



Uterosacral Ligament Assessment Skill Acquisition: Assessing Learning Curves in Identifying Uterosacral Ligaments and Endometriosis on Ultrasound



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Background

Accurate identification of uterosacral ligaments (USL) and associated pathology, such as endometriosis, is essential for effective diagnosis, counseling, and management. Many Minimally Invasive Gynecologic Surgery (MIGS) fellows lack formal training in advanced gynecologic ultrasound and rates of ultrasound skill acquisition varies^{1,2}. Understanding their learning curves in identifying USLs on ultrasound may inform future competency-based training programs.

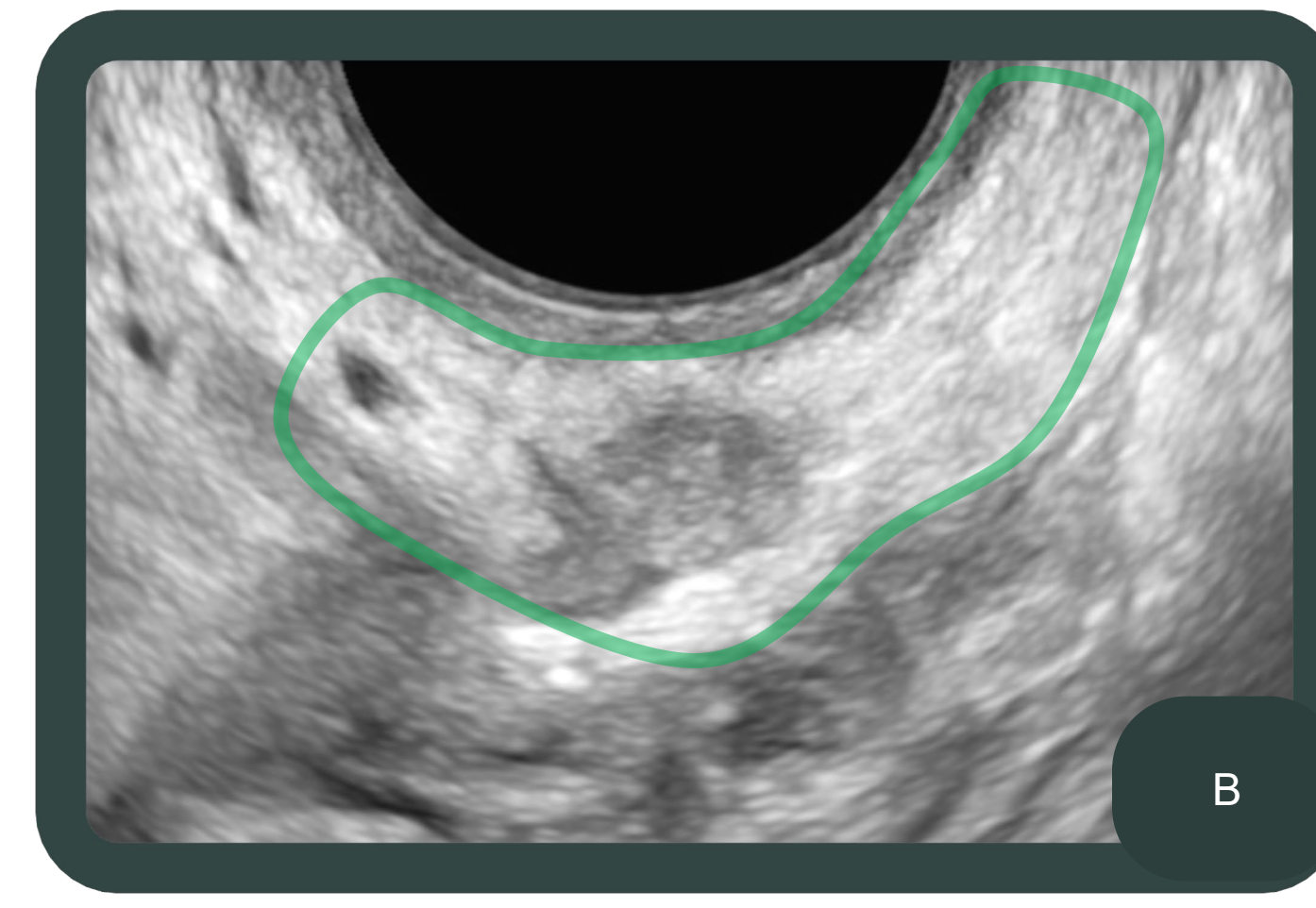


Figure 1: (A) Normal USL on transvaginal ultrasound (green outline). (B) Deep endometriosis involving USL (yellow outline).

Methods

In this retrospective observational study, 3 first- and second-year MIGS fellows (T1, T2, T3) without formal advanced gynecologic ultrasound training performed transvaginal ultrasounds as part of standard clinical practice after independent review of educational materials on USL identification. Each fellow identified USLs and pathology if present with real-time comparison to an expert standard scan. Data were analyzed using a conservative Learning Curve Cumulative Sum (LC-CUSUM) analysis ($H=7$, failure rate $H_0/P_0=0.2$, $H_a/P_1=0.05$, $K=0.5$, with adjusted baselines).

Results

Trainees T1 and T2 surpassed the competency threshold, though their improvement was gradual. T1 required more scans than T2 to reach threshold but maintained competency afterward. T3 consistently struggled to meet the threshold.

In the left USL assessment (Fig. 2), T1 and T2's scores rose steadily above the threshold, while T3 remained below competency.

Results cont'd.

In the right USL assessment (Fig. 3), T1 and T2 maintained scores well above the threshold, whereas T3 lagged significantly. These results highlight performance variability, with T1 and T2 achieving competency, and T3 requiring additional support. USL endometriosis prevalence was 46.5% (73/157) for the right USL and 43.3% (68/157) for the left USL.

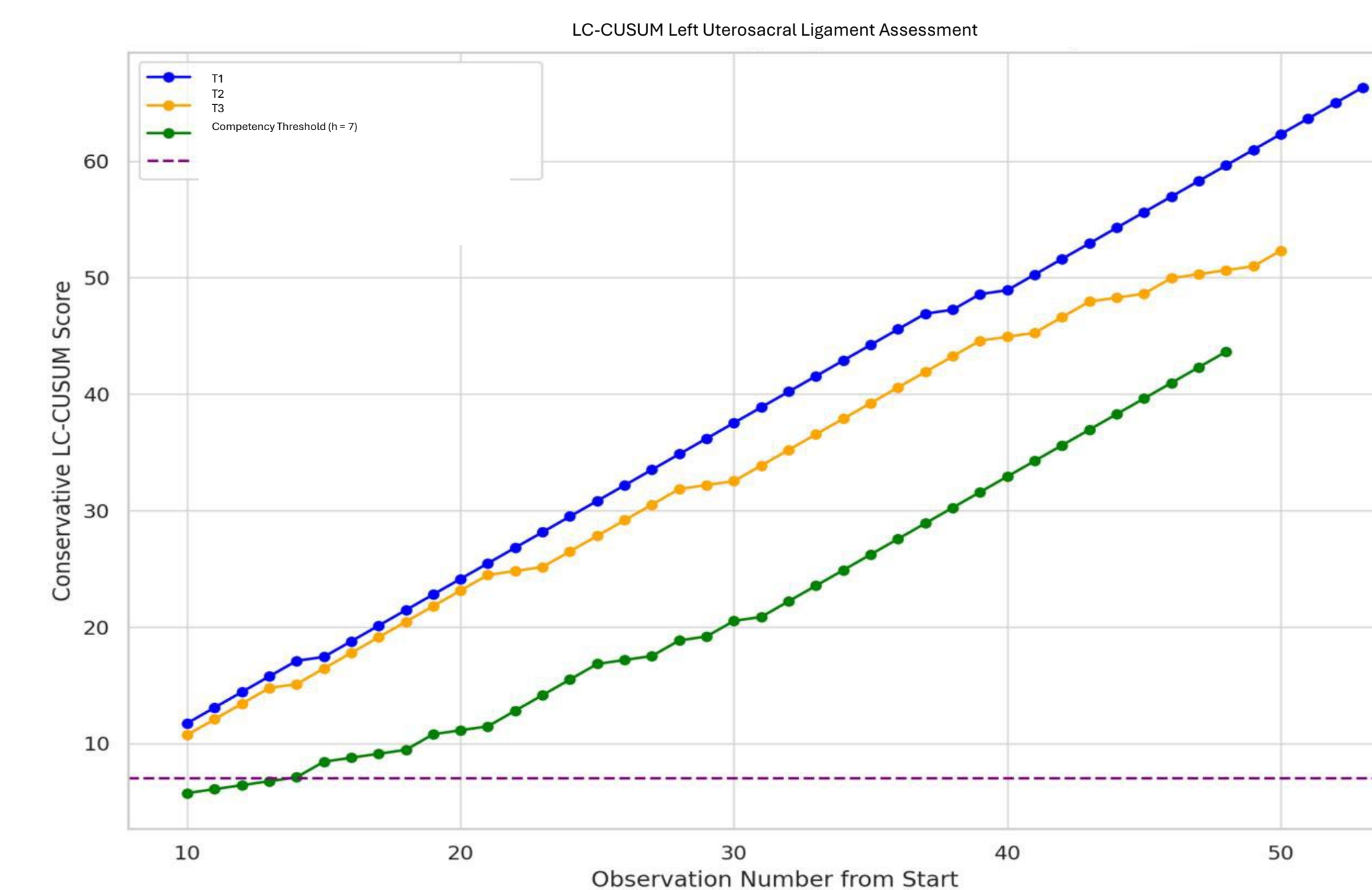


Figure 2: Left USL assessment learning curve. ($H = 7$)

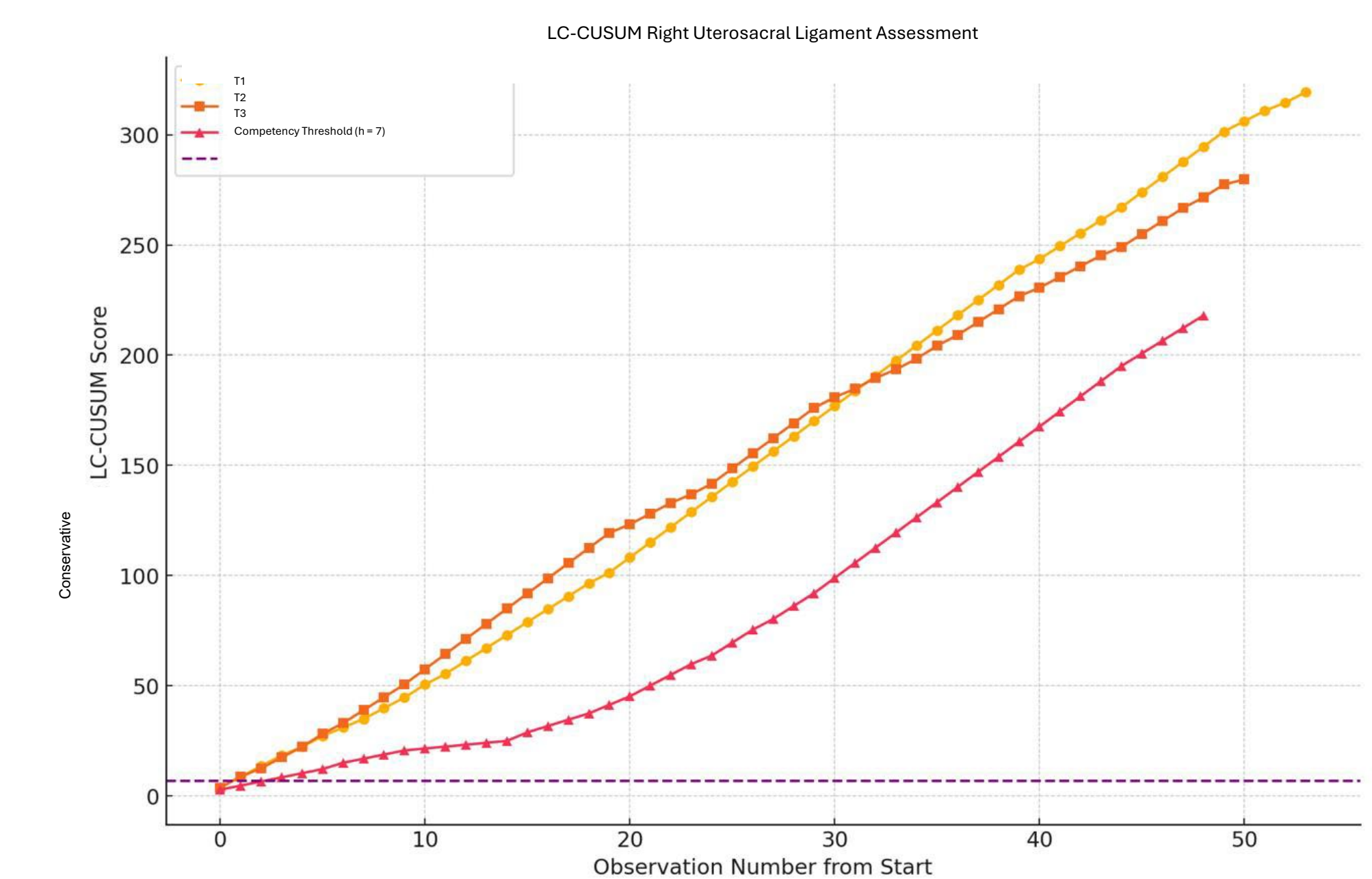


Figure 3: Right USL assessment learning curve. ($H = 7$)

Conclusion

This study demonstrates that some trainees may achieve competency under conservative conditions, while others may require additional support. Notably, cumulatively improving accuracy with additional scans suggests capacity for progressive USL assessment improvement. These findings suggest individualized training strategies could be beneficial to ensure competency in USL assessment across all trainees.

References

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