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The impact of cervical geometry and suture material on cerclage integrity ALEXA BAUMER, The George Washington University , ALEXIS GIMOVSKY, The George Washington University Medical Faculty Associates, MEGAN C LEFTWICH, The George Washington University — Cervical insufficiency is a medical condition during pregnancy in which the uterine cervix softens, shortens and dilates before reaching full term, usually between 18 and 22 weeks gestation, such that a preterm birth occurs. It is a common cause of second trimester pregnancy loss. Part of the clinical treatment of this condition is the cervical cerclage, a procedure to close the cervix with a purse-string stitch. There are conflicting findings on the efficacy of the cerclage, with most studies relying on statistical evidence. The purpose of this investigation is to examine the mechanical limitations of the cerclage. Working with physicians from The George Washington University Hospital, we create generalized, synthetic models of the cervix and fabricate them with silicone to mimic physiological, softening cervical tissue. Aspects of the cervical geometry (length of cervix, shape and width of dilatation) and suture material used in the cerclage are varied. The synthetic cervices are stitched by physicians according to clinical techniques. The maximum force required for the synthetic tissue to rupture through the cerclage stitch is recorded. The results of this study provide insight into the most effective clinical interventions and the mechanism of their success.

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