3D Printing an Intrauterine Device Specifically for Nulliparous Women, by Adjusting Size and Exterior Design

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Teen pregnancies account for roughly 11% of all pregnancies in the United States, which among other developed countries is one of the highest rates of teen pregnancies. This can be reduced by the increased use of highly effective contraceptive that teens are willing to use. The goal of this engineering project was to build an IUD with a customizable frame size to fit measurements of different uterus's with a more comfortable shape for the uterus for less cramping pain after insertion. The IUD frame was be scaled to the size of patient X’s cervix and uterus then 3D printed. Using the printed object, a mold was cast of the shape and size, where the bio-material Sylgard was cast in. The IUD prototype has rounded sides to ensure comfort for years after insertion and lower the chance of uterine wall perforation. After testing the finalized Sylgard IUD, it was found that by using the material Sylgard flexibility went up by 268%, fit of the IUD improved as the baseline impacted the cervix by 1.32 cm, and shape distributed the pressure from the IUD shown with the Sylgard IUD with 0.006911 Pascals compared to the baselines 0.042986 Pascals. Results demonstrated the engineering goals for this project were achieved and that an IUD more geared towards nulliparous women (women who have not given birth) and comfort, unwanted teens pregnancies and abortion rates will be reduced in the future.

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