

## Freehand Draw

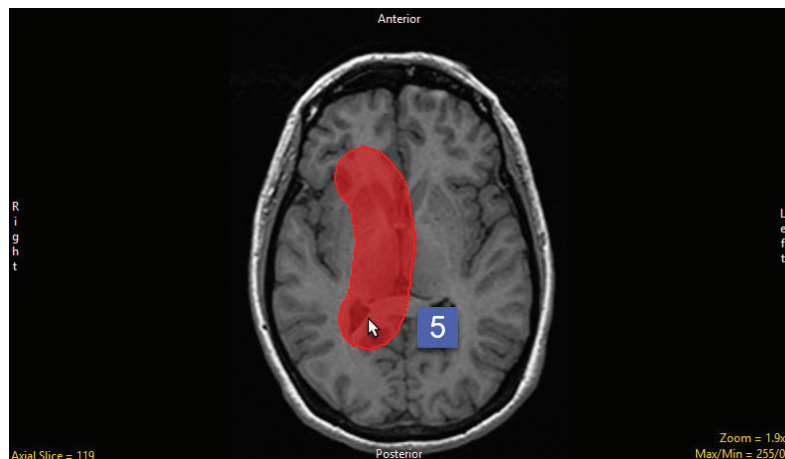
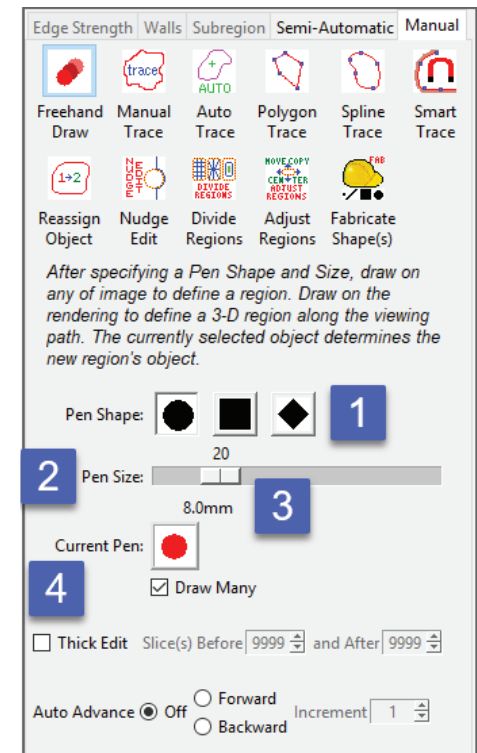
The Freehand Draw tool lets the user draw regions of interest directly onto the image data. The following options are available.

**Pen Shape:** The pen shape option [1] allows users to specify the shape of the pen for region definition, choose from Round, Square, or Diamond.

**Pen Size:** The pen size slider [2] provides users with the ability to adjust the size of the pen used for region definition. The pen size ranges from 1 to 100 pixels. Note that the real-world size of the pen is reported below the pen size slider [3].

**Current Pen:** The current pen icon [4] is a quick reference tool for users, displaying the selected pen shape, pen size, and object color of the selected object from the object list.

**Draw Many:** The draw many option allows users to enable (default) or disable the draw many option. Enable this option is you wish to draw a continuous region, [5] disable the option is you wish to draw a single region as defined by the pen shape, pen size, and selected object [6].



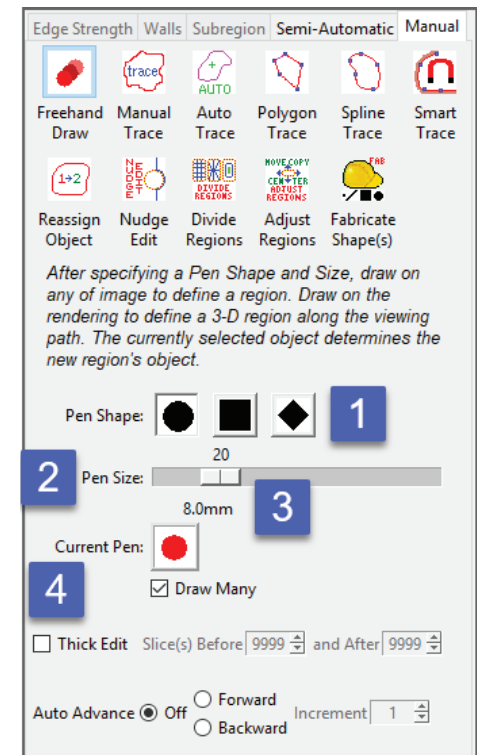
## Freehand Draw (continued)

**Thick Edit:** The thick edit option allows users to apply edits (region definitions) defined on the current slice to other slices in the volume. When thick is enabled the following options are available:

- Slices(s) Before: Specifies the number of slices before the current slice in which to apply the edits.
- And After: Specifies the number of slices after the current slice in which to apply the edits.

**Auto Advance:** The auto advance option automatically moves users to a new slice, as defined by the auto advance options, once the current edit is defined. Note the auto advance will occur after the user releases the left mouse button and the edit is applied to the current slice. The auto advance option is a productivity tool allowing users to move through the image data without having to move the cursor from the current orientation window that regions are being defined on. The following options are available.

- Off: Off is the default option for auto advance. When off is selected auto advance is disabled.
- Forward: Specifies that auto advance will move forward through the image data (slice number increases).
- Backwards: Specifies that auto advance will move backwards through the image data (slice number decreases).
- Increment: Specifies the number of slices the auto advance will move forward or backwards.

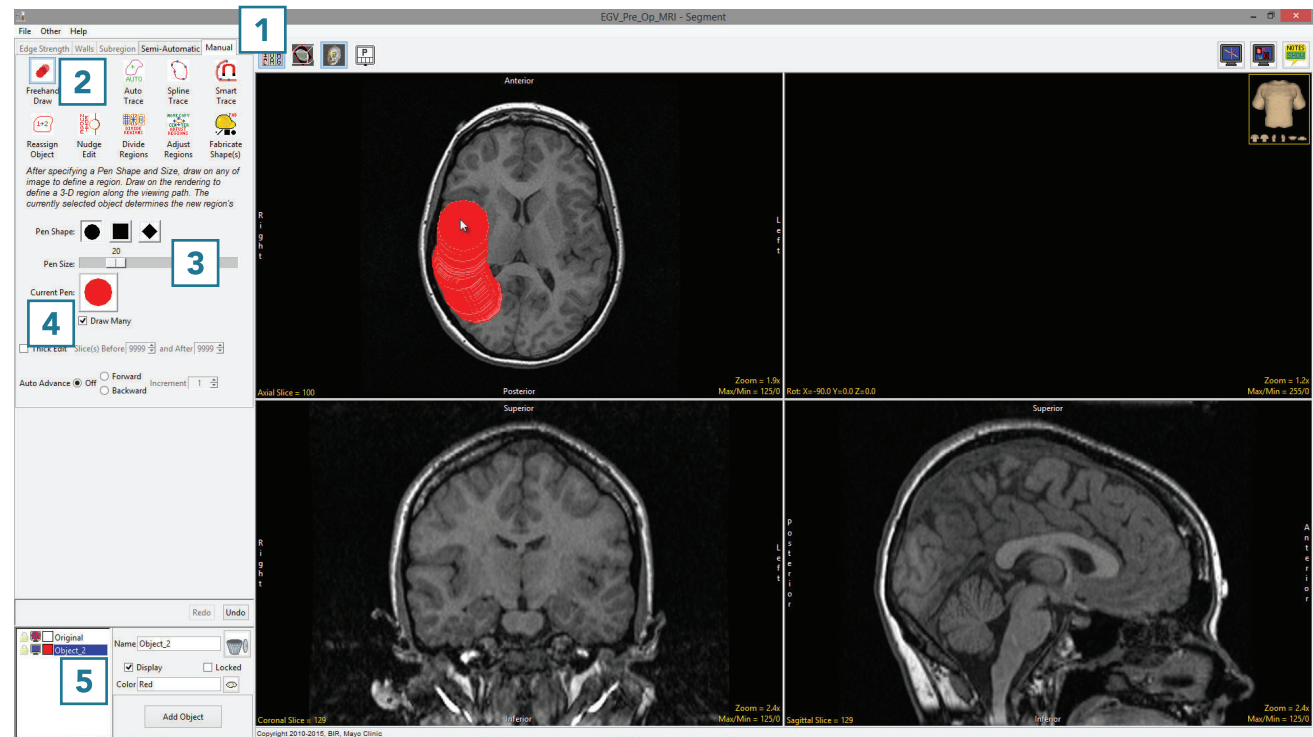


## Using Freehand Draw to Define a 2D Region

Freehand Draw allows easy definition of 2D regions.

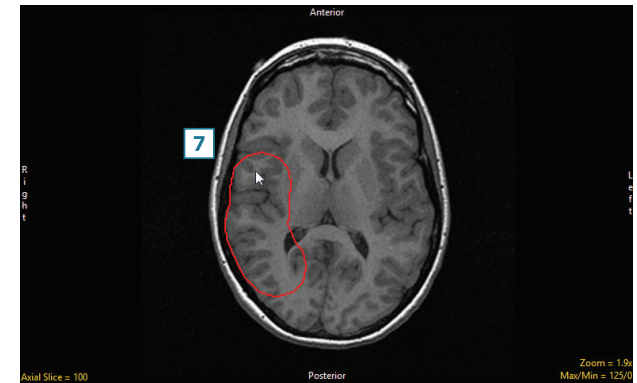
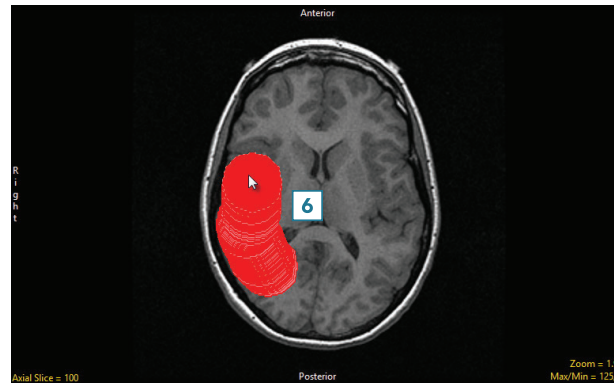
To follow along, download the data set EGV\_MRI from analyzedirect.com/data and load into Analyze using Input/Output.

- Select the data set and open Segment.
- Select Manual [1] and choose Freehand Draw [2].
- Use the Pen Size slider to change the Pen Size to 20 [3].
- The Current Pen [4] will update to the color of the currently selected object [5].

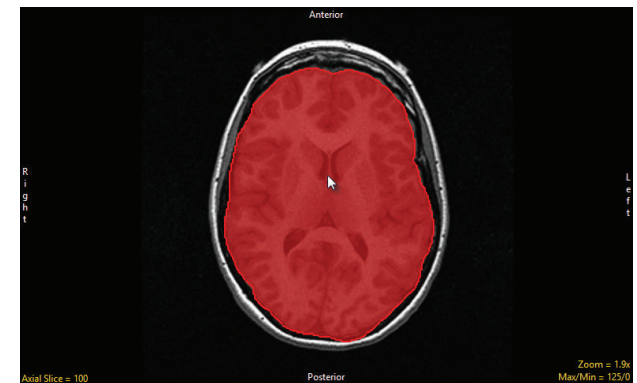
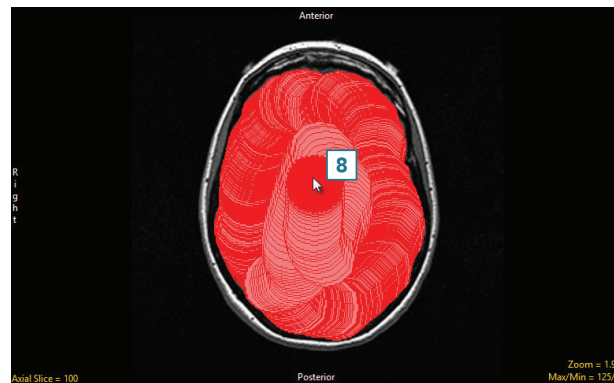


## Using Freehand Draw to Define a 2D Region (continued)

- Left-click on the image and drag the cursor to trace a region [6].
- Releasing the left mouse button will end the trace [7].



- Continue to define the brain using the pen tool [8].

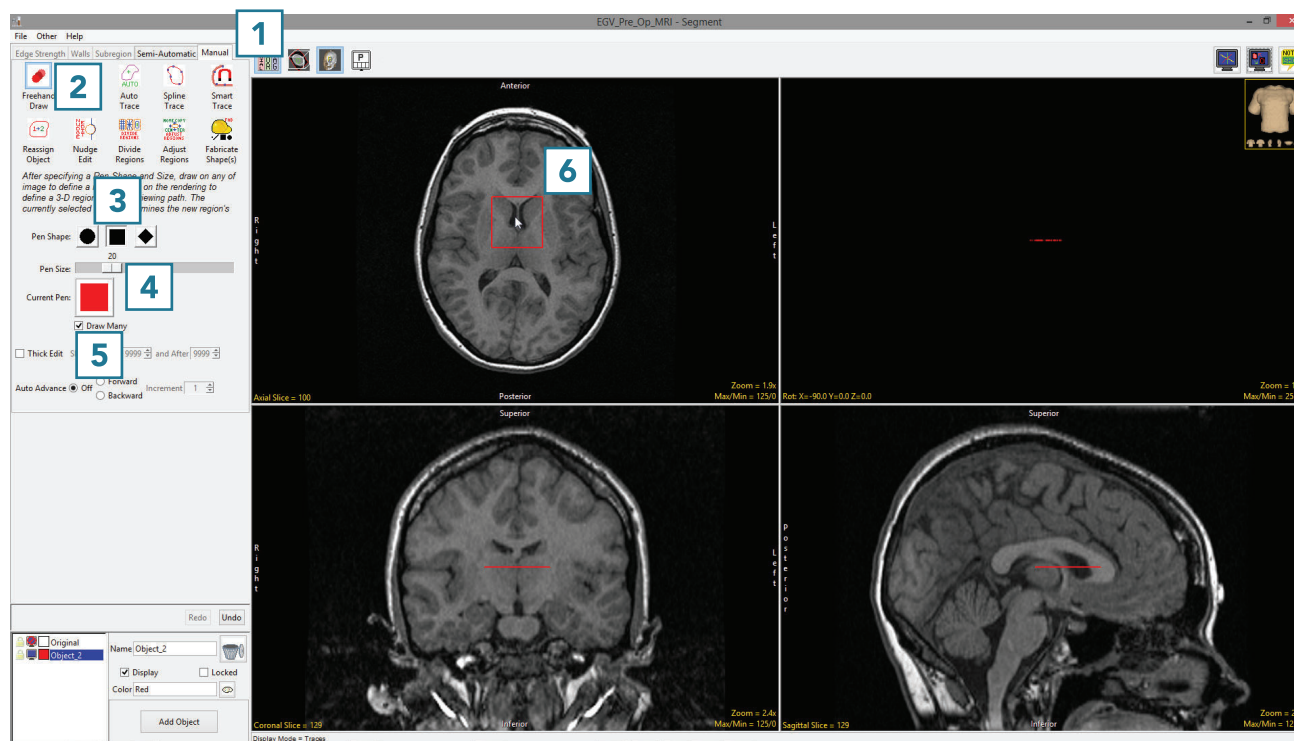


## Using Freehand Draw to Define a Single Shape on a 2D Slice

The Freehand Draw tool allows users to define a single circle, square, or diamond.

To follow along, download the data set EGV\_MRI from analyzedirect.com/data and load into Analyze using Input/Output.

- Select the data set and open Segment.
- Select Manual [1] and choose Freehand Draw [2].
- Set the Pen Shape to Square [3] and change the Pen Size to 25 [4].
- Uncheck the Draw Many option [5].
- Click on the image to define a square. [6]
- Additional squares can be defined by clicking on the slice again.



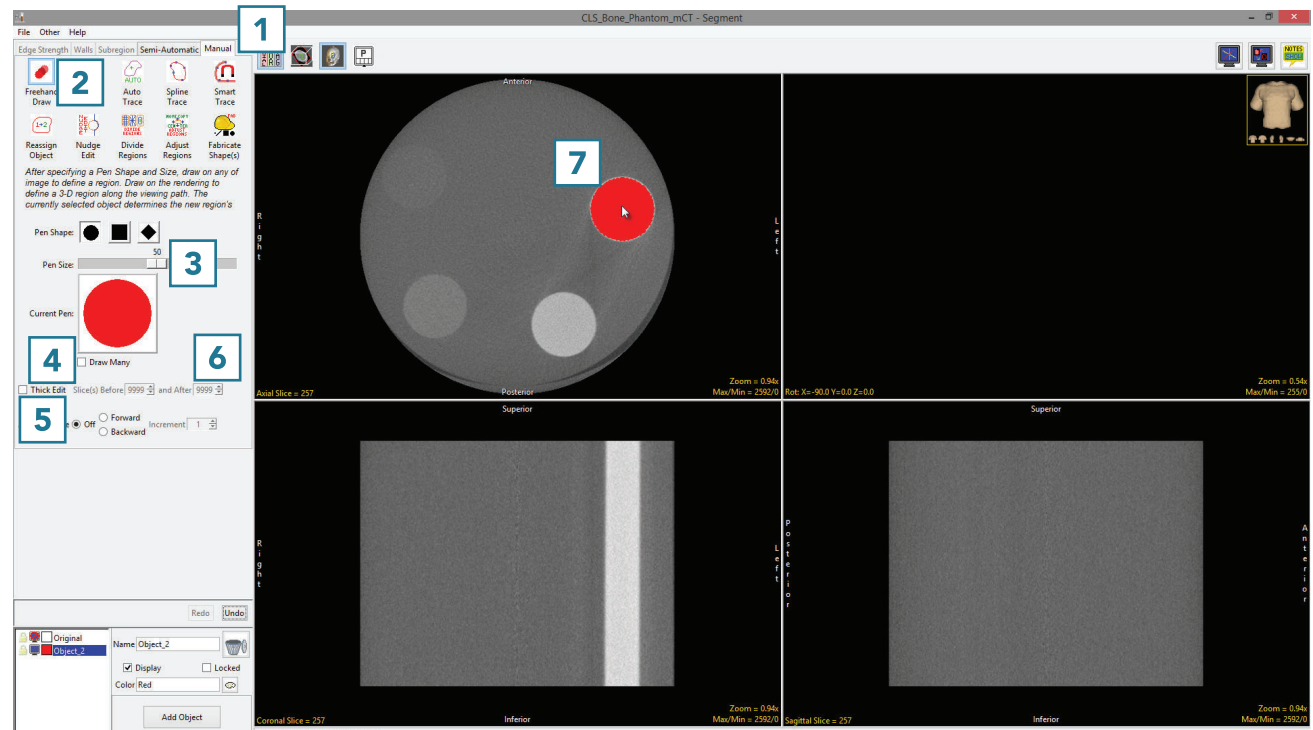


## Using Freehand Draw to Define a Single Shape in 3D

The Freehand Draw tool allows users to define a single shape (circle, square, or diamond) over many slices. This can be helpful when defining regions that are constant through the 3D volume.

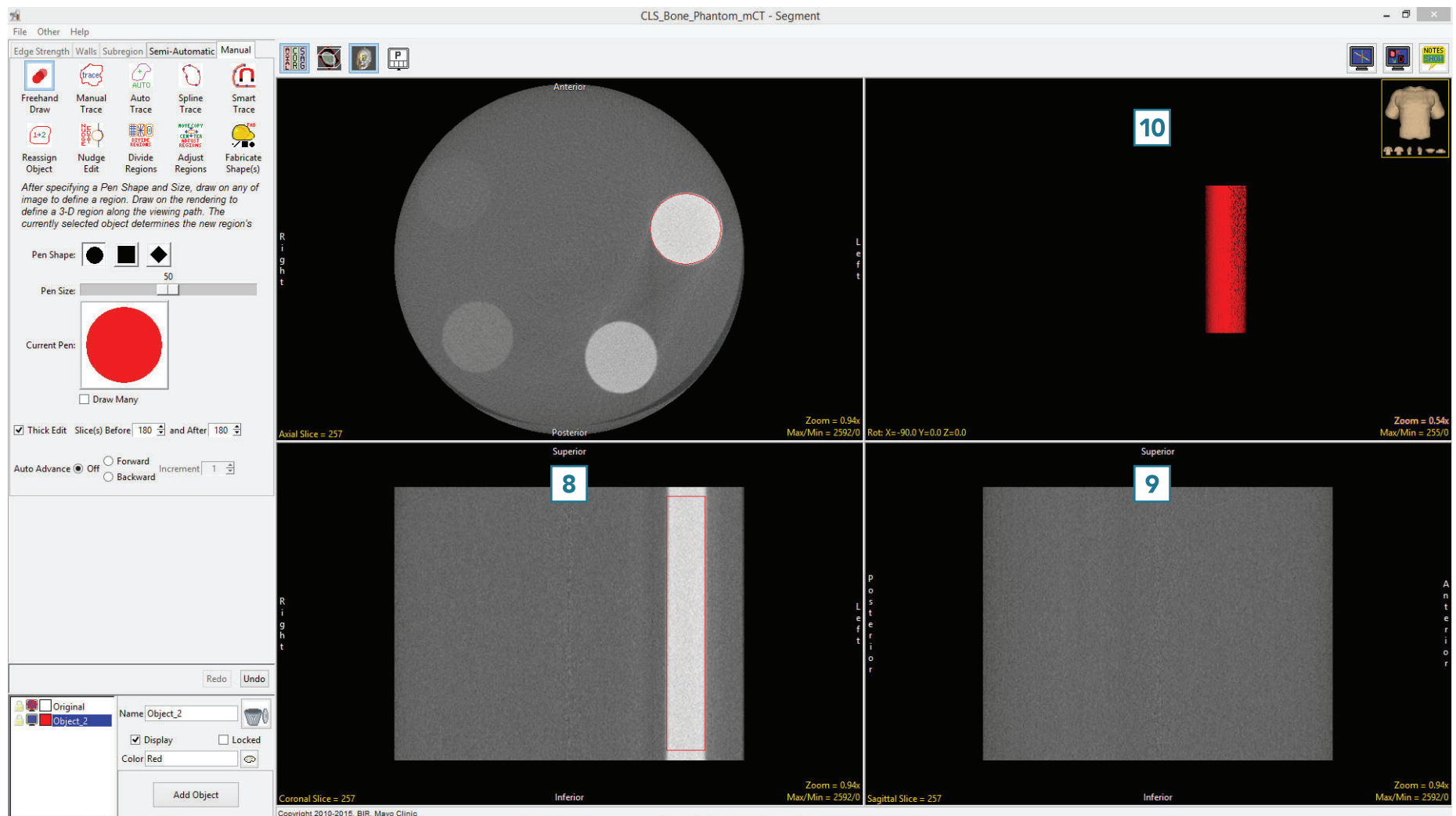
To follow along, download the data set CLS\_Bone\_Phantom from [analyzedirect.com/data](http://analyzedirect.com/data) and load into Analyze using Input/Output.

- Select the data set and open Segment.
- Select Manual [1] and choose Freehand Draw. [2]
- Change the Pen Size to 50 [3] and uncheck the Draw Many option [4].
- Check the Thick Edit option [5].
- To define the phantom insert on multiple slices, use the Slice(s) Before and After options [6] to specify the extent of propagation of the 2D region through the data set. In this example, set both parameters to 180.
- Click on an insert [7] to define a region, and note that you can move the 2D region around. The region will not be defined until the left mouse button is released.



## Using Freehand Draw to Define a Single Shape in 3D (continued)

Once the left mouse button is released the regions will be applied to the specified slices. Note the update in the coronal [8] and Sagittal [9] orientations and the 3D rendering [10].



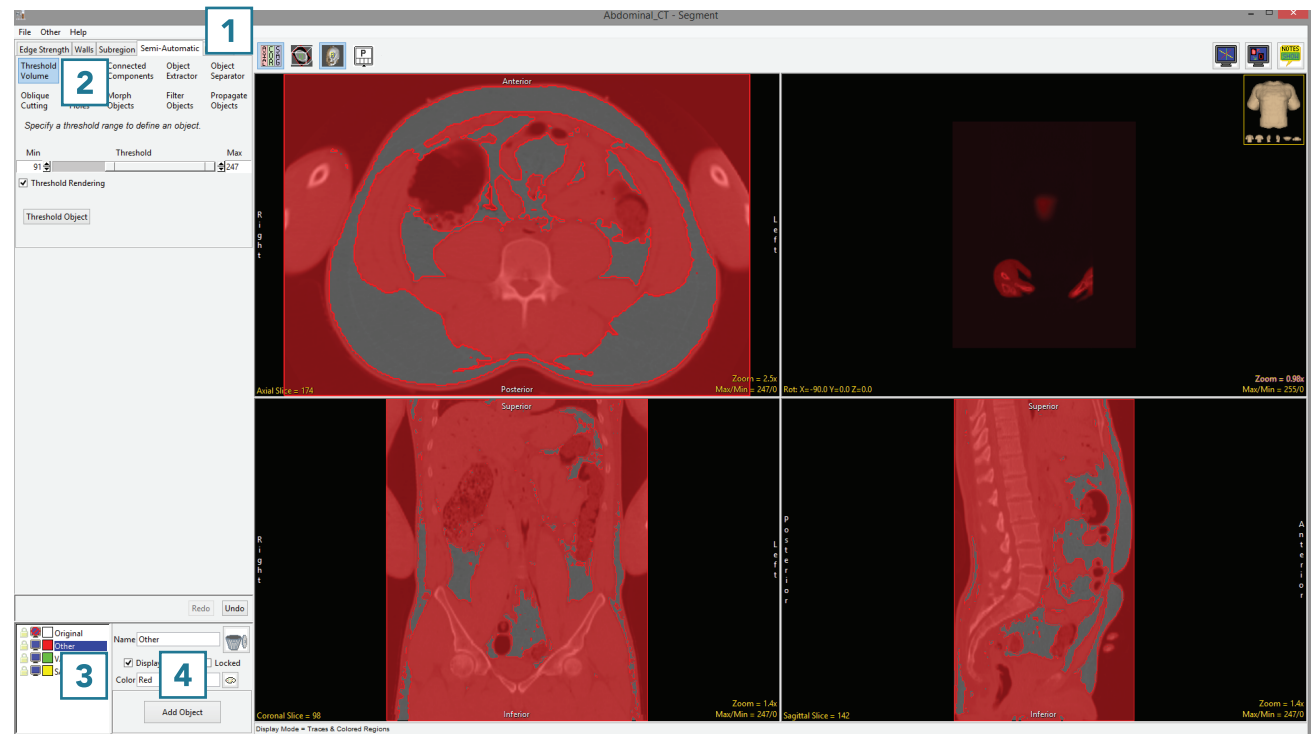
## Using Freehand Draw to Paint Regions of Interest

The Freehand Draw tool is particularly useful for manually defining or filling regions between locked objects, specifically when the region of interest is not easily segmentable but the surrounding tissue is.

To follow along, download the data set VH\_Abdomen from [analyzedirect.com/data](http://analyzedirect.com/data) and load into Analyze using Input/Output.

- Select the data set and open Segment.
- Select Semi-Automatic [1] and choose Threshold Volume [2].
- Change the name of the current object to Other, then add two new objects: VAT (visceral adipose tissue) and SAT (subcutaneous adipose tissue) [3]. Select the Other object and use global thresholding to assign voxels having intensity values of 0 to 81 and 91 to 247 to the Other object. This will assign all of the non-adipose tissue voxels to the Other object.
- Lock the Other object [4].

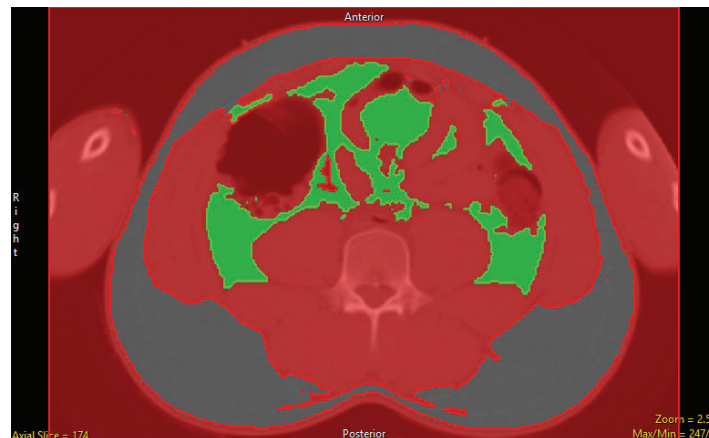
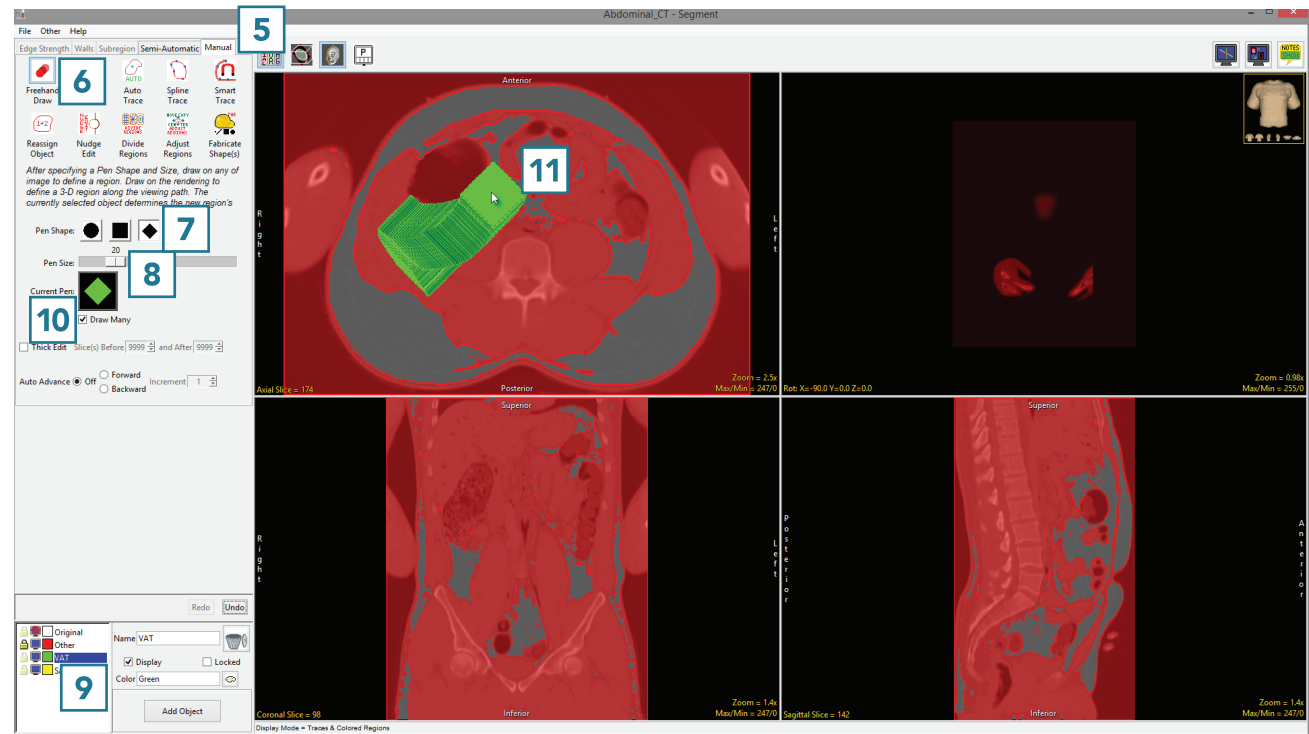
For more information on threshold-based segmentation, refer to [Threshold Volume](#).





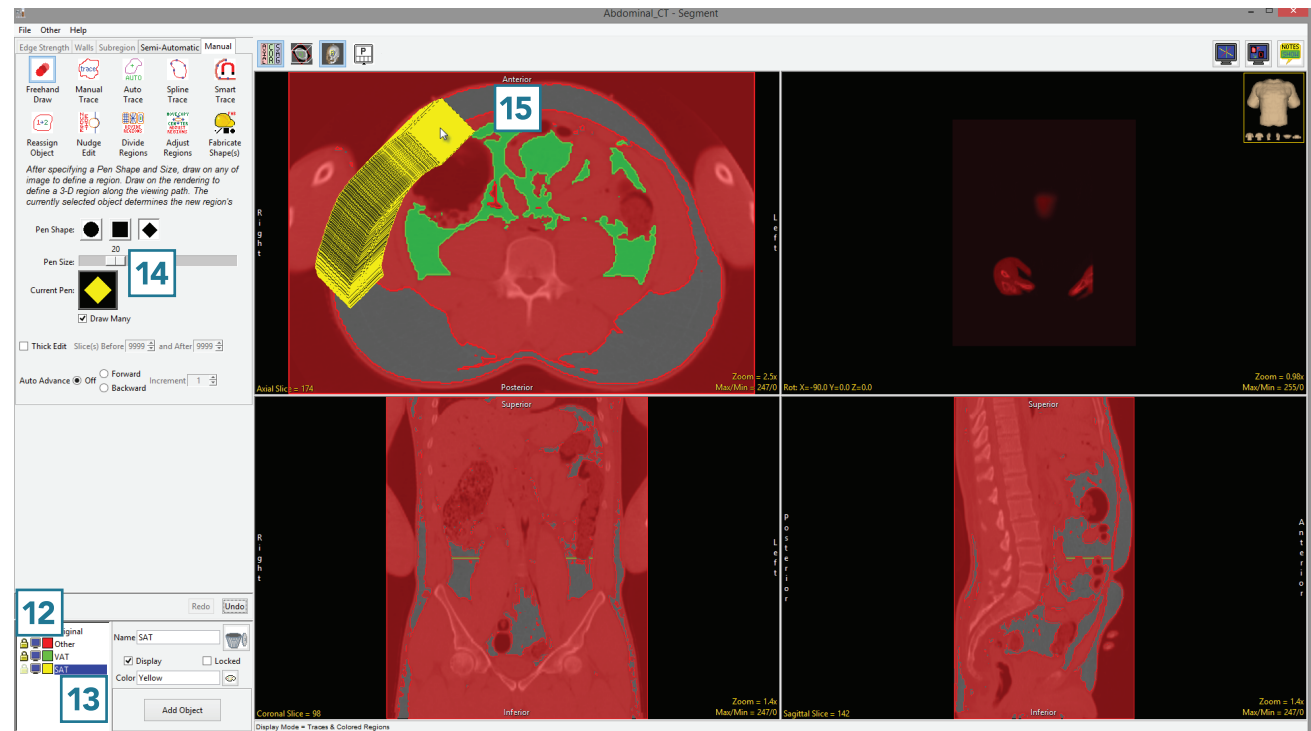
## Using Freehand Draw to Paint Regions of Interest (continued)

- Select Manual [5] and choose Freehand Draw [6].
- Set the Pen Shape to Diamond [7] and change the Pen Size to 20 [8].
- Select the VAT object [9] and note that the Current Pen [10] will update to the color of the VAT object.
- Use the pen tool to draw over the VAT regions [11].



## Using Freehand Draw to Paint Regions of Interest (continued)

- Once the VAT region is defined, lock the VAT object **12** and select the SAT object. **13**
- Increase the Pen Size to 30 **14** and draw over the SAT regions **15**.



- When finished, **16** use File > Save Object Map to save your work.

