Designing a Cost-Effective Device to Decrease the Risk of Vesicovaginal and Rectovaginal Fistulae during Labor

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In developing areas where professional medical care is scarce, the labor complications that result in the development of obstetric fistulae are common and the effects devastating, with over two million women currently suffering from severe incontinence, shame, and terrible pain.The purpose of this experiment was to design a cost-effective and portable device to decrease the risk of vesicovaginal and rectovaginal fistulae during childbirth. From the use of a precise, self-built CAD and FEA model of female pelvic anatomy from anonymized CT scan data and a mechanical simulation program, different designs and design materials were tested, yielding a final device design. Then, the stress-distributing properties of the final design was compared with that of using no device at all, recording the stress 50 times at the critical point 3 times for each different amount of force to model different conditions during labor during the simulation. While this device was in place, the mean stress at the key point showed a percent difference of almost 200% for all three tests, and each t-test performed for each test yielded a p-value much less than the declared alpha value of 0.05, showing that the device significantly decreases the amount of stress at points where fistulae commonly occur. However, this design and the model is still being improved with daily redesigning and simulation.

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