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## The Geometric Model and Fat Reduction

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**Background and Objective:** Assessing the efficacy of noninvasive fat removal relies on measurements that are subject to error and subjective comparisons. Even the integrity of photographic comparisons, an accepted assessment tool, is difficult to control. With the emergence of noninvasive fat reduction technologies, there is a greater need for standardized assessments of efficacy.

**Materials and Methods:** A geometric model is described that correlates circumference and fat layer changes following noninvasive body contouring procedures. To validate the geometric model, abdominal measurements were taken with and without an artificial fat pad in place with: 1) a tape measure, 2) ultrasound, and 3) micrometer. The model was then used to analyze the published results of fat layer reduction and circumference changes following noninvasive body contouring procedures.

**Results:** While there was a high correlation ( $R^2=0.8943$ ) between our ultrasound method and the model with 6 subjects, the correlation between the tape measure method and the model was low ( $R^2=0.0142$ ).

**Conclusion:** Our results underscore the need for a highly accurate and standardized method for fat measurement. The efficacy in previous studies that had been assessed by tape measure in combination with ultrasound or computed tomography imaging does not conform to the model prediction, which leads us to conclude that the measurements used in those studies were not reliable. Studies reporting efficacy should use such a geometric model to ensure consistency between various measurement methods and to minimize errors due to weight change and measurement technique.

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