



WEBINAR

Elevating Plastic Surgery Outcomes: The Role of Ultrasound in the Management of Diastasis Recti

October 2025



Your Host



Shelley Guenther, CRGS, CRCS

Sonographer | Clinical Marketing Manager

Ultrasound and Plastic Surgery: Clinical Applications of the Newest Technology

“

With the **miniaturization, clearer imaging, and decreased cost** of the latest US technology, previous barriers to use have largely been eliminated”

Miller JP, Carney MJ, Lim S, Lindsey JT. Ultrasound and Plastic Surgery: Clinical Applications of the Newest Technology. Ann Plast Surg. 2018 Jun;80(6S Suppl 6):S356-S361. doi: 10.1097/SAP.0000000000001422. PMID: 29668508.

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Ultrasound and Plastic Surgery: Clinical Applications of the Newest Technology

John P Miller, Martin J Carney ¹, Soobin Lim ¹, John T Lindsey ²

Affiliations + expand

PMID: 29668508 DOI: [10.1097/SAP.0000000000001422](https://doi.org/10.1097/SAP.0000000000001422)

Abstract

Background: Color Doppler ultrasound (CDUS) has not been routinely used in plastic and reconstructive surgery. Barriers to use have included large, cumbersome equipment, low-definition images, cost, and availability. In addition, programs in plastic surgery have not included training with ultrasound (US); thus, many current-day practitioners are unfamiliar with and reluctant to use this technology. Nevertheless, recent studies have demonstrated the utility of US in surgical planning. With the miniaturization, clearer imaging, and decreased costs of the latest US technology, previous barriers to use have largely been eliminated.

Methods: Fifty-six patients scheduled for either reconstructive or aesthetic surgery were evaluated preoperatively and/or intraoperatively by a single surgeon with the linear 12-4 probe of a Philips Lumify CDUS device (Philips, Reedsville, Penn). For patients undergoing flap reconstruction, potential donor sites were imaged in order to locate the largest perforator. For patients undergoing abdominal procedures, intraoperative visualization of the abdominal muscular layers was used for the delivery of anesthesia during transversus abdominis plane block. Lastly, the superficial fascial system (SFS) was subjectively evaluated in all preoperative patients.

Results: For flap reconstruction, 11 patients were preoperatively examined with CDUS in order to locate the largest perforators prior to perforator flap reconstruction. Flaps studied included the deep inferior epigastric perforator, anterolateral thigh, tensor fascia lata, thoracodorsal artery perforator, superior gluteal artery perforator, and the gracilis musculocutaneous. Color Doppler ultrasound findings were confirmed intraoperatively for all cases (100%). In 2 (18.2%) of 11 cases, CDUS identified perforators not detected by computed tomography angiography. Twenty-five patients undergoing either abdominoplasty or deep inferior epigastric perforator flap reconstruction had successful intraoperative visualization of the abdominal wall muscular layers, thus allowing administration of transversus abdominis plane blocks by the operating surgeon. Twenty patients undergoing body contouring surgery had preoperative visualization of the SFS. The SFS was found to be varied not only among different patients but also within individual patients.

Conclusions: The newest, miniaturized CDUS technology has a variety of applications that may improve patient outcomes and experience in plastic surgery. Our observations require further investigation to quantify the perceived benefits of this new technology.

[PubMed Disclaimer](#)

Ultrasonography as a Tool to Improve Preoperative Marking in Body Contour Surgery

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Ultrasonography is increasingly use in plastic surgery by providing a better understanding of the patients' unique structures.”

Manzaneda Cipriani RM, Viaro M, Adrianzen G, Flores E, Duran Vega H, Babaitis R, Dal Ponte Zatt JV, Salonia Goldmann I, Kornalewski de Oliveira R, de Souza Bisognin L. Ultrasonography as a Tool to Improve Preoperative Marking in Body Contour Surgery. *Plast Reconstr Surg Glob Open*. 2023 Nov;11(11):e5431. PMID: 38025643 PMCID: PMC10681564.

Plast Reconstr Surg Glob Open. 2023 Nov 27;11(11):e5431.
doi: 10.1097/GOX.0000000000005431. eCollection 2023 Nov.

Ultrasonography as a Tool to Improve Preoperative Marking in Body Contour Surgery

Raúl Martín Manzaneda Cipriani¹, Maurício Viaro¹, Gerardo Adrianzen², Emmanuel Flores³, Héctor Duran Vega⁴, Ricardo Babaitis⁵, João Vitor Dal Ponte Zatt¹, Ignacio Salonia Goldmann⁶, Rafael Kornalewski de Oliveira⁶, Laura de Souza Bisognin⁷

Affiliations + expand

PMID: 38025643 PMCID: PMC10681564 DOI: 10.1097/GOX.0000000000005431

Abstract

Background: Body contouring surgery and surgical drawings are usually performed based on the surgeon's experience without considering the nature of the unique anatomical structures of each patient. Thus, we propose a more reliable surgical design approach that considers the anatomical structures of each patient. Ultrasonography is increasingly used in plastic surgery and helps plastic surgeons to highlight anatomical features representing results in their interventions by providing a better understanding of the patients' unique structures.

Methods: This study presents a series of cases involving 100 recruited patients (36 men and 64 women) between 18 and 60 years of age. Five surgeons examined the patients and created a presurgical design based on palpation, which was validated later by a physician skilled in evaluating the anterior wall of the abdomen using ultrasonography. The concordance between the findings of palpation and ultrasonography was assessed for each patient.

Results: The concordance rate for each structure in both evaluations was midline (49%) ($P > 0.9$), linea alba (15%), semilunar line (23%), upper edge of rectus abdominis muscles (12%), lower edge of pectoral muscles (16%), border of oblique muscle (13%), number of tendinous intersections (12%), shape of tendinous intersections (11%), serratus anterior muscle (15%), subcostal triangle (15%), and oblique triangle (26%) ($P < 0.0001$).

Conclusion: All the structures evaluated by palpation in comparison with ultrasound show discordance, except the midline where agreement is evident, with a very good level of statistical significance.

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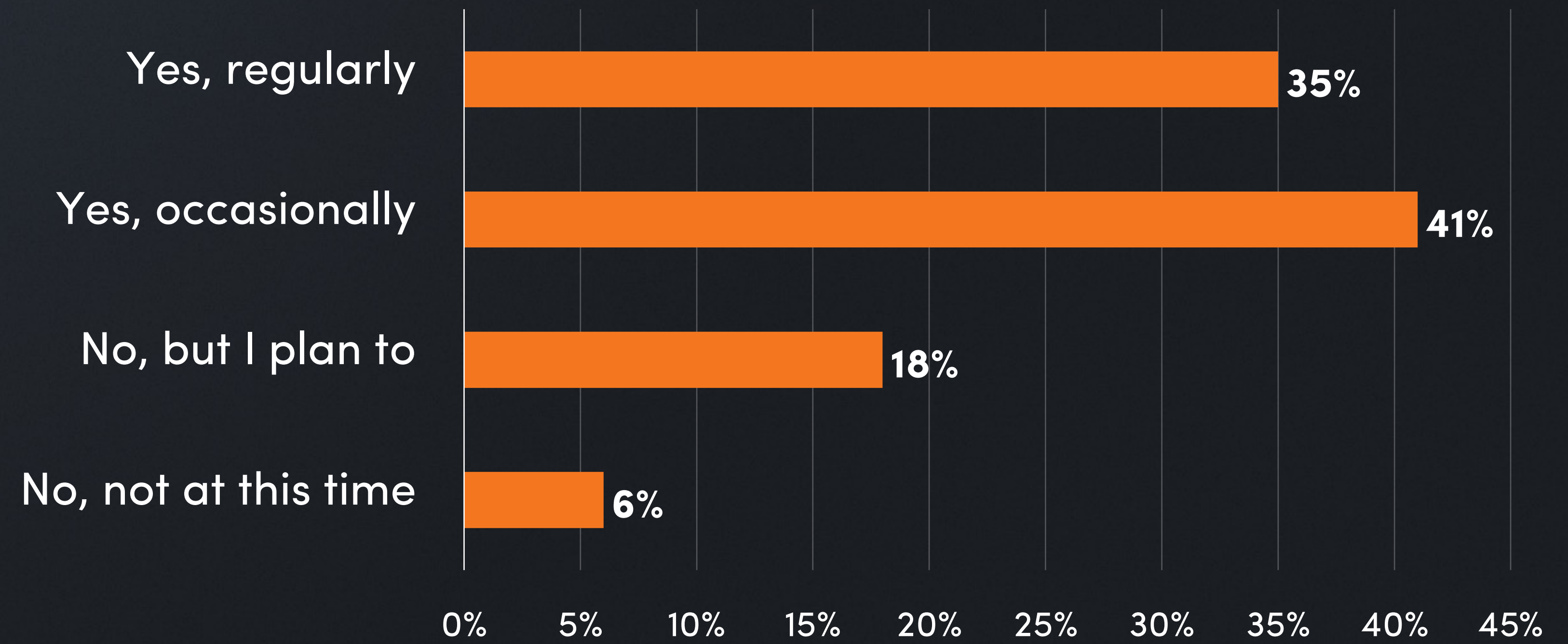
PubMed Disclaimer

Conflict of interest statement



Interactive Poll

Do you use ultrasound in your practice?





Interactive Poll

What is the main reason you are not using ultrasound?

Lack of training or confidence

43%

Limited access to equipment

21%

Cost concerns

36%

Not needed in my practice

0%

0% 10% 20% 30% 40% 50%

Your Expert Speaker



Dr. Khanh Nguyen

Plastic and Reconstructive Surgeon

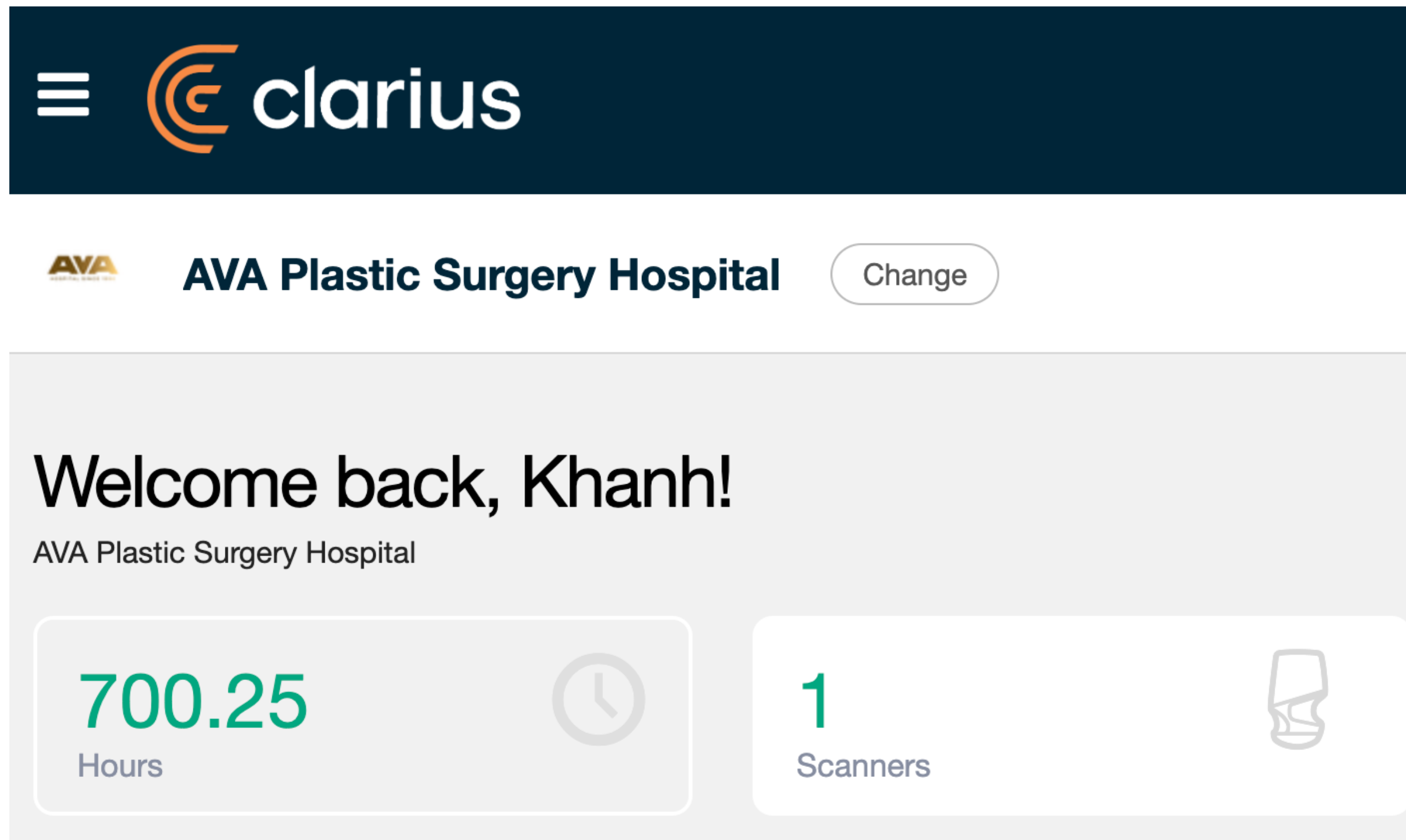
CLARIUS ULTRASOUND IN ABDOMINAL CONTOURING SURGERY: PRINCIPLES AND PRACTICE

NGUYEN THIEN KHANH MD
PLASTIC SURGEON



DISCLOSURE

1. KOL and Speaker for InMode since 2023
 2. Clinical Lecturer for Surgery, VinUniversity 2024
 3. Clarius User since 2021
- * NOT A RADIOLOGIST

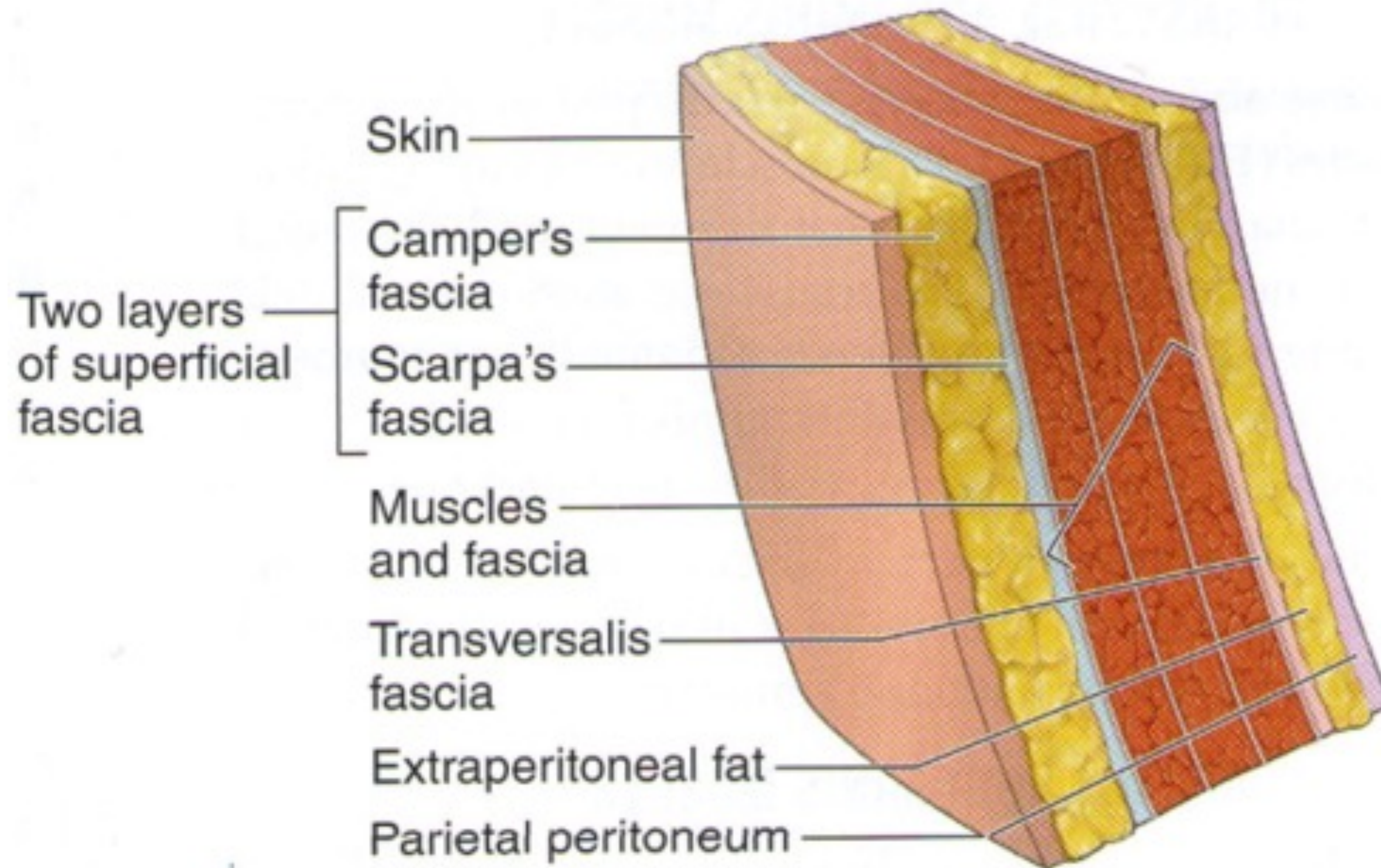




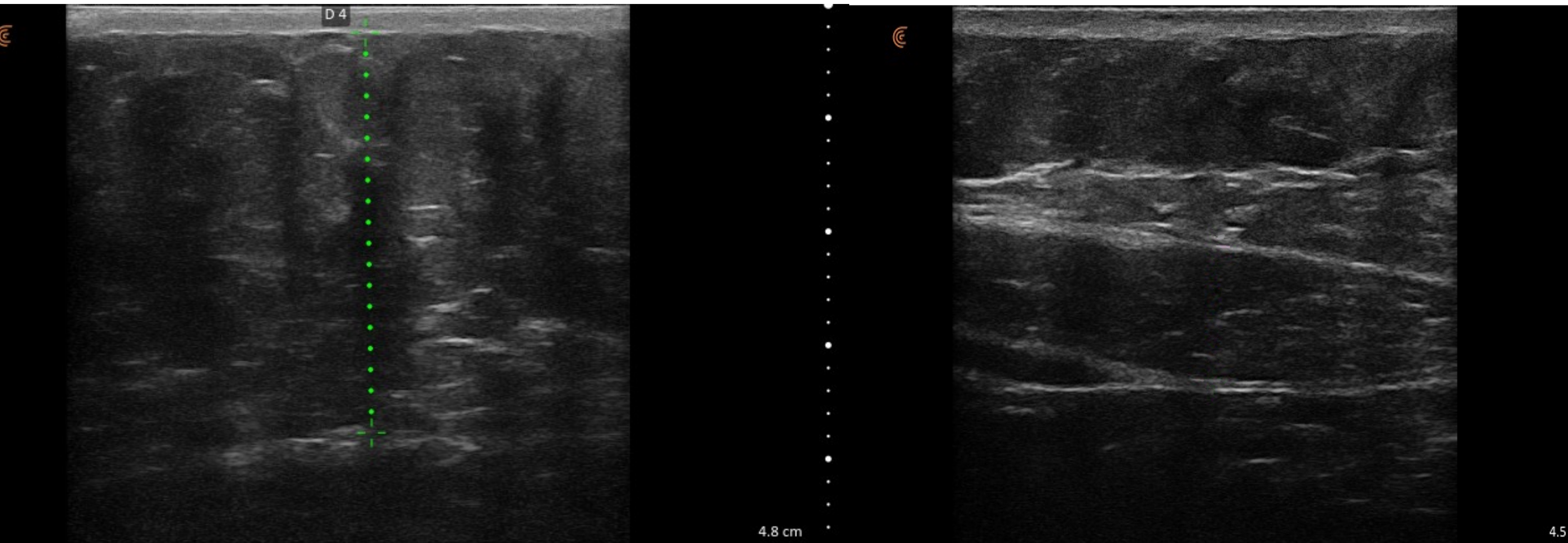
I. ANATOMY AND PHYSIOLOGY OF THE ABDOMINAL WALL

II. APPLICATION OF ULTRASOUND IN ABDOMINOPLASTY

ANATOMY



ANATOMY



ANATOMY

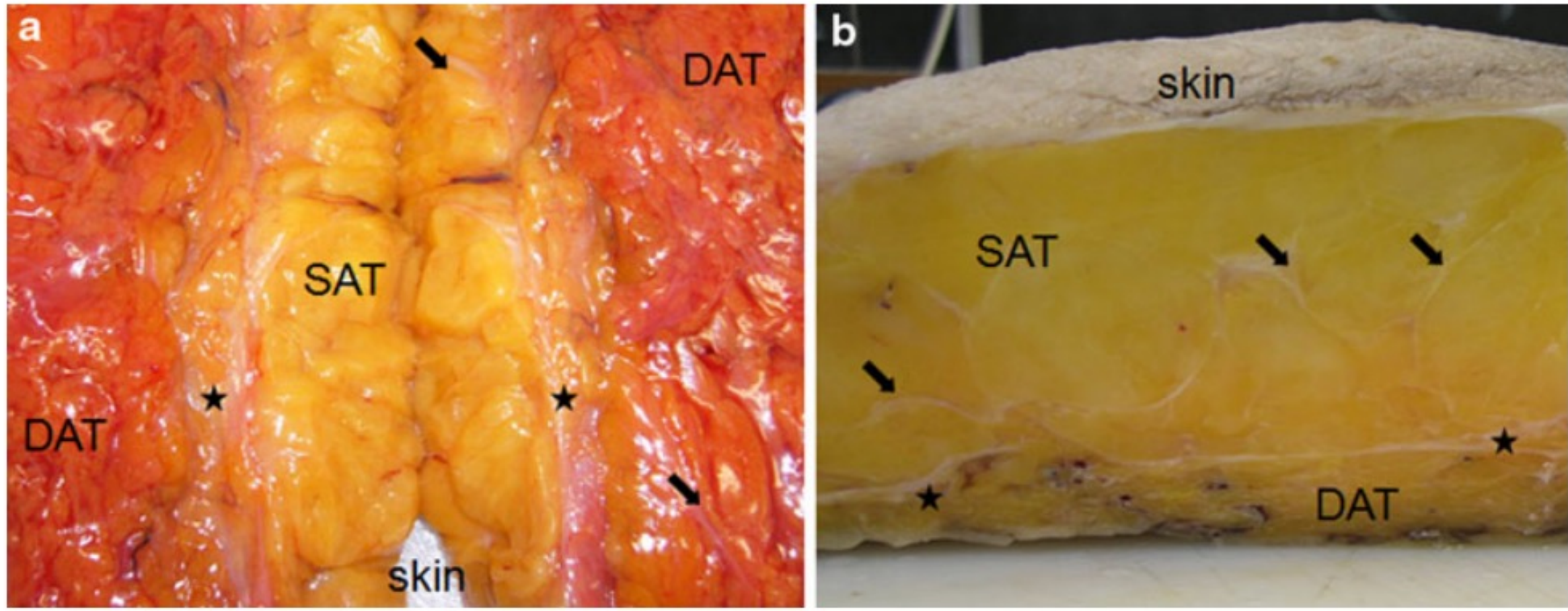
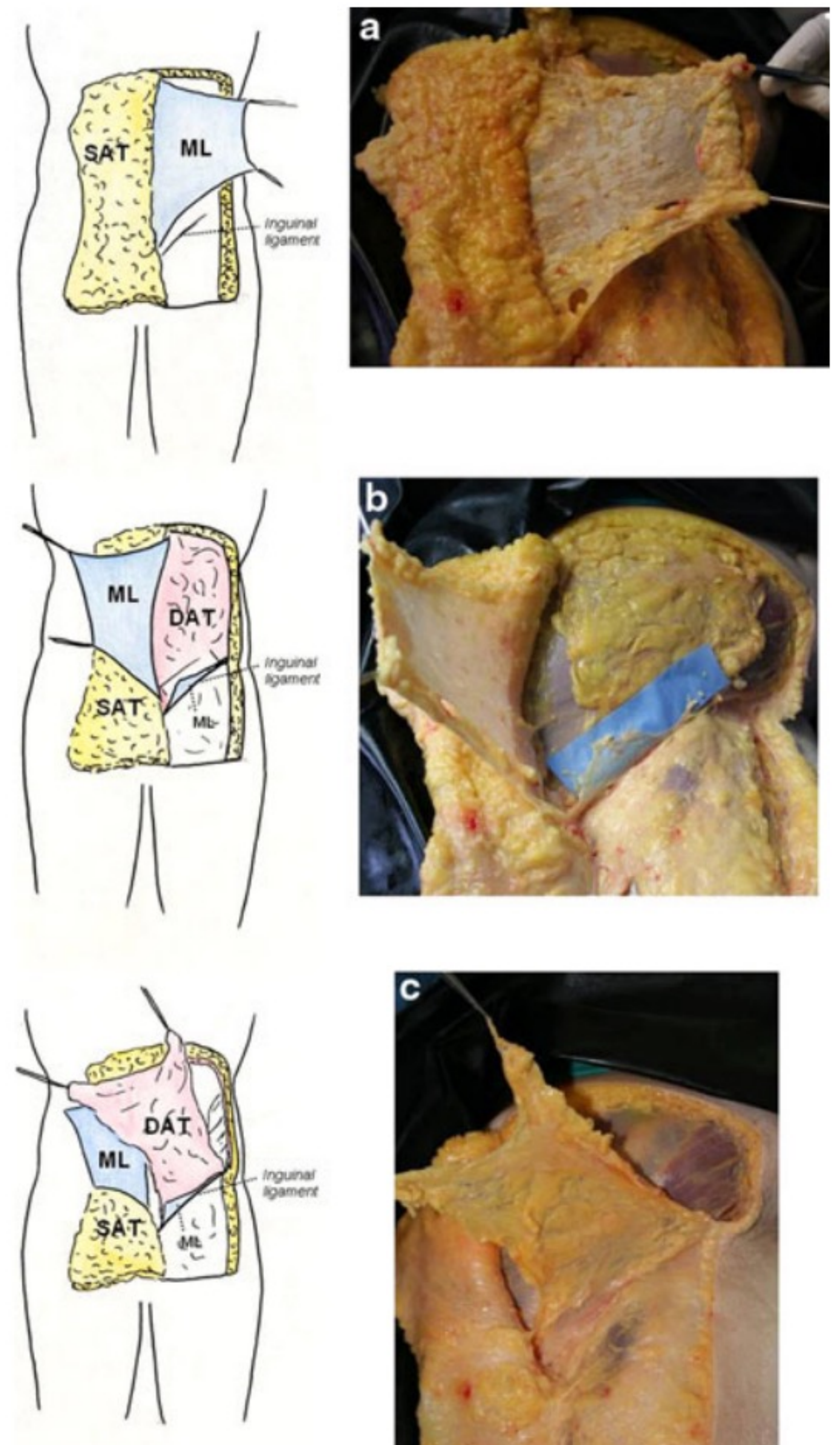


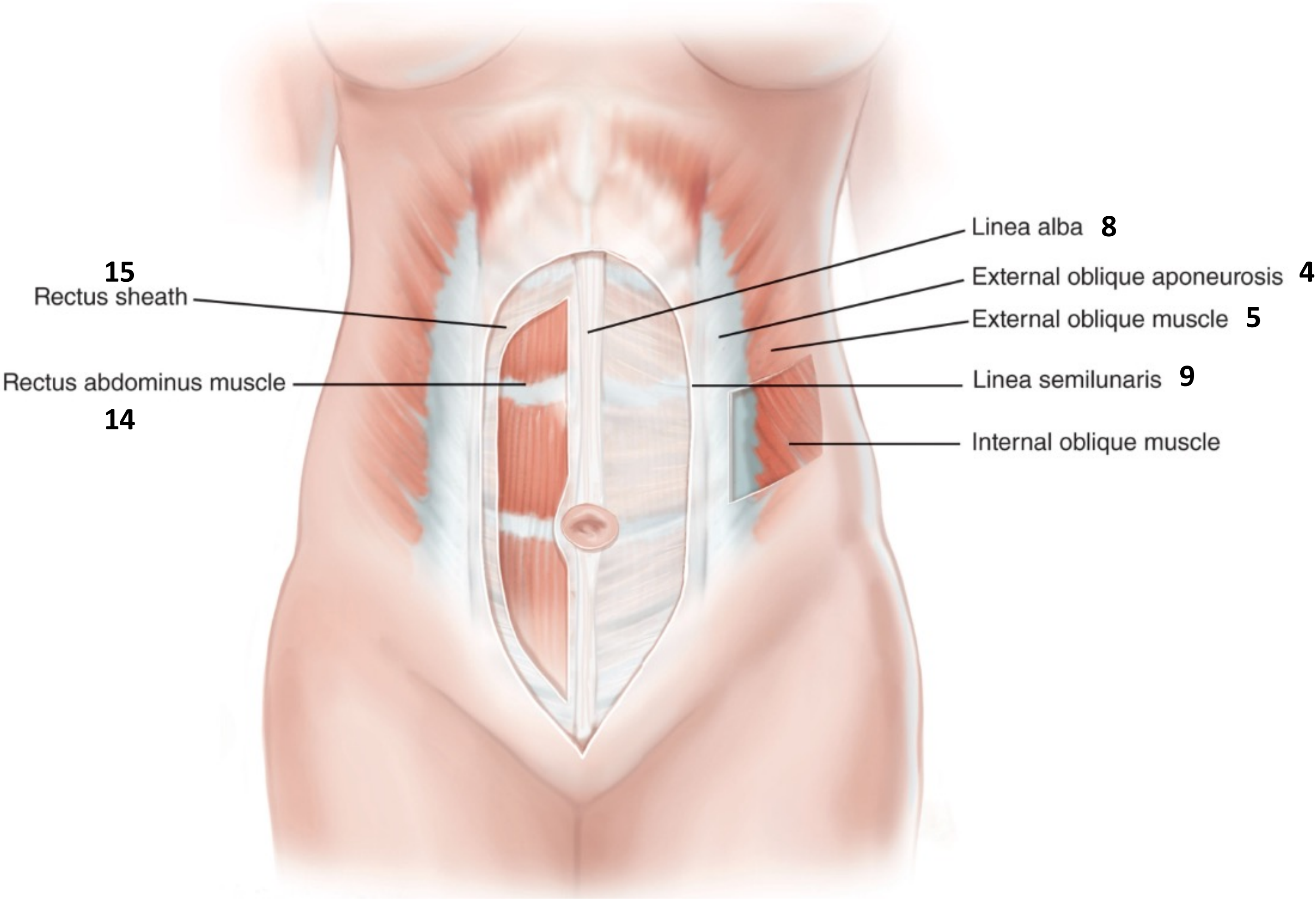
Fig. 1 “Surgical” description of abdominal subcutaneous tissue; **a** fresh full thickness specimen, reversed and cut perpendicularly to skin; **b** slice of formalin-fixed specimen. SAT superficial adipose tissue, DAT deep adipose tissue, stars membranous layer, arrows retinacula cutis



PHYSIOLOGY

- Camper's fascia is variable in thickness and is the predominant target for liposuction.
- Scarpa's fascia (Membranous Layer) is usually a strong and visible layer and is closed separately during various operations to achieve an improved cosmesis of the wound closure.
- Deep Adipose Tissue is often thinner than Camper's, can contribute to the lymphatic drainage of the lower abdomen and is important in abdominoplasty

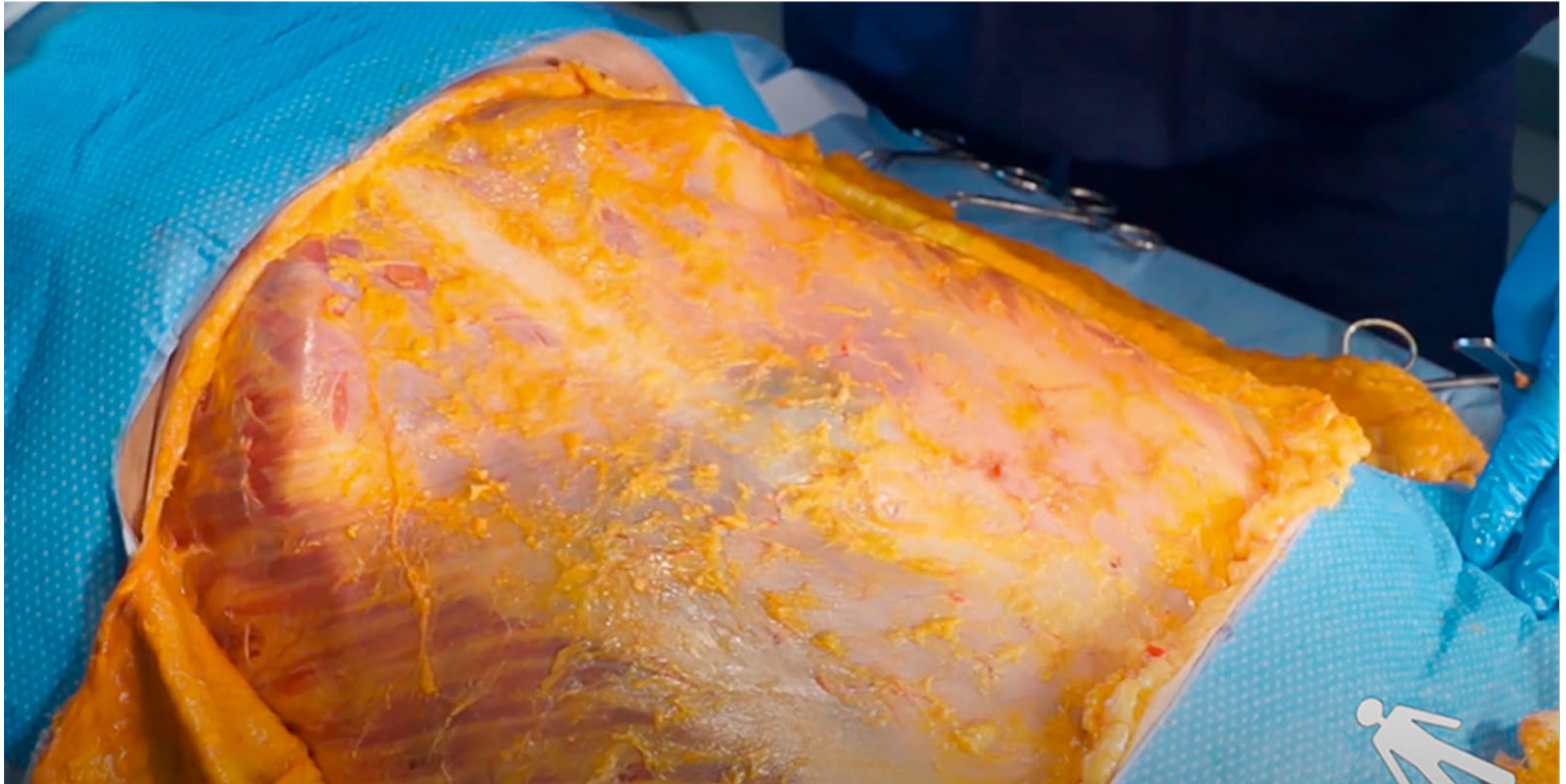
ANATOMY



PHYSIOLOGY

- Support and Protect abdominal viscera
- Maintain Posture, including stabilization of the pelvis
- Facilitate trunk movements
- Breathing support by lifting diaphragm during exhalation
- Increase Intra-abdominal Pressure during coughing, laughter, childbirth, micturition, and defecation
- Provide physical signs and signal for satiety

ANATOMY OF THE LINEA ALBA



PHYSIOLOGY OF THE LINEA ALBA

- Key to an aesthetically pleasing abdomen: The linea alba is visible externally in those who are lean and muscular as a shallow midline groove in the anterior abdominal wall.
- Key to a small waistline – separation of the the linea alba contributes to a condition called Diastasis Recti: loss in abdominal tone, expanding waistline



DIASTASIS RECTI – WHAT IS IT?

- Widening of the Linea Alba of greater than 2.2 cm at a point 3 cm above the umbilicus
- Results in laxity of the abdominal wall and lateralization of the rectus muscles from the midline
- Etiology for thinning of the musculoaponeurotic layer of the abdominal wall: pregnancy, obesity, and aging.
- Not a true hernia because fascial integrity remains intact.
- May co-exist with a true hernia which is important to rule out/assess for the best surgical planning.



DIASTASIS RECTI – WHY CORRECT?

- Allows abdominal contents to bulge. At the site of laxity, resulting in undesirable shape of the abdomen
- Myofascial thinning leads to weakness, and instability of the trunk, and degradation of the abdominal core health
- Contributes to functional impairment, chronic MSK pain, urogynecologic dysfunction, and weight gain.



DIASTASIS RECTI – CLASSIFICATIONS

Level	Normal Width
At xiphoid process	≤ 15 mm
3 cm above umbilicus	≤ 22 mm
2 cm below umbilicus	≤ 16 mm

Citation: Reference -Clin Anat 2009 Sep;22(6):706

Table 1: Beer Classification of the Normal Width of the Linea Alba in Nulliparous Women

Level	Age < 45 years	Age > 45 years
Above umbilicus	> 10 mm	> 15 mm
At umbilicus	> 27 mm	> 27 mm
Below umbilicus	> 9 mm	> 14 mm

Citation: Reference -Surg Radiol Anat 1996;18(4):281

Table 2: Rath Classification of Rectus Abdominis Diastasis Based on Level of Linea Alba widening relative to the umbilicus based on age and relationship to the umbilicus.

CASE 1 – DIASTASIS RECTI

37 years old Vietnamese woman, two pregnancy. She had a previous Mini Tummy Tuck two years ago. However, her abdominal shape has not improved: no waistline and distended abdomen especially after food.

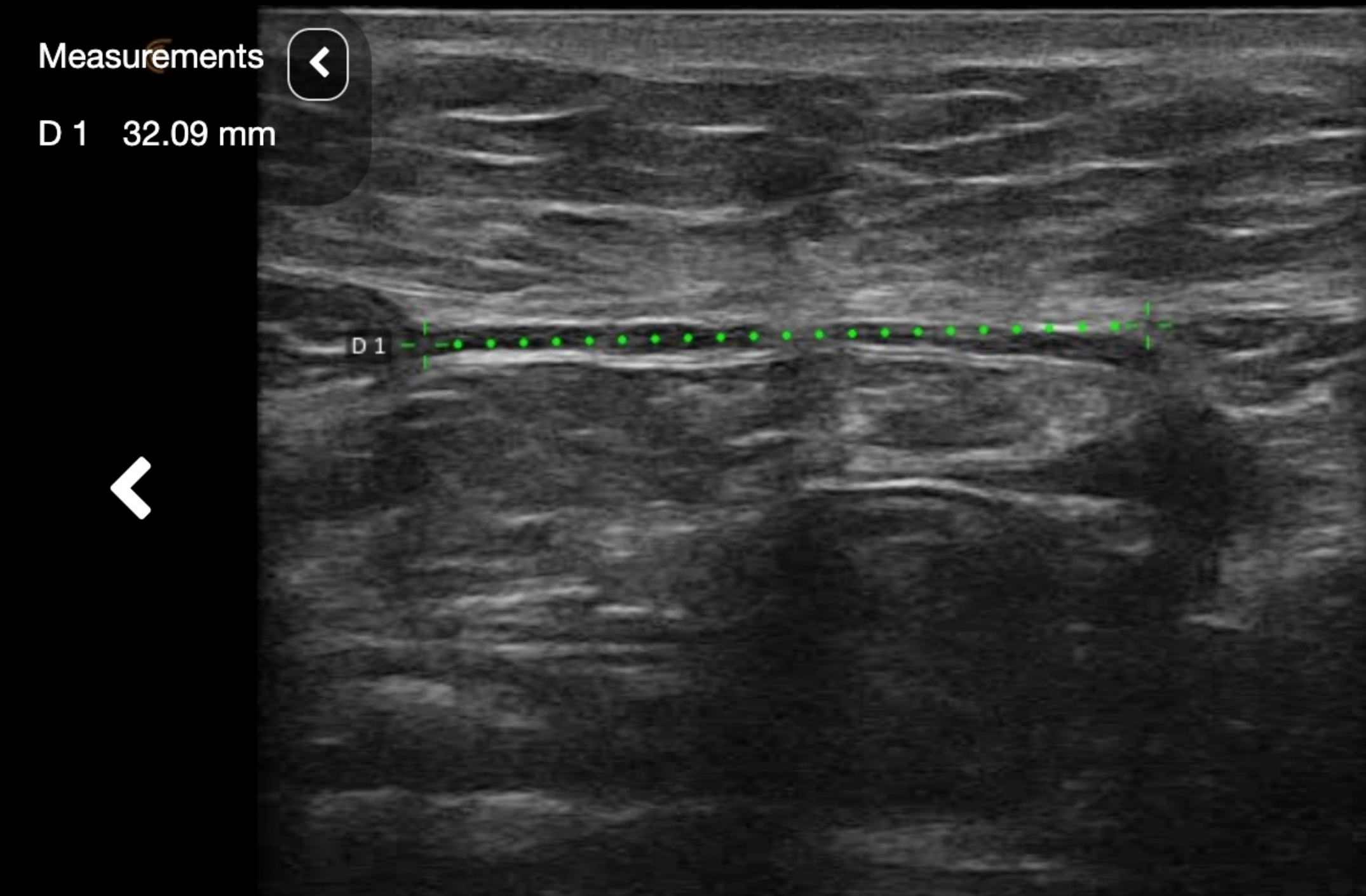


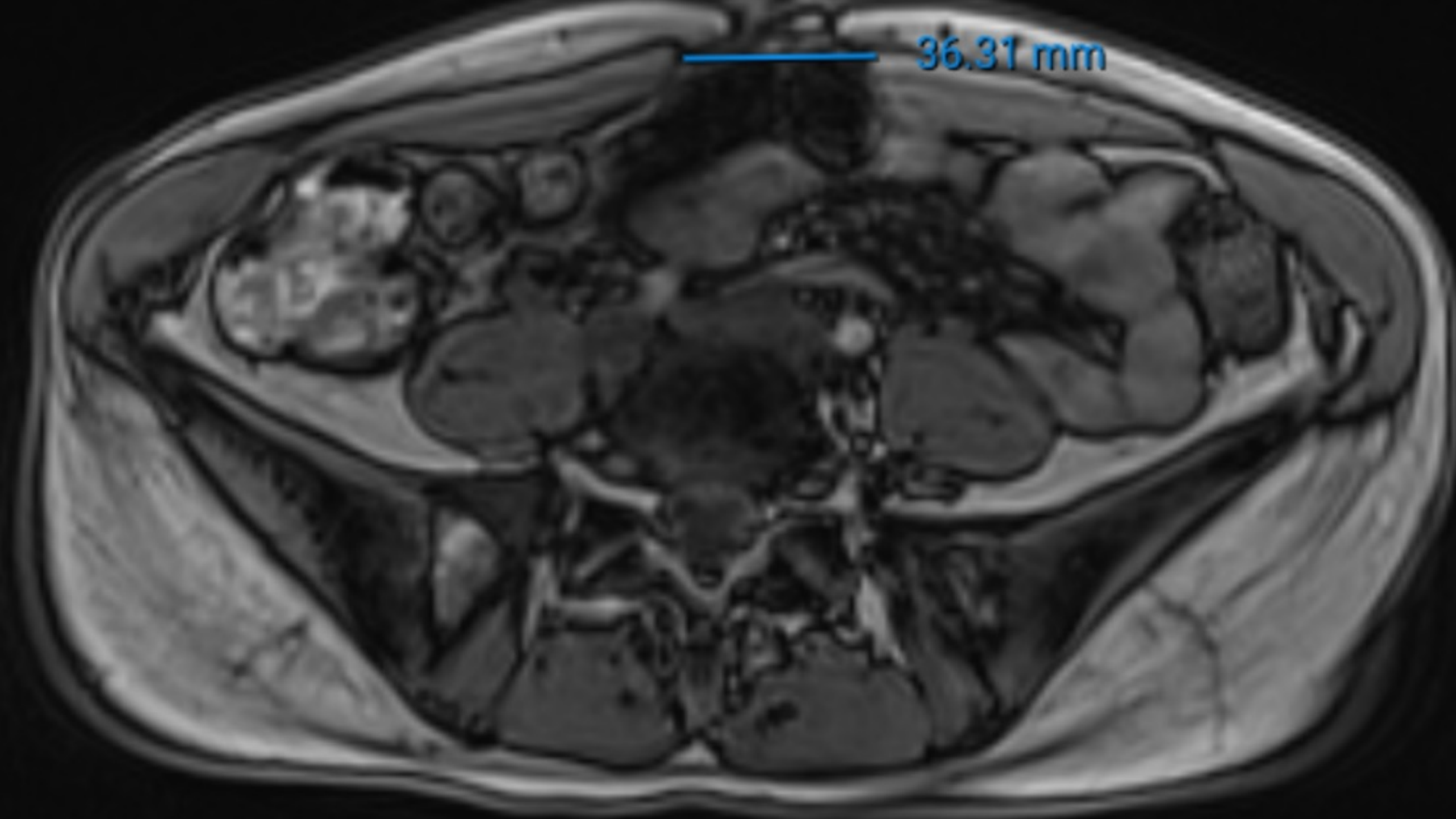




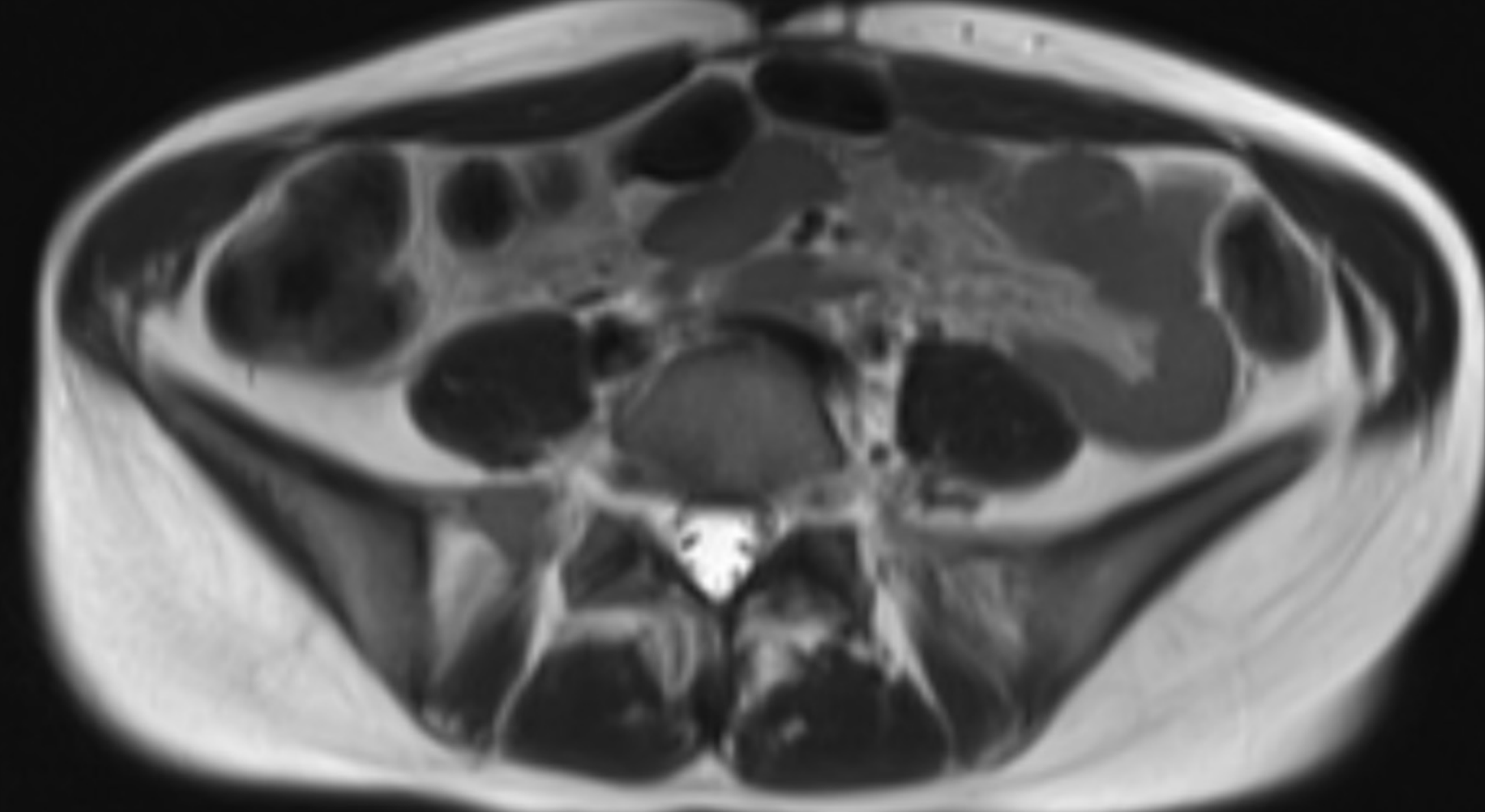
Above Umbilicus

3 cm





L R



L R

T1

T2



Normal anatomy



Type 1

59%



Type 2

1%



Type 3

9%



Type 4

29%



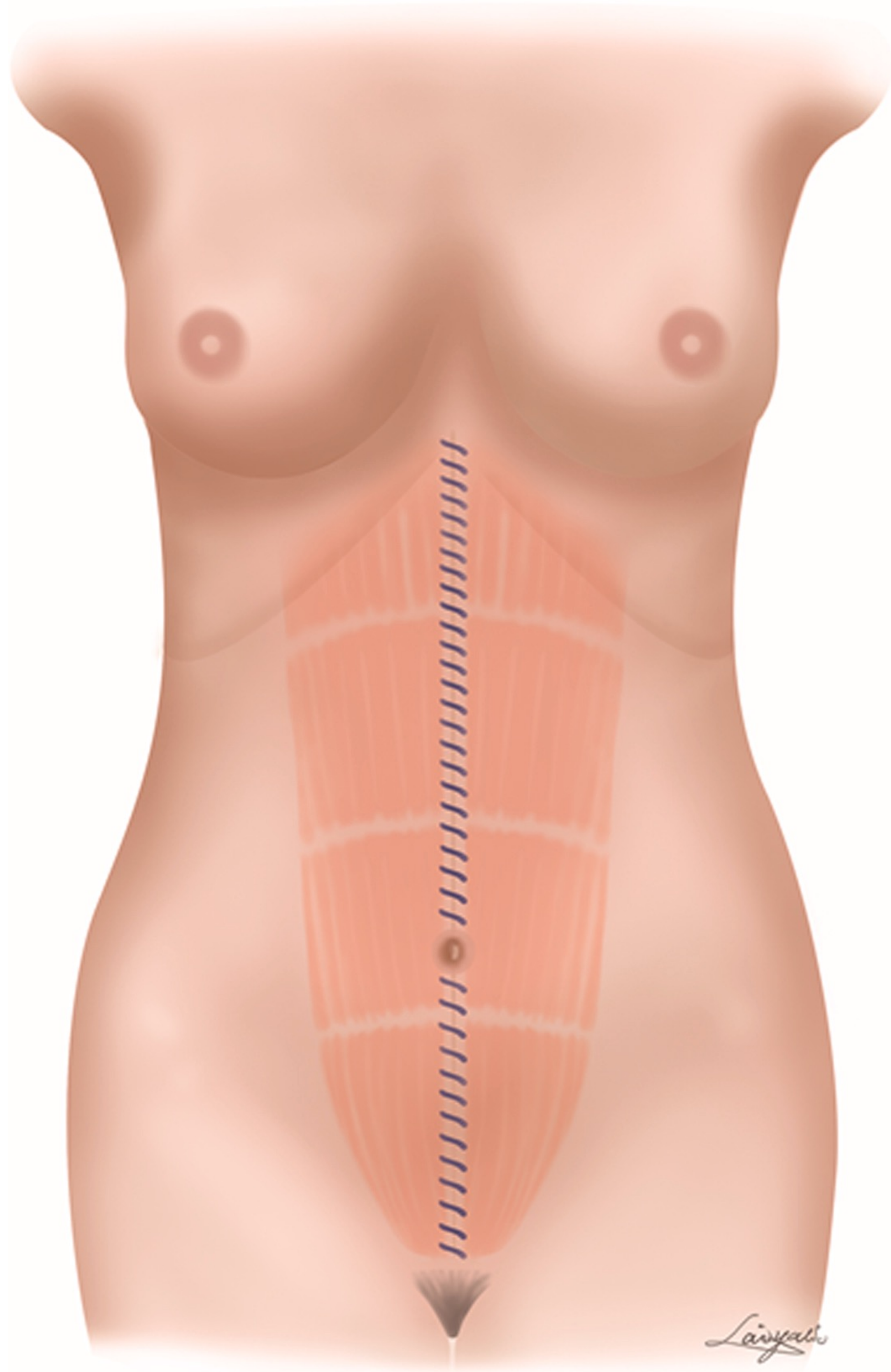
Type 5

2%

The above-navel patterns of rectus abdominis muscle diastasis are by far the most common. Even when open completely, diastasis is usually wider above the navel.

==> Avoid excessive repair below the navel in mini-abdominoplasty.

==> Consider mini-tummy tuck with full abdominal plication









CASE 2 – DIASTASIS RECTI

30 years old Vietnamese female, occupation: personal trainer. She is postpartum 9 months and has returned to her pre-pregnancy weight. However, her abdomen shape remains protruded, distended with expanded waistline. She is also unable to resume her previous workout for body core strength. Her son birthweight was 4kg.

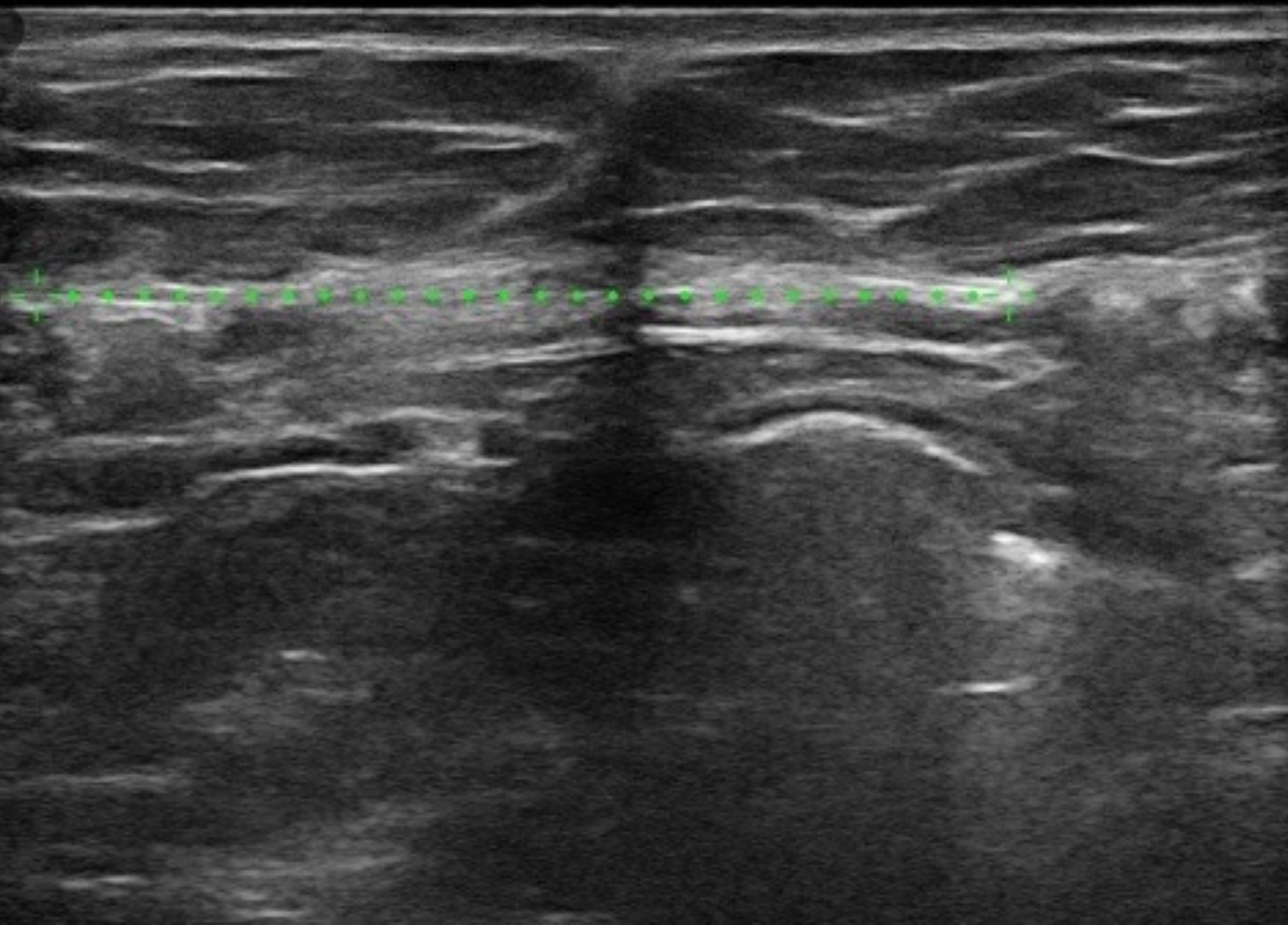


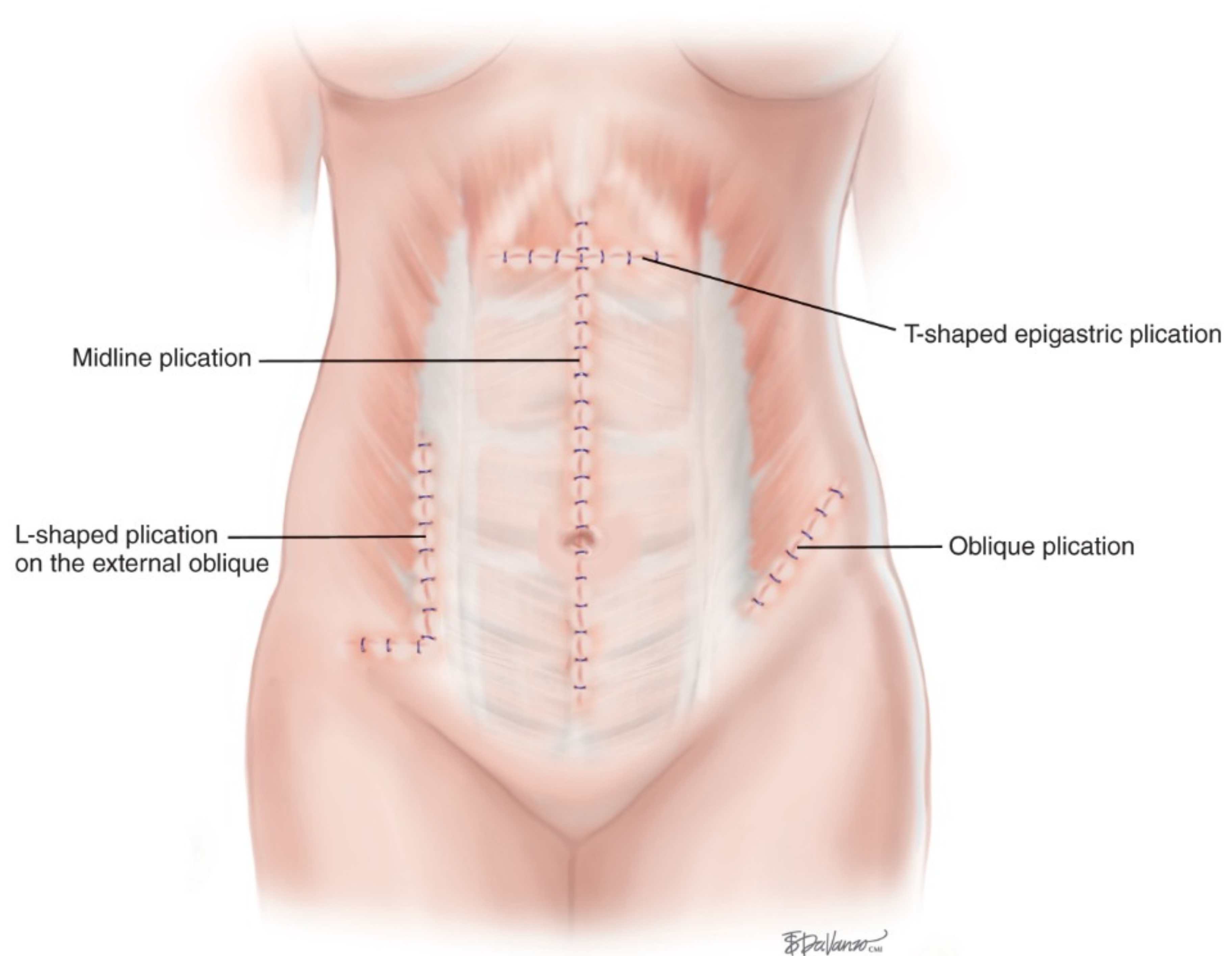
D 3

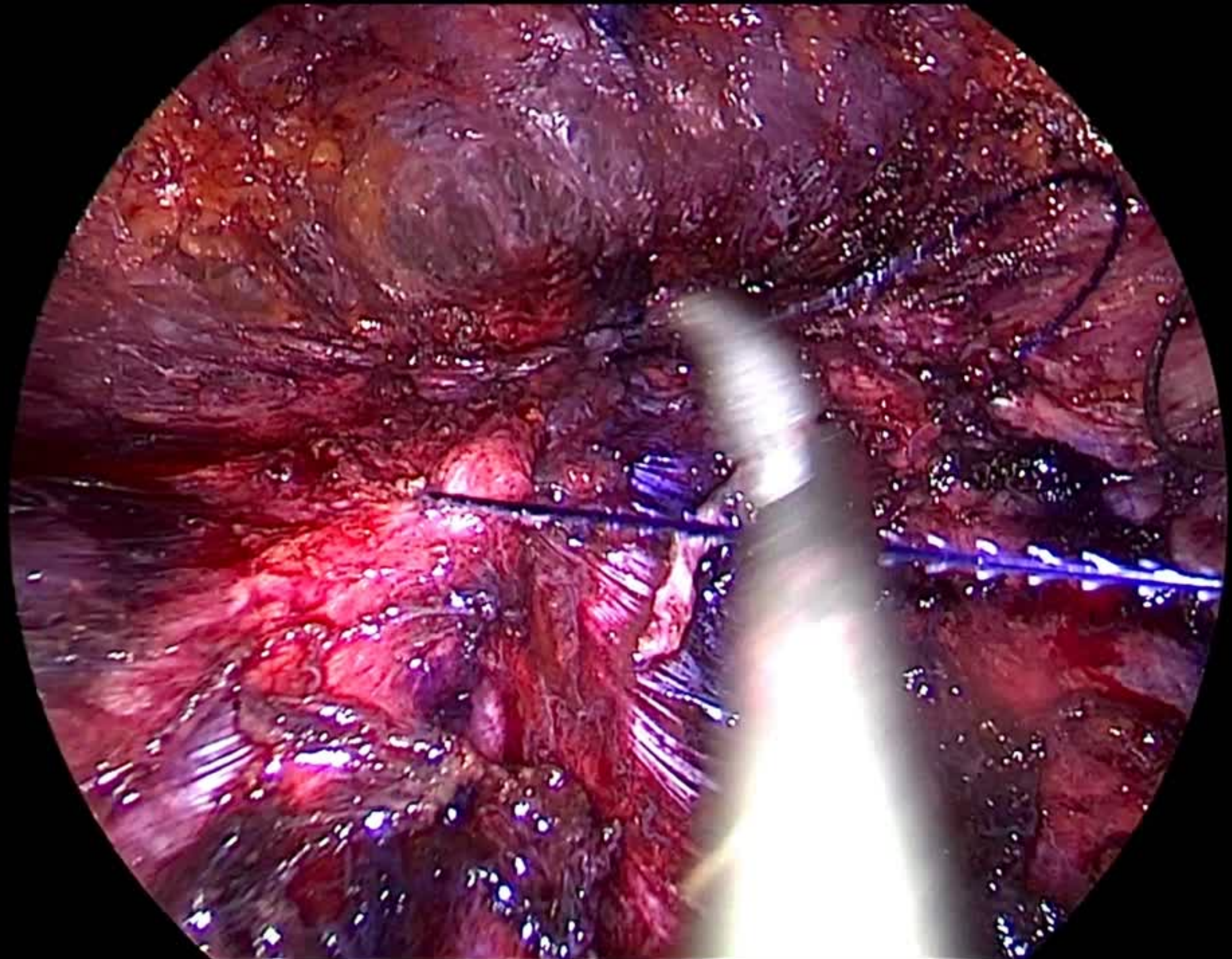


37.0 mm

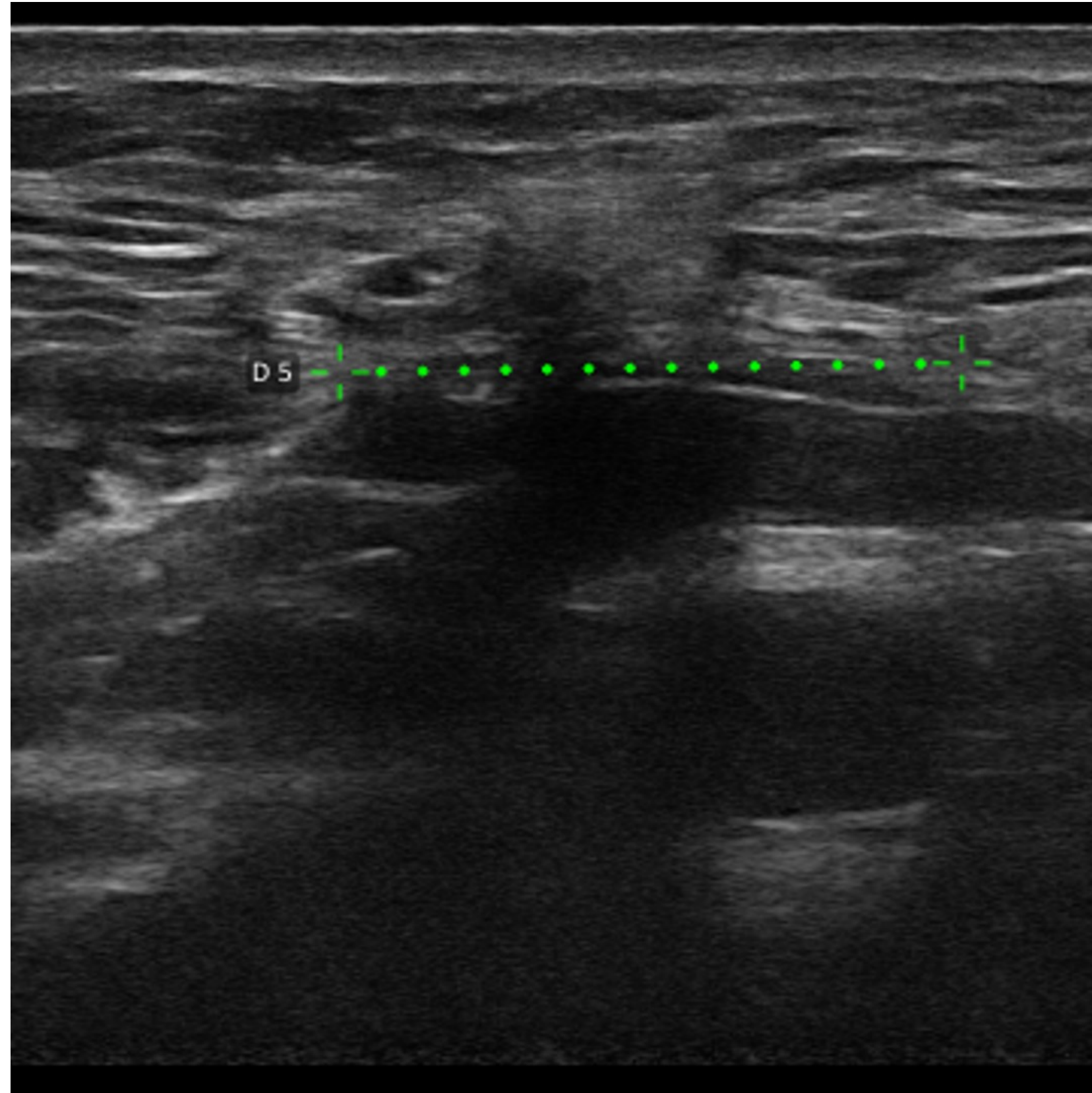
D 3



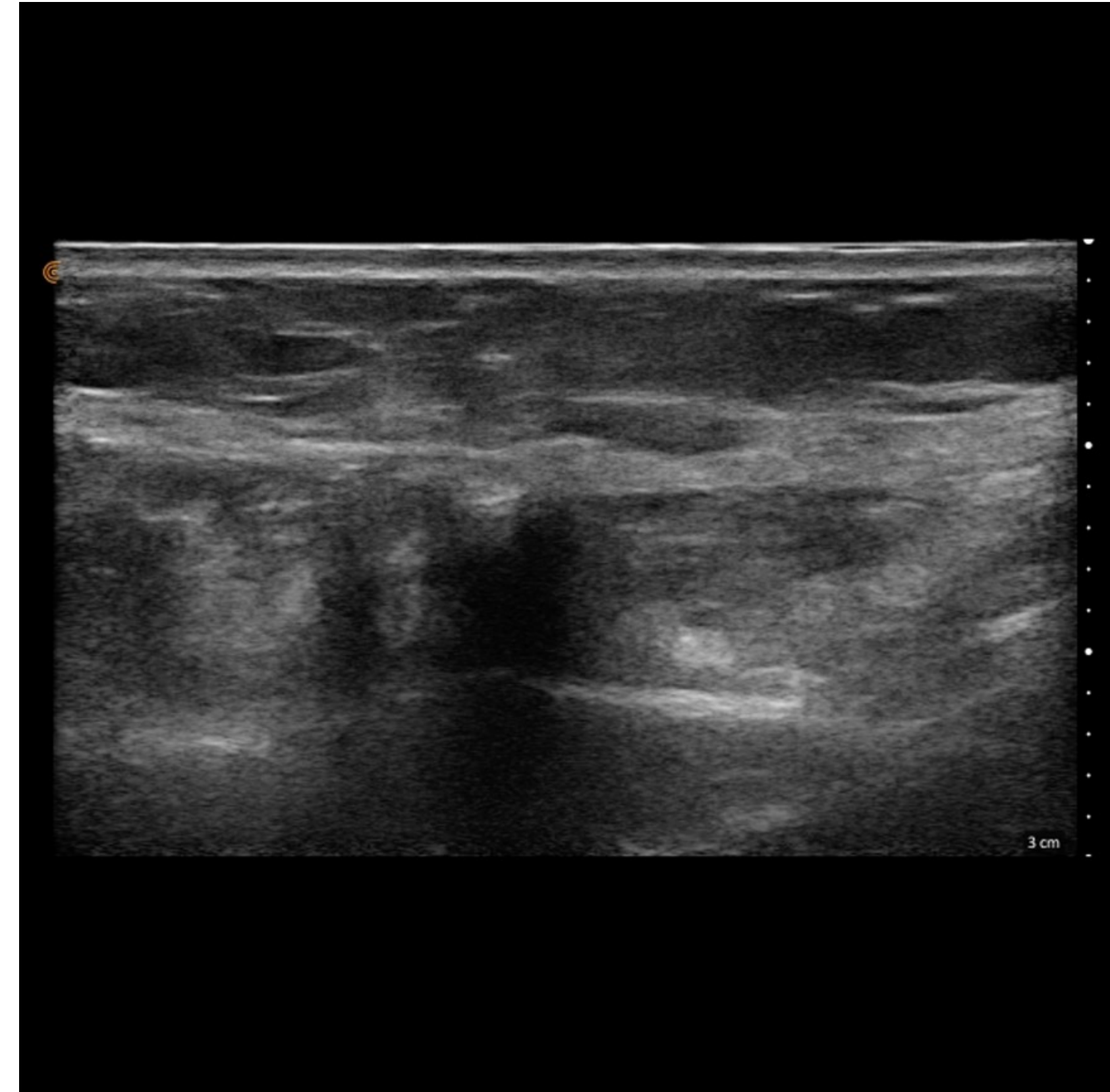




BEFORE



AFTER





BEFORE



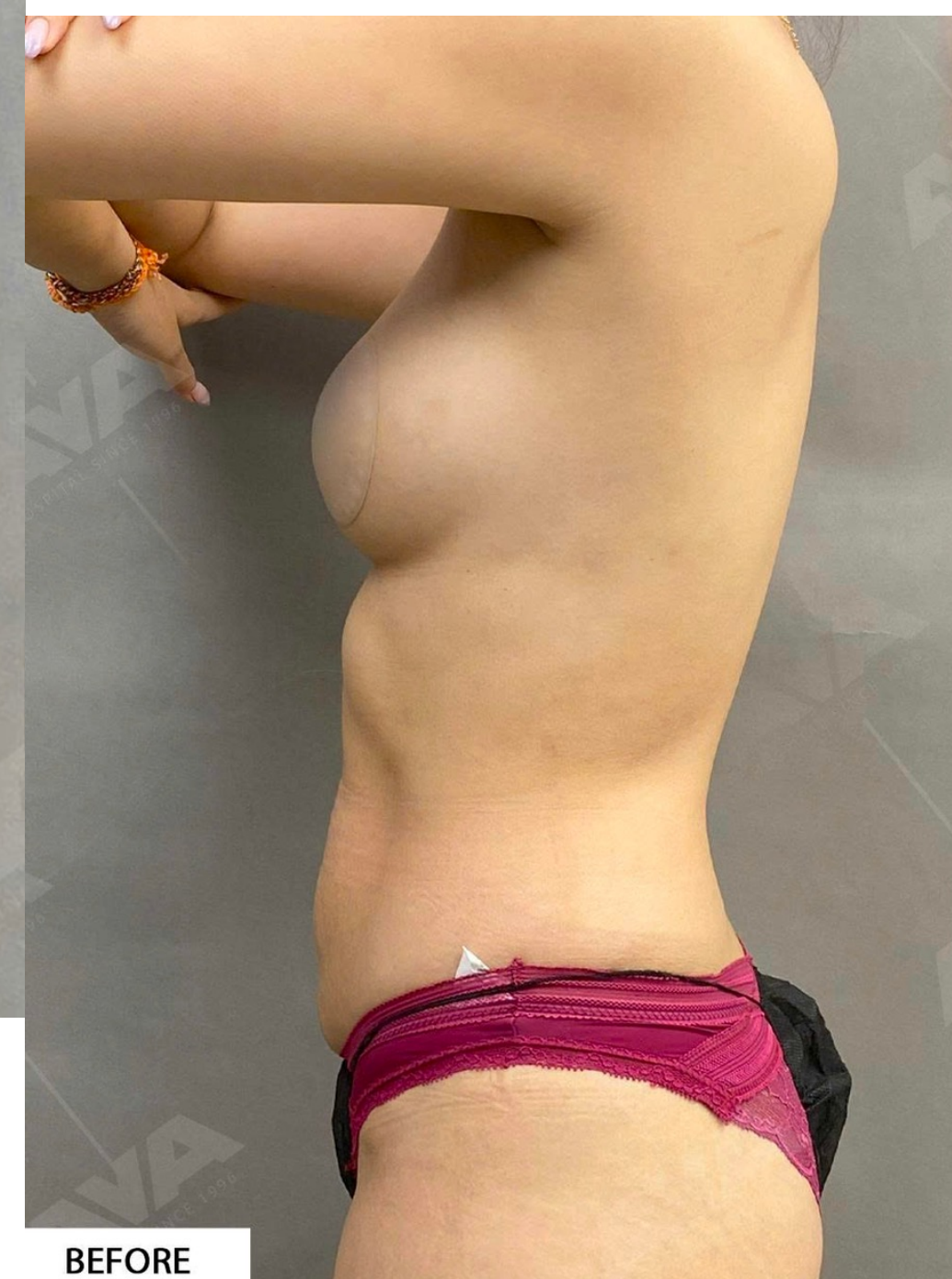
AFTER 2 WEEKS



BEFORE



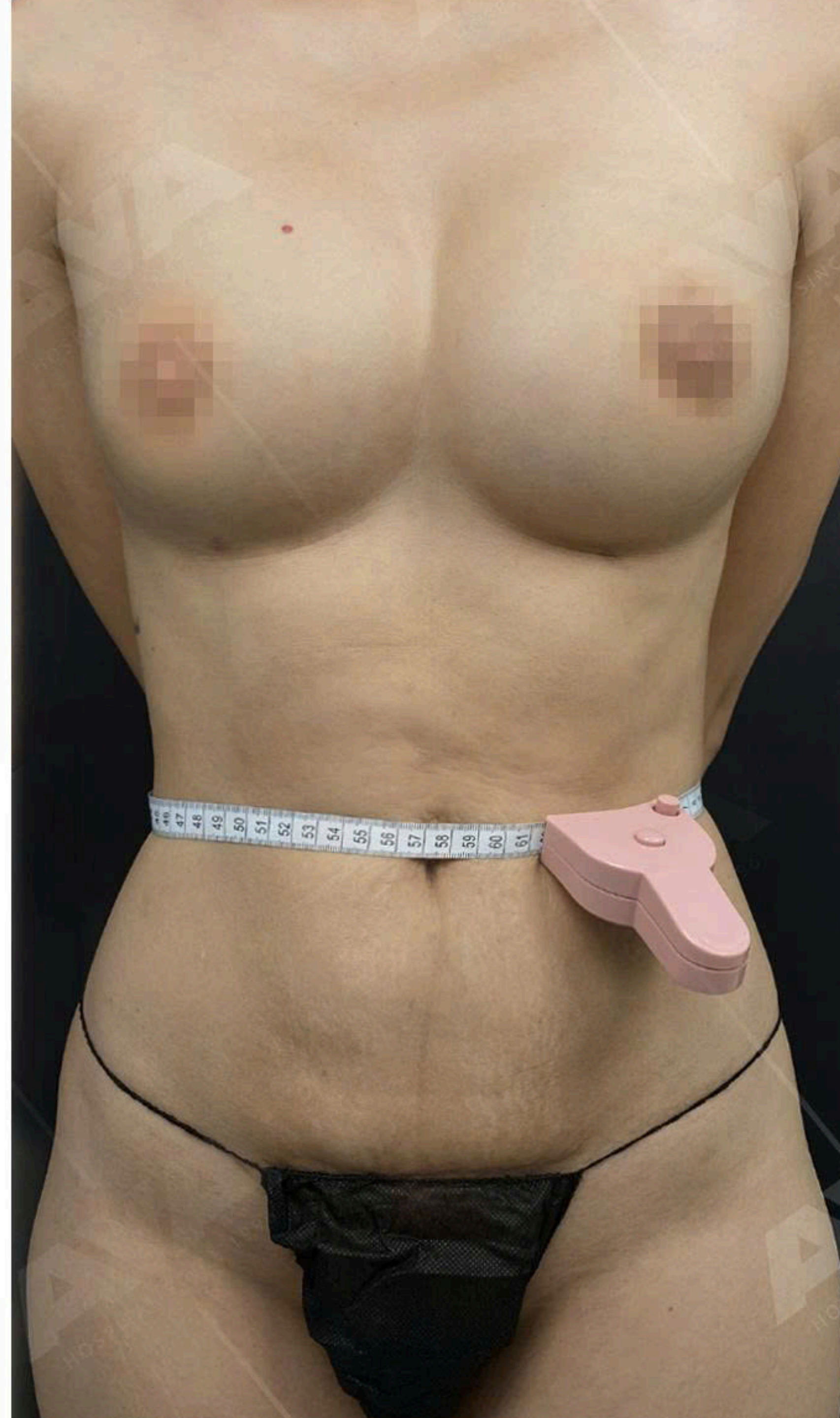
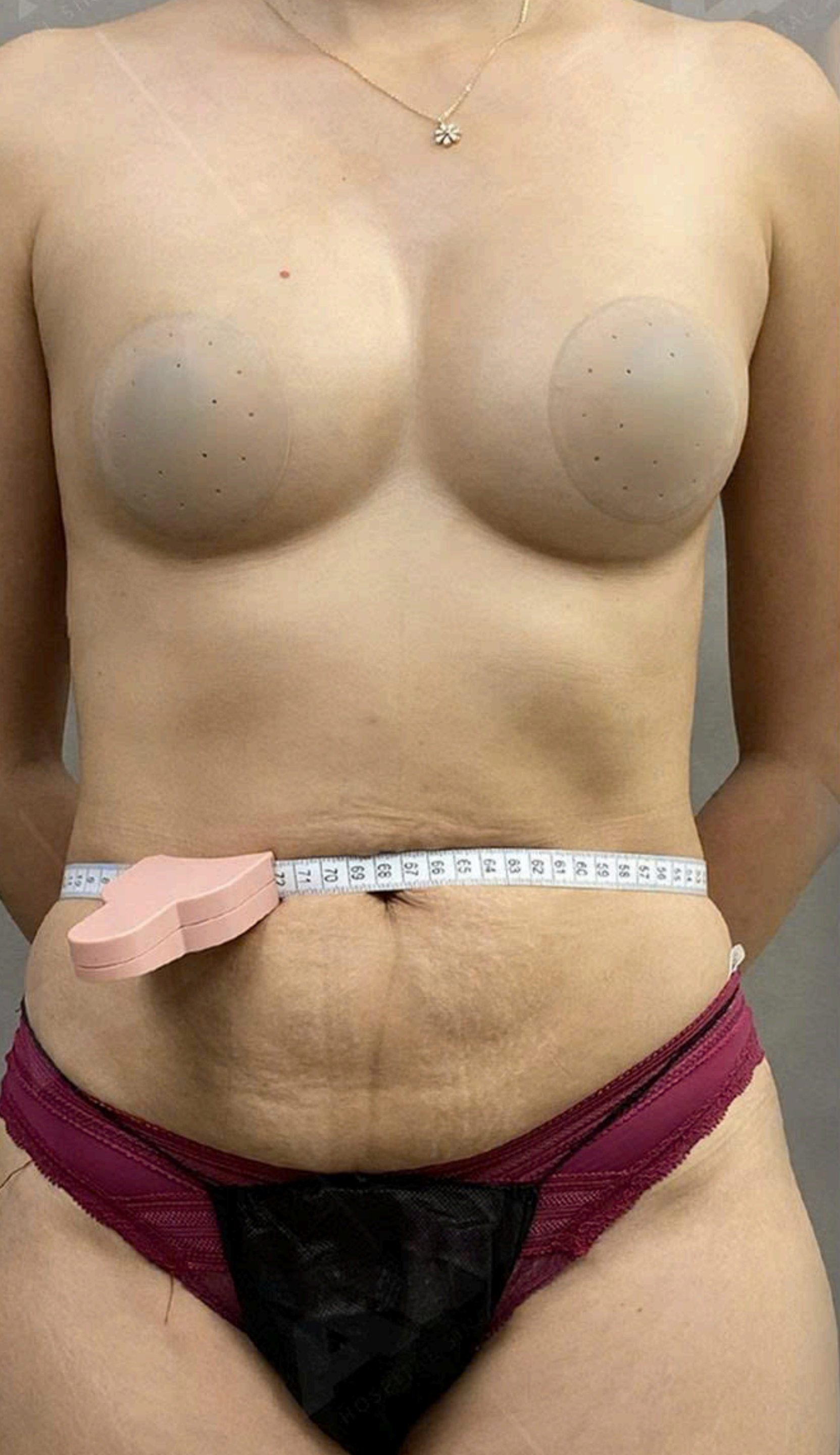
AFTER 2 WEEKS



BEFORE



AFTER 2 WEEKS



CASE 3 – SAFETY ENHANCEMENT

30 years old Singaporean female with previous BMI of 38, underwent Laparoscopic Sleeve Gastrectomy two years ago. She has lost 20kg, currently weight 80 kg; her weight lost has been stabilised for more than 6 months. She is now seeking body contour surgery to address her waistline.



SAFETY PRINCIPLE

Port sites/Incisional Hernias

- * ≥ 10 mm incision don't get fascial closure
- * poor nutritional state perioperatively
- * large intra-abdominal pressure





Trocar Site HERnias After Bariatric Laparoscopic Surgery (HERBALS): a Prospective Cohort Study

Ioannis Karampinis¹ • Eliette Lion¹ • Svetlana Hetjens² • Georgi Vassilev¹ • Christian Galata¹ • Christoph Reissfelder¹ • Mirko Otto¹ 

Published online: 16 January 2020

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OVERALL PREVALENCE: 34%

Abstract

Background The exact prevalence of trocar site hernias after bariatric procedures is not yet known. Recent metaanalysis data indicated concerning rates of up to 25%. We conducted a prospective cohort study to estimate the prevalence and analyze the role of fascia closure in the development of trocar hernias.

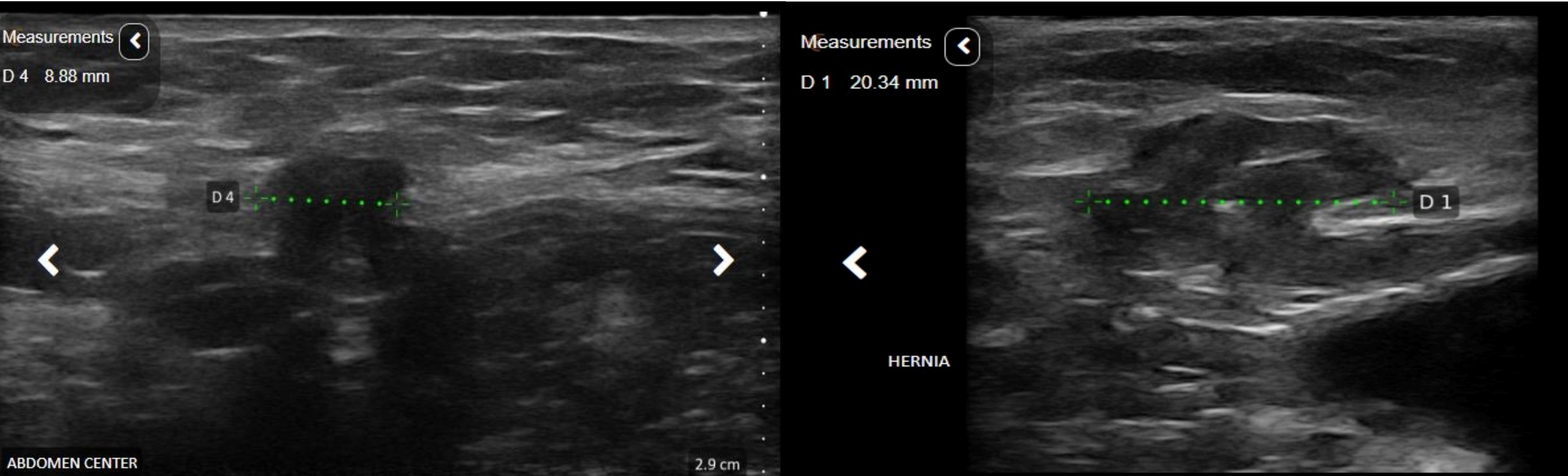
Method A total of 365 patients who were operated for obesity in our department between 2009 and 2018 were included. All patients were invited for a follow-up ultrasonography scan in order to detect abdominal wall defects. The role of intraoperative fascia closure in the development of trocar site hernias was evaluated, and a logistic regression analysis was performed to detect potential risk factors.

Results The overall prevalence of trocar hernias detected by ultrasonography was 34%. The prevalence of abdominal wall defects in patients who received a fascia closure was 37% compared with 34% in patients who did not receive a fascia closure ($p = 0.37$). The only factor that was associated with a higher risk for trocar site hernias was high excessive weight loss ($p = 0.05$).

Conclusion Trocar site hernias are an underestimated complication of minimally invasive, multiportal bariatric surgery, and the prevalence of asymptomatic hernias is probably higher than initially expected. In this study, fascia closure did not protect against trocar hernias. However, opposing evidence from similar trials suggests closing the fascia. This clinical problem should therefore be further assessed in a prospective randomized setting.

VENTRAL HERNIAS ON CLARIUS LD15

* IMAGES COURTESY OF CLARIUS DATA SCIENCE TEAM







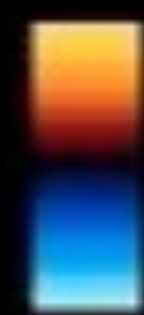
CASE 4 – SAFETY ENHANCEMENT

42 years old South American female with previous BMI of 38, underwent Laparoscopic Sleeve Gastrectomy two years ago. She has lost 40kg, currently weight 89 kg. She is now seeking body contour surgery to address her waistline and loose skin.





5.5 cm/s



-5.5 cm/s

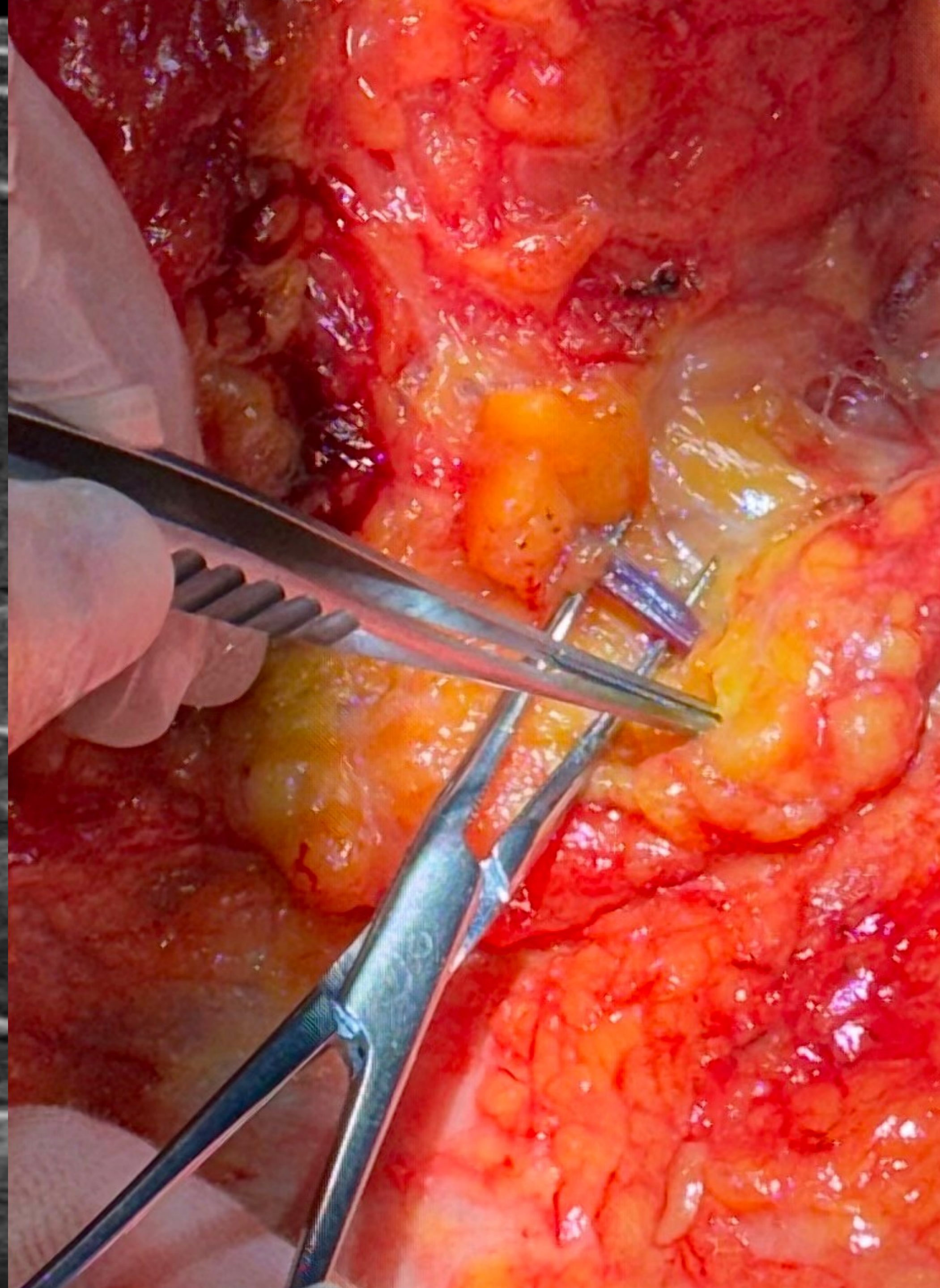
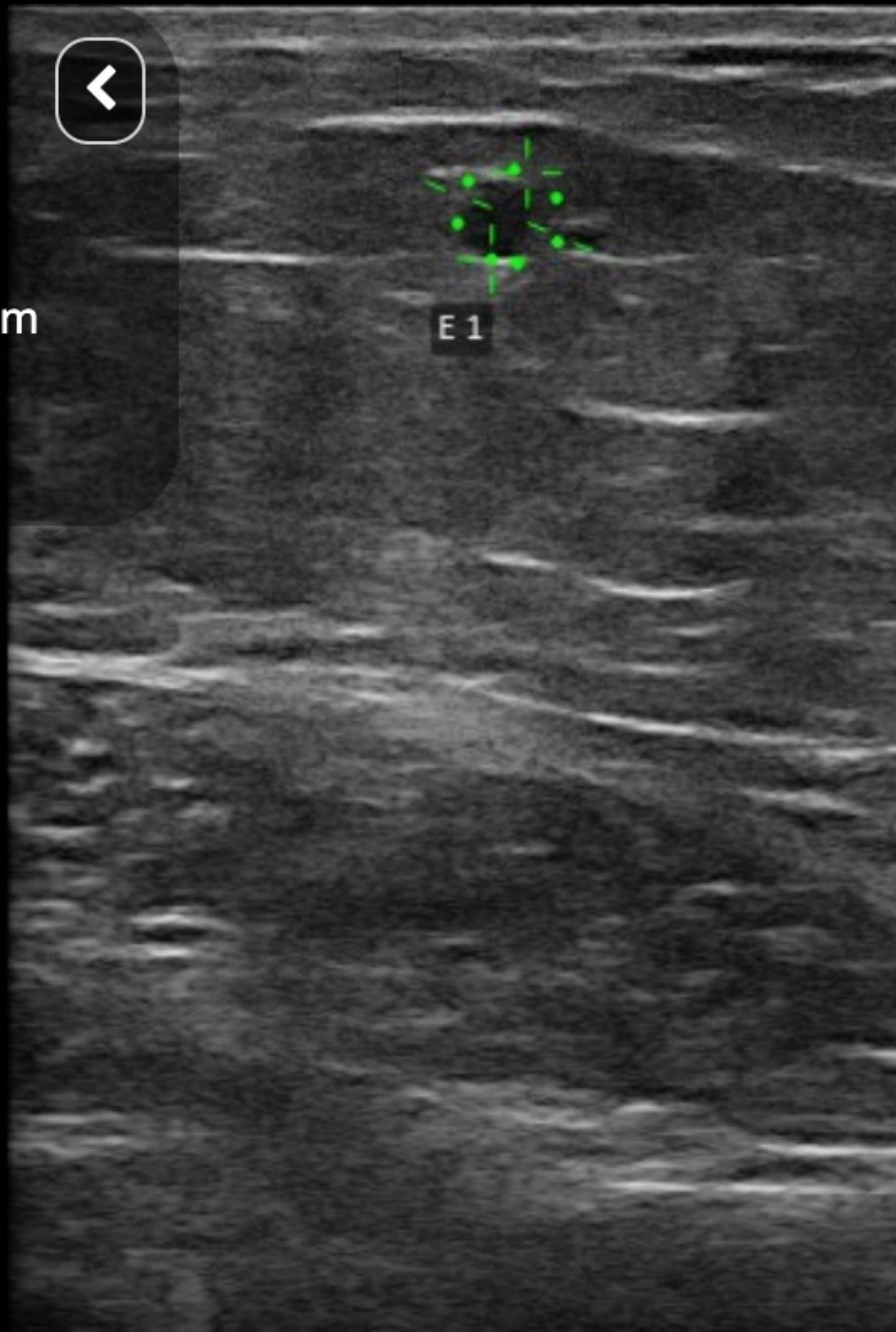
Measurements

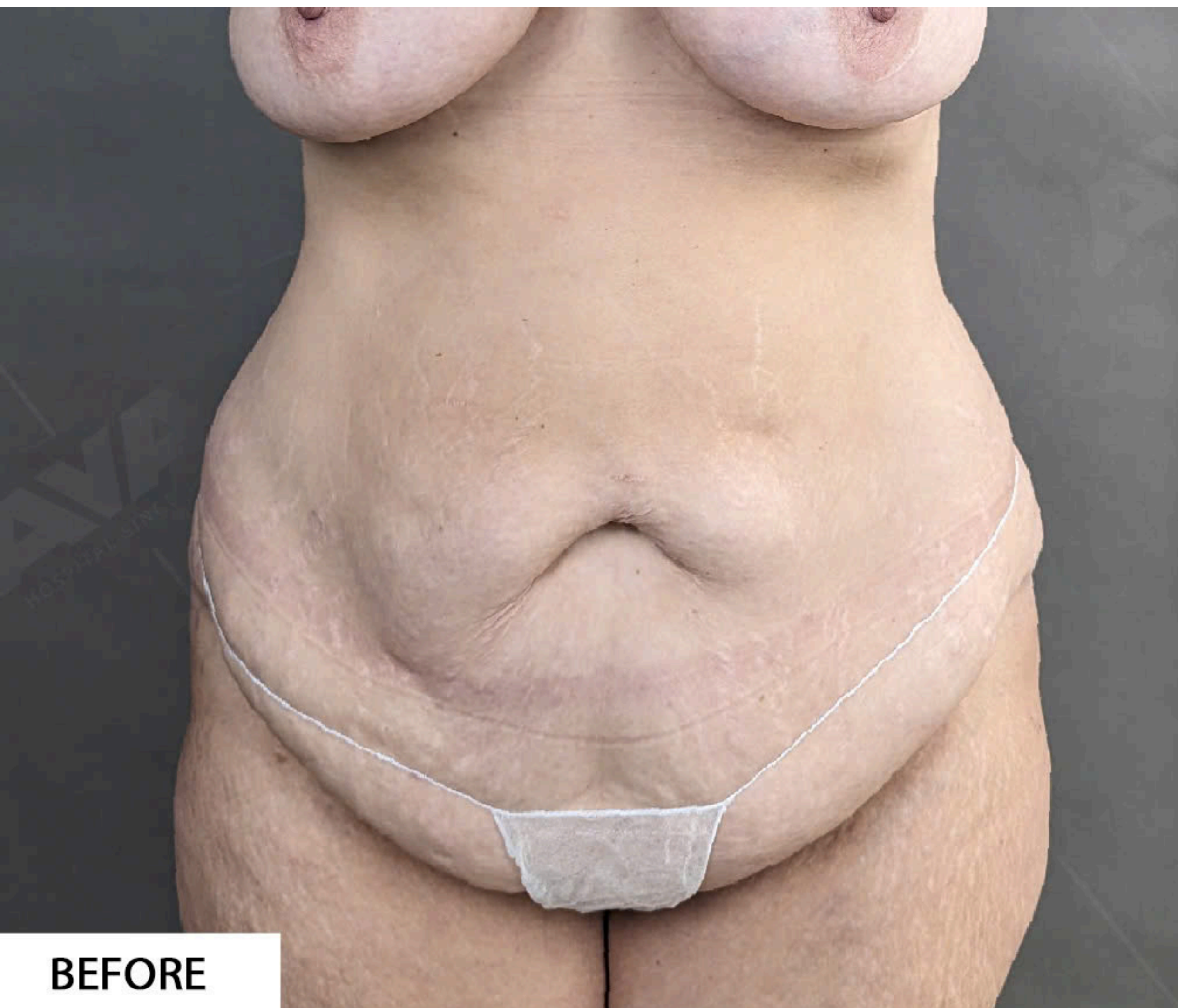


Circumference 14.96 mm

Area 17.62 mm²

E 1





BEFORE



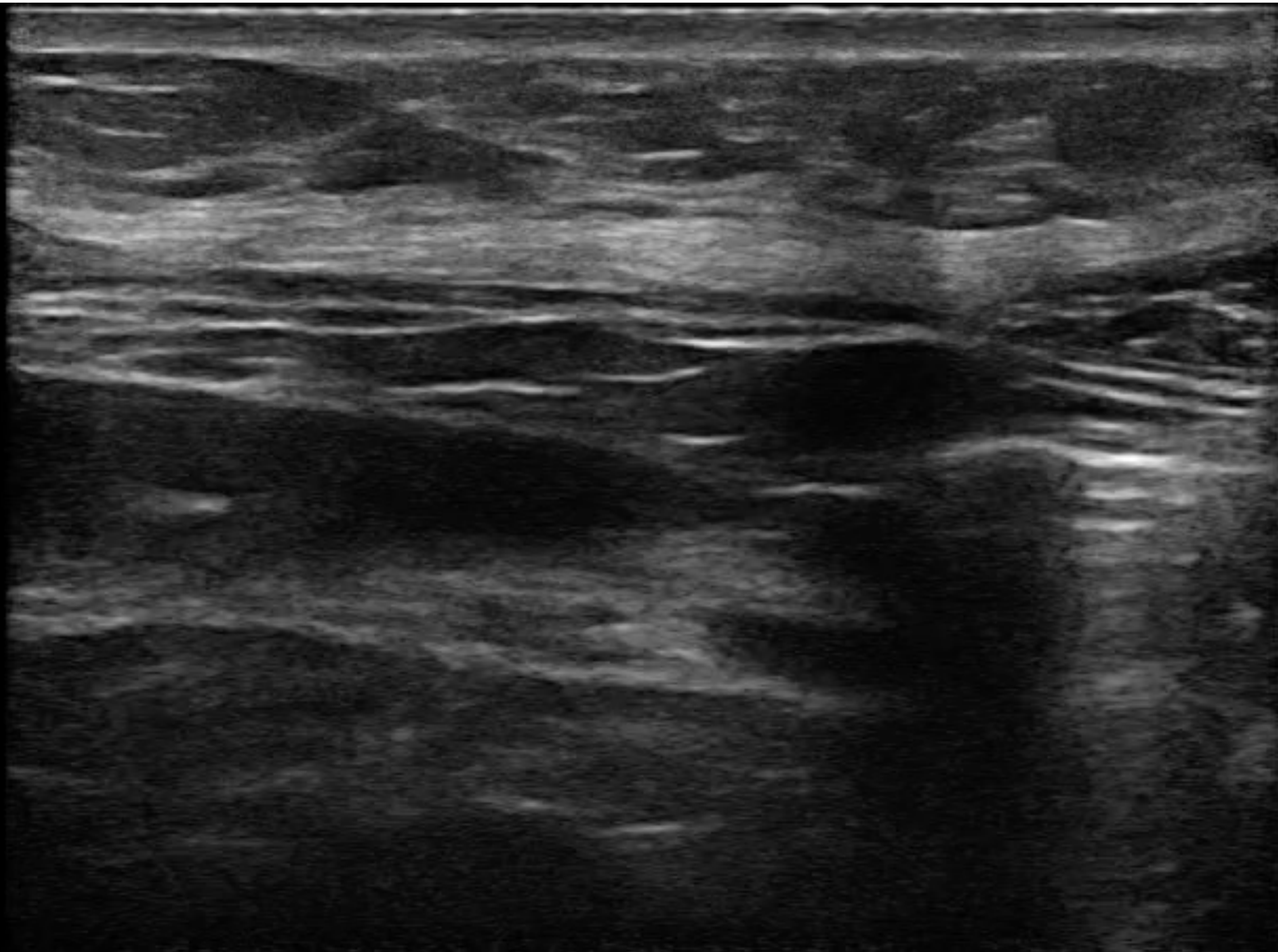
AFTER 6 WEEKS



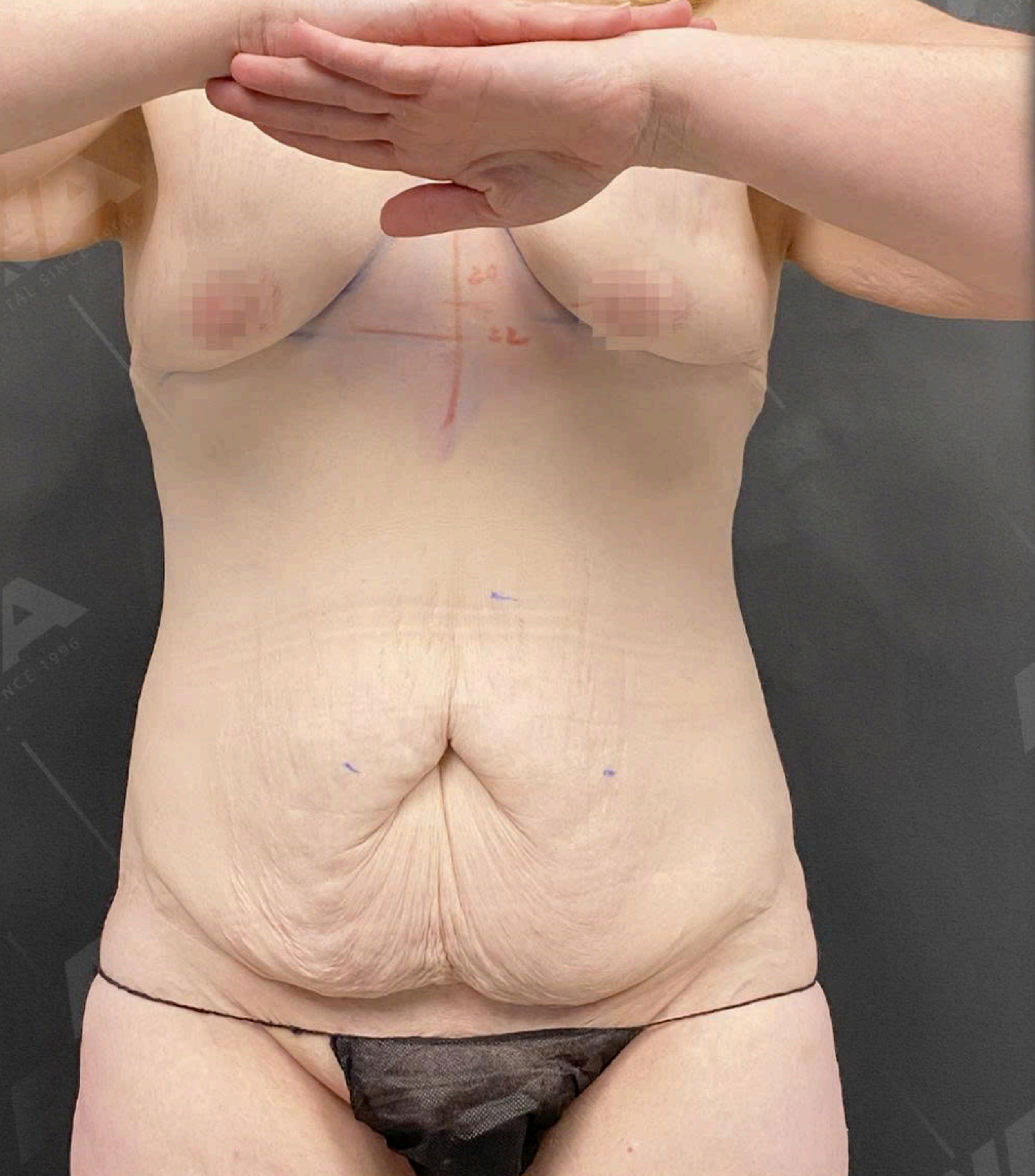
CASE 5 – SAFETY ENHANCEMENT

40 years old female from New Zealand with previous BMI of 40, underwent Laparoscopic Roux en Y two years ago. She has lost nearly 100 kg, currently weight 78 kg. She is now seeking body contour surgery to address her waistline and loose skin.



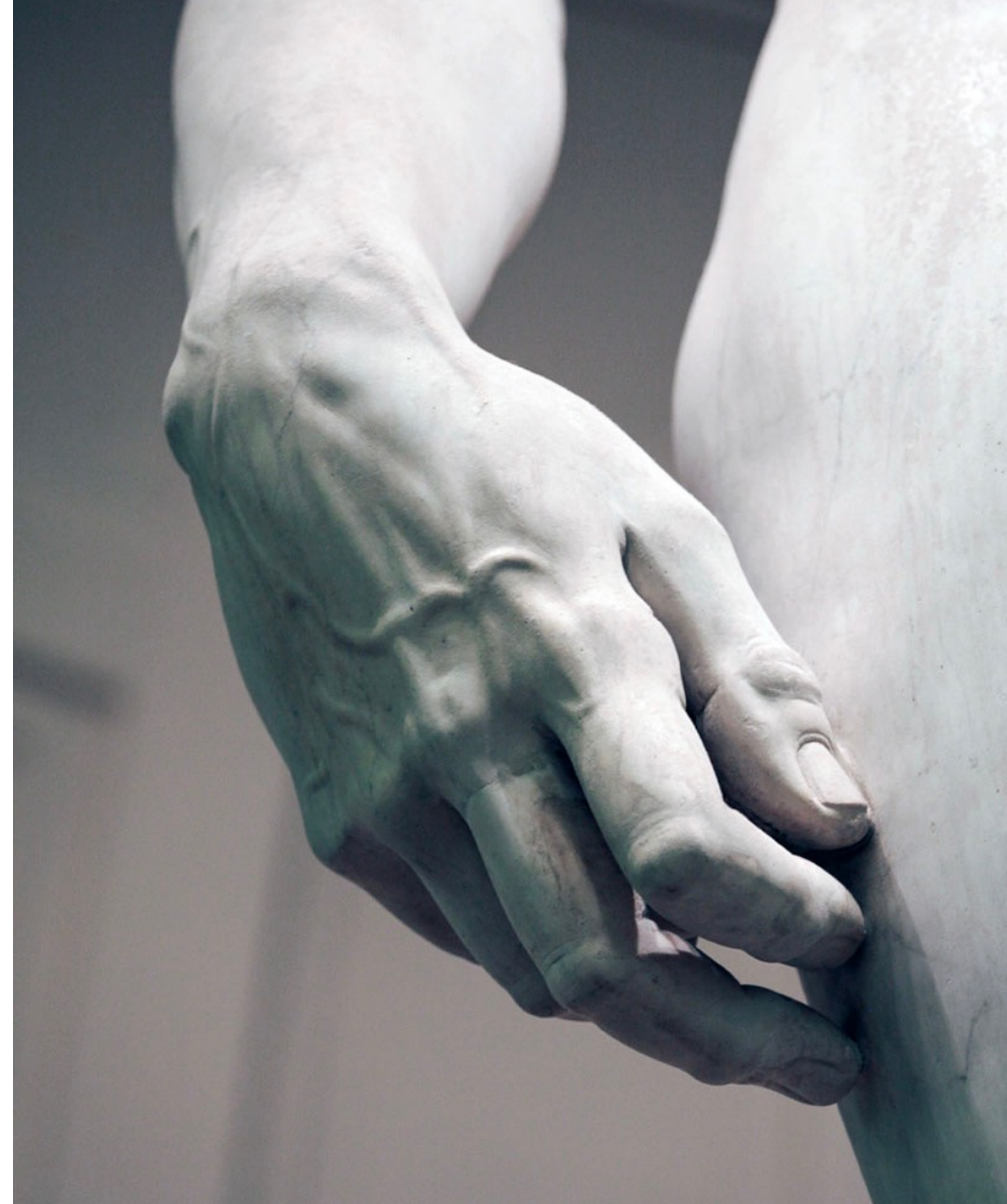


3.7 cm



CONCLUSIONS

1. Full clinical assessment of Diastasis Recti and muscle thickness enables better patient consent and surgical decision making.
2. Preoperative Mapping of vascular structures enables localized and improved tumescent, reduces intraoperative bleeding.
3. Preoperative Assessment of soft tissue and muscle thickness increases surgical safety and surgical precision.



The background of the slide is a faded, light-colored version of Michelangelo's famous fresco, "The Creation of Adam". It depicts Adam on the left, reclining and reaching out with his right arm, and God on the right, reclining and reaching out with his right arm. The two hands are just inches apart, creating a sense of tension and divine spark. The overall tone is soft and artistic, with the fresco's details visible but not overpowering the text.

N o S a f e t y , N o S u r g e r y .

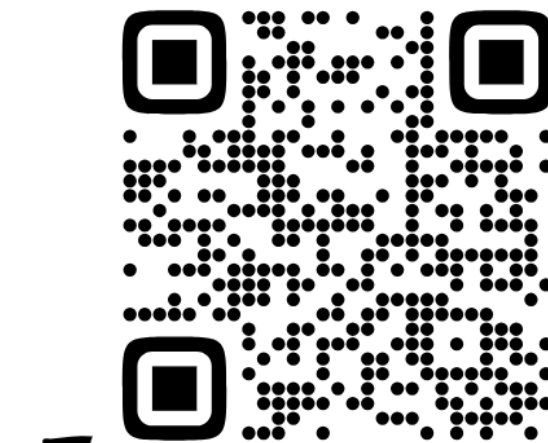
Bedside Ultrasound is an indispensable tool
in creating and maintaining a safety culture
in elective aesthetic surgeries.

P r e c i s i o n E n a b l e s B e t t e r O u t c o m e s .

Bedside and Intra-operative Ultrasound enables better
surgical decision and enhances operative execution to
deliver optimal surgical outcomes for patients.

Thank You!

- IG: khanh.md
- Email: KHANH.NT@VINUNI.EDU.VN



Get In Touch!

Live Demonstration



Janaye Smith, CRGS

Sonographer



What additional
information would
you like?

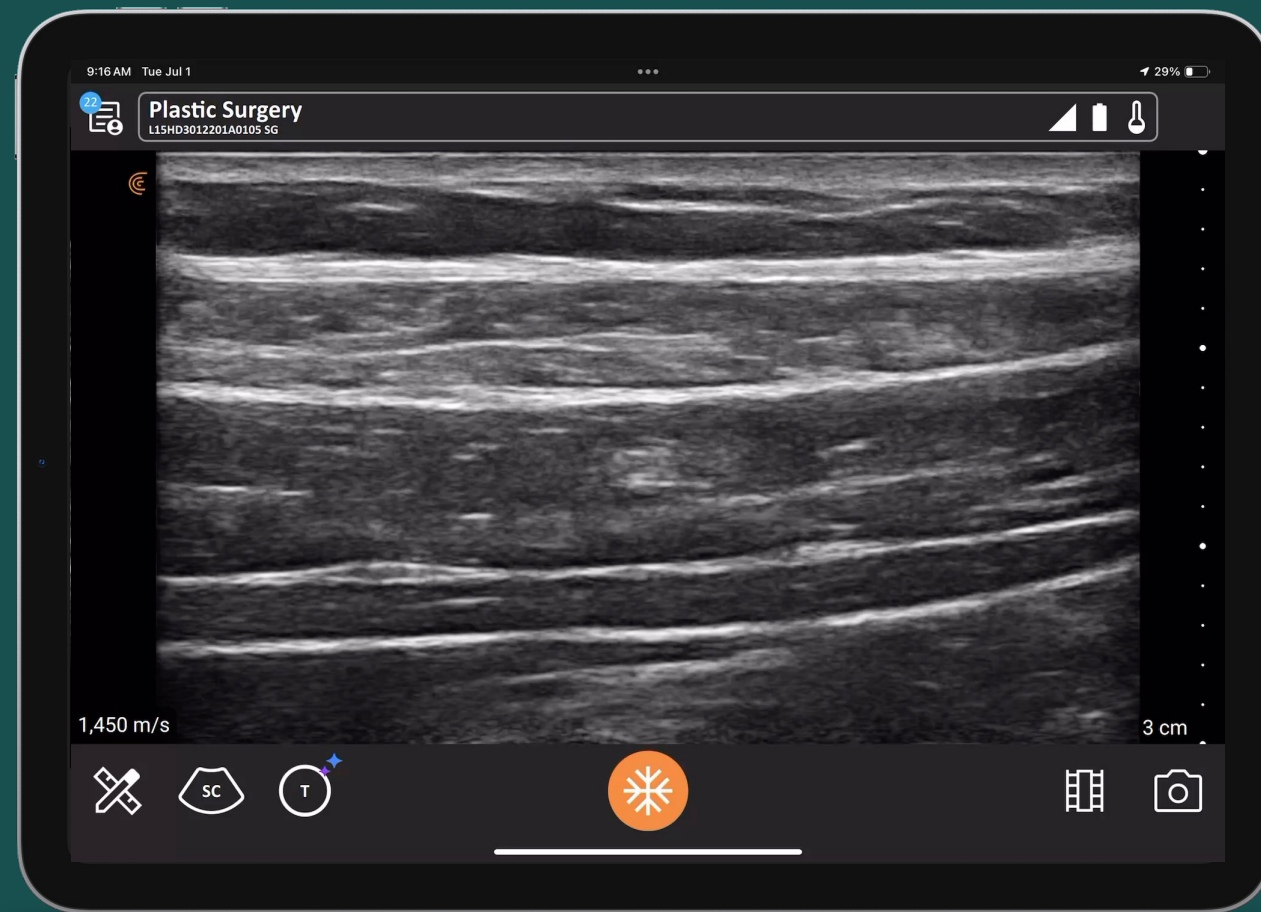
Interactive Poll

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Questions



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