

Purpose: To create a more efficient and accurate method for contouring and contour reviewing. This study is concerned with the determination of the minimum number and optimal orientation of oblique planes for contouring structures. **Method and Materials:** A process was developed to determine the minimum number and optimal orientation of oblique contours to accurately describe prostate volumes. The process began with the development of a library of segmented prostates. The library was generated from the contours of previously treated conformal therapy patients. Surfaces were created using these clinical contours. A custom-developed tool was used to select oblique cut planes through the surfaces. The intersections of the planes with the surfaces were used as the contours that were used to regenerate the surface. A comparison of the original and reconstructed surfaces was used to determine the accuracy of the regenerated surface. The number and orientation of the cut planes were varied to determine the minimum number and optimal orientation of the planes. **Results:** Examination of the oblique segmentation method for prostate volumes demonstrated an accurate segmentation surface while reducing the number of contours for five test cases. In the best instance the use of oblique segmentation was able to reduce the number of contours by a factor of two (19 to 9). However, in the worst instance the oblique segmentation method was only able to reduce the number of contours by 1.5 (12 to 8). **Conclusion:** This was the first in a series of studies intended to develop and evaluate the use of optimized oblique planes for manual contouring and indicated that the number of oblique segmented slices may be less than the number required when using transverse planes. Future studies will investigate if the use of oblique planes improves the overall accuracy of manual segmentation.