We present a method to correct for the error that arises due to the out of plane angle using videodensitometric cross-sectional area measurements. Taking a vector along the centerline of a vessel segment, the out of plane angle is defined by that component of the vector normal to the image plane. Two projections of the artery are used to calculate and correct the videodensitometric data for the out of plane angle. Two anatomical landmarks (arterial bifurcations) in the two projections and the geometry of the imaging system are required for the out of plane calculation. Phantom measurements were used for the validation of the technique. A cube phantom with lead markers was used to measure the geometry of the imaging system. The out of plane angle was calculated with a mean error of 6% for projection angles separated by at least 60°. With this error, an out of plane angle of 50° could produce an error of 56% and 6% in crosssectional area before and after correction for the out of plane angle, respectively. In conclusion, correction for the out of plane angle significantly improves the accuracy of the videodensitometric cross-sectional area measurement.