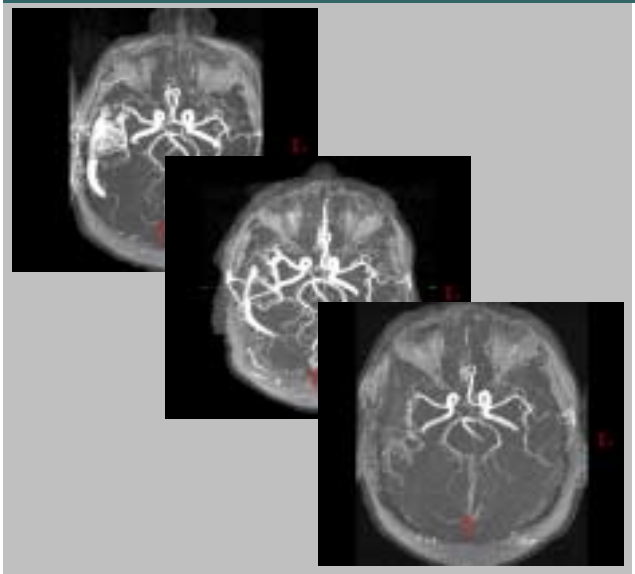
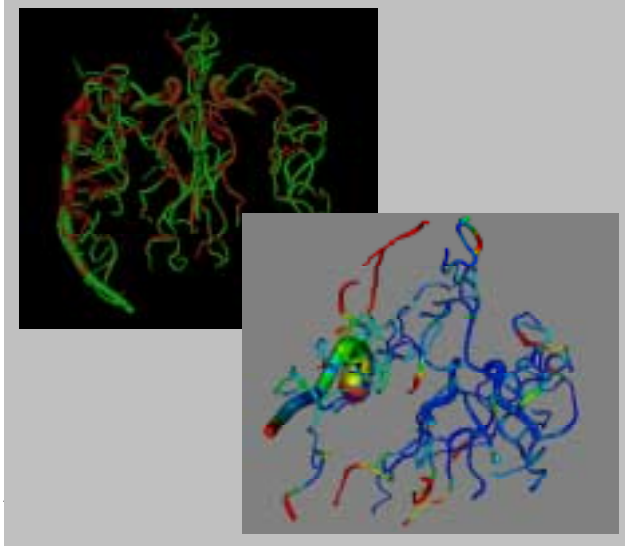
Computer-Aided Diagnosis and Display Lab
Department of Radiology, UNC @ Chapel Hill

Quantitative Analysis of the Vascular Effects of Tumor Treatments



Above: Maximum-intensity projections of three MR angiograms from a patient with an effectively treated arteriovenous malformation (AVM - the knot of bright vessels on left side of images). In sequence: pre-treatment, post-radiation therapy, and post-surgery. Vessels have changed size, shape, and location. Several vessels have been eliminated.

Below: The upper image shows the vessel models of the pre-treatment data (red wire-frame tubes) co-registered with the vessel models from post-radiation therapy data (green solid tubes). The vessels near the AVM have shifted and shrunk. Lower Image: a color-encoding (blue to green to red) quantifies how much the vessel models from the pre-treatment image must change to match the vessels in the post-surgery data.



The goal of this project is to provide clinicians with a tool for visualizing and quantifying vascular changes. The short-term clinical benefit will come from the use of this tool for assessing the effectiveness of radiation and embolization treatments for arteriovenous malformations and other brain tumors. Improved assessment will enable patient and population-specific tuning of treatment protocols. The long-term clinical benefits will arise when this tool is enhanced to enable the tracking of large-scale vascular and organ-shape changes that are associated with open-surgery. Such additional tracking capabilities will enable clinicians to match tumor treatment margins between pre and post-operative images and even align pre-operative CT images of partial-liver donors with post-operative donor and recipient CT images. Such alignment will enable the quantification of donor and recipient liver regeneration.

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This project is being lead by Drs. Stephen Aylward, Elizabeth Bullitt, and Sue Weeks. Significant contributions are being made by the research assistants: Jisung Kim, Andrew Mackelfresh, Julien Jomier, and Jean-Philippe Guyon.

For more information, please see the CADDLab web pages at

http://caddlab.rad.unc.edu

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