

AbstractID: 1659 Title: Compression Modulated Mammography: a Method for Improved Detection of Cancer in Dense Breasts Using Digital Mammography

Recent ultrasound (US) and magnetic resonance (MR) elastography studies show that suspicious cancer growths can be 5-10 times stiffer than normal tissue. It may be possible to make use of this property when additional views are required to improve the visibility of breast cancers that are obscured by overlying or surrounding structures. We hypothesized that modulating the direction and magnitude of compression force exerted on a breast would displace non-cancerous structures more than cancer tissue, and this change could be detected on serial digital mammograms. Compression Modulated Mammography (CMM) consists of a series of rapidly obtained digital radiographs of a breast subjected to dynamic vector compression. CMM utilizes a recently invented patient comfort device, the Breast Reshaping Pillow‡ (BRP), which comprises x-ray transparent compressible/expandable material that adapts to the bucky of a digital mammography unit. Incorporated within the BRP are elastic chambers for holding air under pressure. The configuration of each chamber changes as air is introduced or withdrawn, causing a breast, held in place on the bucky by the compression paddle, to change shape. Images are acquired after each change in shape. The magnitude and direction of compression force cannot exceed preset limits. The feasibility of CMM was evaluated using a compressible phantom having embedded overlapping test objects. Different views were obtained without moving the phantom and the visibility of some of the embedded objects was considerably improved. The images can be enhanced by computer and viewed individually or as a ciné loop.

‡ Patent pending by BMG.