Purpose: To report a comparative dosimetric analysis of prone breast treatments on Tomotherapy versus conventional LINAC.

Methods: The static beam prone breast treatment with TomoDirect™ has been explored on Tomo treatment planning version 4.03 in comparison with conventional opposing beams in Philips Pinnacle version 9.0. Current LINAC based prone breast contours are imported into Tomo planning station and the same planning goals are established accordingly. Two laterally opposing beams from Tomotherapy are set with proper flashes to avoid any motion uncertainties. The common flash is opened for 4-5 leaves (each leaf is 6.25 mm) to properly compensate the breast margin. No forward segments need to be generated with TomoDirect, and the non-uniform fluence sinogram pattern which will deliver homogeneous dose to cover the intended breast volume with a 3D compensation delivery nature.

Results: Clinical dosimetry results indicate improved dosimetry coverage while minimizing the dose non-uniformity inside the volume slices of PTV for Tomotherapy. With 97% coverage of the PTV prescription dose, segmented lateral breast treatments on the Pinnacle plan tends to have higher hot spots compared to TomoDirect plan (107.2% vs. 101.2%). Sparing of the right lung volume is also noticeable (1 cc of lung is 1425 cGy compared to 176 cGy in TomoDirect plan). Setup on the Tomotherapy unit is also easier since there will be no manual adjustment of the treatment couch. After MCVT, the imaged guidance matches the breast volume with automatic couch repositioning. Lung and heart sparing can be achieved via the inherent TomoDirect non-uniform fluence delivery pattern with constant couch movement, which is similar to the 3D compensator approach in 3D breast treatment.

Conclusions: With the Tomotherapy MVCT image guided approach and TomoDirect planning, prone breast can be easily positioned and delivered with better dose uniformity and minimized positional errors with reduced hot spots.