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Effects of hysteroscopic metroplasty on uterine contractility in women with septate uterus pre and post treatment

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Introduction

Uterine contractility is a key aspect of normal uterine function, influencing peristalsis throughout the menstrual cycle. Septate uterus may alter these patterns, but detailed evidence on its effects and the impact of surgical correction is still limited.

Aim

To investigate the differences in uterine contractility in women with septate uterus compared to women with normal uterus throughout the menstrual cycle and to evaluate if the restoration of normal cavity after hysteroscopy metroplasty modify uterine contractility.

Method

This multicentric observational prospective study was carried out in the outpatient gynecology departments of the Catharina Hospital in Eindhoven, Netherlands and in the University of Naples, Federico II, Italy from February 2023 and March 2024. Women with diagnosis of septate uterus in reproductive age, scheduled for hysteroscopic metroplasty, were included. Patients underwent 2D-3D transvaginal ultrasound and a 2D 4-minute video was recorded in a median longitudinal section of the uterus. Records were analyzed using a dedicated spot tracking algorithm by 2D transvaginal ultrasound measurement. The characteristics of uterine contractility were expressed in terms of frequency, amplitude, speed, direction, and coordination. The results were compared with the uterine peristalsis of a control group “normal uterus”, already analyzed in our previous study. After hysteroscopic metroplasty, second 2D-3D transvaginal ultrasound with video recording was performed to compare characteristics of uterine peristalsis pre and post treatment.

Results

Regardless cycle phases, trends of decreased frequency, velocity and amplitude, and worsened contraction coordination were seen statistically significantly in patients with septate uterus compared with healthy controls. On the other hand in Luteal phase, where, contractions are relatively quiescent in order to facilitate embryo implantation an increase of contraction frequency (1.27 ± 0.21 vs 1.10 ± 0.12 , $p=0.040$), contraction velocity (0.90 ± 0.23 vs 0.70 ± 0.09 , $p=0.027$), contraction amplitude (1.27 ± 0.21 vs 1.10 ± 0.12 , $p=0.040$) and a worsening in contraction coordination (0.41 ± 0.16 vs 0.20 ± 0.08 , $p=0.006$) were reported in septate uteri. In detail, data demonstrated more impairment of uterine contractility in partial septate uterus rather than complete septum, when compared with normal uterus. After hysteroscopy metroplasty, uterine peristalsis uterine was significantly improved, taking on values close to the normal uterus. This was statistically significant, regardless cycle phases, with a higher frequency (1.67 ± 0.18 vs. 1.39 ± 0.19), higher velocity (0.84 ± 0.21 vs. 0.58 ± 0.21) compared with pre-treatment contractility.

CONCLUSIONS

Uterine contractility seems differs in patients with septate uterus compared with healthy control with improvement of uterine peristalsis after hysteroscopic metroplasty. This could suggest a new etiologic mechanism for the infertility a recurrent miscarriage in patients with septate uterus and open the door to hysteroscopy metroplasty as treatment to resume normal uterine contractility.

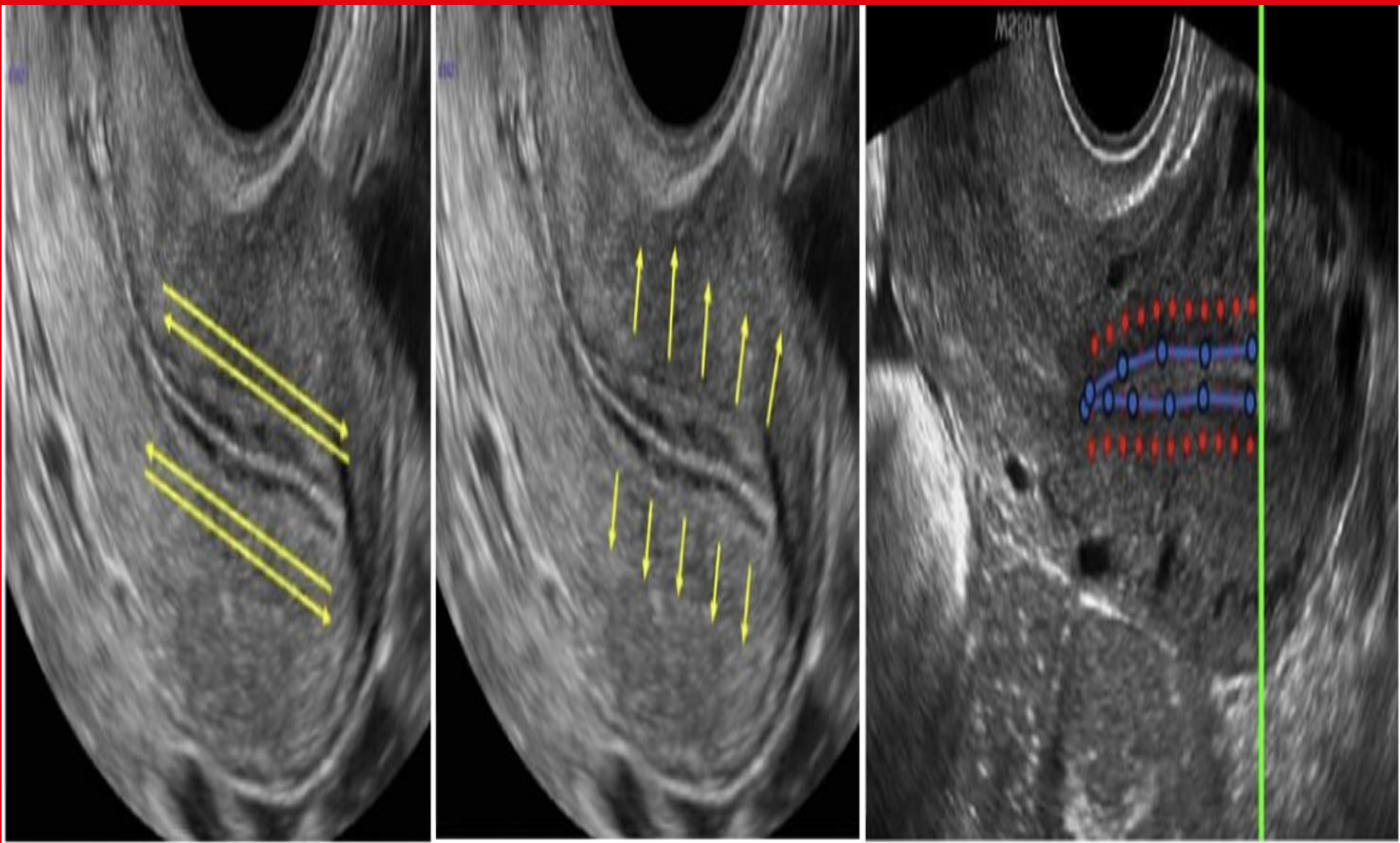


Figure 1. Ultrasound images of the uteurs in mid-saggital section with depiction of contraction in longitudinal and radial direction. Placement of the speckle tracking grif (red dots) along the endometrial border (blue line) at 5 mm (green line) from the apexn of the fundus.



Figure 2. 3D ultrasound of Uterine Septum according to the ESHRE/ESGE classification. a. Class U2a or partial septate uterus b. Class u2b or complete sepatate uterus

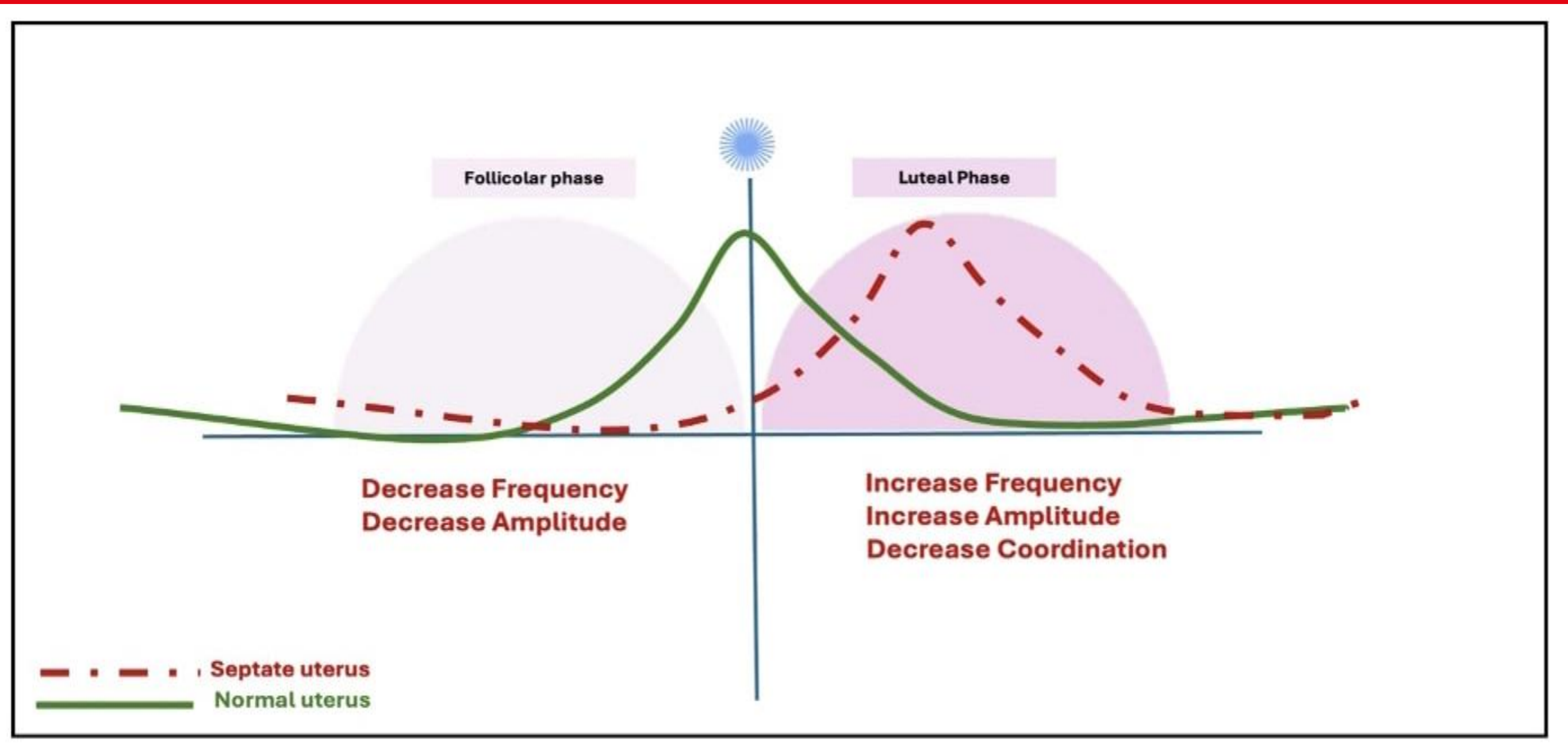


Figure 3. Uterine contraction feauteres per cycle phase, septate uterus vs normal uterus