

This executes the following three operations:

- Clip the mesh along the nasion-tragus plane
- Holes and mesh artifacts are patched (pymeshfix)
- The mesh is resampled using voronoi clustering (pyacvd)
default $n_{\text{vertices}} = 10.000$

Cranial mesh (clipped) saved as:
"filename_rg_C.ply"



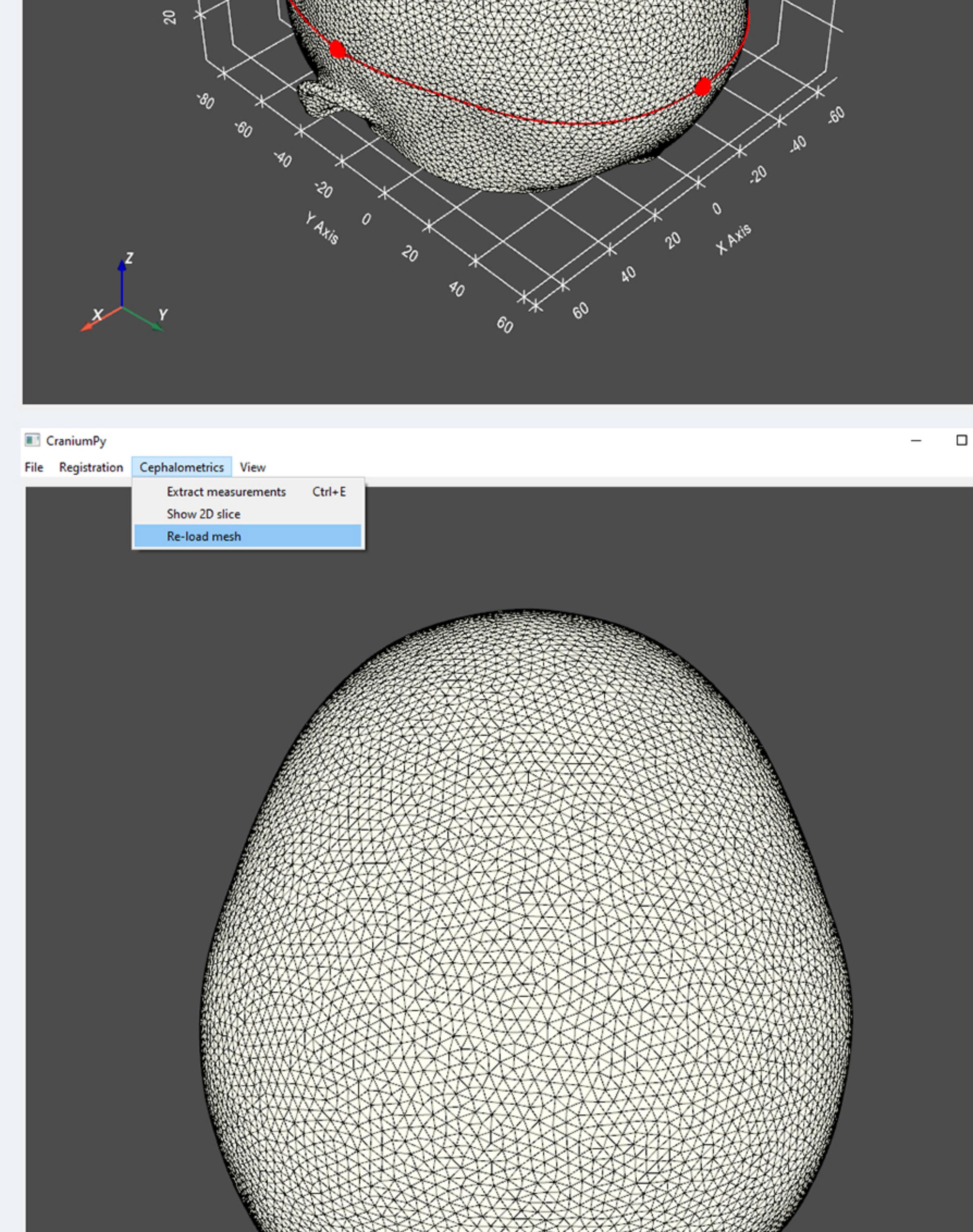
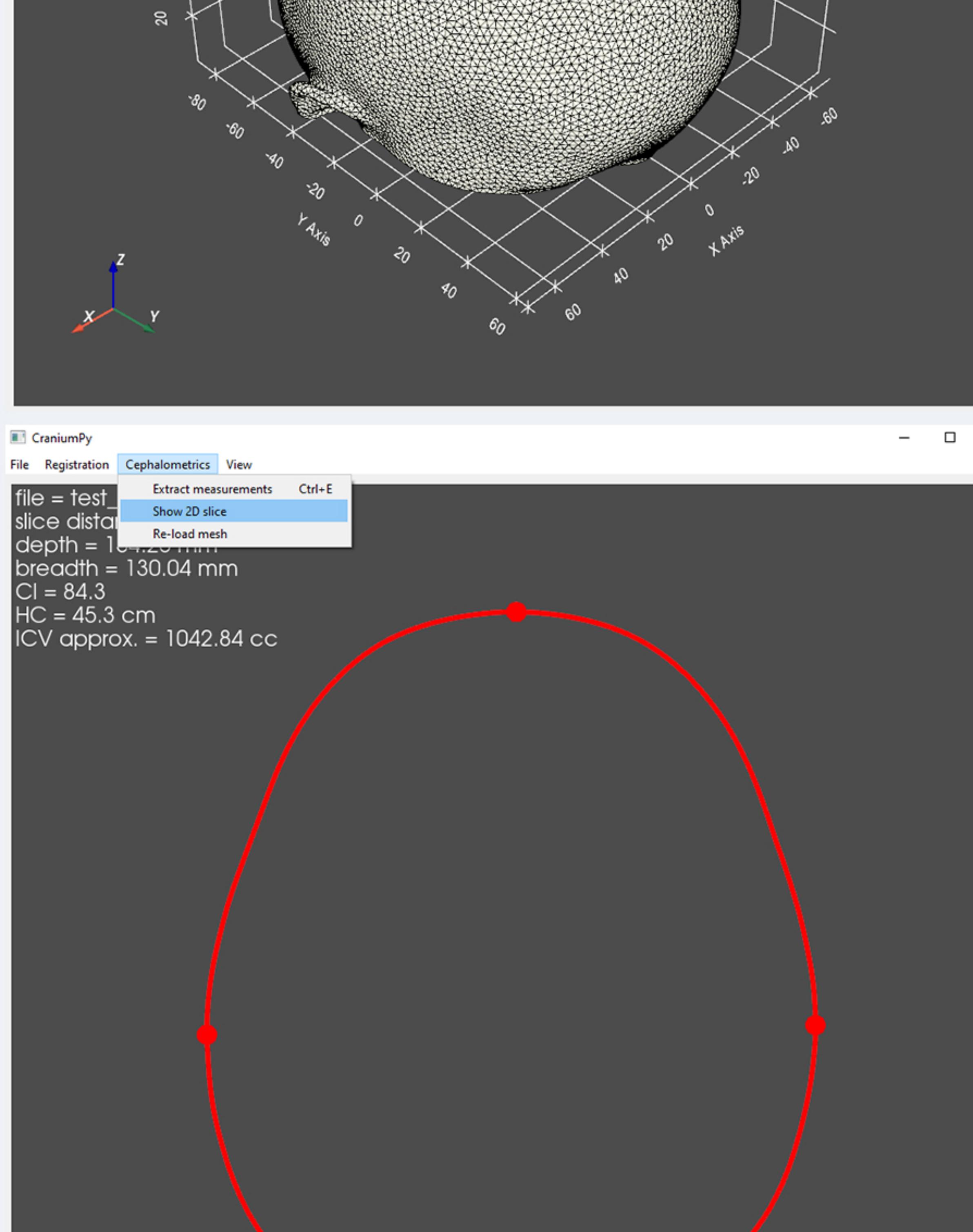
Extracting cranial measurements:

Cephalometrics > Extract measurements

This function returns the following cephalometric measurements:

- head depth
- head breadth
- cephalic index
- head circumference
- approximated intracranial volume

These measurements are calculated in a single transverse slice, which is the slice at which the head depth is highest.



This transverse slice can also be visualized by itself:

Cephalometrics > Show 2D slice

The cranial mesh is returned using:

Cephalometrics > Re-load mesh

