

## Exercise 16 : Volume Render Fix Tool

The Fix Tool provides the capability to correct for bad slices within a volume. The tool allows a variety of correction methods for missing or corrupt images that occur in a volume, including removing corrupt images, copying from an adjacent uncorrupted image, and interpolation from a range of uncorrupted images near the corrupt image. This exercise will demonstrate how to use the Fix Tool to correct for bad slices within a volume.

1. Load the **VH\_Abdomen.avw** data set from the **\$.\BIR\images\TutorialData** directory.
2. Open the **Volume Render** module (**Display > Volume Render**).
3. Open the **Preview** window (**Generate > Preview**).
4. Now, open the **Thresholds** window (**Generate > Thresholds**).
5. Set the **Threshold Minimum** to **26**; the Preview window will interactively update (figure 1). Note the lines that appear in the image [A].
6. Open the **Ortho Sections** tool (**Tools > Display > Ortho Sections**).
7. In the Ortho Sections tool (figure 2), click on the line in the rendering seen in the top left pane [B]. The three orthogonal views will automatically update. Notice the corrupt image in the transverse orientation [C].
8. Click **Done** to close the Ortho Sections tool. Also close the Thresholds and Preview windows.

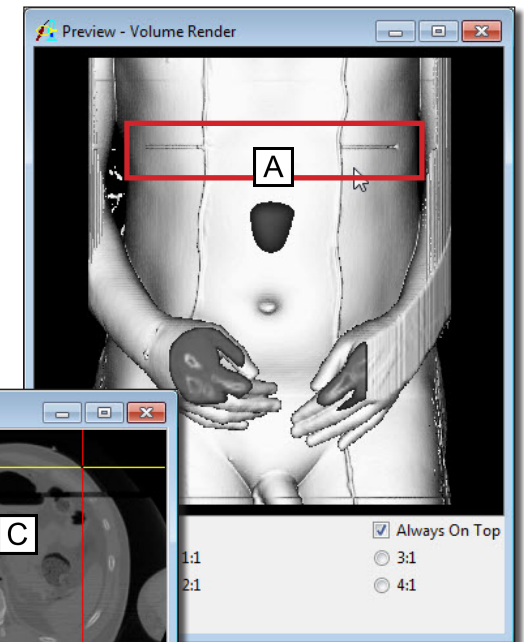


Figure 1

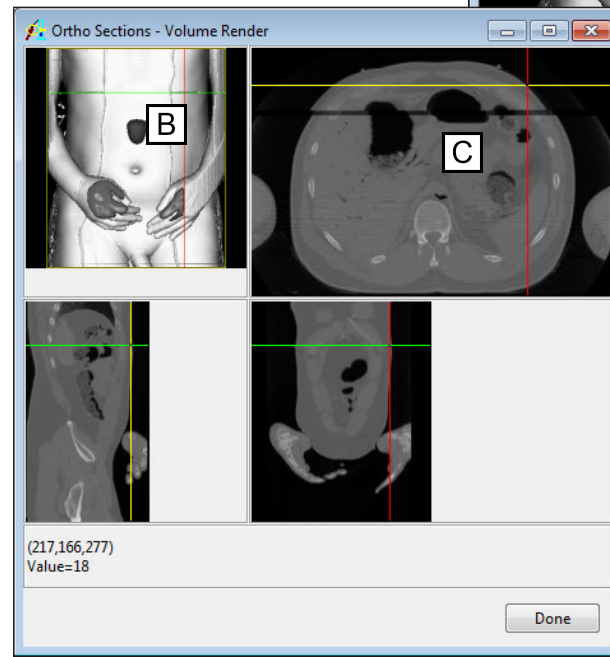


Figure 2

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- Open the **Fix Tool (Tools > Manipulate > Fix)**.
- In the Fix Tool (figure 3), use the **Displayed Slice** slider bar [D] to locate the first corrupt slice. Note that the first corrupt slice is slice 276.
- In the **Bad Slice(s)** portion of the window, set **slice 276** as the **first bad slice** [E].
- Now, use the Displayed Slice slider bar to locate the last corrupt slice. Note: the last corrupt slice is slice 279.
- In the **Bad Slice(s)** portion of the window, set **slice 279** as the **last bad slice** [F].
- Select **Interpolate Between the First Good Slice** for the correction method [G].

*note* This method uses linear interpolation to calculate a replacement slice for each bad slice. The value of each voxel is computed using information for each of the good slices on each side of the bad slices. The percentage of each image used is calculated based on the distance from the bad slice to each good slice.

- Click **Fix Slice(s)**. A dialog box will be returned, click **Change a Copy of the Loaded Volume**. The fix will now be applied to a copy of the data set; the fixed data set will be saved to the Analyze workspace as 'VH\_Abdomen0'.
- Click **Done** to close the Fix Tool.
- In the main Volume Render window, press the **Render** PowerBar button or choose (**Generate > Render**). Note that the lines that appeared in the top of the image are no longer present (figure 4).
- Close the Volume Render module before proceeding to the additional task.

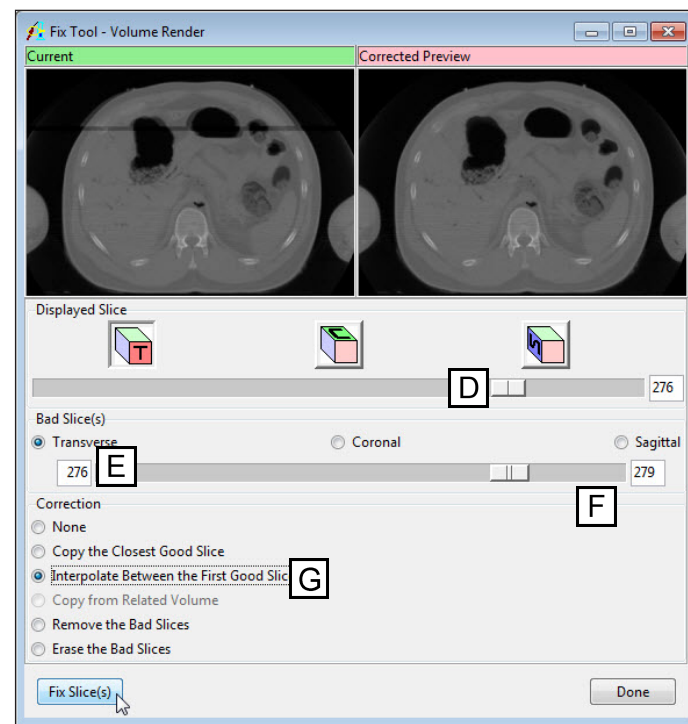


Figure 3

Figure 4

1. Copy from Related Volume Option

The option 'Copy from Related Volume' provides the ability to use a related volume as input for the Fix Tool, allowing images to be copied from the Related Volume to the Loaded Volume. To demonstrate the new fix option we will correct for the corrupt slices in the 'VH\_Abdomen' data set, using the fixed slices from the 'VH\_Abdomen0' data set.



1. Select the **VH\_Abdomen** data set in the Analyze workspace and open the **Volume Render** module (**Display > Volume Render**).
2. In the main Volume Render window, choose **File > Input/Output Ports**. The VH\_Abdomen data set icon will appear under the 'Volume' port.
3. In the Analyze workspace, select the fixed data set created in the main exercise, **VH\_Abdomen0**.
4. Drag-and-drop **VH\_Abdomen0** to the **Related Volume** port in the main Volume Render window (figure 5).
5. Open the **Fix Tool** (**Tools > Manipulate > Fix**).
6. As in the main exercise, set **slice 276** as the **first bad slice** and **slice 279** as the **last bad slice**.
7. Select **Copy from Related Volume** for the correction method.
8. Click **Fix Slice(s)**. Slices 276 through 279 will be copied from the related volume and replace the corrupt slices in the loaded volume. A dialog box will be returned, click **Change a Copy of the Loaded Volume**.
9. Click **Done** to close the Fix Tool.



10. In the main Volume Render window, press the **Render** PowerBar button or choose **Generate > Render**. Note that the lines that appeared in the top of the image are no longer present (see step 7 in the main exercise).
11. Close the Volume Render module before proceeding to the next exercise.

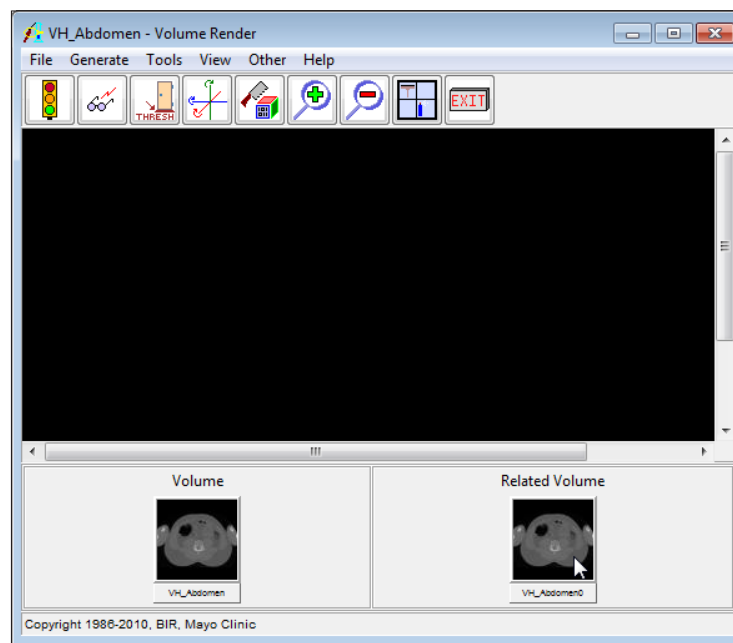


Figure 1