

AB211. 3D printing—the future in improving outcomes in breast conserving surgery

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Background: Breast conserving surgery (BCS) has demonstrated equal outcomes oncologically and superior outcomes from patient satisfaction compared to mastectomy with or without reconstruction. However, with BCS positive margins at a rate of 10% to 15% require further surgery and can delay adjunctive treatment. Pre-operative planning can be aided by using advanced imaging, and there exists an opportunity for 3D printed models to enhance this process.

Methods: A patient with a clinically detected breast malignancy who underwent BCS and had pre-operative imaging in the form of breast MRI was selected retrospectively. The MRI images were read as a Dicom file, then Horos Software was used to create the 3D virtual

model. Maxon Cinema 4D software was used to generate the STL file to enable 3D printing. 1.75 mm diameter PLA plastic was the substrate used to form the model via a 3D Pro 2 Plus Printer.

Results: A radiological tumor size of 3 cm was identified in the left breast. A 3D printed model of the breasts, with removable tumor of a total volume of 3.762 cm³, and distance of 7.7 cm from tumor midpoint to nipple was created. The location of the tumor *in situ* and in the model was at 3 o'clock. Subsequent analysis of the histopathological specimen comprised a 2.8 cm invasive ductal carcinoma with lobular features. The lateral and inferior margins were both positive for malignancy within 0.5 cm.

Conclusions: This feasibility study proves 3D modelling is possible, and if undertaken pre-operatively may aid intra-operatively to improve overall outcomes including the rate of positive margins.

Keywords: 3D printing; breast conserving surgery (BCS); breast cancer

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