

Comprehensive mapping of levator ani muscle dynamics using transperineal ultrasound: a pilot study

Romero Ramírez M, Roca Comella B,
Fontsaré del Castillo A, Fernandez Sanchez C,
Oteros Rodríguez B, Moreno Sanchez J

CST • CONSORCI SANITARI DE TERRASSA
HOSPITAL UNIVERSITARI

1. AIMS OF STUDY

LAM is not a ring but rather a concave, tubular structure. A comprehensive evaluation along its entire caudal-to-cranial axis may provide additional insights. The primary objective was to assess LAM contractility along its entire length.

3. RESULTS

- Mean age 45.7 years.
- 75 intact LAM,
- 10.7% bilateral avulsion
- 14.2% unilateral LAM injury.
- 53.6 levator hiatus overdistension

4. INTERPRETATION OF RESULTS

Figure 2A shows three peaks of maximal contraction corresponding to slices 2, 4, and 7. These likely correspond to the three muscle bundles from caudal to cranial. Figure 2B (LAM avulsion subgroup) demonstrates preserved contraction peaks with reduced amplitude and more pronounced depressions between bundles. In contrast, Figure 2C (hiatal overdistension subgroup) shows loss of the characteristic contraction peaks, while maintaining a contraction amplitude similar to the overall cohort.

2. STUDY DESIGN, MATERIALS AND METHODS

Cross-sectional design. 28 patients recruited. A rendered axial image of the levator hiatus was obtained. Tomographic slices of 2.5 mm were acquired from the most caudal to the most cranial region. The levator hiatus area (cm^2) was measured at rest and during maximal contraction across eight tomographic images. The percentage reduction in area was calculated. Subgroup analyses: LAM avulsion and levator hiatus overdistension ($>25 \text{ cm}^2$).

Figure 1. Levator ani muscle contractility graphs along its entire length. The x-axis represents the eight LAM levels assessed. The positive y-axis shows the levator hiatus area at rest (red) and during contraction (green). The negative y-axis represents the percentage reduction in hiatus area during contraction compared with rest (purple). Panel A corresponds to a patient without LAM injury. Panel B corresponds to a patient with LAM avulsion. Panel C corresponds to a patient with levator hiatus overdistension during the Valsalva manoeuvre.

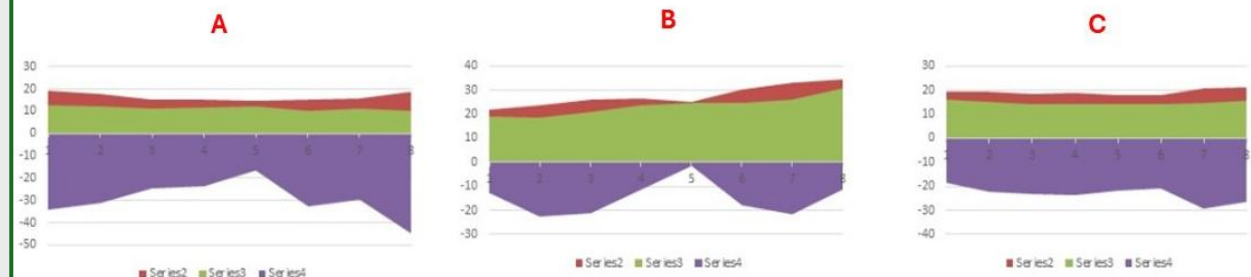
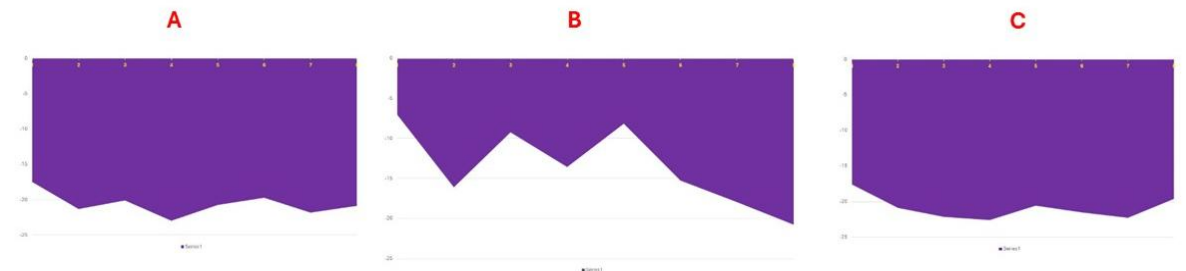


Figure 2. Contractility mapping of the levator ani muscle (LAM) based on mean values from all participants (A), all levator ani avulsion subgroup (B), and all hiatal overdistension subgroup (C)



5. CONCLUDING MESSAGE

A dynamic evaluation along its entire length may provide a better understanding of LAM function. This approach may serve as a starting point to better characterise in vivo LAM behaviour, including the function of individual muscle bundles and the interaction between them.