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2<sup>nd</sup> INTERNATIONAL CONFERENCE ON OBESITY AND DIET IMBALANCE  
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## A net structure bariatric surgery device with silicone materials

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**Introduction:** It is acknowledged that obesity is excessive enough to be defined as a worldwide epidemic phenomenon. Bariatric surgery is currently the most effective treatment options for morbid obesity, resulting in dramatic improvement of weight loss outcomes and obesity-related comorbidities compared to nonsurgical interventions. This paper tests the feasibility of designing net-shaped device to control the stomach capacity using modified silicone materials.

**Methods:** The net-shaped bariatric device is custom made for each patient by 3D printing technology using silicone material based on a physician's assessment of height, weight and energy consumption of obese patients. The device has several MEMS pressure sensors incorporated inside the net structure and is placed onto the outer wall of the patient's stomach by laparoscopic surgery. The sensors measure the pressure of the stomach in real time at different location. When a patient eats more than needed, the pressure reaches its threshold set by the physician and the monitor will send out an alarm to remind the patient. Meanwhile, the increased stomach pressure caused by the restriction device leads to discomfort (e.g., >2 Kpa), forcing the patient to stop taking food. Thus, our device can control the amount of food intake and also monitor a patient's gastric motility via its pressure sensors.

The net-shaped device was tested using a balloon model, which was inflated by a fluid pump to simulate feeding process. The balloon was infused with water at a constant flow stream, from 50 ml to 1500 ml. The relationship between the volume and pressure was recorded during feeding process. Bariatric device with different hardness (30, 50 and 60D), net thickness (0.15, 0.25 and 0.35 mm) and braid density (40, 60 and 80 PPI) were also tested.

**Results:** Pressure-volume curve which reveal the correlation between pressure threshold and feeding volume for a specific patient was obtained. The bariatric device with different properties was also determined. Notably, patient is allowed to eat more with less rigid and thinner device particularly for the mildly obese and vice versa. It is less likely to develop a "stomach pouch" with the higher braid density, an adverse event which occurs with the gastric banding technology.

**Conclusion:** A net-shaped bariatric device made of silicone materials were designed and prepared. The preliminary function of the device was tested using a simulation system, and the design parameters of the device was tested and optimized.

### Biography

Andrew Zhang is a senior in high school applying to college for biology major. After doing research on the current bariatric surgeries and their complications, he put forward the idea of a silicone 'gastric net' and done some simulation experiments to test the effectiveness of such product. A brief summary of the experiment could be found in this abstract, and he look forward to gaining feedbacks from the Obesity and Diet Imbalance Conference. He has worked on this project since the summer of his freshmen year in high school and plan on continuing it college.