



## SEMINARIO

*Inyecciones eco-guiadas de toxina botulínica: éstos son los pasos para realizar inyecciones faciales y cervicales de manera segura y eficaz*

Marzo 2023



# Su anfitrión



**Jeronimo Maluenda Doñate**

Responsable de desarrollo commercial

# Comparación del marcaje clínico y la inyección ecoguiada de toxina botulínica tipo A en los músculos maseteros para el tratamiento del bruxismo y sus efectos cosméticos

“

El ultrasonido puede ser una herramienta potente para guiar la inyección de toxina botulínica en los músculos maseteros. Puede contribuir a un procedimiento más personalizado, mejores resultados estéticos y ayudar a evitar posibles complicaciones.

Quezada-Gaon N, Wortsman X, Peñaloza O, Carrasco JE. Comparison of clinical marking and ultrasound-guided injection of Botulinum type A toxin into the masseter muscles for treating bruxism and its cosmetic effects. *J Cosmet Dermatol.* 2016 Sep;15(3):238-44. doi: 10.1111/jocd.12208. Epub 2016 Jan 22. PMID: 26799545.

The image shows a screenshot of a PubMed search result page. At the top, the PubMed logo is visible on the left, and a search bar on the right contains the text 'ultrasound guided botulinum injections aesthetics'. Below the search bar, there are buttons for 'Save', 'Email', and 'Send'. The search results section shows the article title, authors, and abstract. The article title is 'Comparison of clinical marking and ultrasound-guided injection of Botulinum type A toxin into the masseter muscles for treating bruxism and its cosmetic effects'. The authors listed are Natacha Quezada-Gaon, Ximena Wortsman, Osvaldo Peñaloza, and Juan Eduardo Carrasco. The abstract section is titled 'Abstract' and contains the following text: 'Background: Botulinum toxin type A has been used for treating the hypertrophy of the masseter muscles and its cosmetic effects. Ultrasound is increasingly used in dermatology, along with the guidance of mini-invasive procedures. Aims: To evaluate the role of ultrasound for guiding the application of Botulinum A toxin in patients with cosmetic alterations due to bruxism, correlate the clinical landmarks with the ultrasound findings, and study the effect on the symptoms, cosmetics, and quality of life. Patients/methods: Twenty individuals with bruxism and cosmetic alterations underwent an ultrasound-guided injection of Botulinum toxin type A in each masseter muscle. Clinical and ultrasound marking of the procedure was compared. Clinical and sonographic evaluation was performed at the time of injection and 3 months later. Ten normal individuals underwent ultrasound of the masseter muscles as a control group. Results: Up to 65% of individuals showed anatomical variants of the salivary glands. The method for clinically marking the skin showed a frequently erroneous location of the anterior point (up to 40% of cases) that was proven by ultrasound to be out of the muscle. In 20% of cases, ultrasound showed that the needle should be longer to enter the muscle. After injection, most of the patients demonstrated a decrease of the symptoms and cosmetic and quality of life improvements. Conclusions: Ultrasound can be a potent tool for guiding the injection of Botulinum toxin into the masseter muscles. It may contribute to a more personalized procedure, better cosmetic results, and help to avoid potential complications. Keywords: botulinum toxin; botulinum toxin ultrasound; bruxism; cosmetic procedures; cosmetic ultrasound; dermatologic ultrasound; skin imaging; skin ultrasound; ultrasound; ultrasound'.

# Los músculos "visibles" en el ultrasonido hacen que la inyección de toxina botulínica sea más precisa: una revisión sistemática

“

La inyección a ciegas no puede tener en cuenta las variaciones anatómicas individuales, que es el principal factor que contribuye a las complicaciones. Se introdujeron las imágenes por ultrasonido (US) para reducir las complicaciones y mejorar los efectos.

Li Z, Yang Y, Yu N, Zhou W, Li Z, Chong Y, Zhang Y, Wang HC, Chen C, Long X, Wang X. The "Visible" Muscles on Ultrasound Imaging Make Botulinum Toxin Injection More Precise: A Systematic Review. *Aesthetic Plast Surg.* 2022 Feb;46(1):406-418. doi: 10.1007/s00266-021-02493-z. Epub 2021 Aug 2. PMID: 34341856.

The image shows a screenshot of a PubMed search result page. At the top, the NIH logo and 'National Library of Medicine' are visible. The search bar contains the text 'ultrasound guided botulinum injections aesthetic' and the word 'Advanced' is below it. The search results section shows a single result for a review article. The title is 'The "Visible" Muscles on Ultrasound Imaging Make Botulinum Toxin Injection More Precise: A Systematic Review'. The authors listed are Zhijin Li, Yanlong Yang, Nanze Yu, Wenzhe Zhou, Zirong Li, Yuming Chong, Yuwei Zhang, Hayson Chenyu Wang, Cheng Chen, Xiao Long, and Xiaojun Wang. The journal is 'Aesthetic Plast Surg.' from 2022, volume 46, issue 1, pages 406-418. The DOI is 10.1007/s00266-021-02493-z. The abstract is visible, starting with 'Background: Botulinum toxin (BoNT) injection is the most commonly performed procedure in cosmetic surgery. However, blind injection is unable to take individual anatomical variations into consideration, which is the main contributing factor to complications. Ultrasound (US) imaging was introduced to reduce complications and improve effects. This article will review uses of US in aesthetic BoNT injection.' The method section states 'A systematic electronic search was performed using the PubMed, MEDLINE, Web of science. Search terms were set to focus on aesthetic BoNT injection. Two independent reviewers subsequently reviewed the resultant articles based on strict inclusion and exclusion criteria. Selected manuscripts were analysed and grouped by procedure categories. Clinical cases were all performed by one plastic surgeon in our department.' The results section states 'The search finally retained 24 articles. Five procedural categories were identified, including masseter (n = 16), frontalis (n = 2), glabella complex (n = 2), trapezius (n=1), and gastrocnemius (n = 3). US imaging is practical and instructive for pre-operative assessments as in needle-type selection, injection point localization and depth setting, as well as post-operative follow-ups regarding injection feedback (for instance, the extent of muscle volume decreases). What's more, ultrasound-guided injection makes needle trajectory visualized so as for the needle to reach the target muscle in avoidance of potential damage to neurovascular bundle, gland or adjacent muscle.' The conclusion states 'Muscles, such as masseter, frontalis, glabella complex, trapezius and gastrocnemius,

# Su orador invitado experto



## **Dra. Karina Ravera, MD**

Médica Especialista en Diagnóstico por Imágenes

Post grado en Medicina Estética



## **Inyecciones ecoguiadas de toxina botulínica en cara y cuello**

Aprenda los **tratamientos eficaces y seguros**

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- Directora Medica de Ultraskinus , plataforma de aprendizaje de Ecografía Cutánea e Intervencionismo Percutáneo
- Scientific advisor Dermica Laboratoires
- Docente Master Medicina Estética Universidad Católica de Valencia
- Miembro European Medical College



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## Top five minimally invasive cosmetic procedures patients are seeking in 2021-22

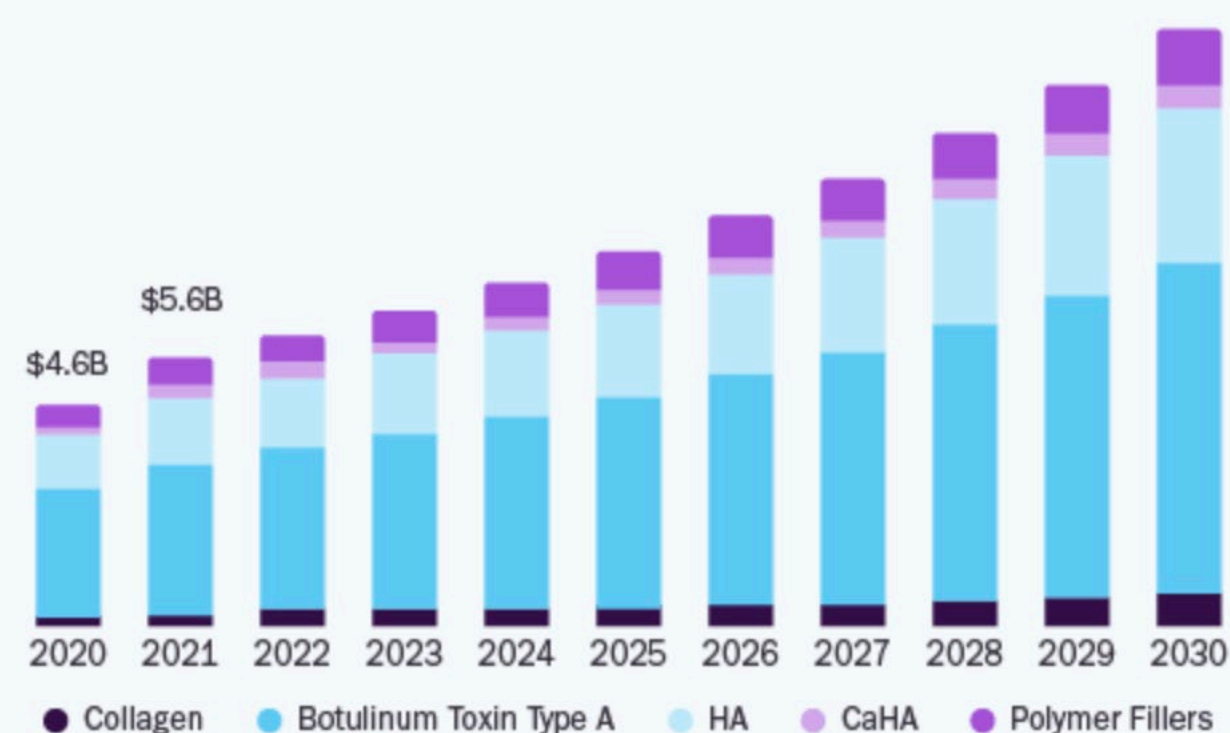
Responses reflect both procedures completed and consults provided for scheduled procedures which will be completed before the end of the year.

### TOP 5 MINIMALLY INVASIVE PROCEDURES

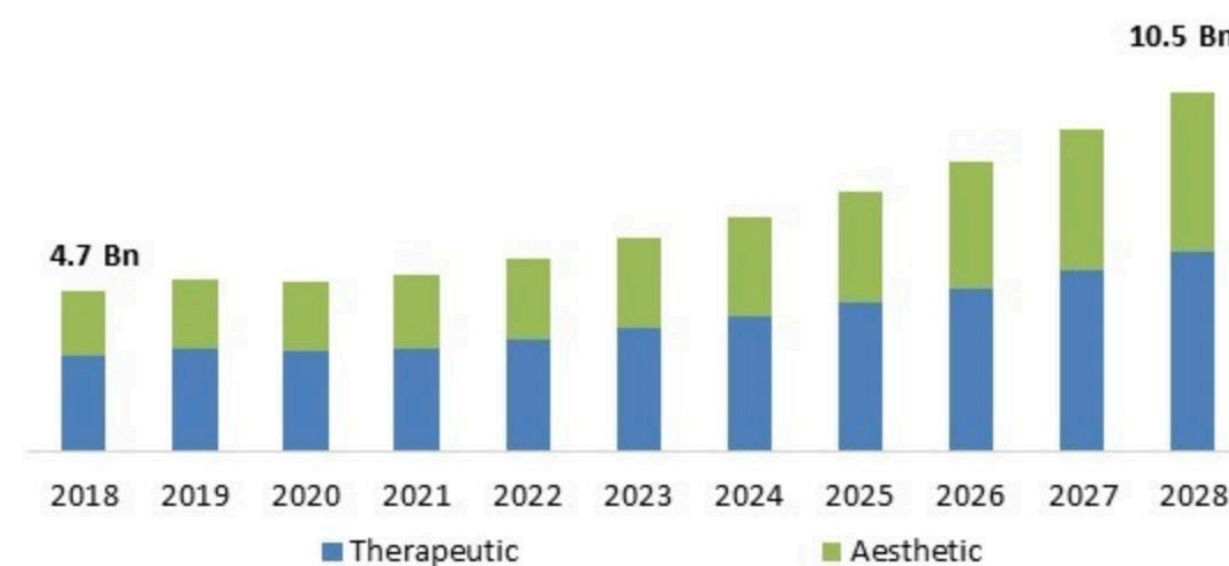
- 1 Botulinum Toxin Type A
- 2 Soft Tissue Fillers
- 3 Noninvasive Fat Reduction
- 4 Nonsurgical Skin Tightening

#### U.S. Facial Injectable Market

size, by product, 2020 - 2030 (USD Billion)



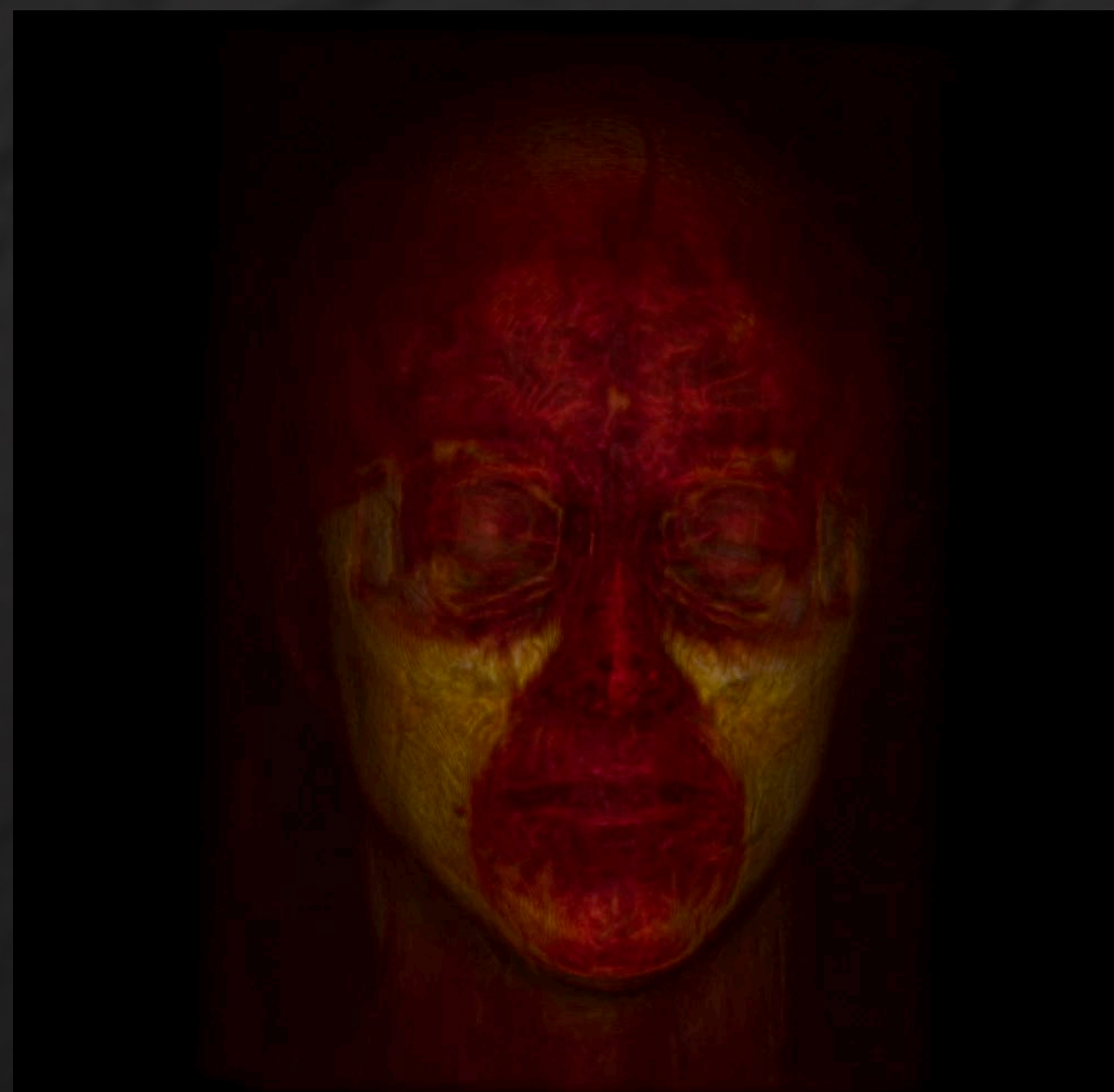
#### Botulinum Toxin Market Size, By Application, 2018 - 2028



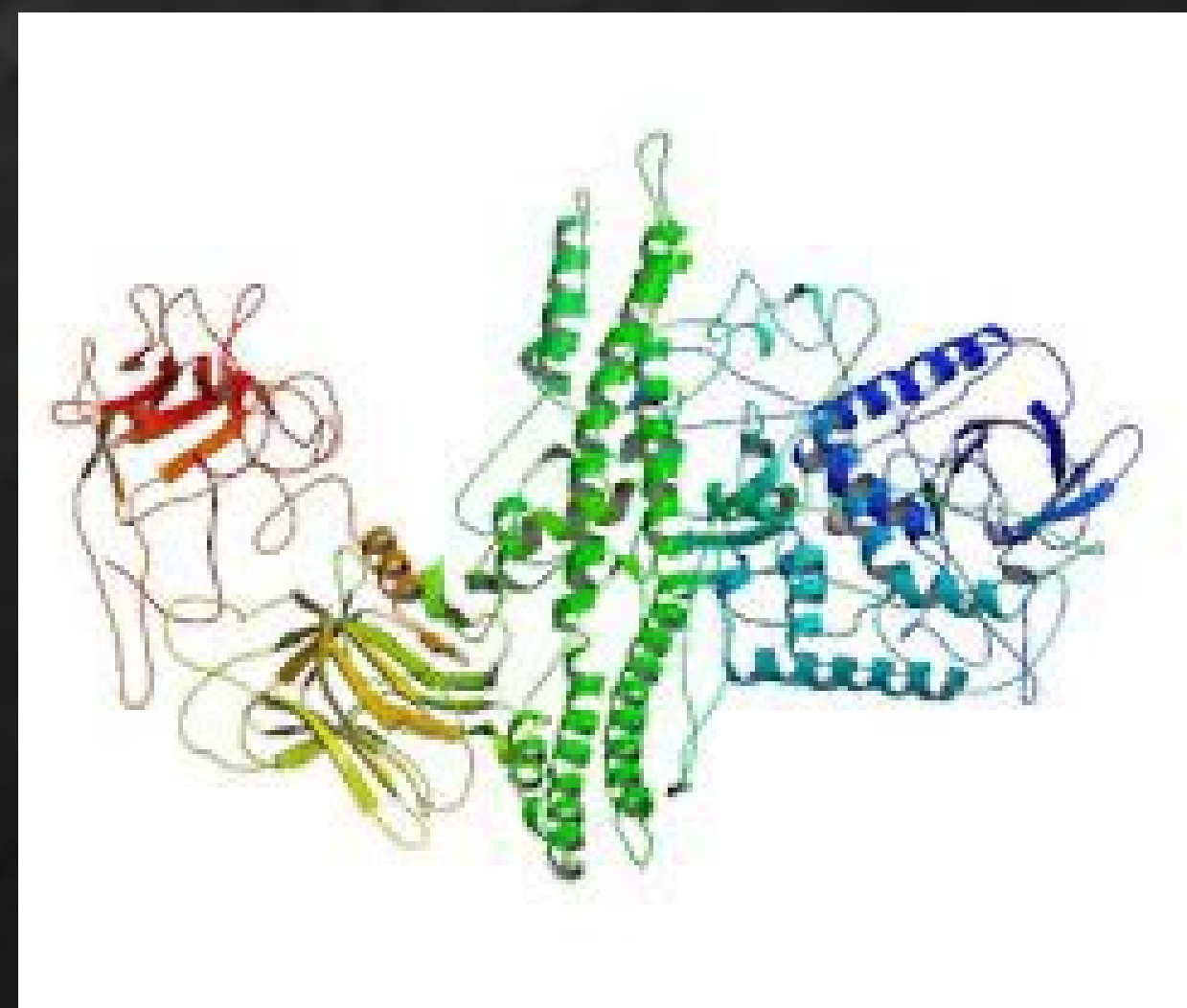


La **quimiodenervación ecoguiada** con US de alta resolución en los músculos cérico-faciales.

Es de importancia fundamental para lograr **tratamientos seguros y eficaces.**



Palpación  
EMG  
EEM  
CT  
MRI  
Fluoroscopia



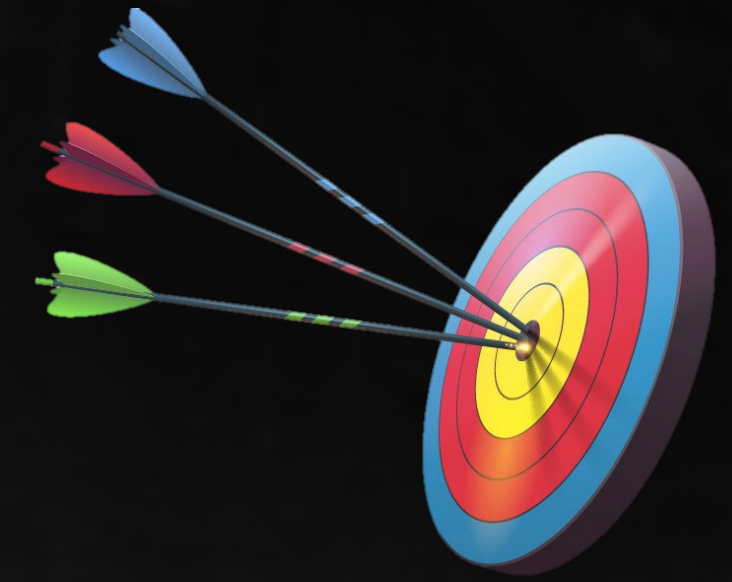
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# Objetivos terapéuticos

**1- EFICACIA**

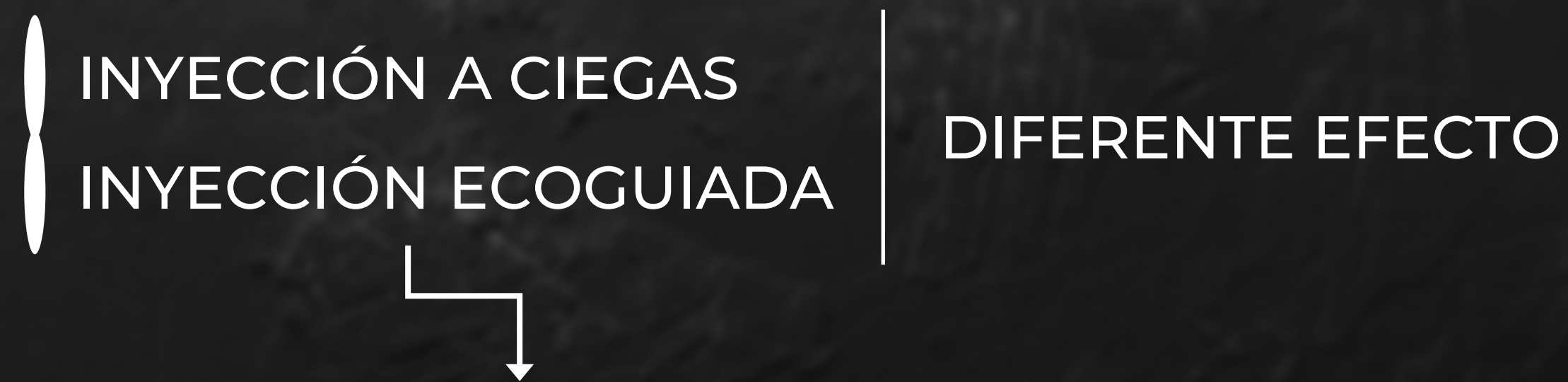
**2- SEGURIDAD**



# Concepto: Inyecciones ecoguiadas de Toxina Botulínica

## 1- EFICACIA

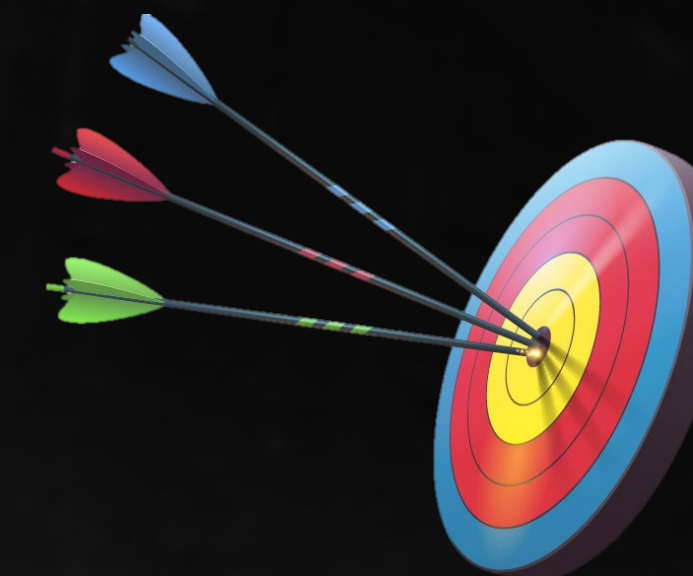
Latín efficacia , es la capacidad de alcanzar un efecto tras la realización de una acción.



Las **inyecciones ecoguiadas de TB** incrementan la **eficacia** terapéutica  
Porque se inocular con **precisión milimétrica y sublimétrica**

# Concepto:

## Inyecciones ecoguiadas de Toxina Botulínica



### 1- SEGURIDAD

Evitar o reducir daños asociados a un acto en sí

#### 1- INYECCIÓN A CIEGAS

##### 1- INYECCIÓN POR FUERA DEL OBJETIVO: A- NO EFECTO TERAPÉUTICO

Menor efecto terapéutico pues tendremos una dosis menor en el sitio deseado. **MENOR EFICACIA**

##### B- EFECTOS ADVERSOS

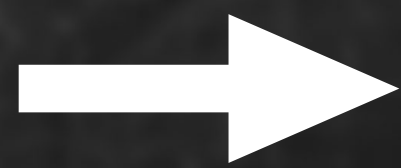
Debido a la acción de la toxina en otra estructura anatómica diferente a la buscada **MENOR SEGURIDAD**

#### 1- INYECCIÓN ECOGUIADA



INOCULAR EN EL SITIO DIANA  
SEGURIDAD  
EFICACIA  
DOSIS CORRECTA





# Índice

- 1- Inyección ecoguiada de toxina botulínica en el músculo **Elevador del Labio superior y Alequae Nasi** (ELSAN)
- 2- Inyección ecoguiada de toxina botulínica en el **Masetero**
- 3- Inyección ecoguiada de toxina botulínica en el **DAO** (Depresor Anguli Oris)
- 4- Inyección ecoguiada de toxina botulínica en el **Platisma**
- 5- Inyección ecoguiada de toxina botulínica en el músculo **Mentalis**

1- Inyección ecoguiada de toxina botulínica en el músculo **Elevador del Labio superior y Alequae Nasi** (ELSAN)

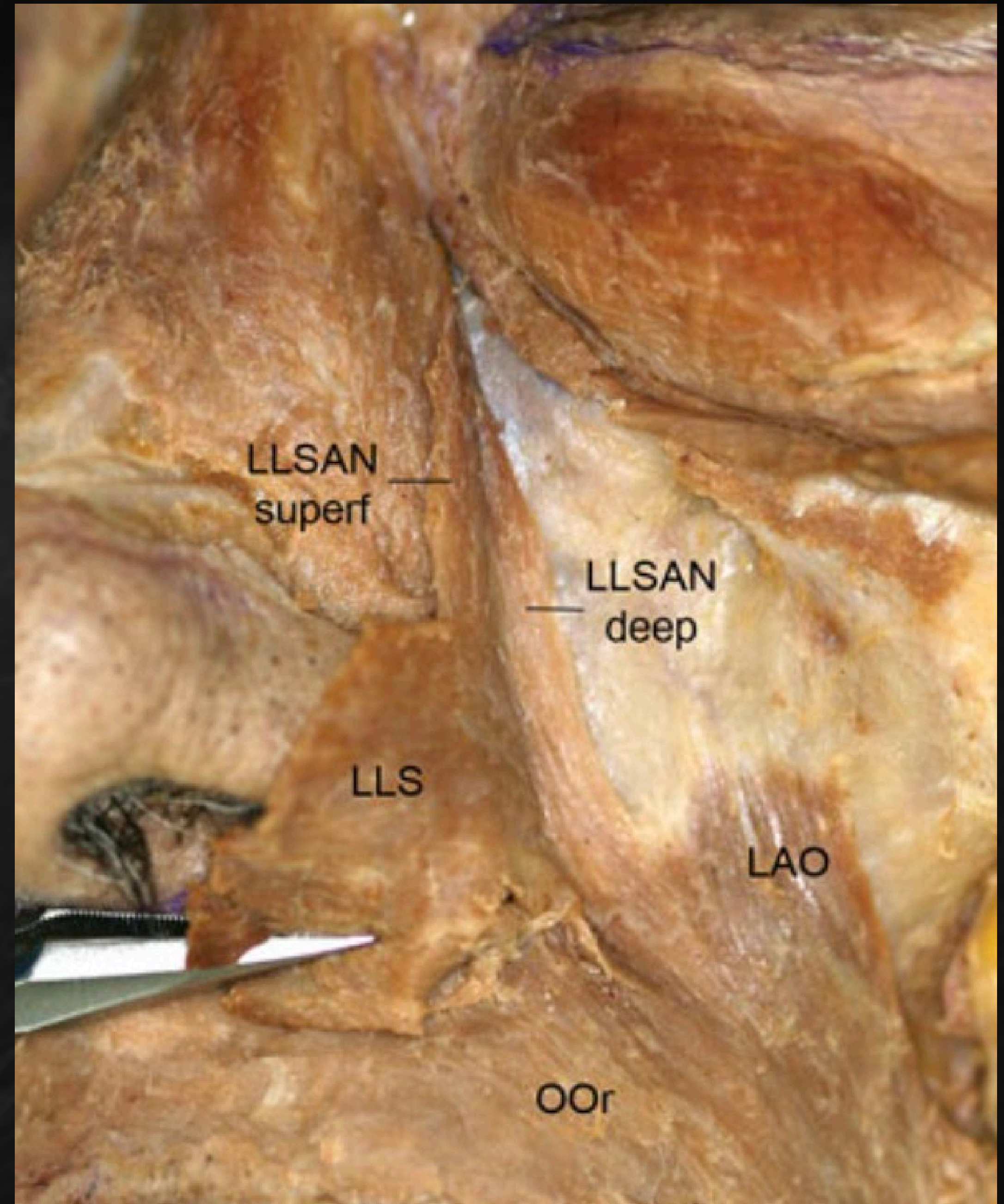
**New anatomical insight of the levator labii superioris alaeque nasi and the transverse part of the nasalis**

M S Hur<sup>1</sup>, K S Hu, J T Park, K H Youn, H J Kim

DOS VERTIENTES MUSCULARES:

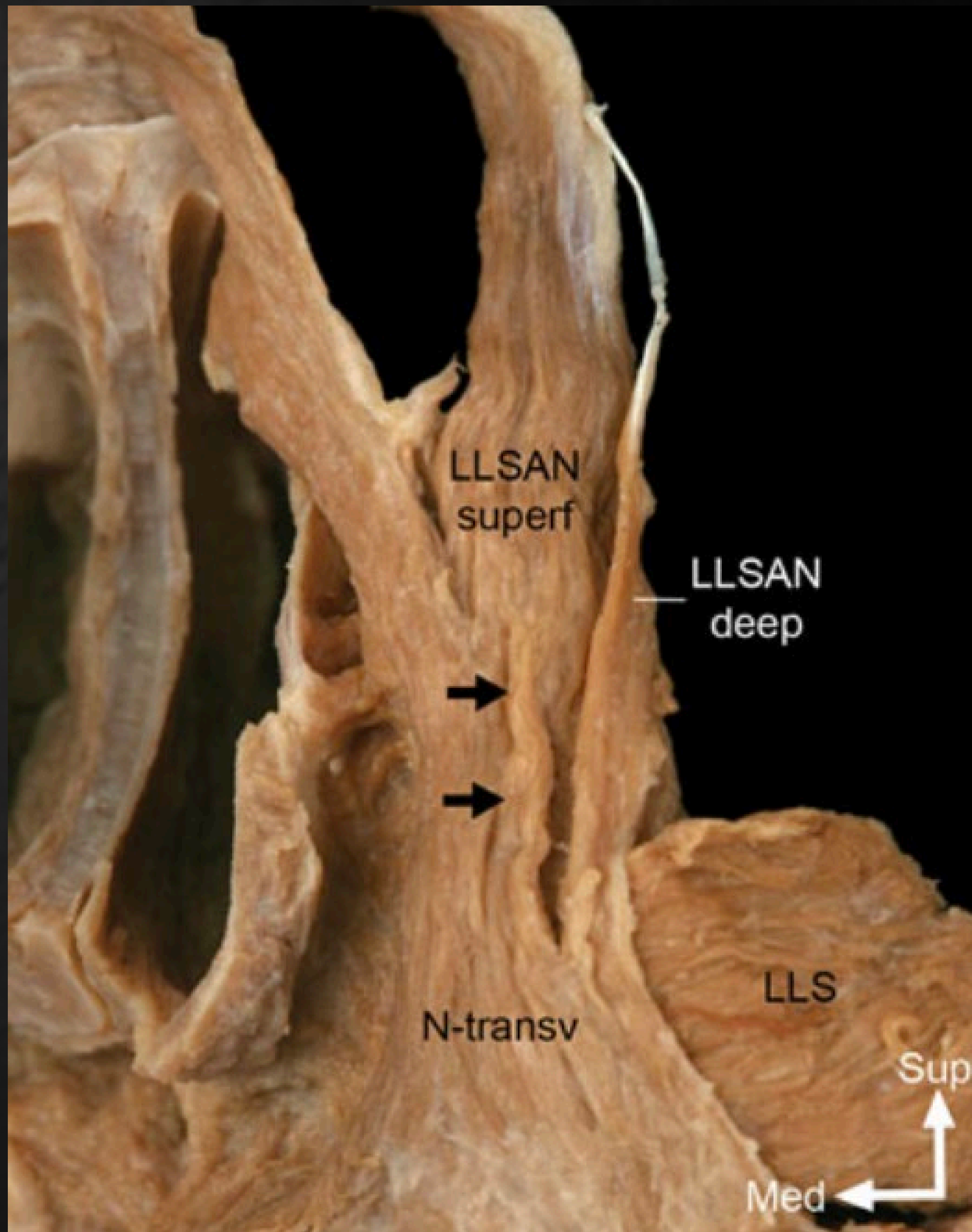
A- SUPERFICIAL

B- PROFUNDO



**Fig. 1** Photograph showing the deep layer of levator labii superioris alaeque nasi (*LLSAN deep*). The *LLSAN deep* originates from the superficial layer of *LLSAN superf* and the maxilla, and inserts between the levator anguli oris (*LAO*) and the orbicularis oris muscles (*OOr*). The levator labii superioris (*LLS*) and the *LLSAN superf* are reflected to reveal the *LLSAN deep*

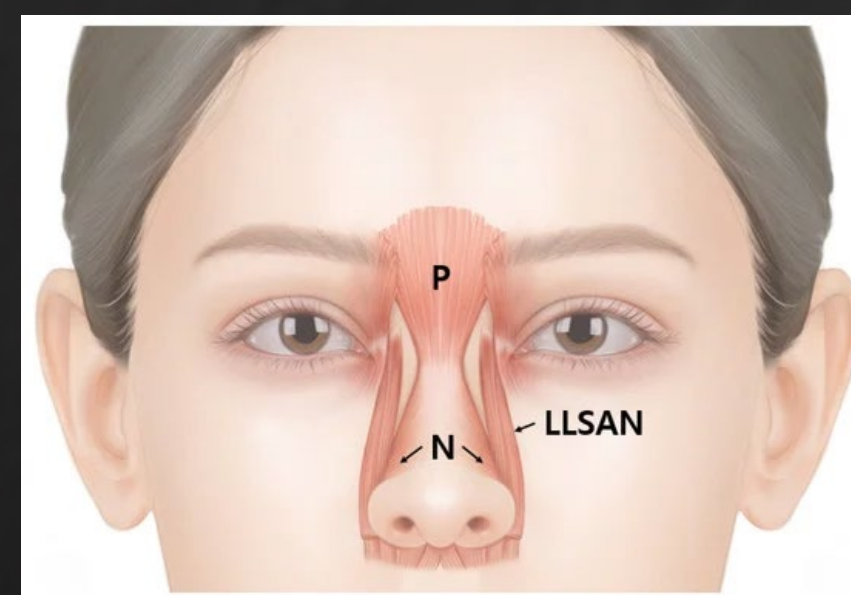






## Novel Anatomical Guidelines on Botulinum Neurotoxin Injection for Wrinkles in the Nose Region

by [Kyu-Ho Yi](#)<sup>1,2</sup>, [Ji-Hyun Lee](#)<sup>2</sup>, [Hye-Won Hu](#)<sup>2</sup> and [Hee-Jin Kim](#)<sup>2,\*</sup>



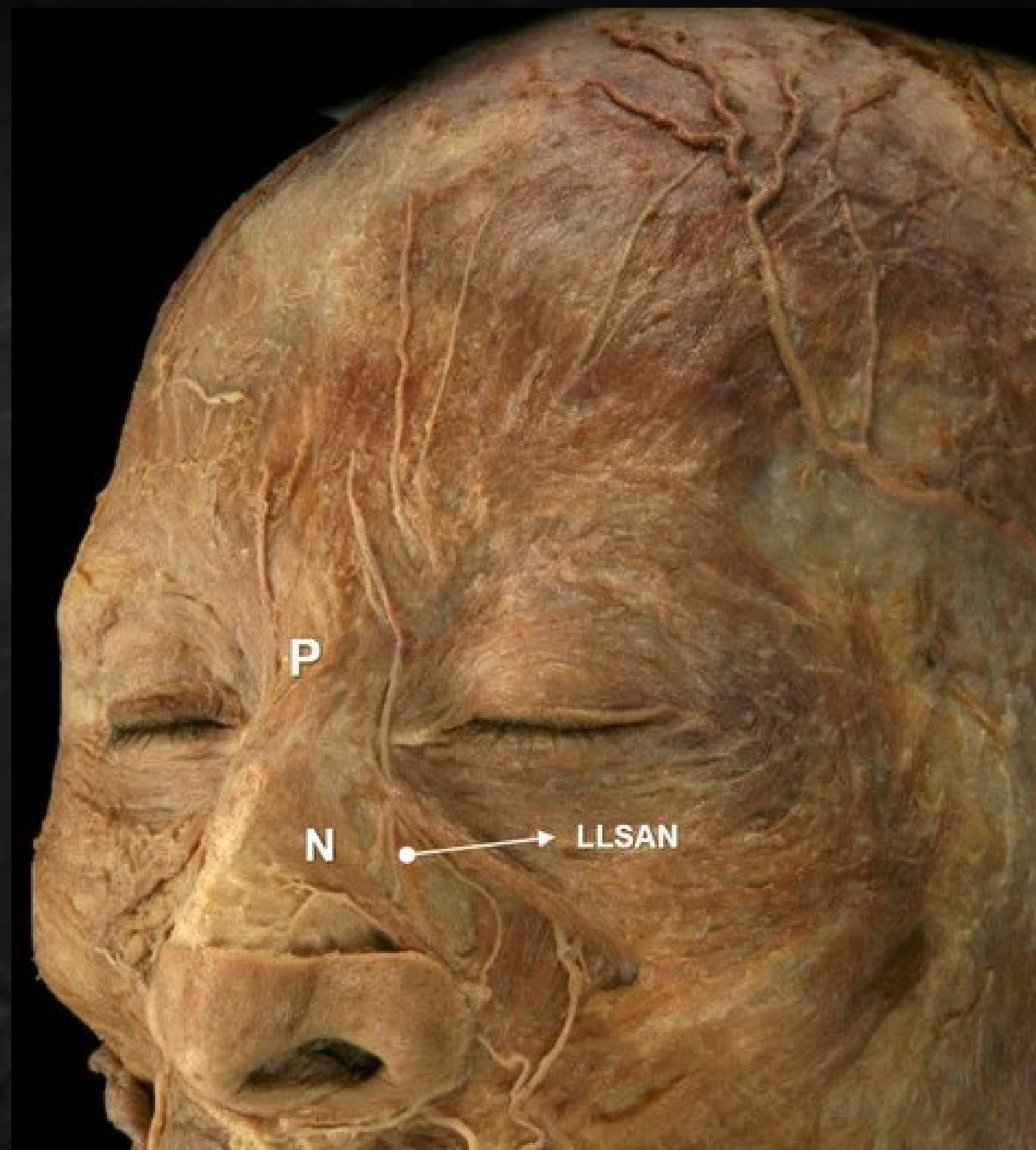
Deep belly



Sup belly

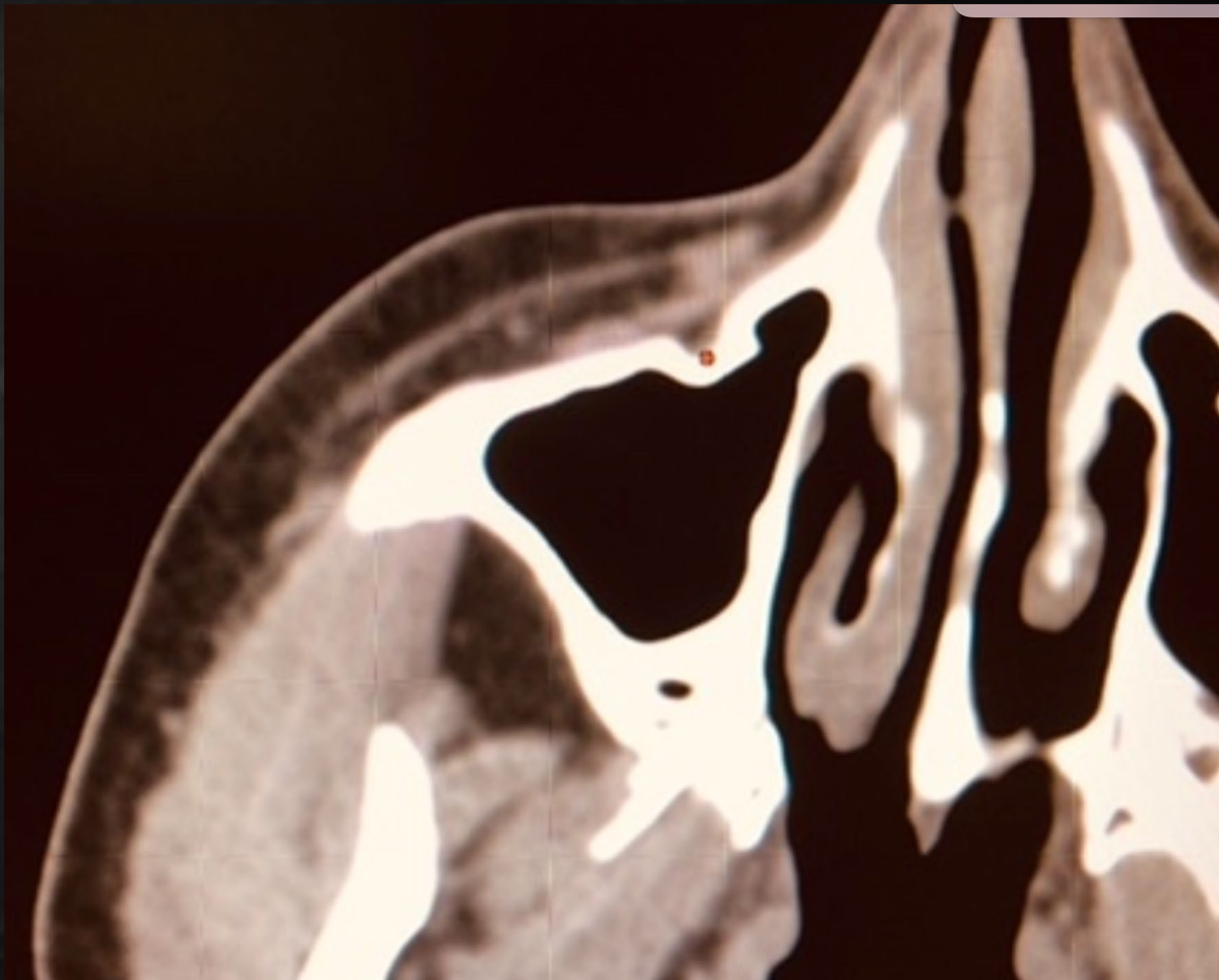
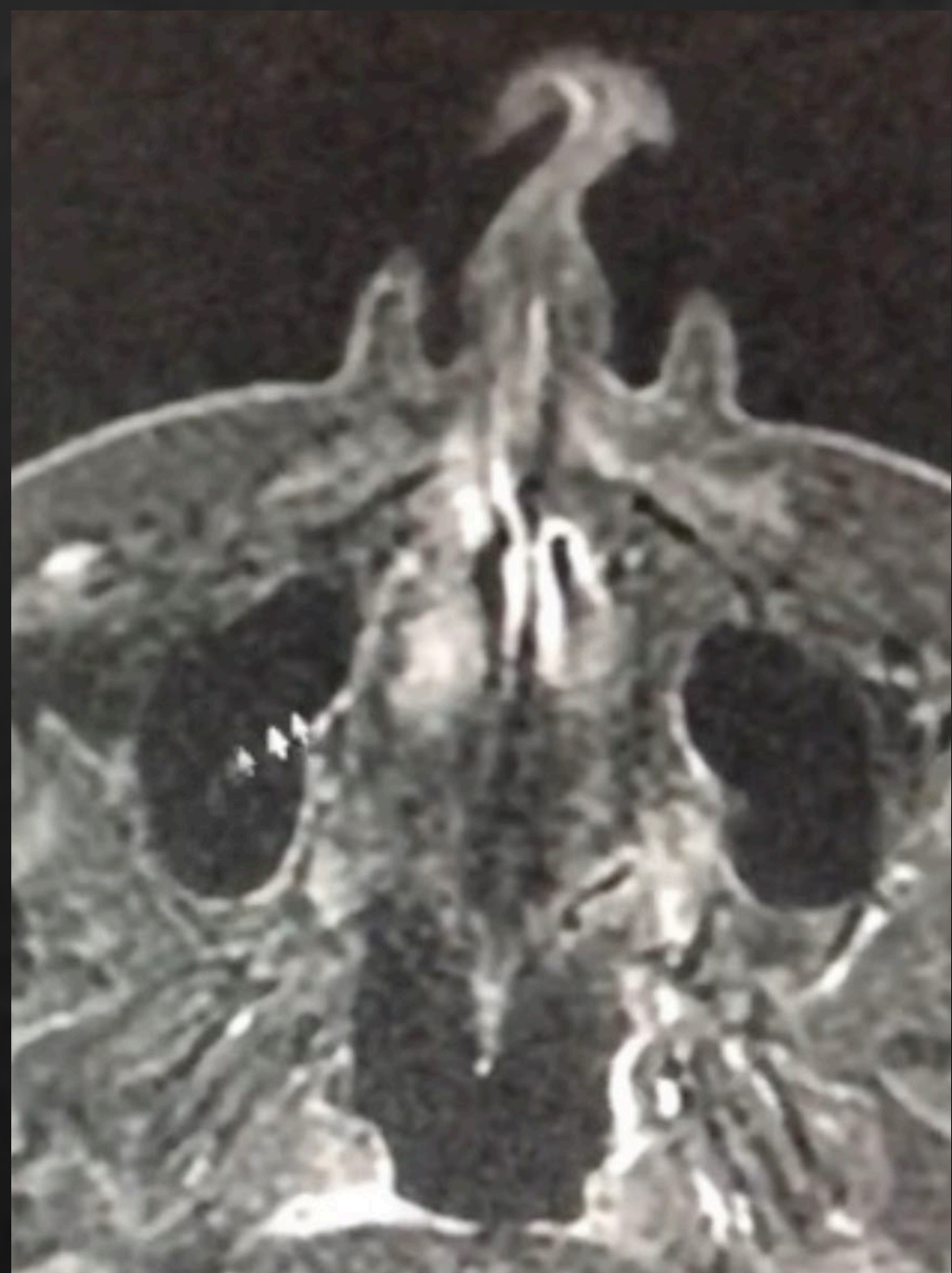


LLS



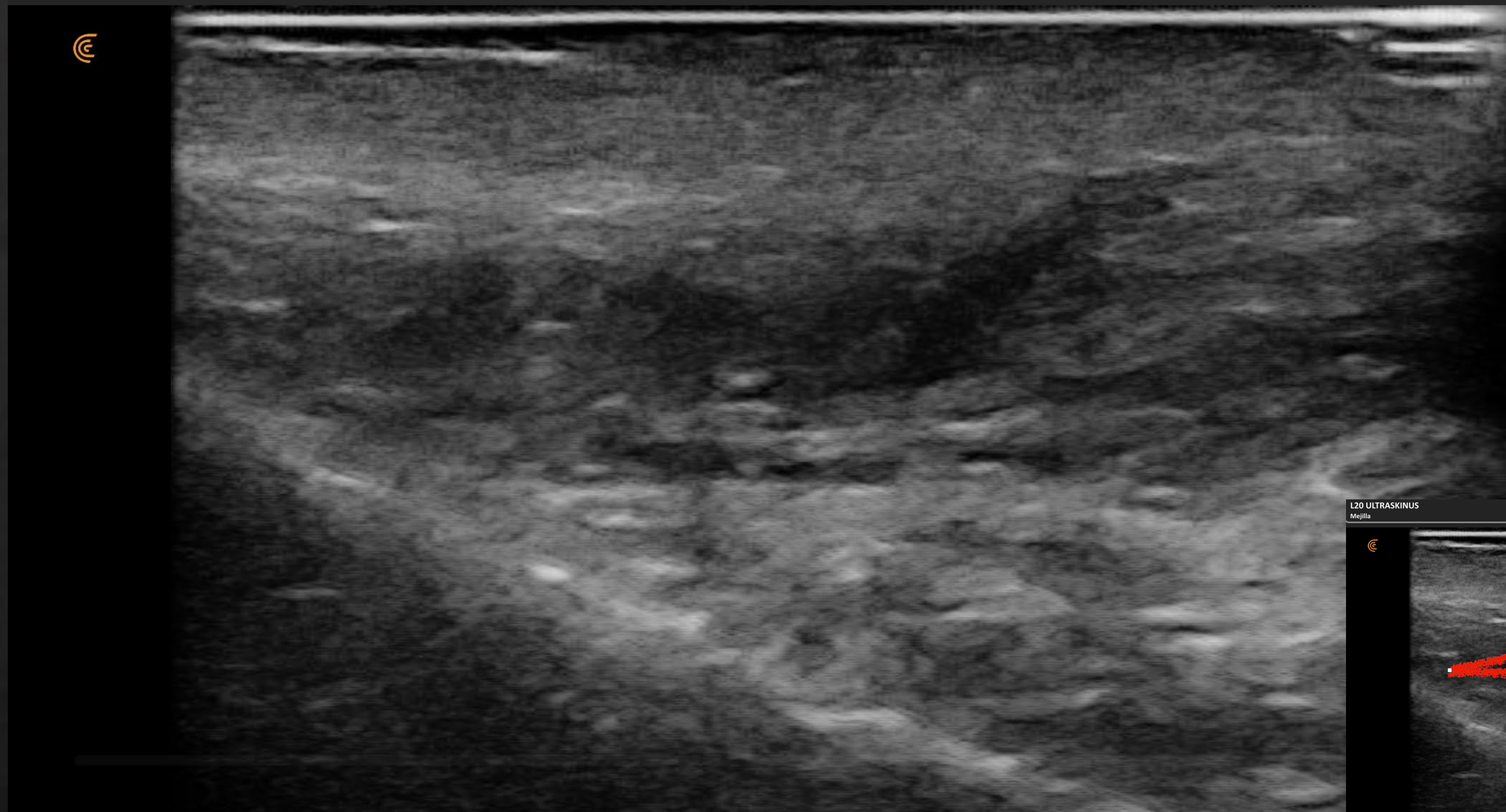
### 2.3. Levator Labii Superioris Alaeque Nasi Muscle

The levator labii superioris alaeque nasi muscle is a long running muscle originating in the maxillary frontal process, and involves the nasal ala and upper lip [29]. The levator labii superioris alaeque nasi muscle can be divided into deep and superficial bellies [30]. The deep belly runs deep to the levator labii superioris muscle, whereas the superficial belly runs superficial to the levator labii superioris muscle [29].

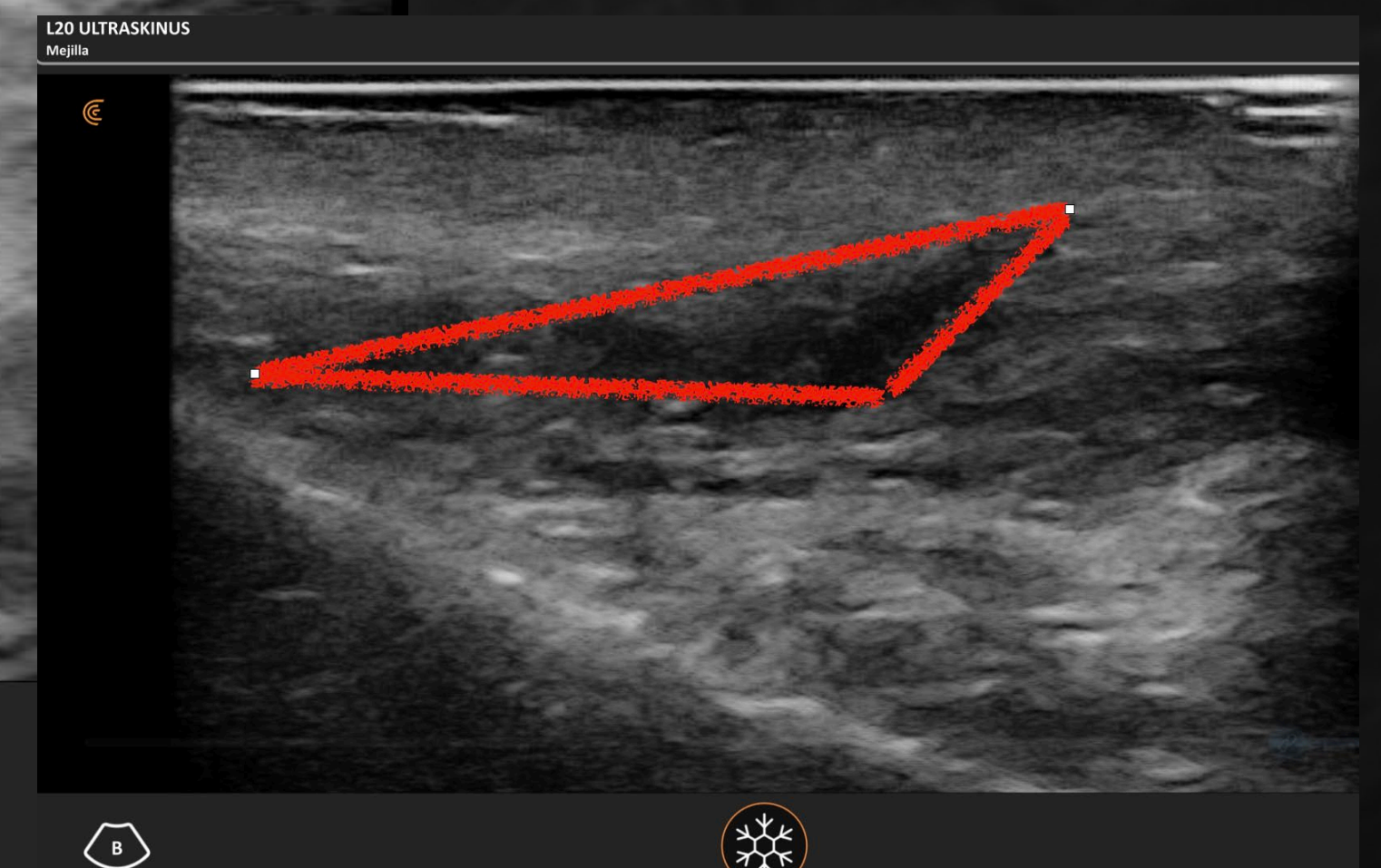


# Anatomía ecográfica del LLSAN Corte longitudinal

L20 ULTRASKINUS  
Mejilla



S  
Ce Ca  
I

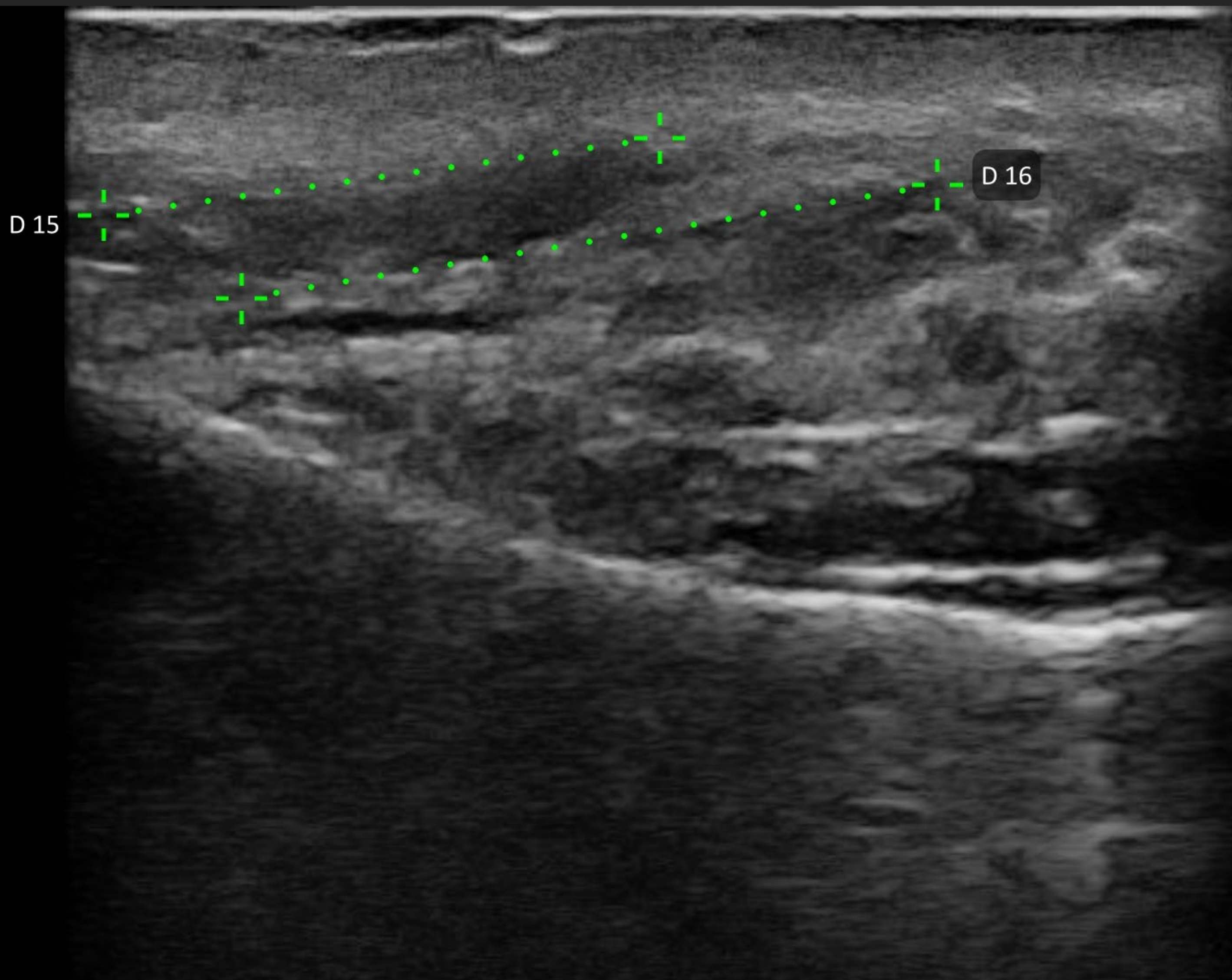




L20 ULTRASKINUS  
Infraorbitario

D 15 11,92 mm (X) (C)

D 16 14,97 mm (X)

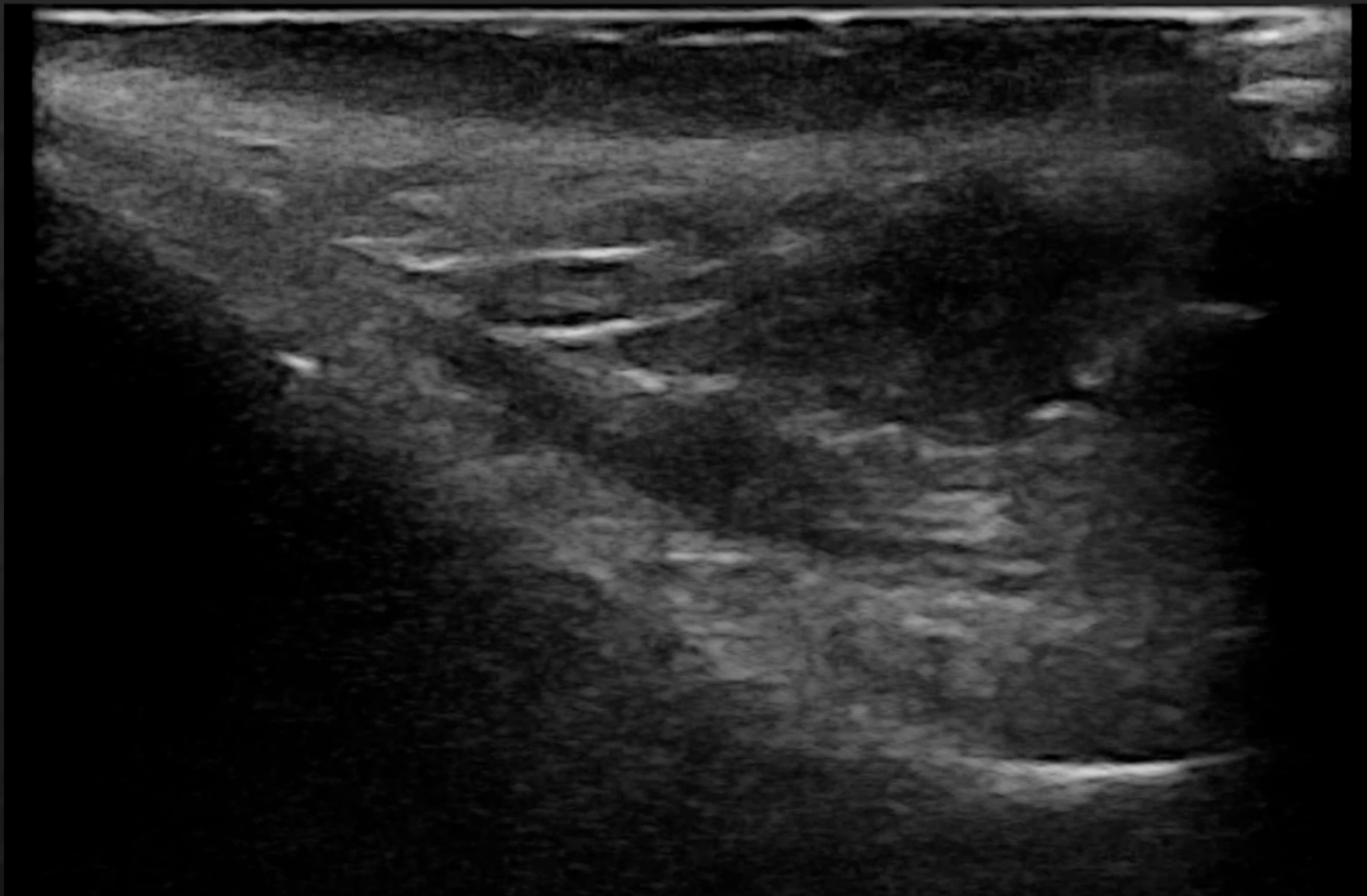


# Anatomía ecográfica del LLSAN Corte longitudinal dinámica muscular



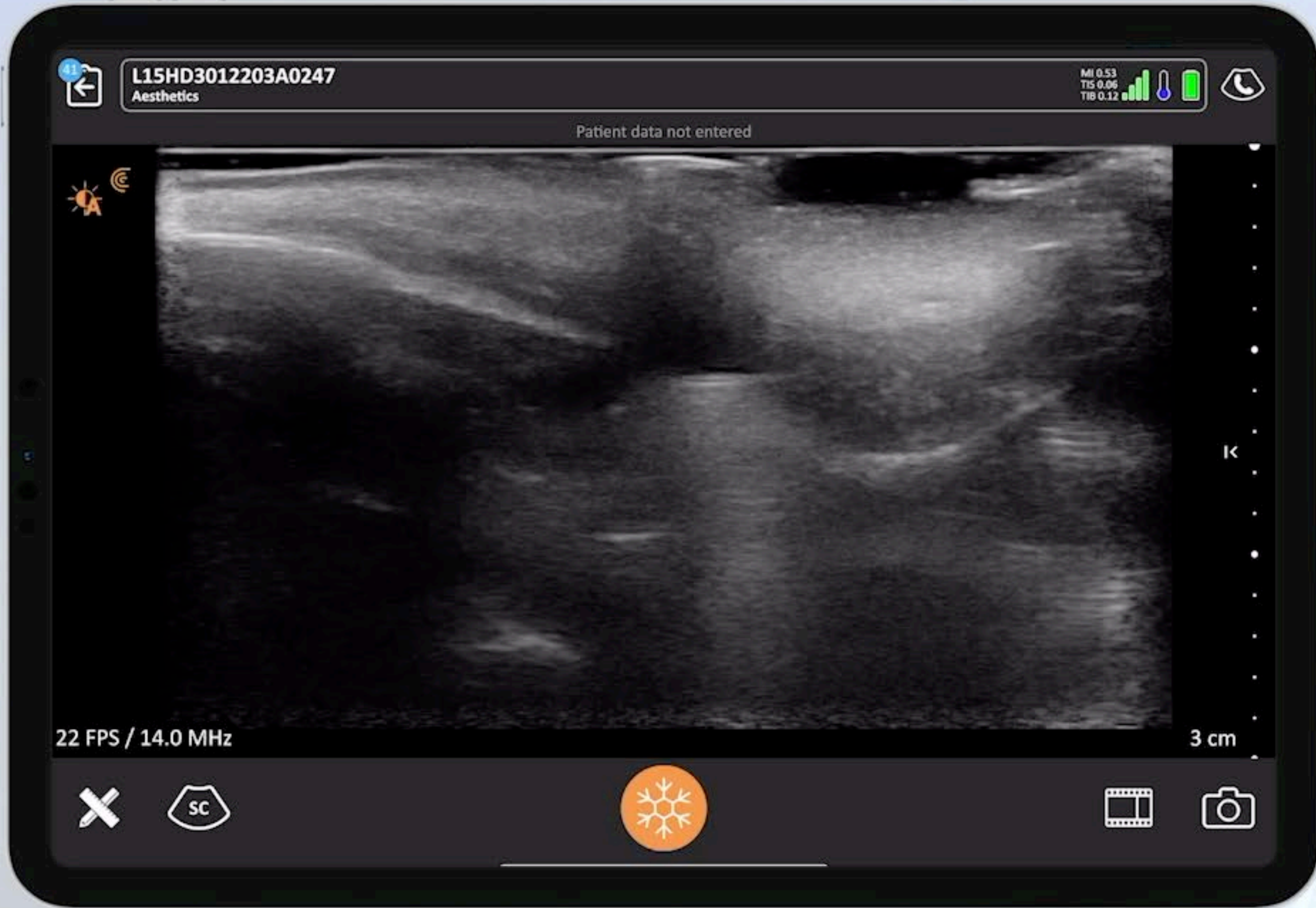
S  
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I



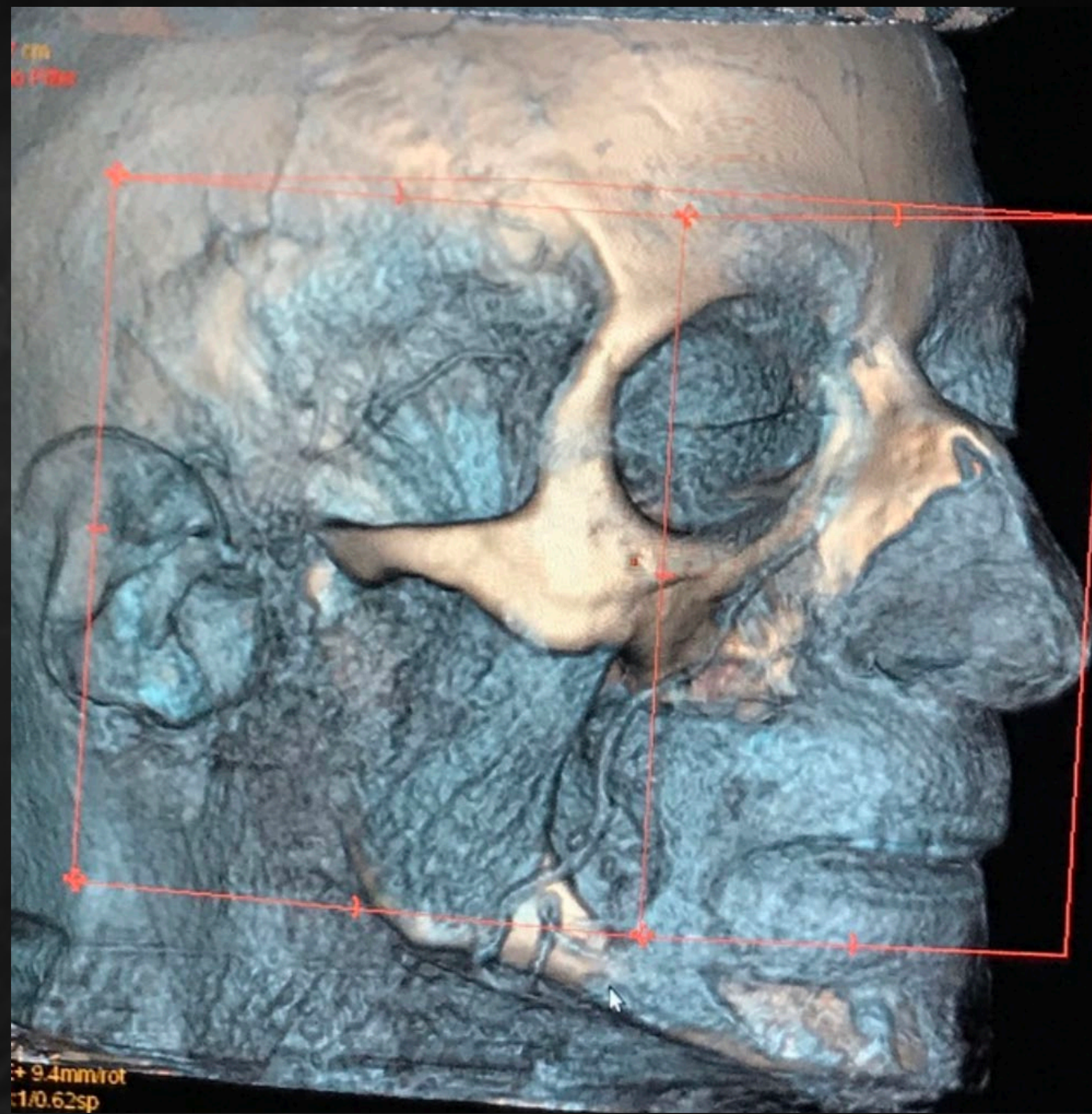
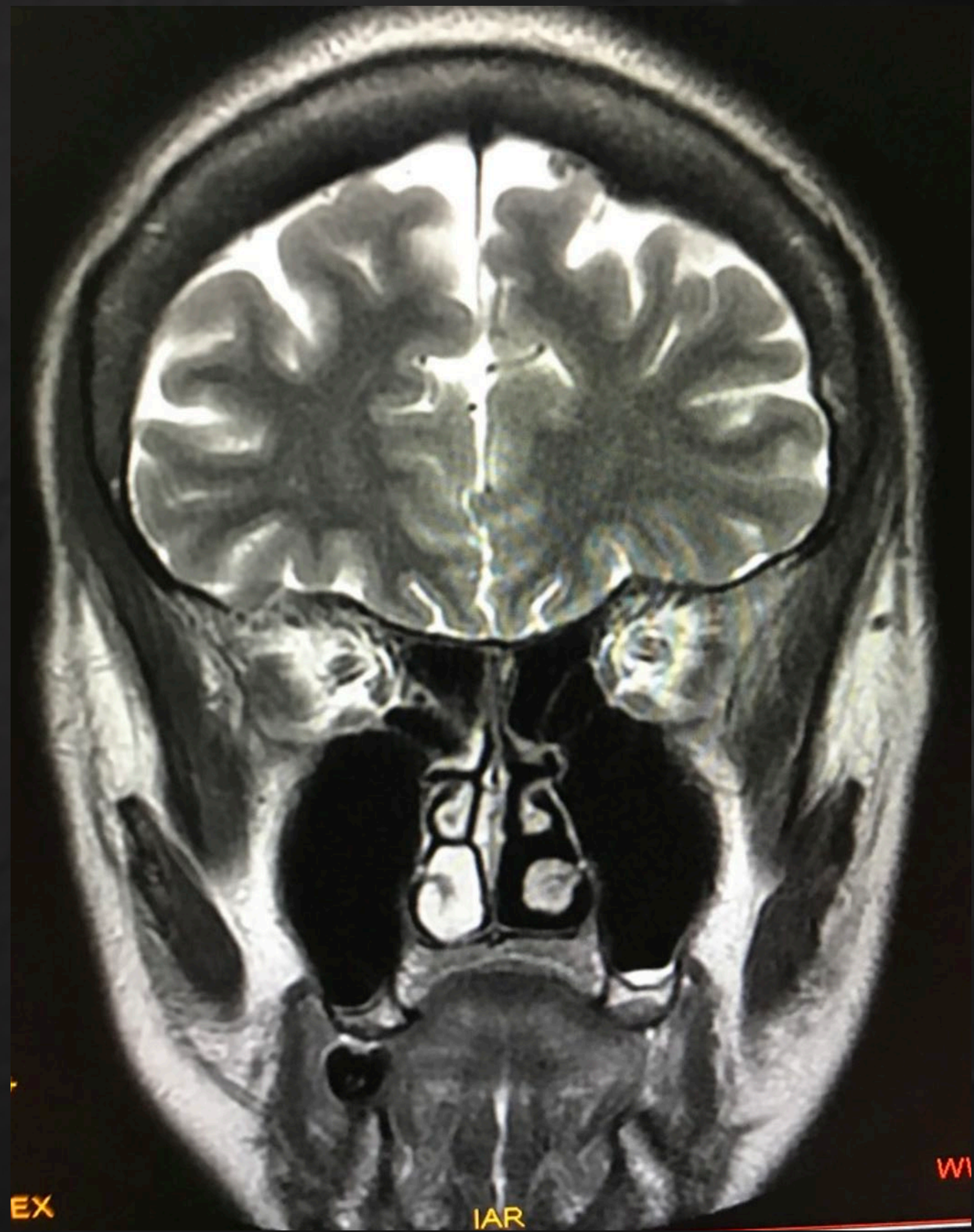


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Ce Ca  
I

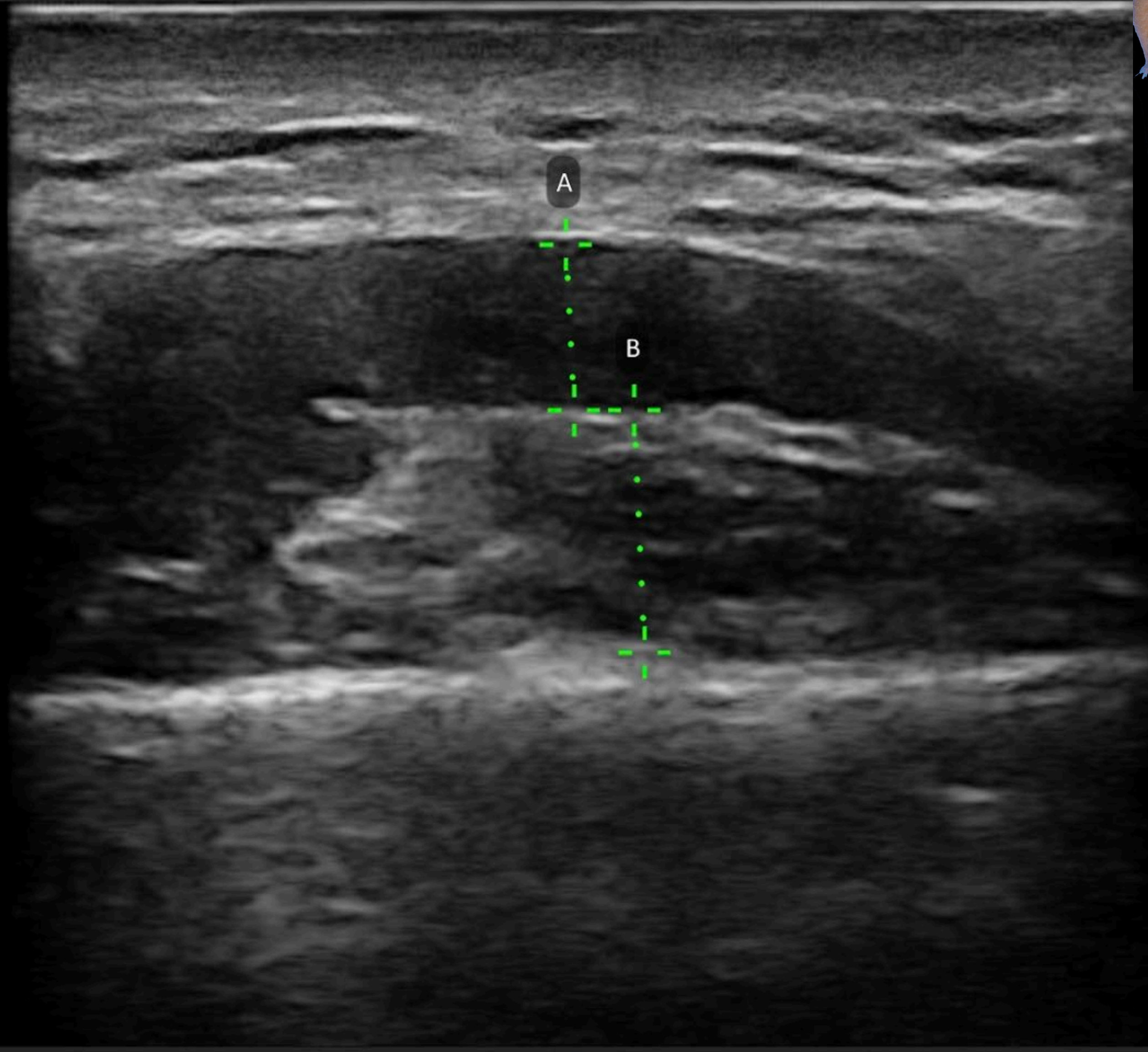




## 2- Inyección ecoguiada de toxina botulínica en el **Masetero**

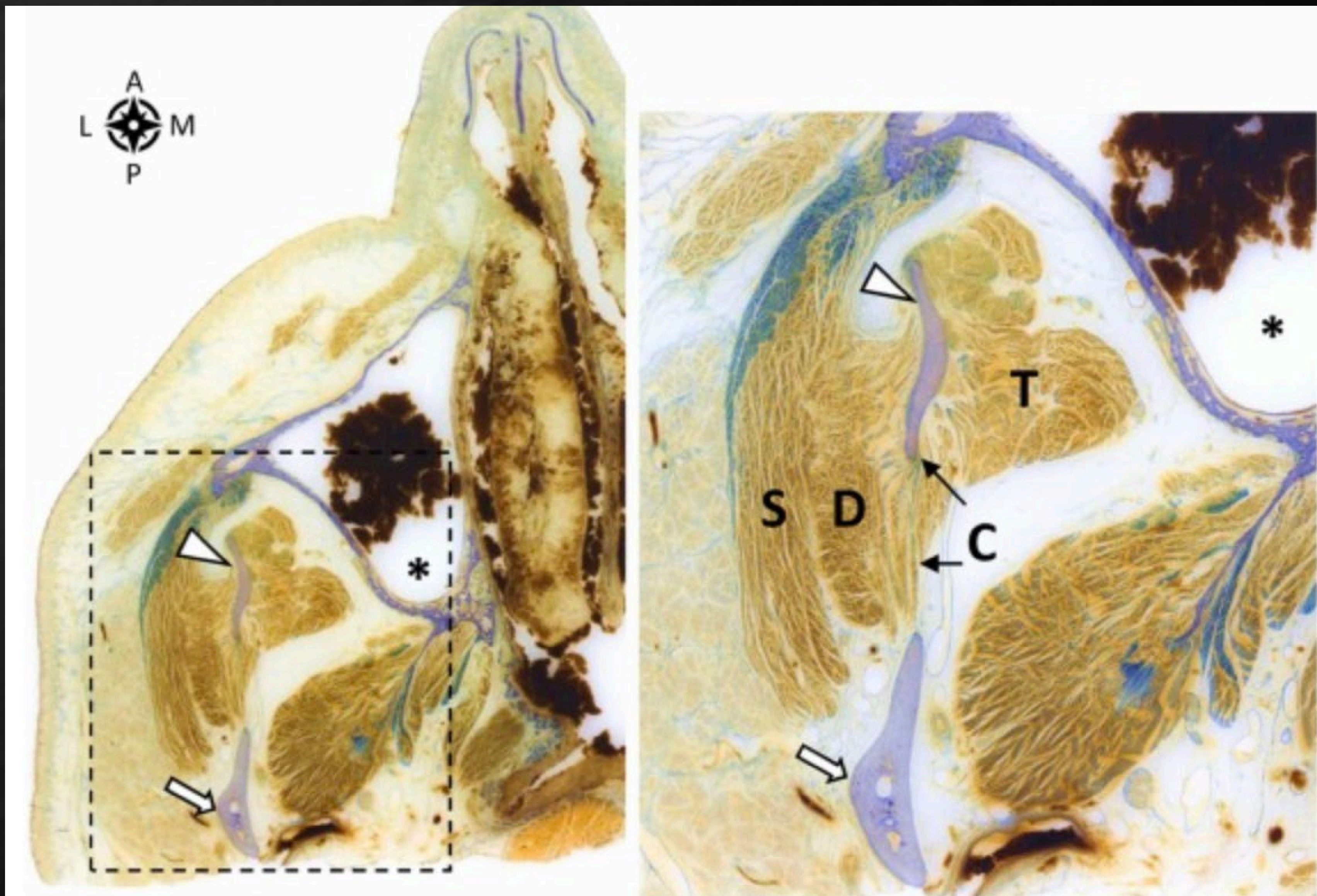


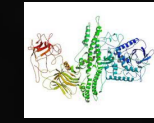
D 15 --  
A 3,553 mm  
B 5,20 mm



S  
Ce Ca  
I

# Anatomía del músculo masetero

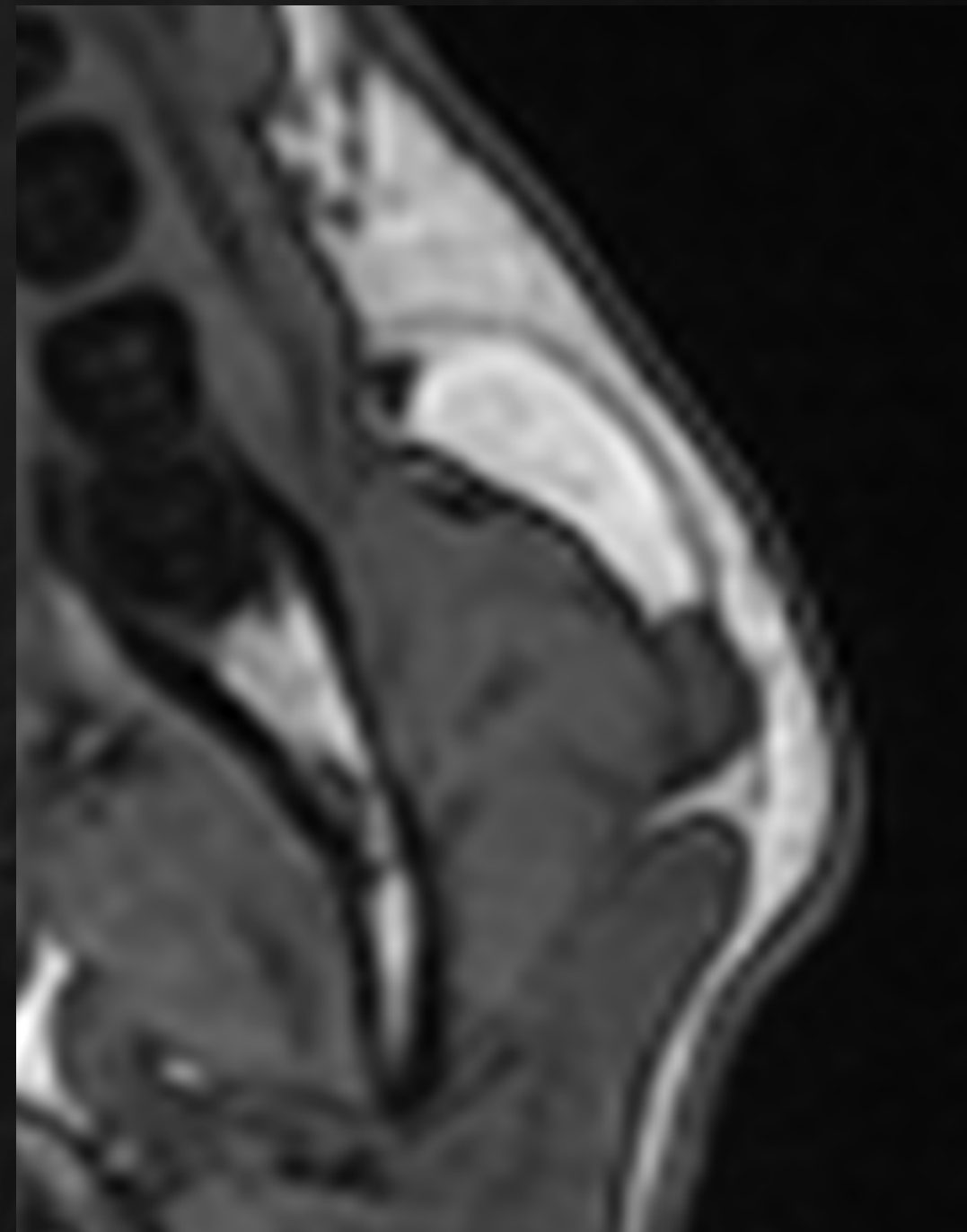




Bruxismo – Cefalea – Hipertrofia - Estetica

Maria Peris-Celda





## Riesgo: Risorio -Parótida-Ventre superficial MM-Bucinator

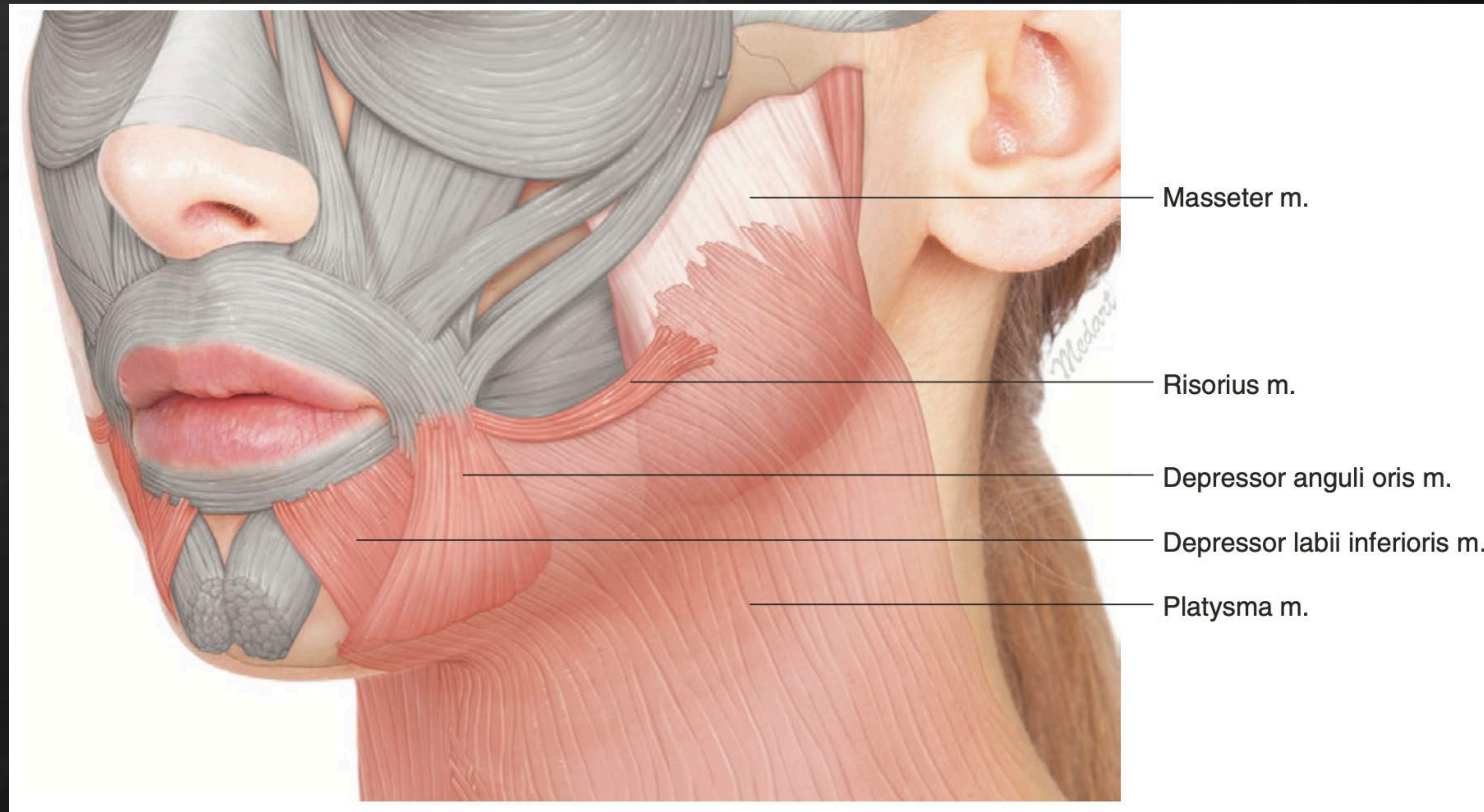
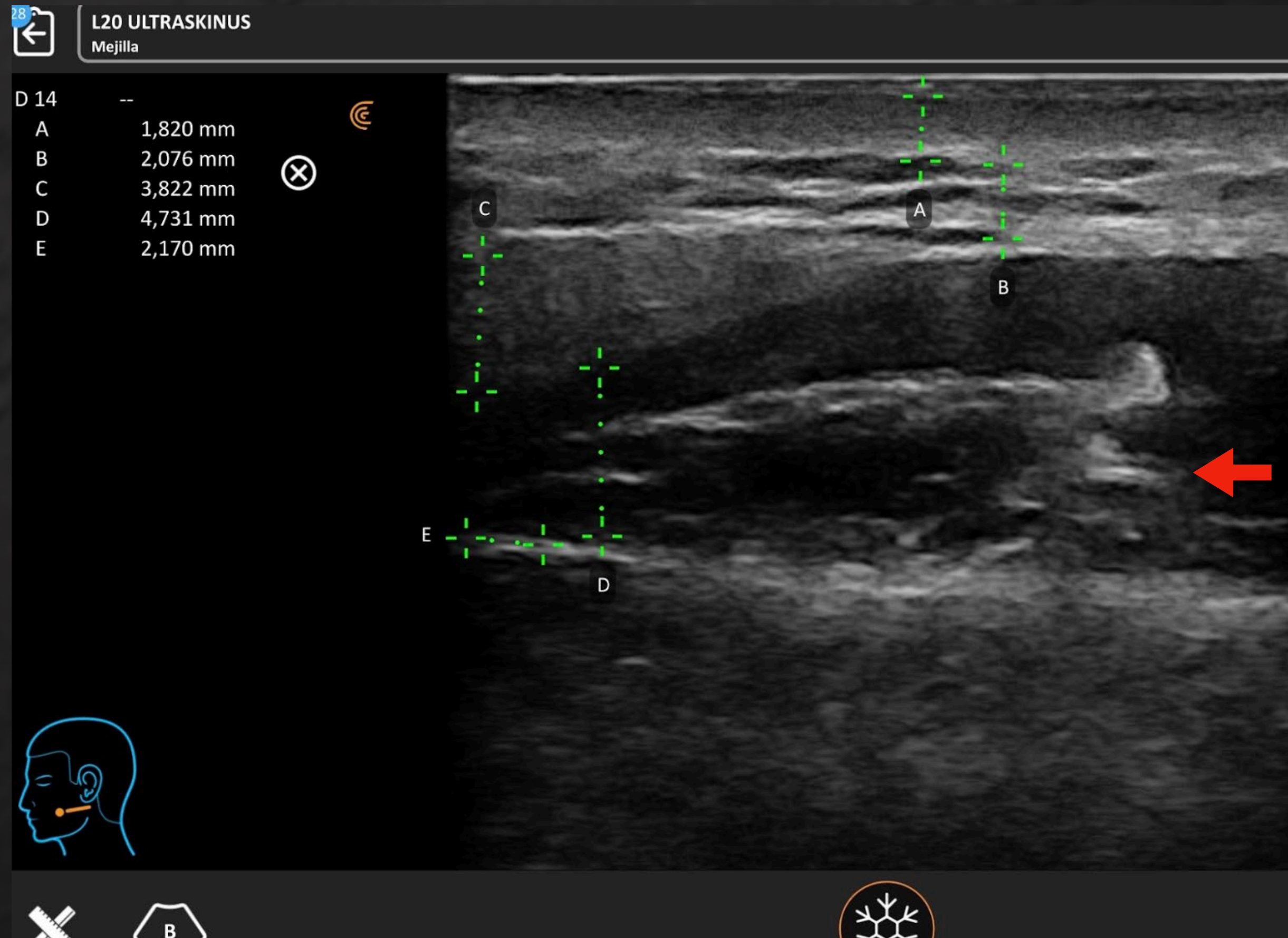


Illustration of the platysma muscle and surrounding perioral musculature

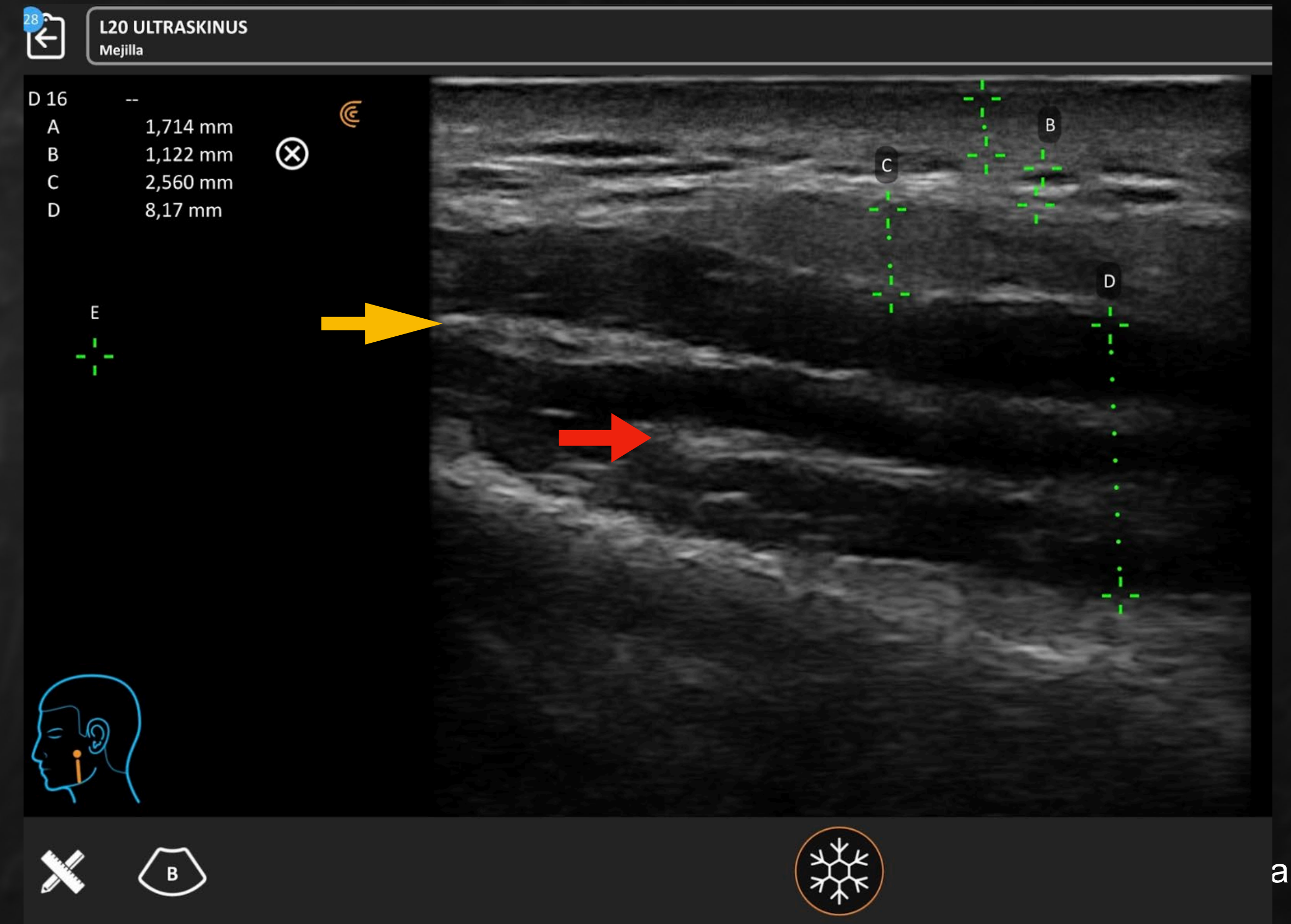
Kwan-Hyun Youn 2020.



# Corte transversal






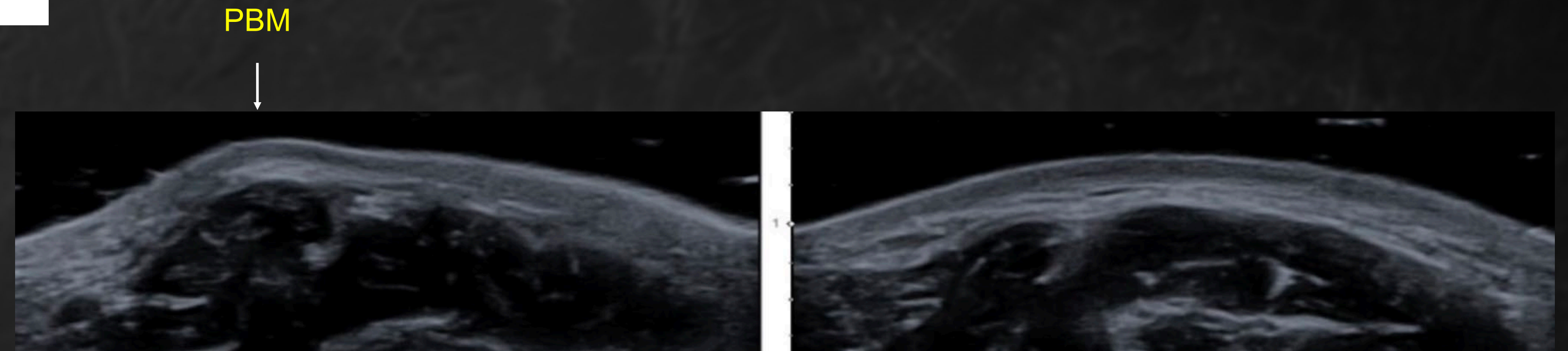
# Corte longitudinal



Article

## Comparison between Conventional Blind Injections and Ultrasound-Guided Injections of Botulinum Toxin Type A into the Masseter: A Clinical Trial

Hyungkyu Bae <sup>1,†</sup>, Jisoo Kim <sup>2,†</sup>, Kyle K. Seo <sup>3</sup>, Kyung-Seok Hu <sup>1</sup> , Seong-Taek Kim <sup>4,\*</sup>  and Hee-Jin Kim <sup>1,5,\*</sup> 



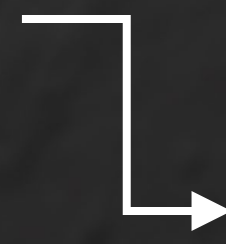
Bulging

Currently, the most common approach is to inject BoNT-A deeply into the lower third of the masseter, in order to avoid diffusion or unintended injection into surrounding tissues, including the facial expression muscles and parotid gland

Lee et al. (2017) suggested that the deep inferior tendon (DIT) located inside the muscle may cause PMB by preventing the spread of toxin when the deep injection method is used [7]. However, it is nearly impossible to determine the internal location of the DIT with the naked eye or by palpating, which represents a limitation of blind injections based on the presence of the DIT.



## 2- Inyección ecoguiada de toxina botulínica en el Masetero



### Inyección ecoguiada en el vientre profundo del Masetero

Se debe localizar el DIT

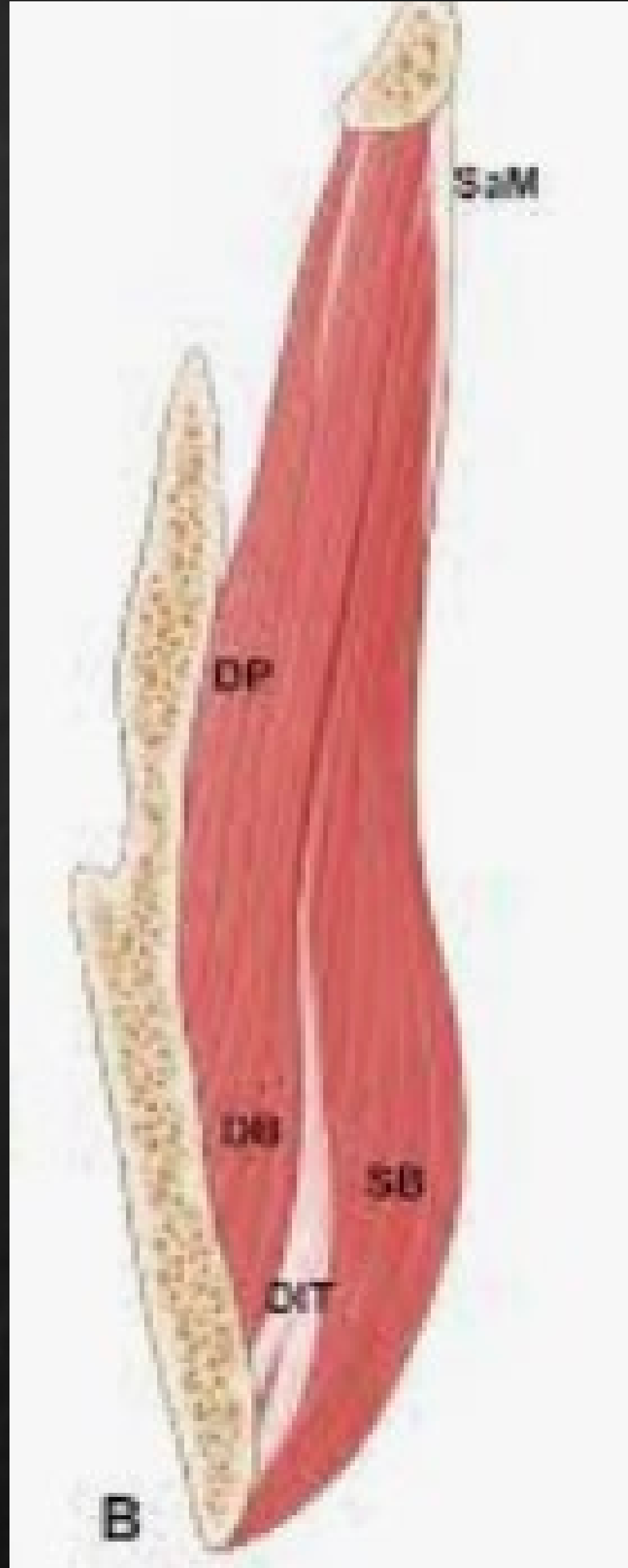
Se evita difusión de TB al vientre superficial

Se evita que se produzca **Bulding Paradojal** (Lee y Cols 2017)

El **tendón** solo se visualiza mediante ecografía (no a ojo o con palpación)

Esta sería la gran limitación de las inyecciones a ciegas

El Nervio Masetérico inerva la porción inferior del músculo por lo tanto estas inyecciones profundas e inferiores o caudales incrementarían la eficacia del tratamiento.



DIT



P  
Ce  
Ca  
S

## **Ultrasonography of the Internal Architecture of the Superficial Part of the Masseter Muscle In Vivo**

**HYUNG-JIN LEE,<sup>1</sup> YOU-JIN CHOI,<sup>2</sup> KANG-WOO LEE,<sup>1</sup> KYUNG-SEOK HU <sup>1</sup>,  
SEONG TAEK KIM <sup>3</sup> AND HEE-JIN KIM <sup>1,4\*</sup>**

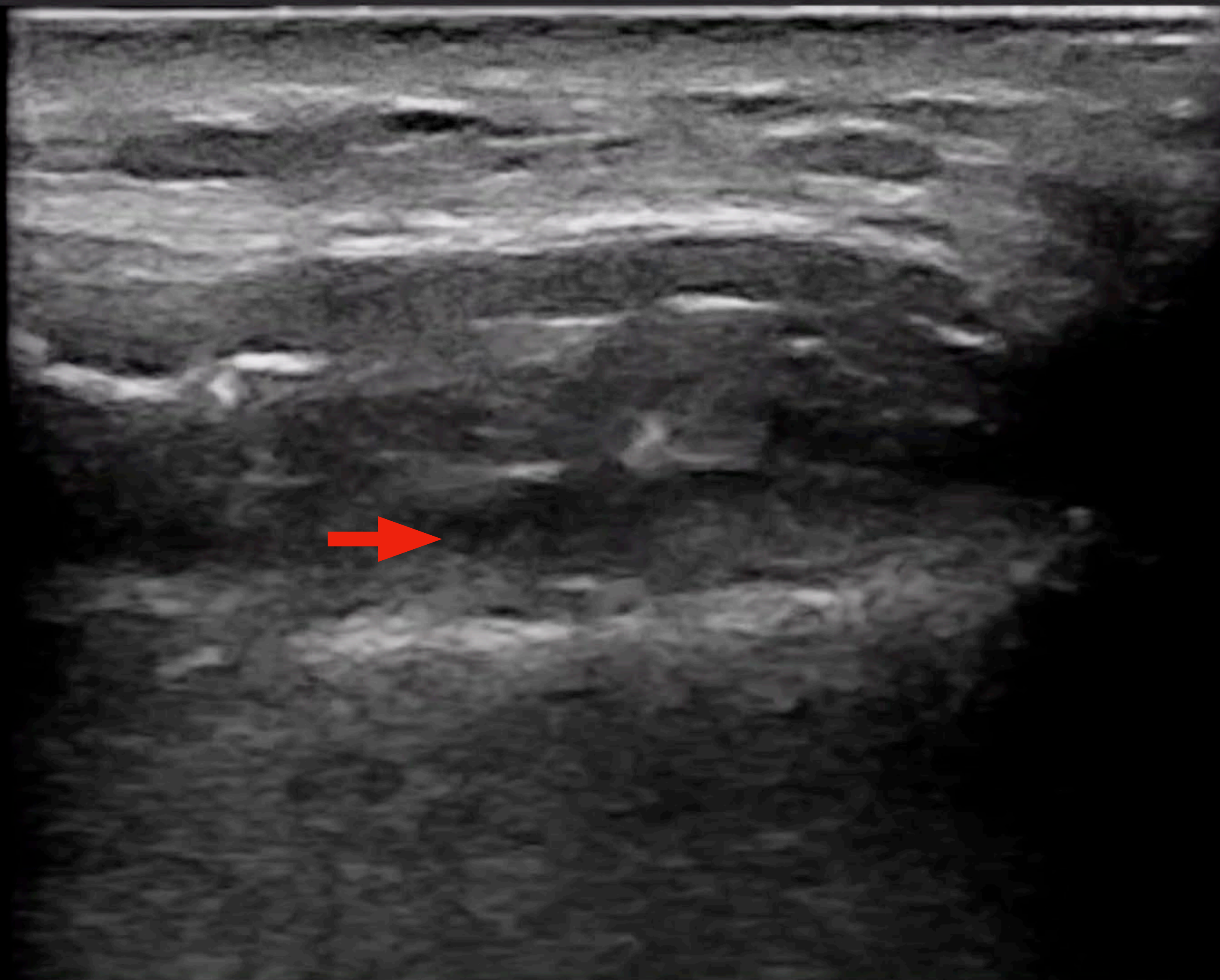
Clinical Anatomy (2019)

**La detección US del DIT es de fundamental  
importancia en los tratamientos de TB en el  
Músculo Masetero.**



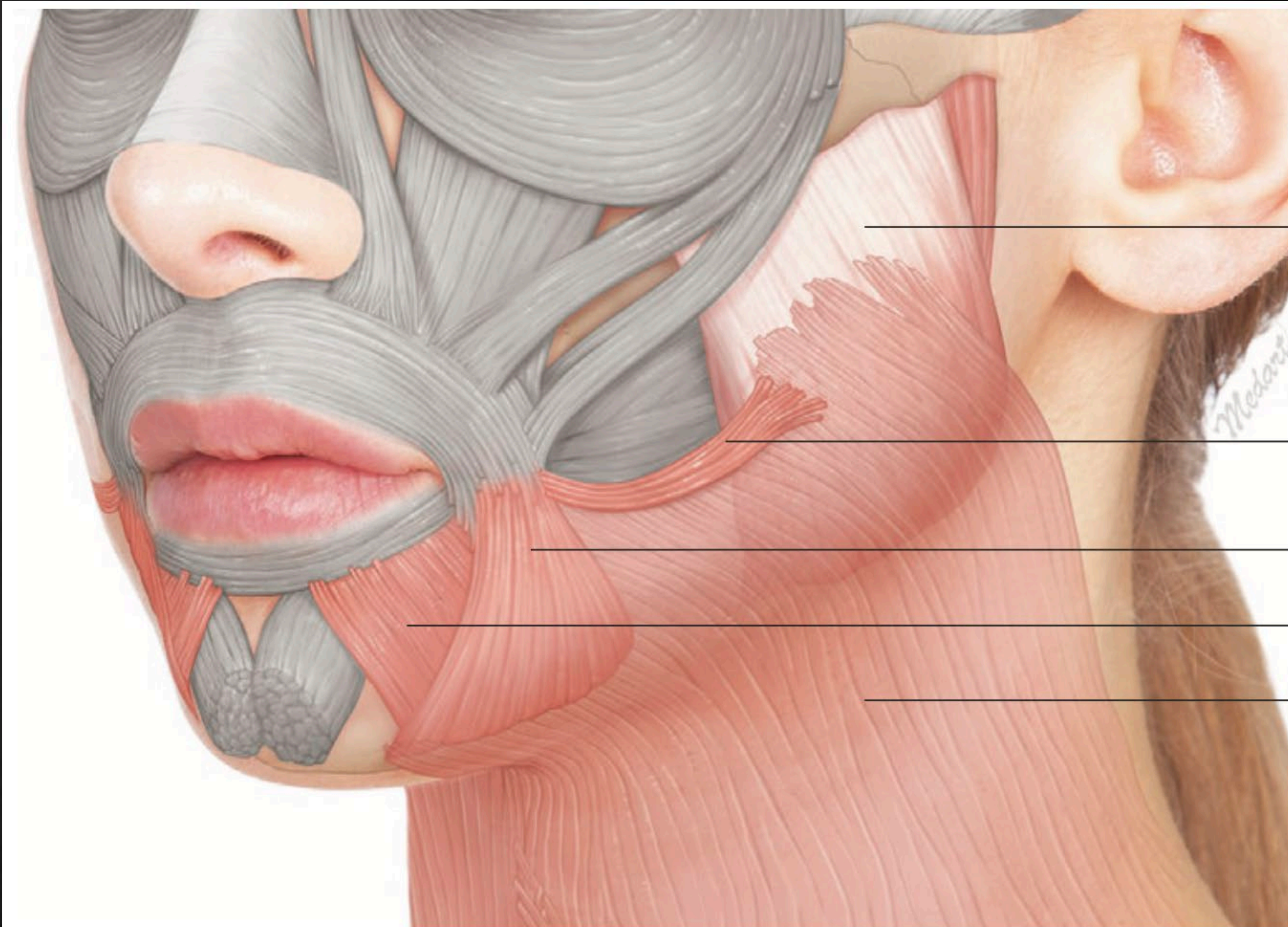
L20 ULTRASKINUS

Mejilla





**3-** Inyección ecoguiada de toxina botulínica en el **DAO** (Depresor Anguli Oris)



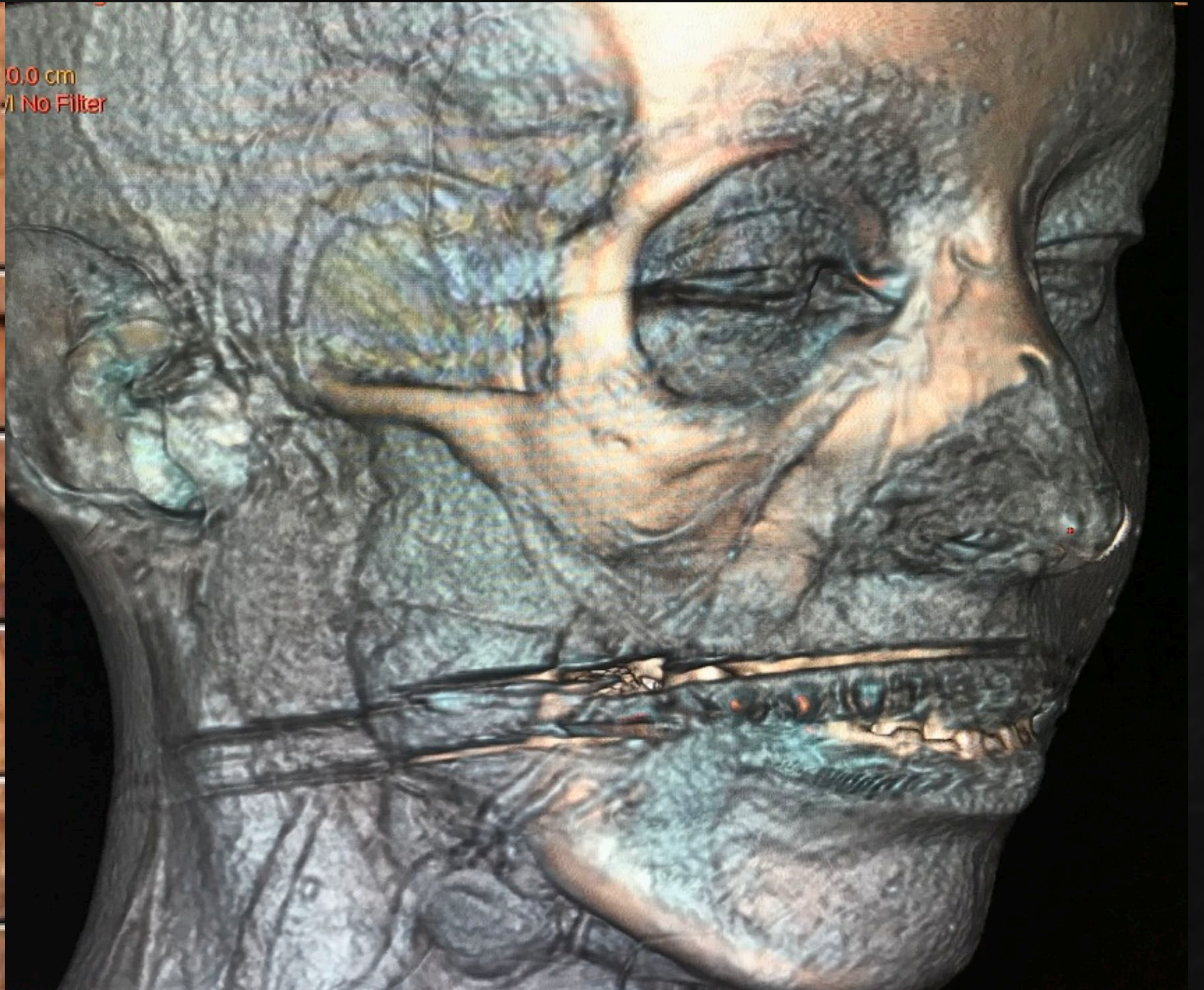
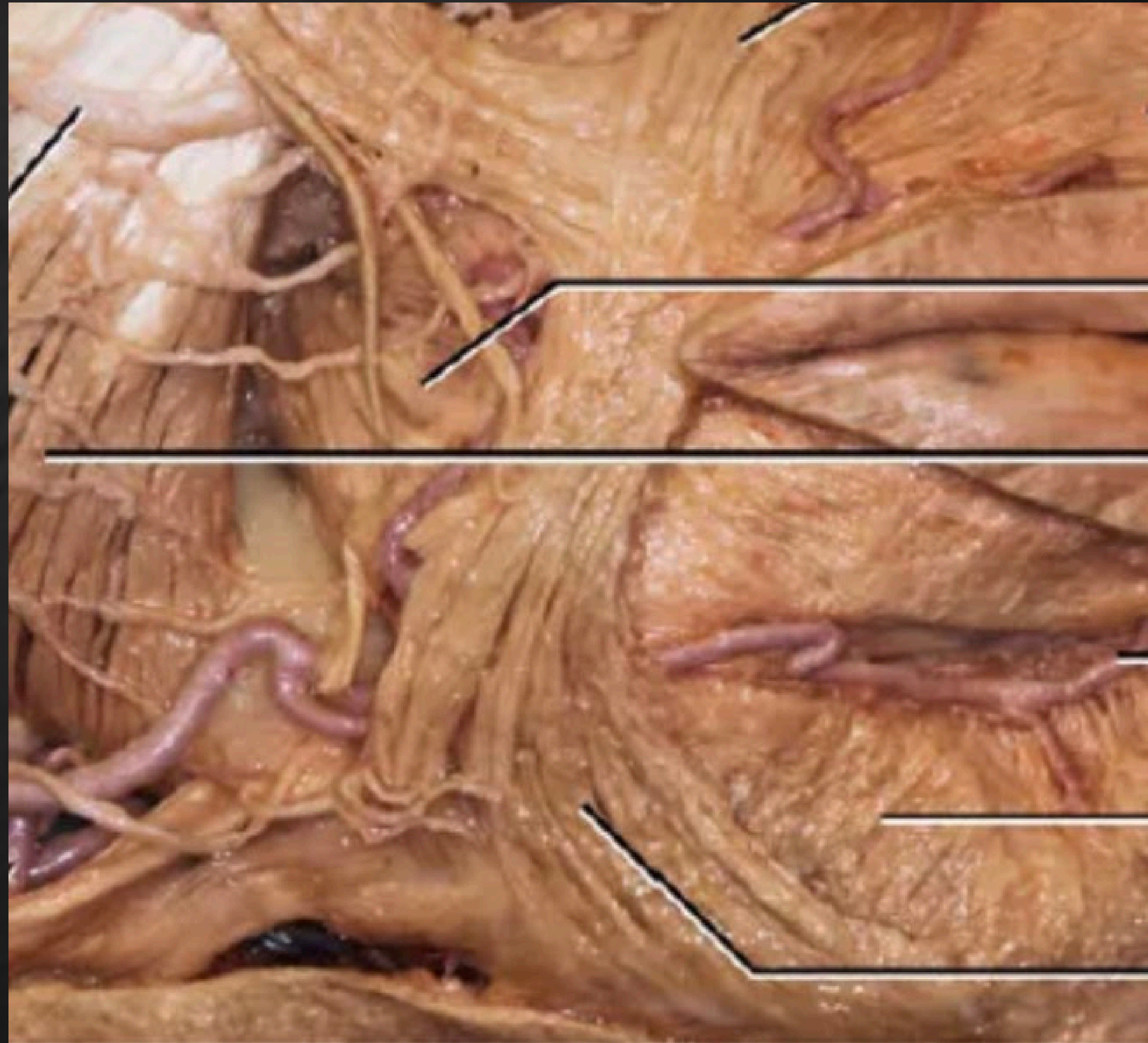
Masseter m.

Risorius m.

Depressor anguli oris m.

Depressor labii inferioris m.

Platysma m.

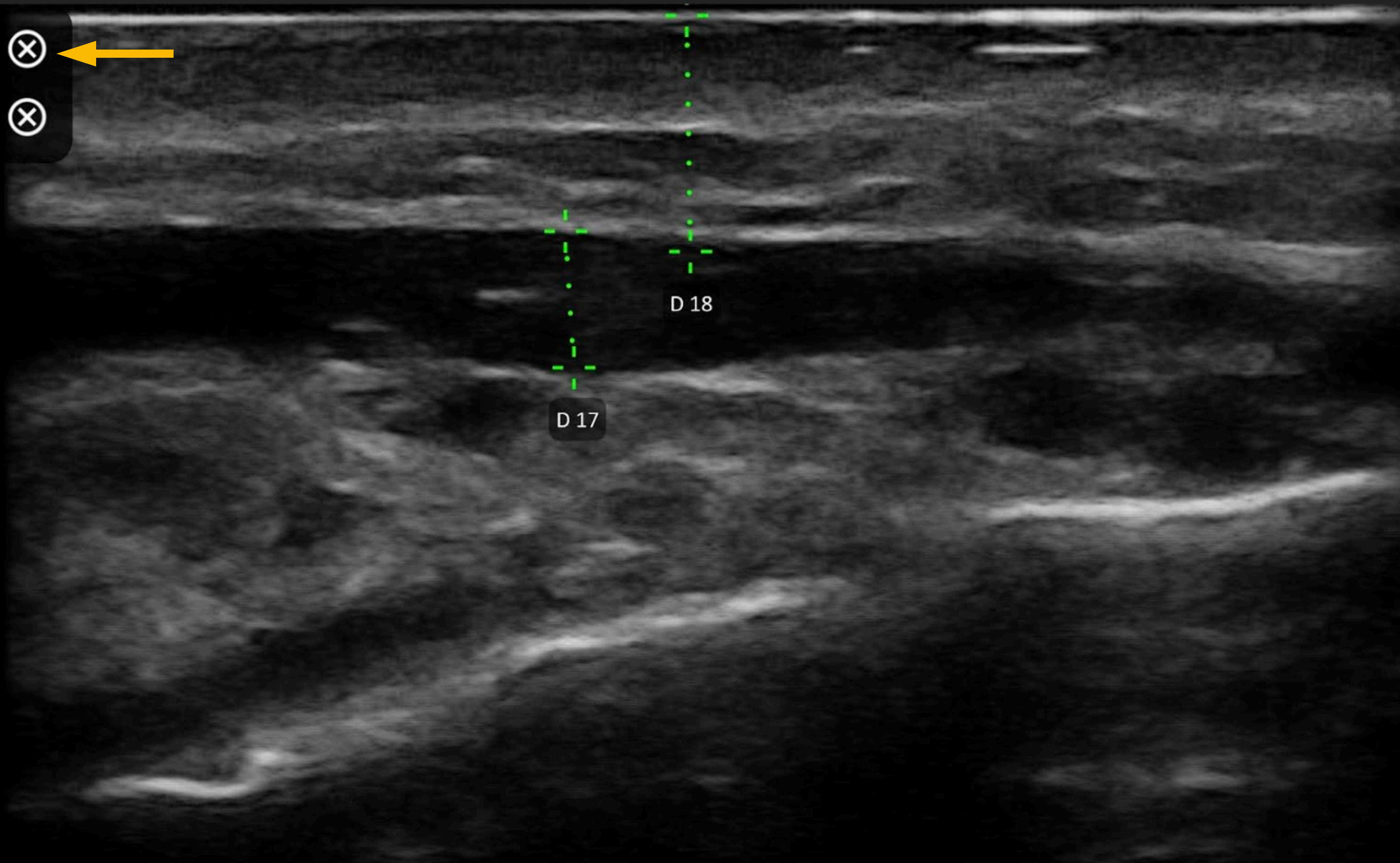




D 17 2,413 mm ⊗



D 18 4,167 mm ⊗



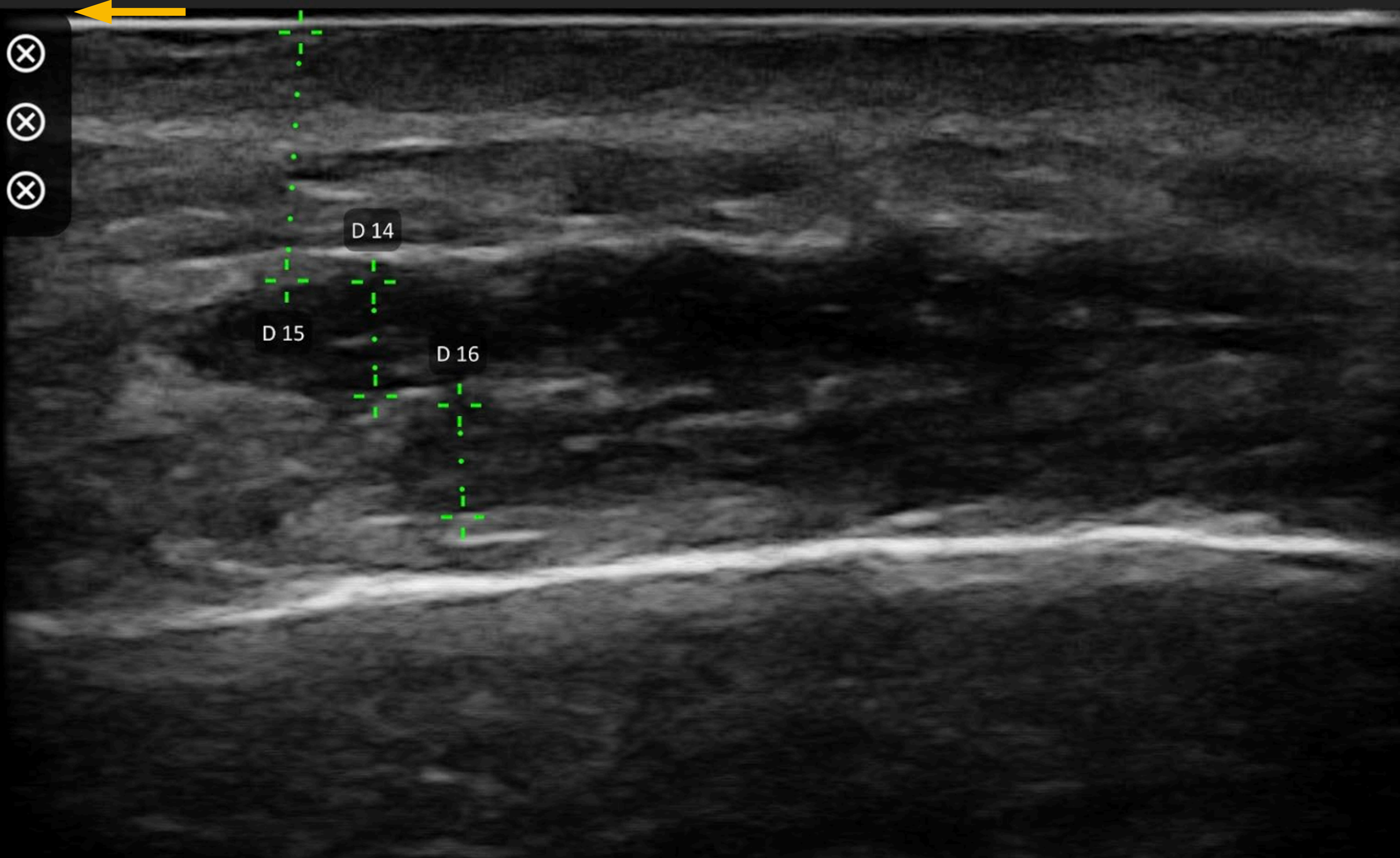
D 17

D 18



L20 ULTRASKINUS  
Labios

D 14	2,007 mm	⊗
D 15	4,365 mm	⊗
D 16	1,961 mm	⊗





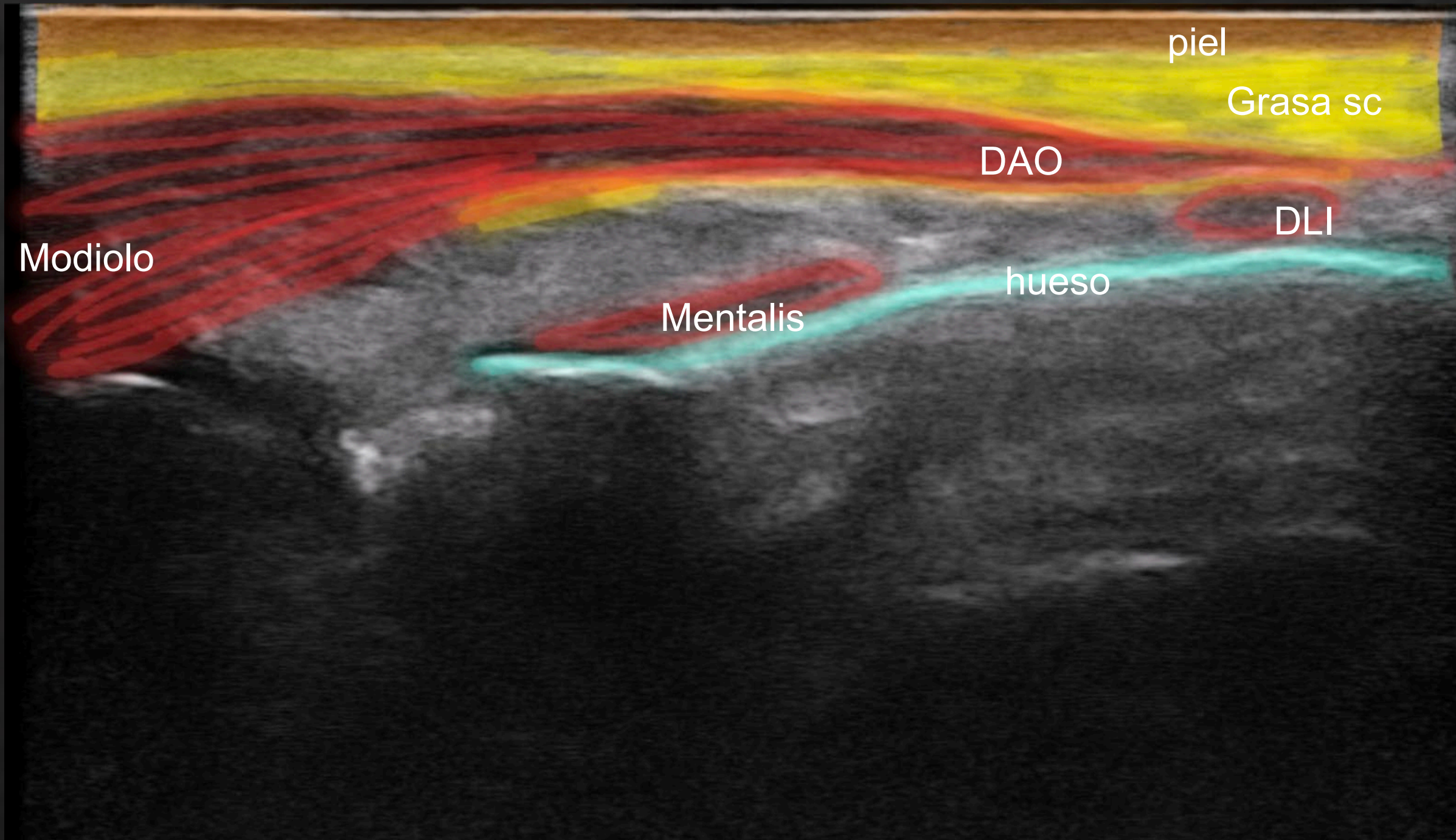
Sup  
Me    La  
  Inf

DAO

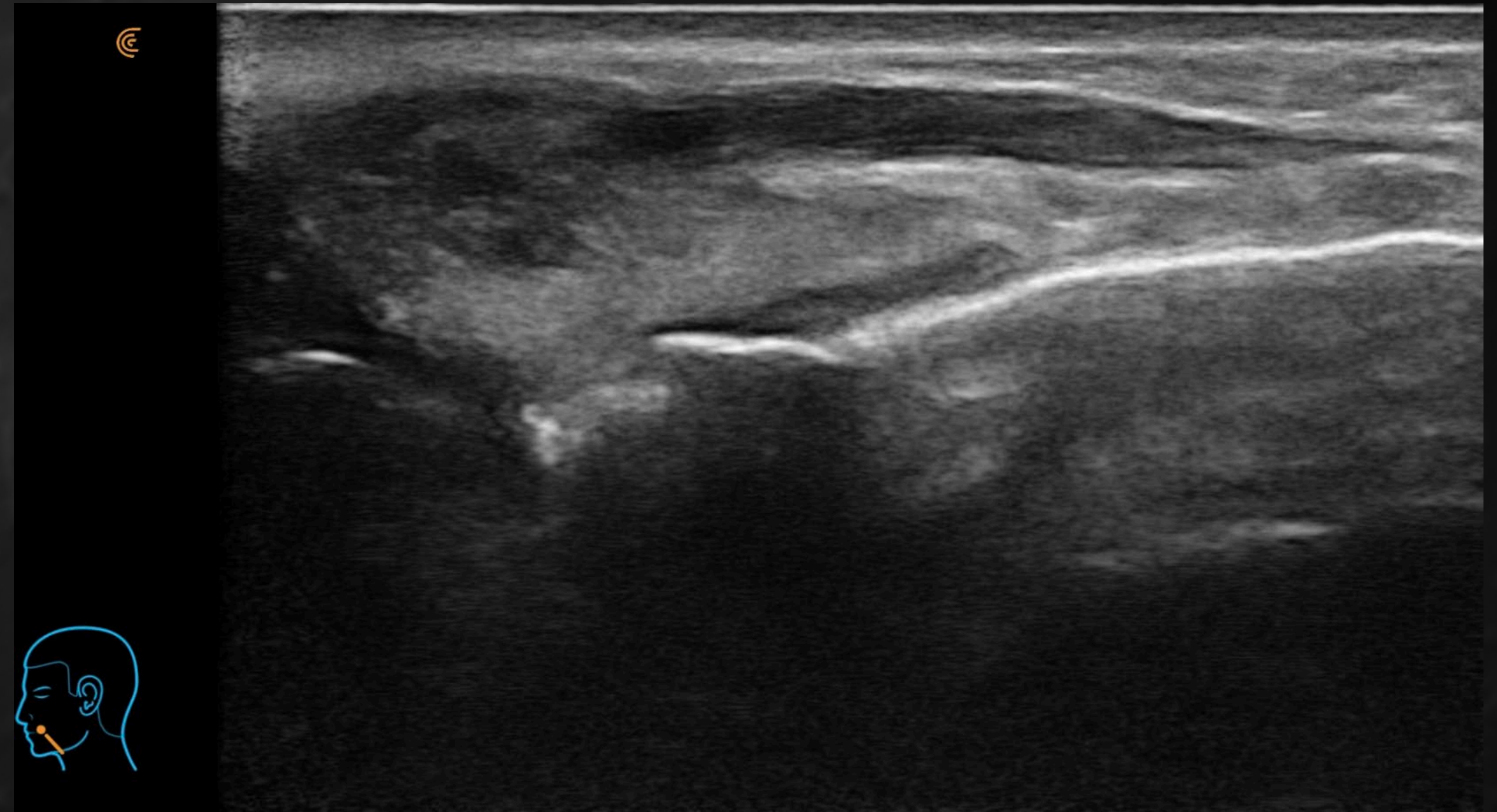
DLI

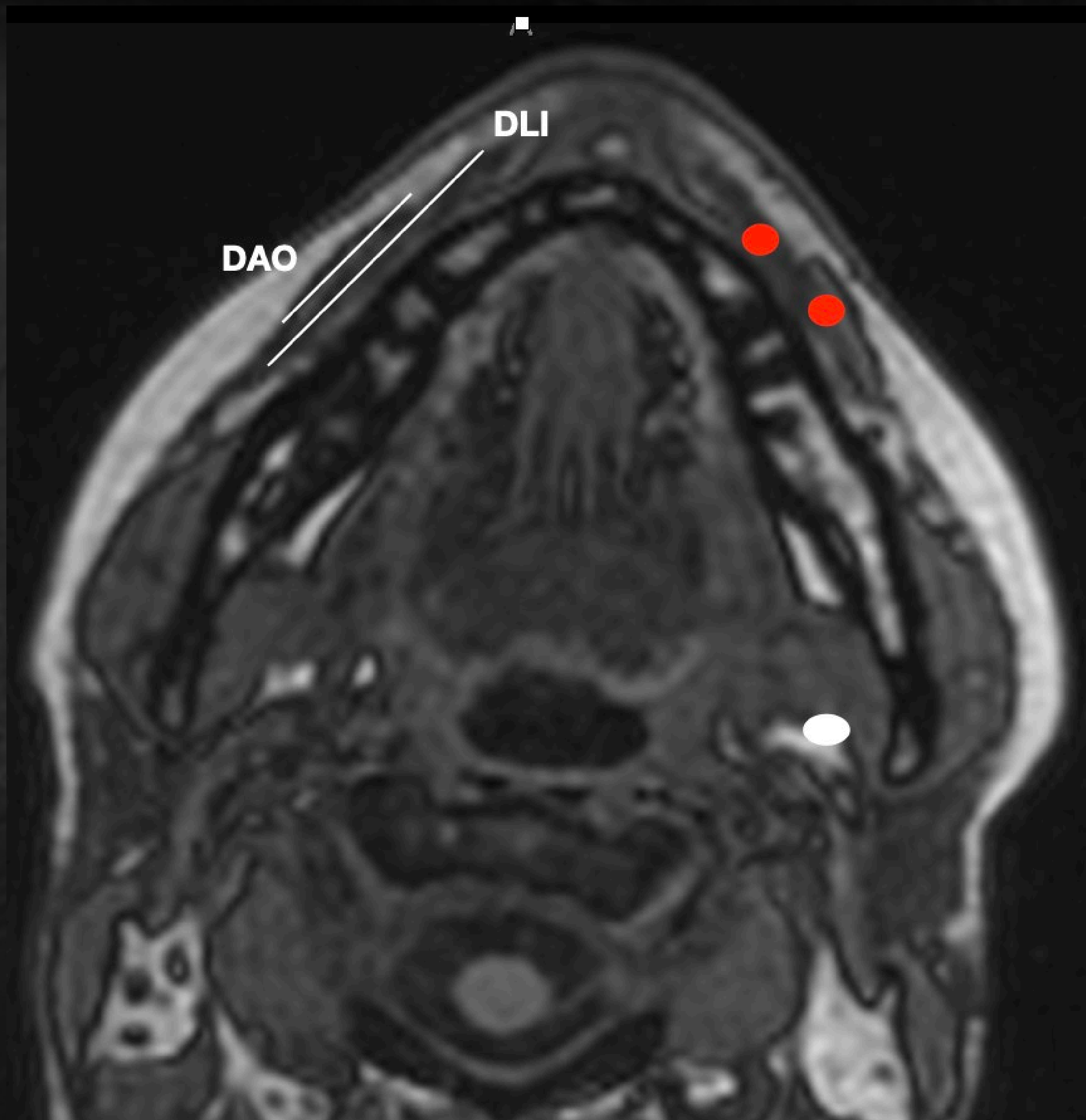


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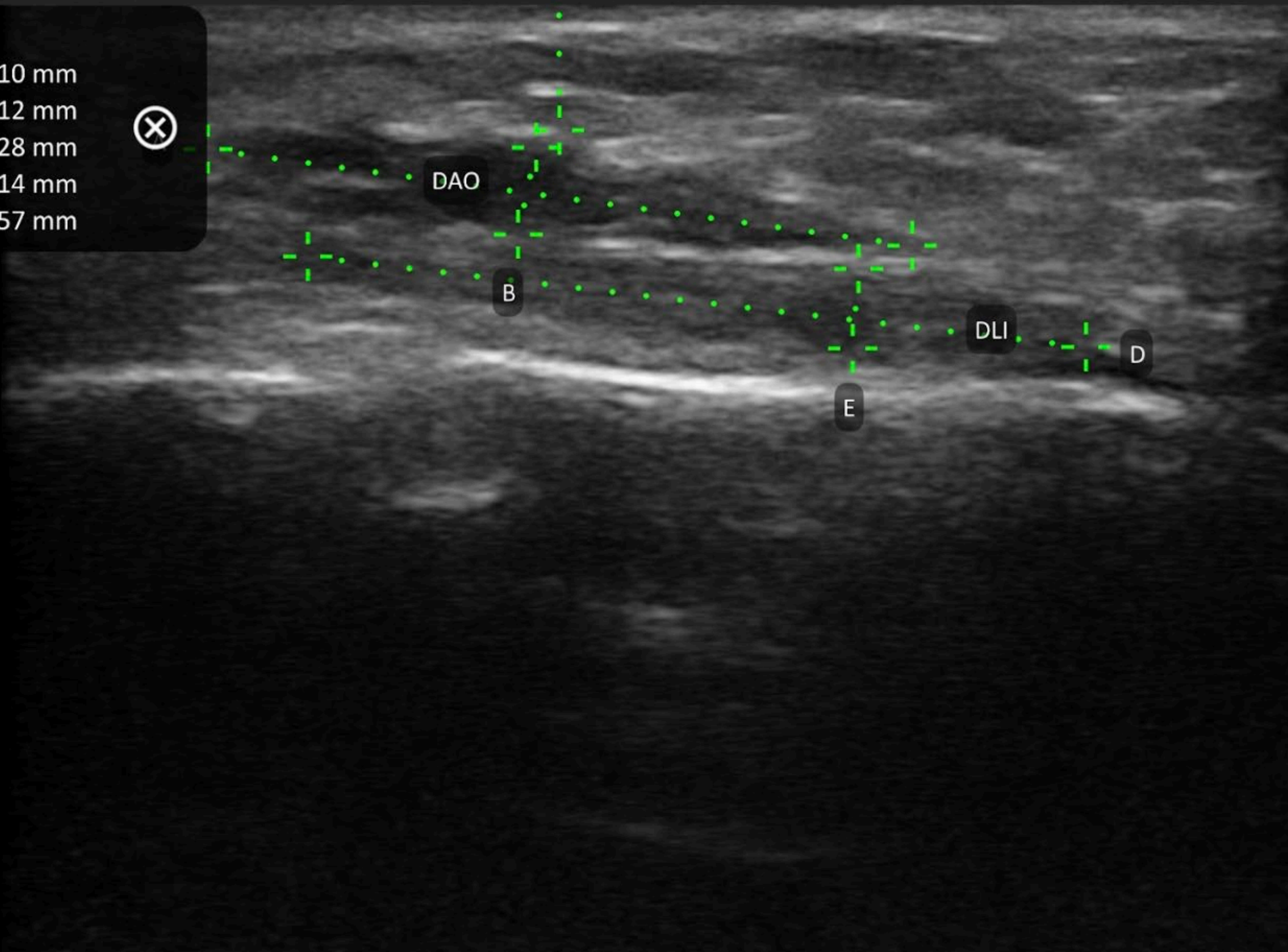
Sup  
Ce. Ca  
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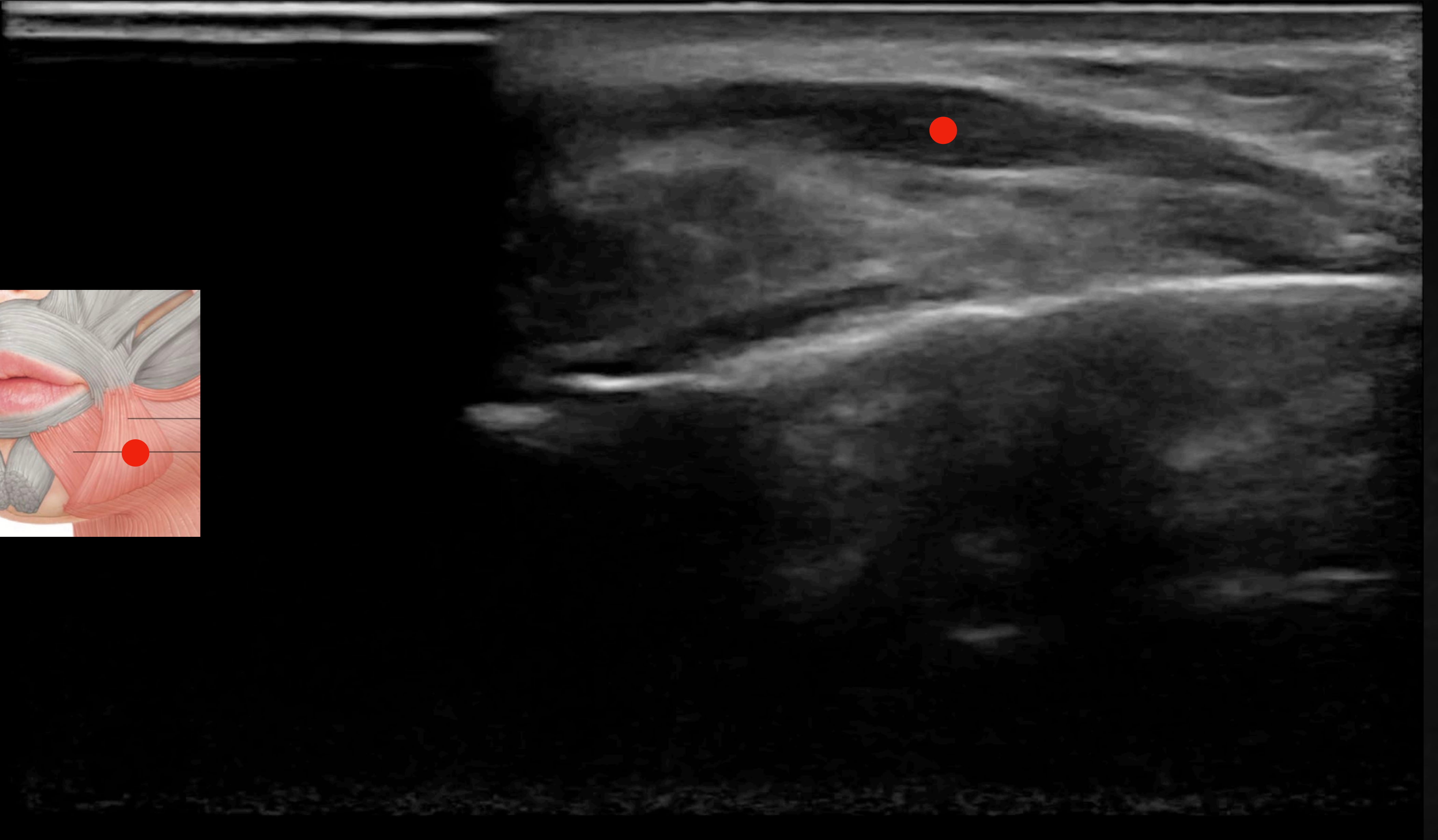
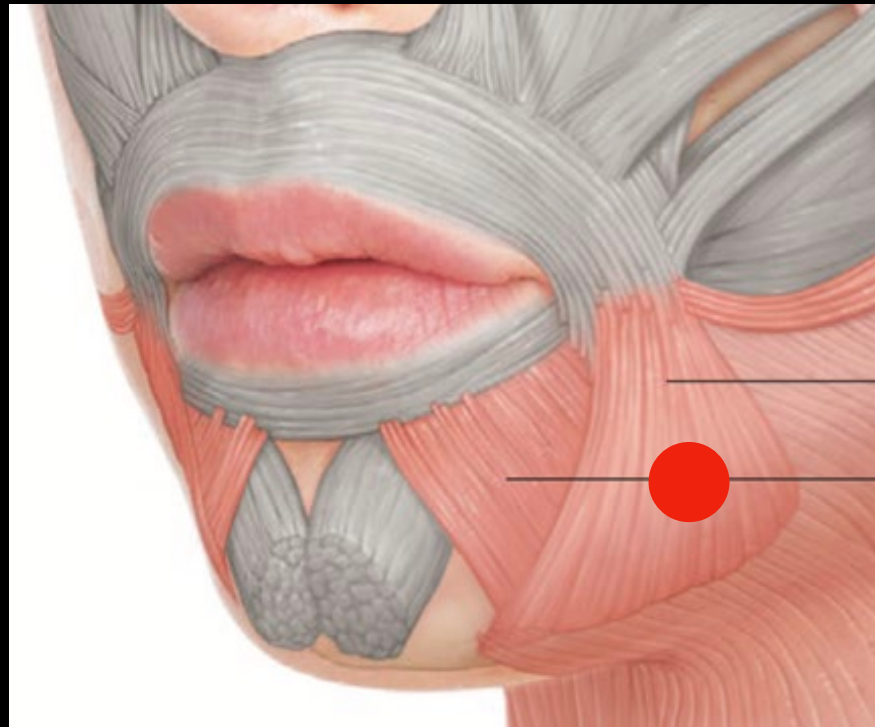






D 42	--
A	20,10 mm
B	2,512 mm
C	4,328 mm
D	22,14 mm
E	2,257 mm





Distancia entre DAO y DL: 0,2 mm o 2000 micras

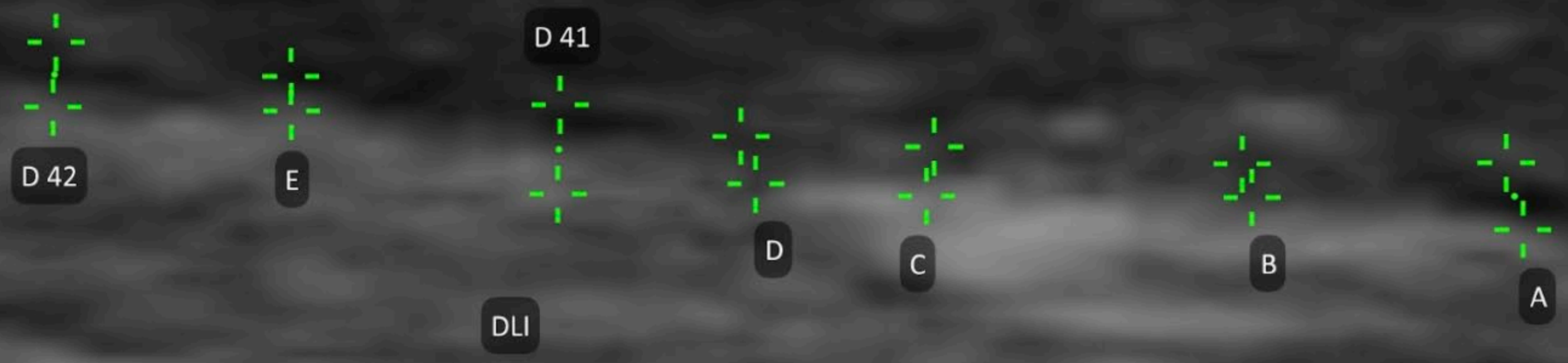


L15\_Dra.Karina Ravera  
Cirugía Plástica



D 41	0,4469 mm	⊗
D 42	0,3253 mm	⊗
D 43	--	
A	0,3458 mm	
B	0,1751 mm	
C	0,2494 mm	⊗
D	0,2495 mm	
E	0,1729 mm	

0,4 cm



1 cm

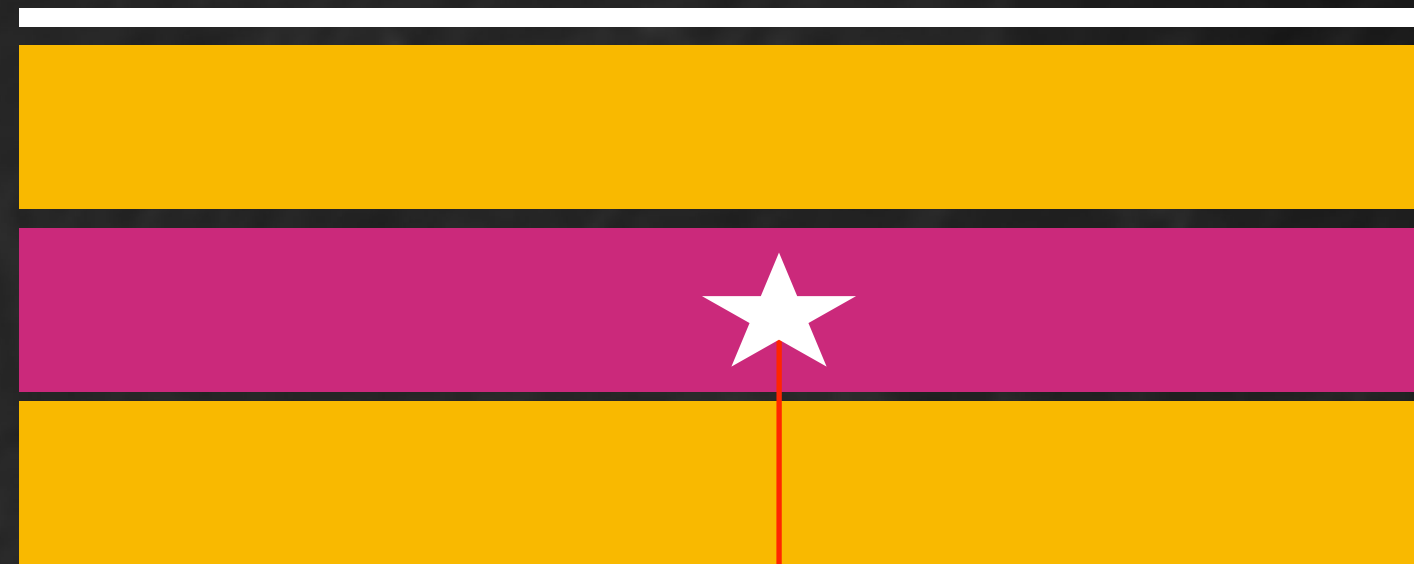
## Complicaciones del tratamiento con Toxina Botulínica en el DAO

Caída del labio inferior	DLI	Espera
Alteraciones deglución	Bucinador	Espera
Alteraciones en la fonación	DLI	Espera
Hematoma	A-V Facial	Presión



## 4- Inyección ecoguiada de toxina botulínica en el **Platisma**

# Factores que incrementan el índice de fracaso en el acierto de las inyecciones en el músculo platisma



1- ESPESOR MUSCULAR ( 1- 2 MM )

2- ESPESOR GRASA PREPLATISMAL

3-VARIANTES ANATÓMICAS DEL MÚSCULO

4- PELLIZCO DISTORSIONA ANATOMÍA

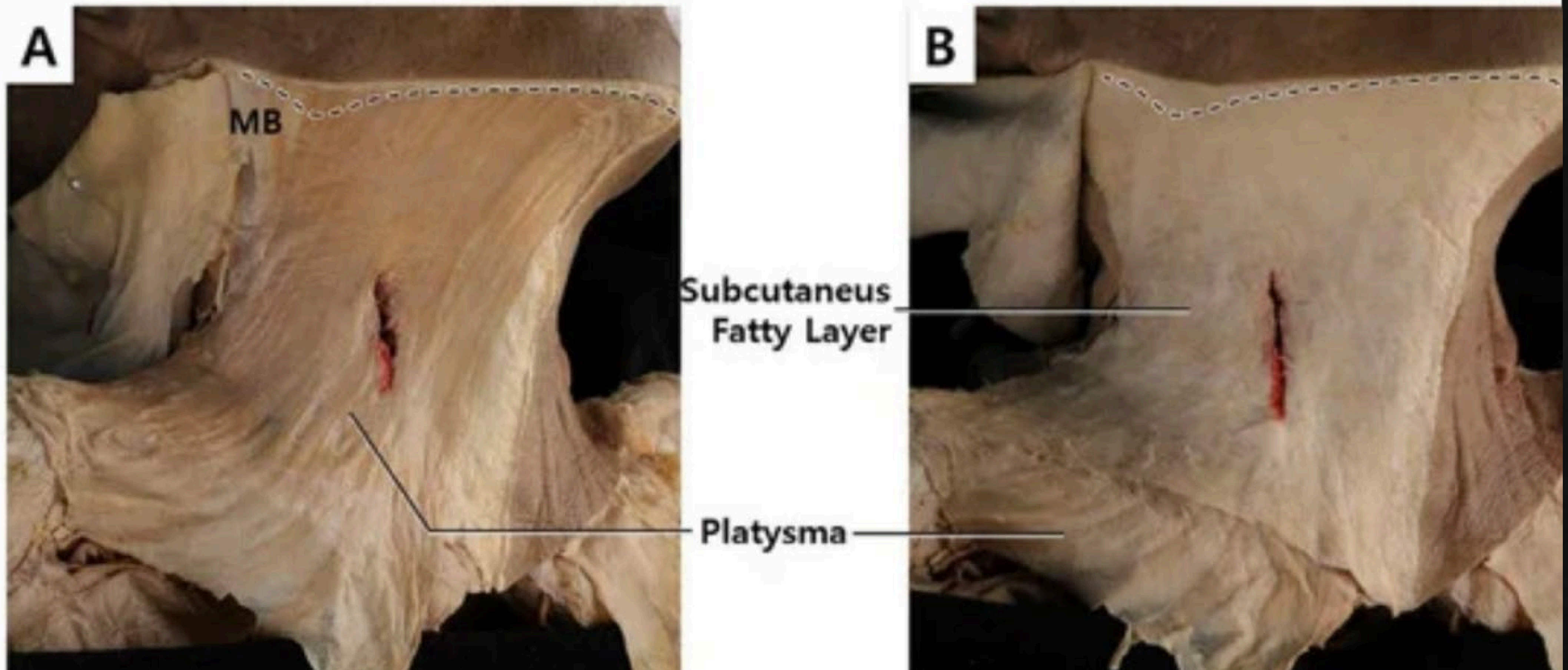




## Platysma Muscle for Treating Platysmal Band and Jawline Lifting: A Review

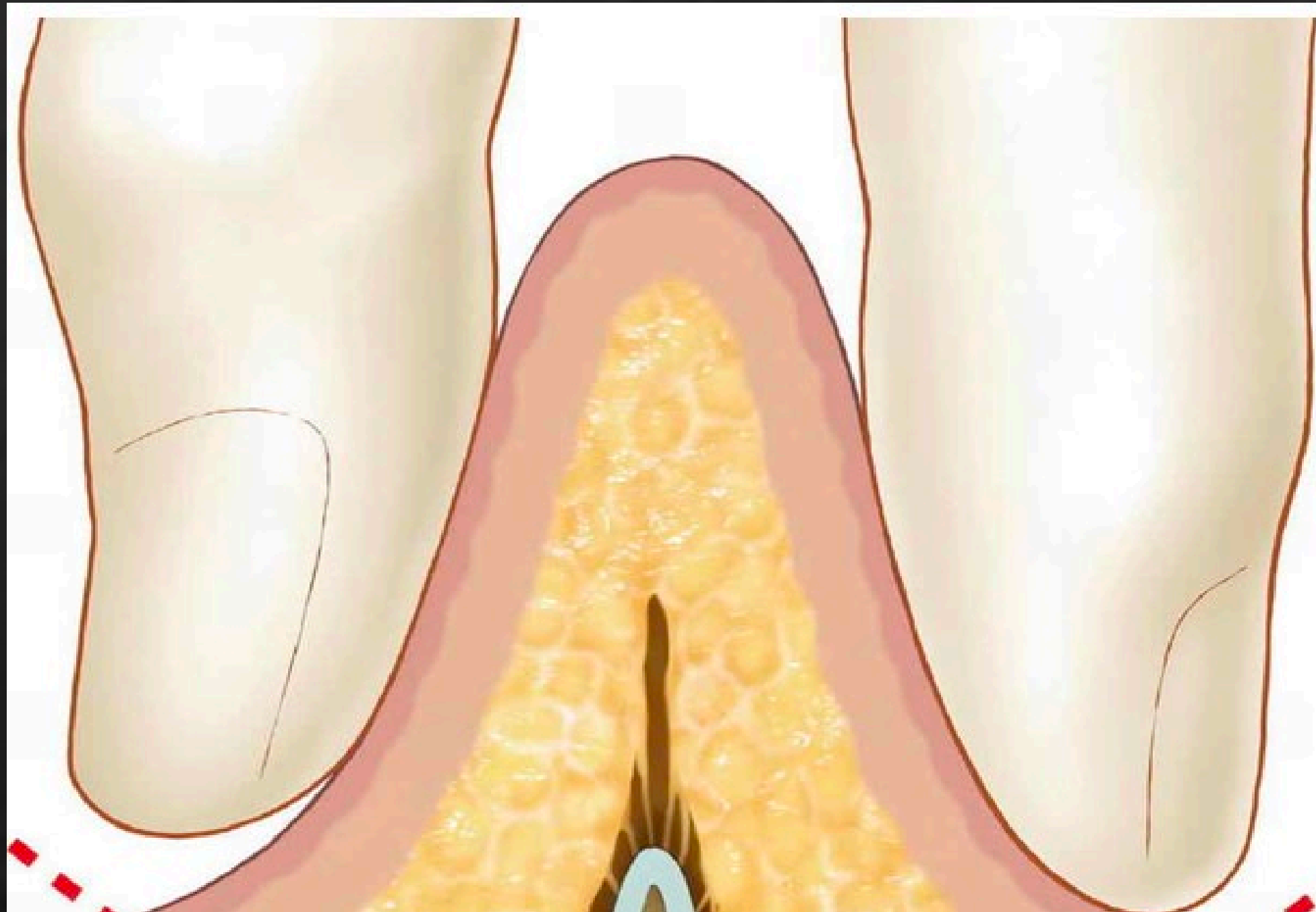
by [Kyu-Ho Yi](#) <sup>1,2,†</sup> , [Ji-Hyun Lee](#) <sup>2,†</sup> , [Kangwoo Lee](#) <sup>2</sup>, [Hye-Won Hu](#) <sup>2</sup>, [Hyung-Jin Lee](#) <sup>3</sup>  and [Hee-Jin Kim](#) <sup>2,\*</sup>  

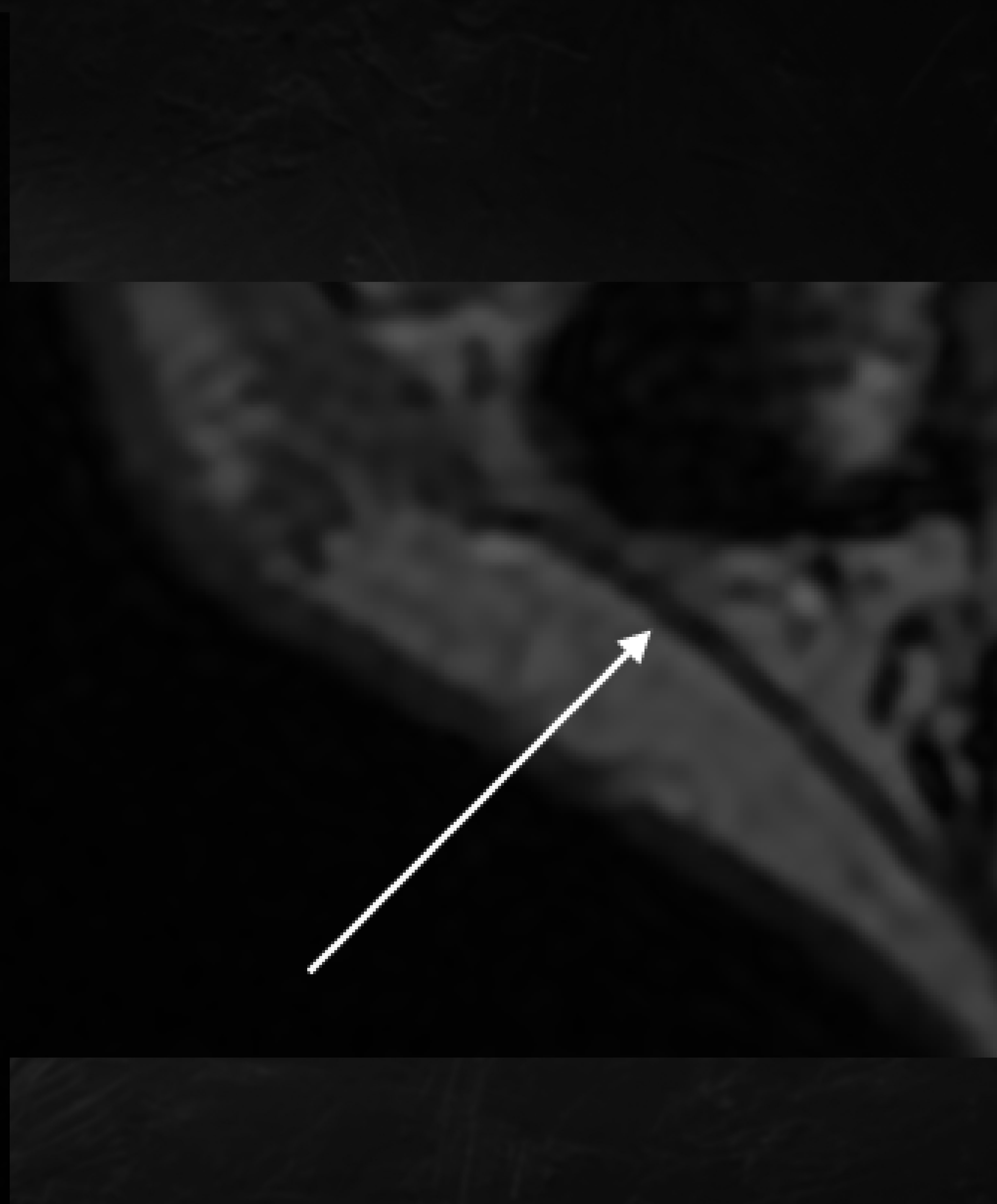
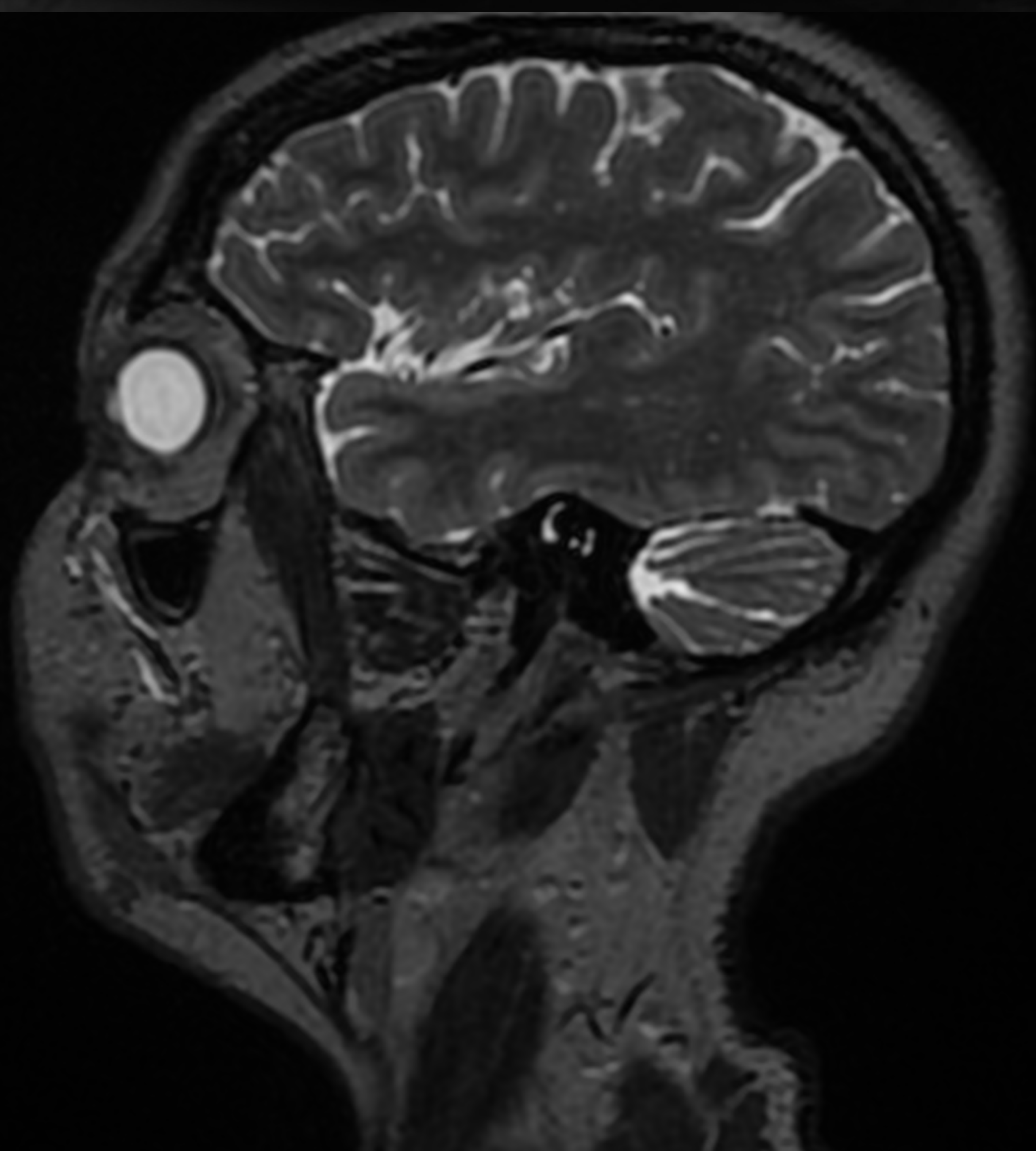
[Hee-Jin Kim](#) 

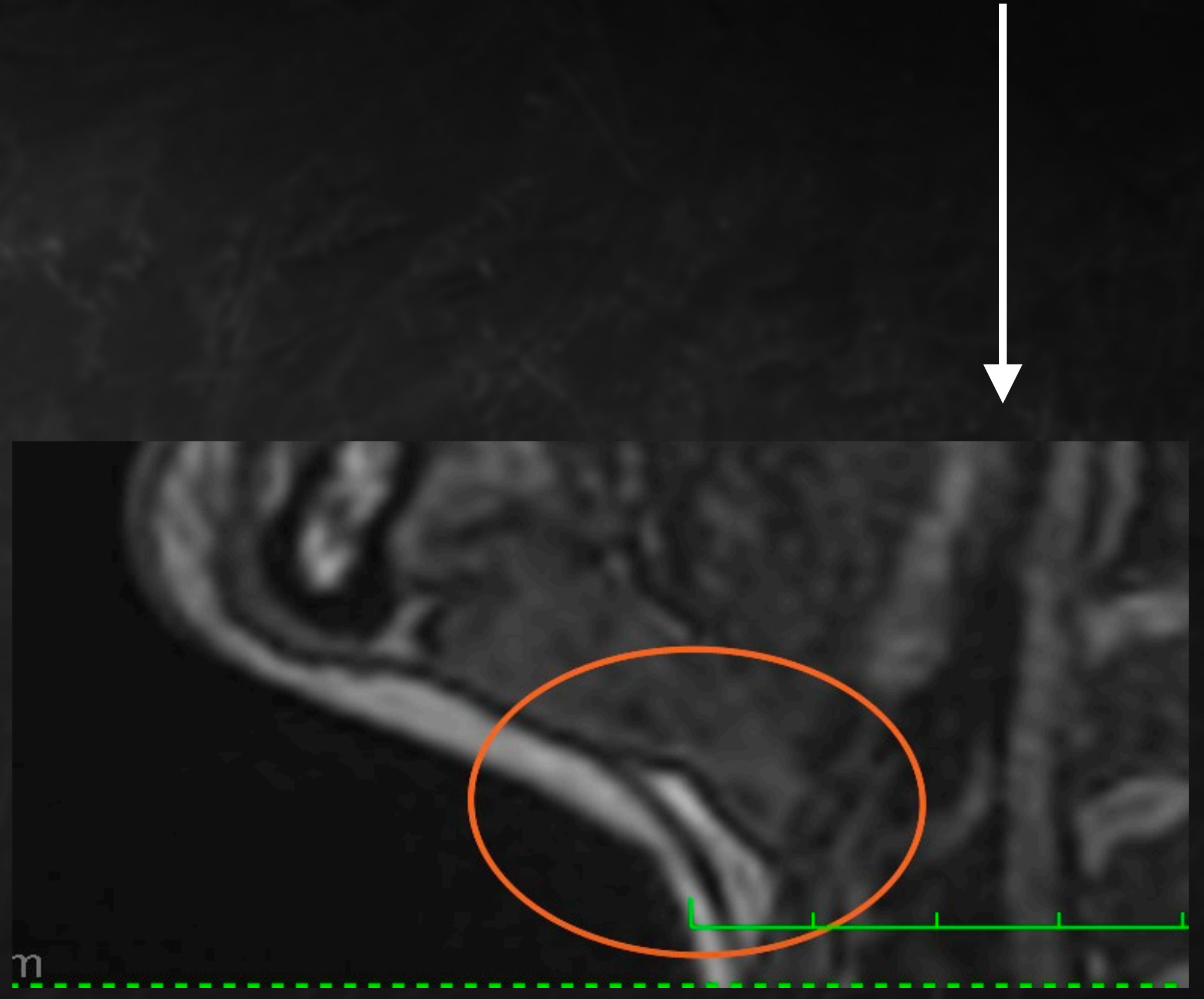




¿Hasta qué punto podemos ser precisos inyectando a ciegas y con la técnica del pinzamiento de los tejidos cervicales?





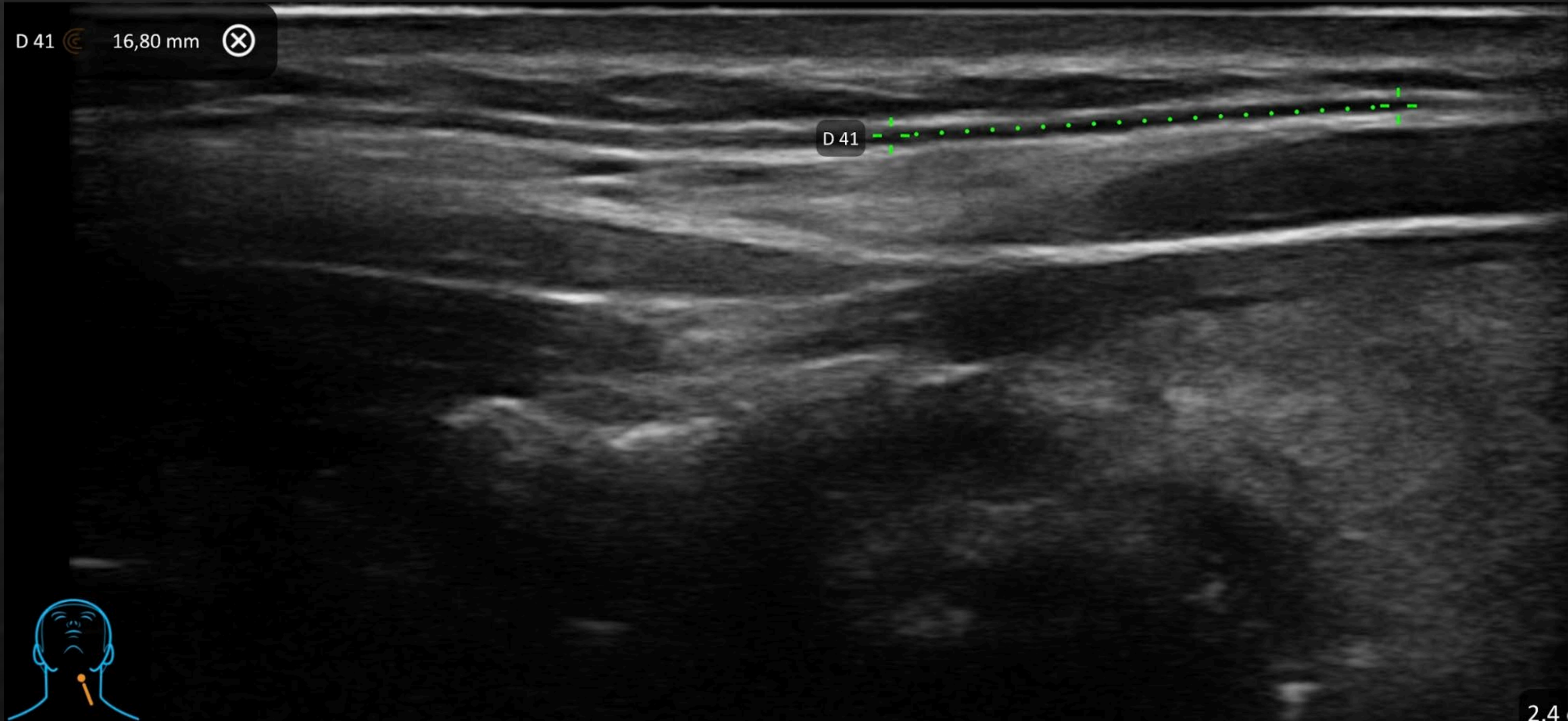




L15\_Dra.Karina Ravera  
Cirugía Plástica



D 41 16,80 mm





L15\_Dra.Karina Ravera  
Cirugía Plástica



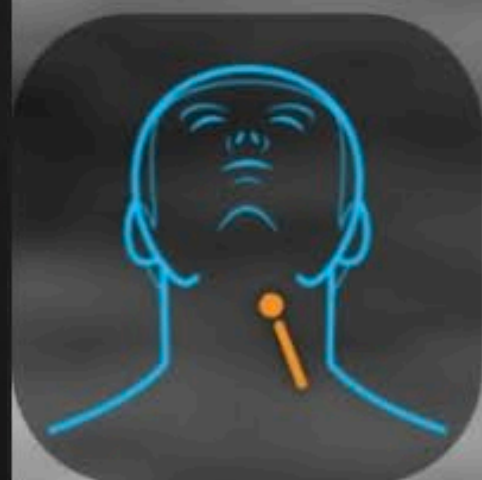
D 42 0,5555 mm



D 43 0,3612 mm



0,2 cm



0,7 cm



L15\_Dra.Karina Ravera  
Cirugía Plástica



D 44 1,523 mm



D 45 0,6635 mm



PLANO GRASO PREPLATISMAL

D 44

D 45



2,1 c



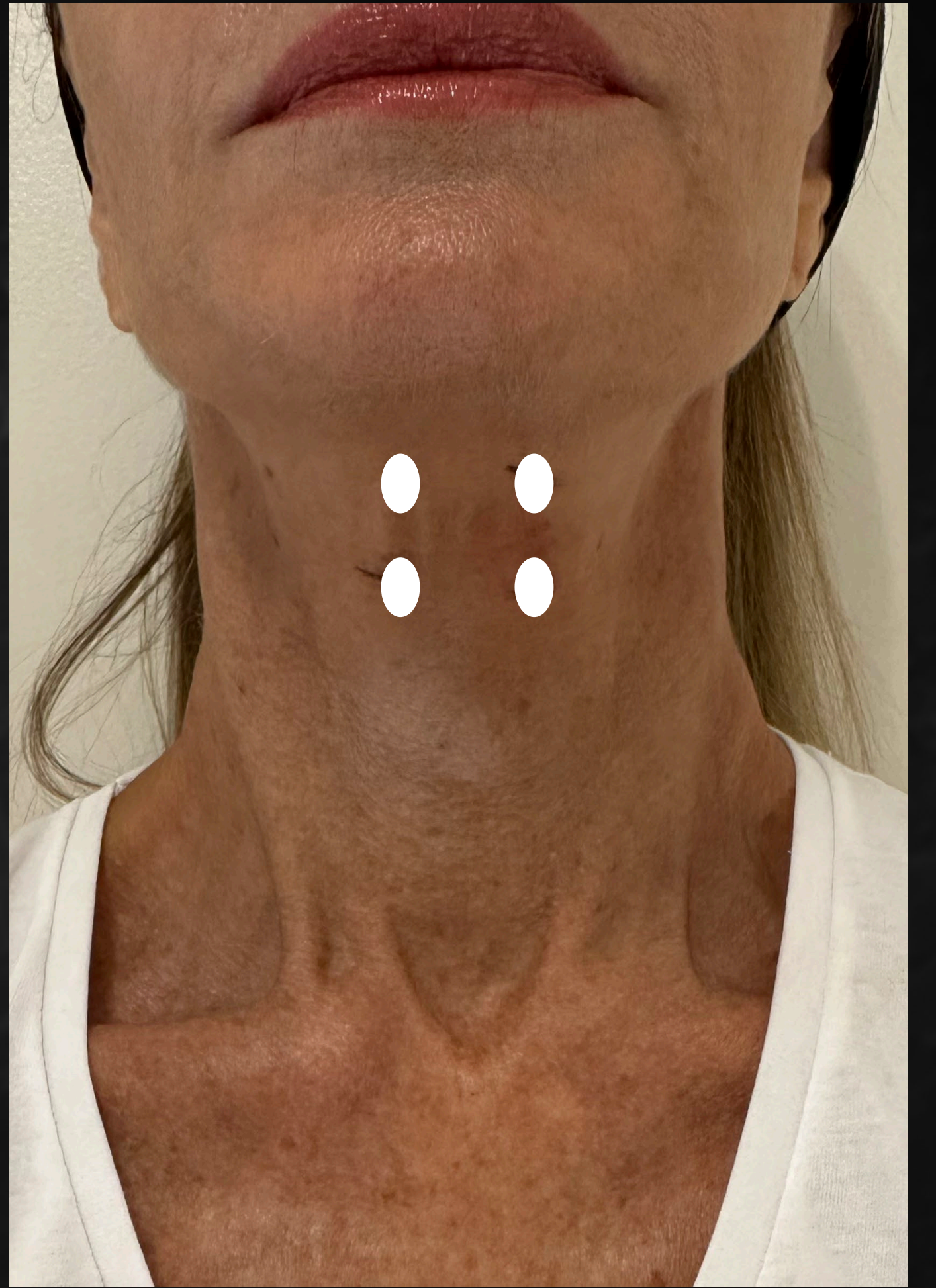
**Botulinum Toxin Treatment for Mild to Moderate Platysma Bands: A Systematic Review of Efficacy, Safety, and Injection Technique** FREE

Conor M Sugrue, MCh, MRCS, MB, BCH, BAO ✉, Jack L Kelly, FRCS (Plast), MD, Niall McInerney, FRCS (Plast), MD

*Aesthetic Surgery Journal*, Volume 39, Issue 2, February 2019, Pages 201–206, <https://doi.org/10.1093/asj/sjy179>

**Complicaciones 15,5 %**


- Disfonía
- Disfagia
- Asimetría
- Debilidad muscular cervical
- otras

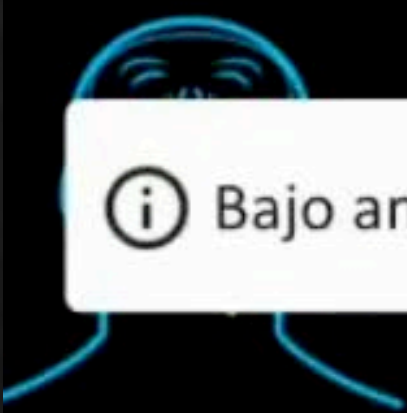


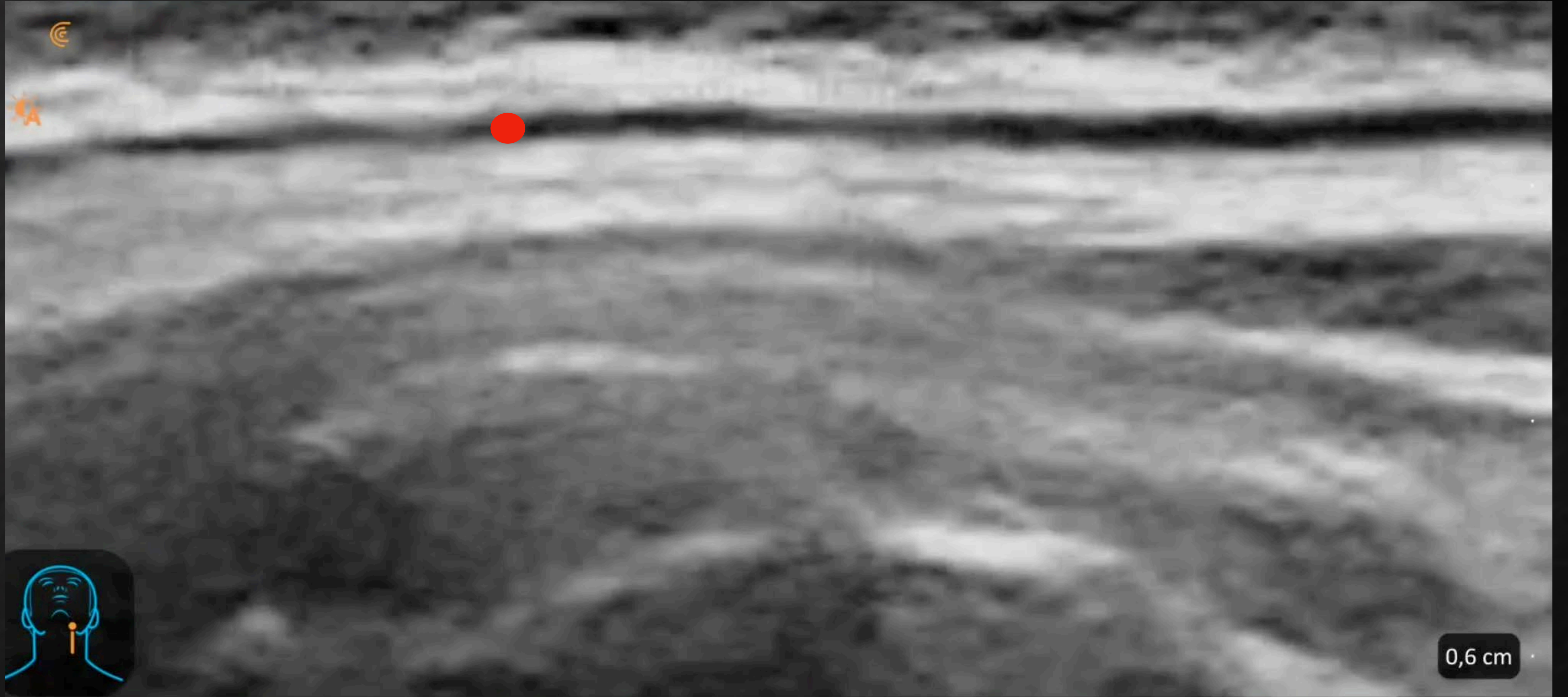






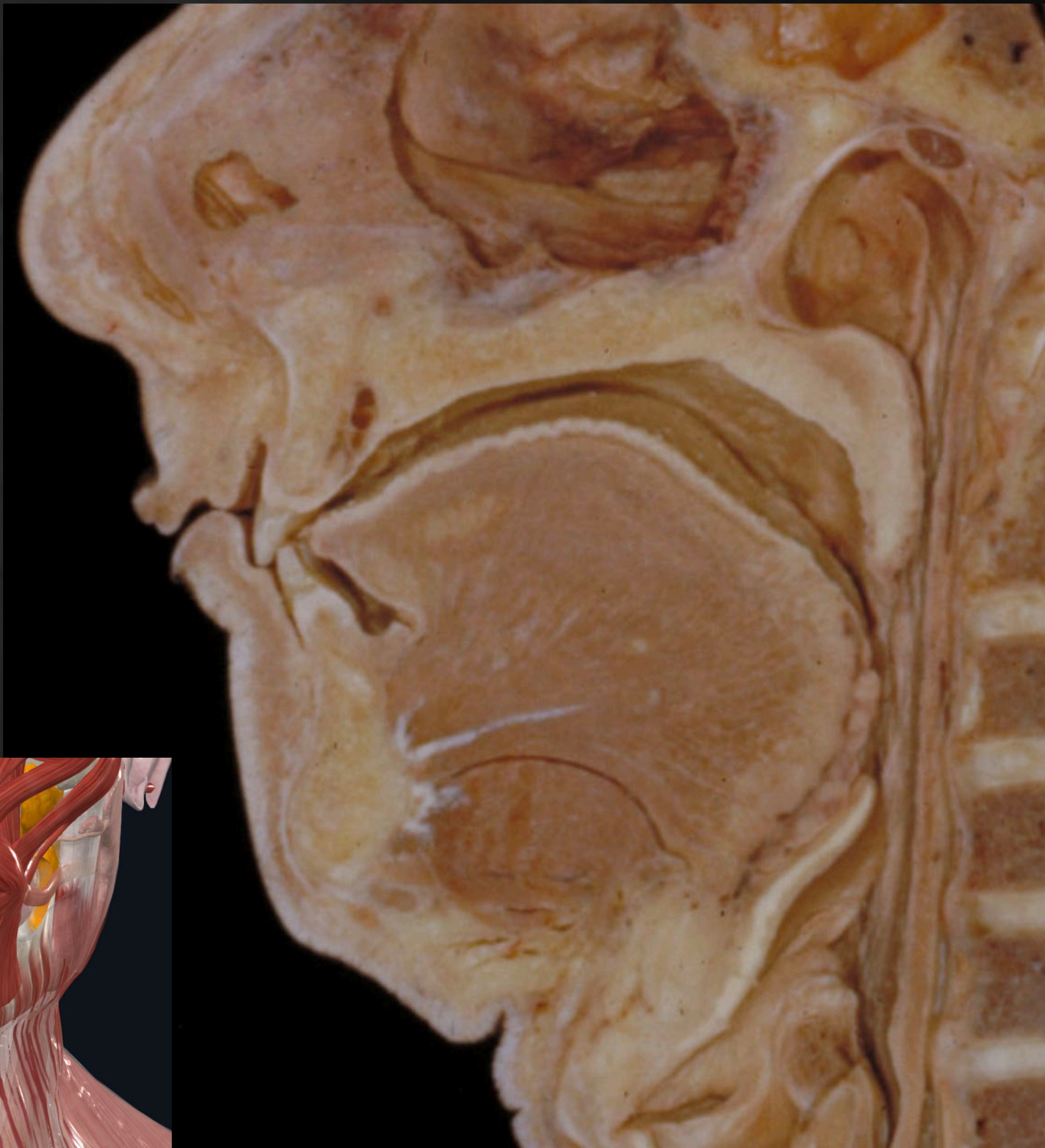
 Bajo ancho de banda detectado, ajustando los parámetros de transmisión.



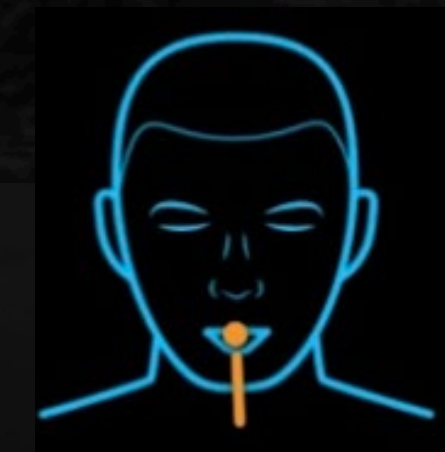
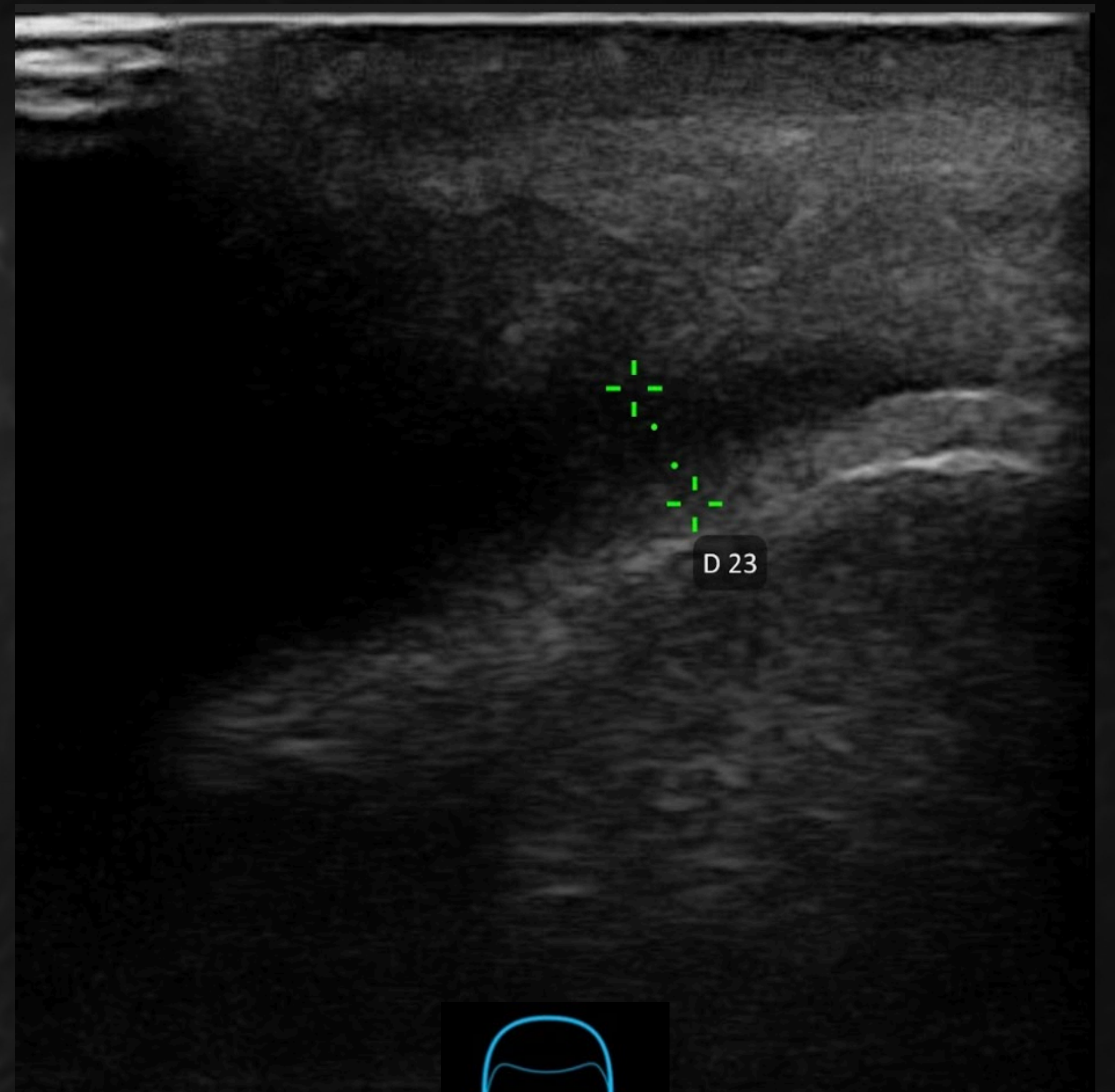
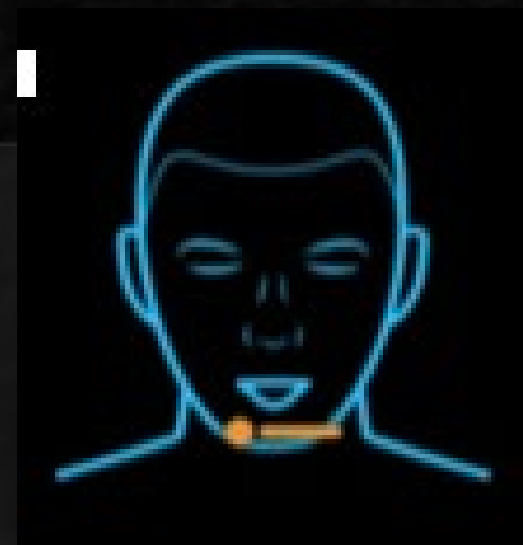
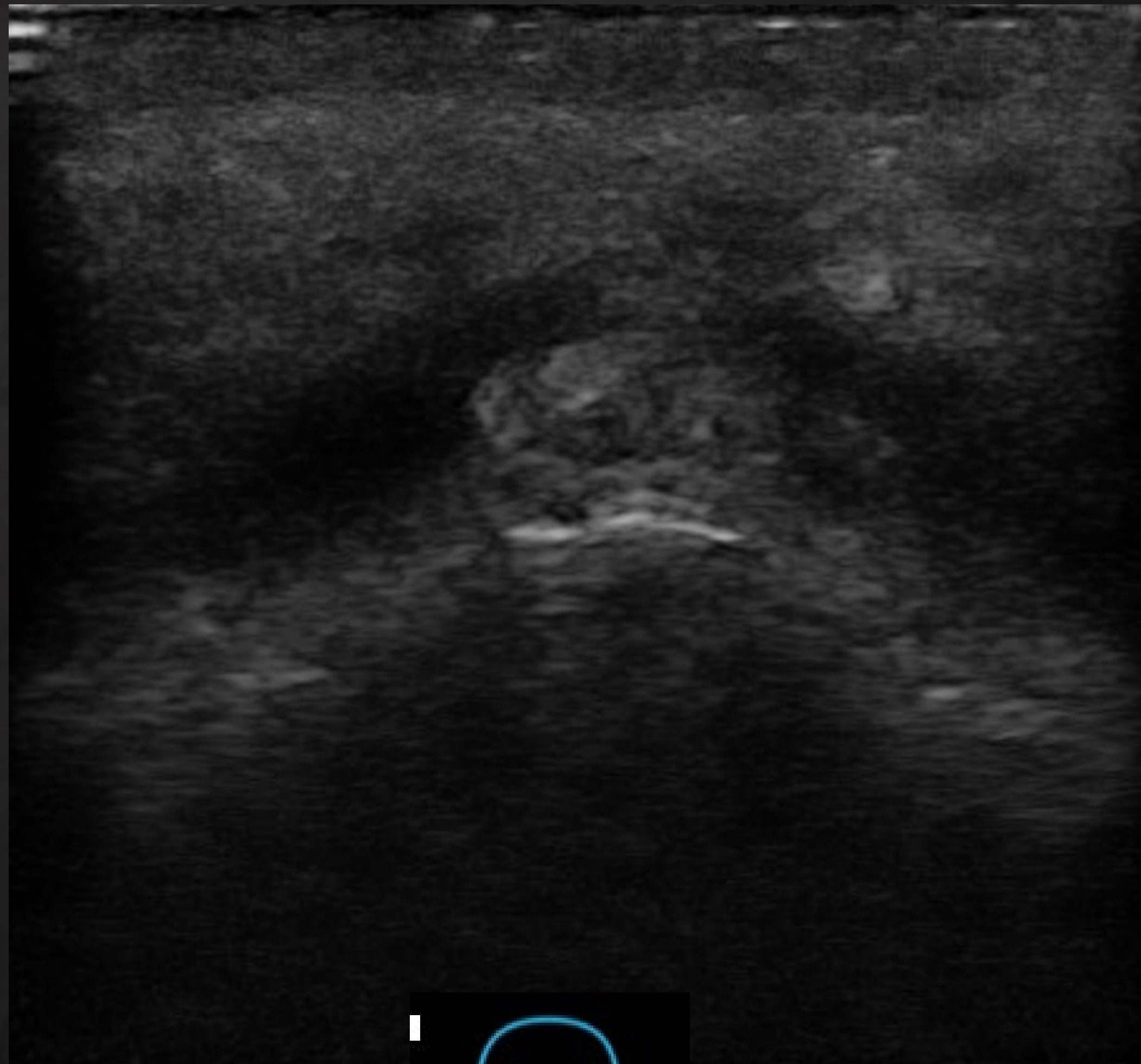


0,6 cm

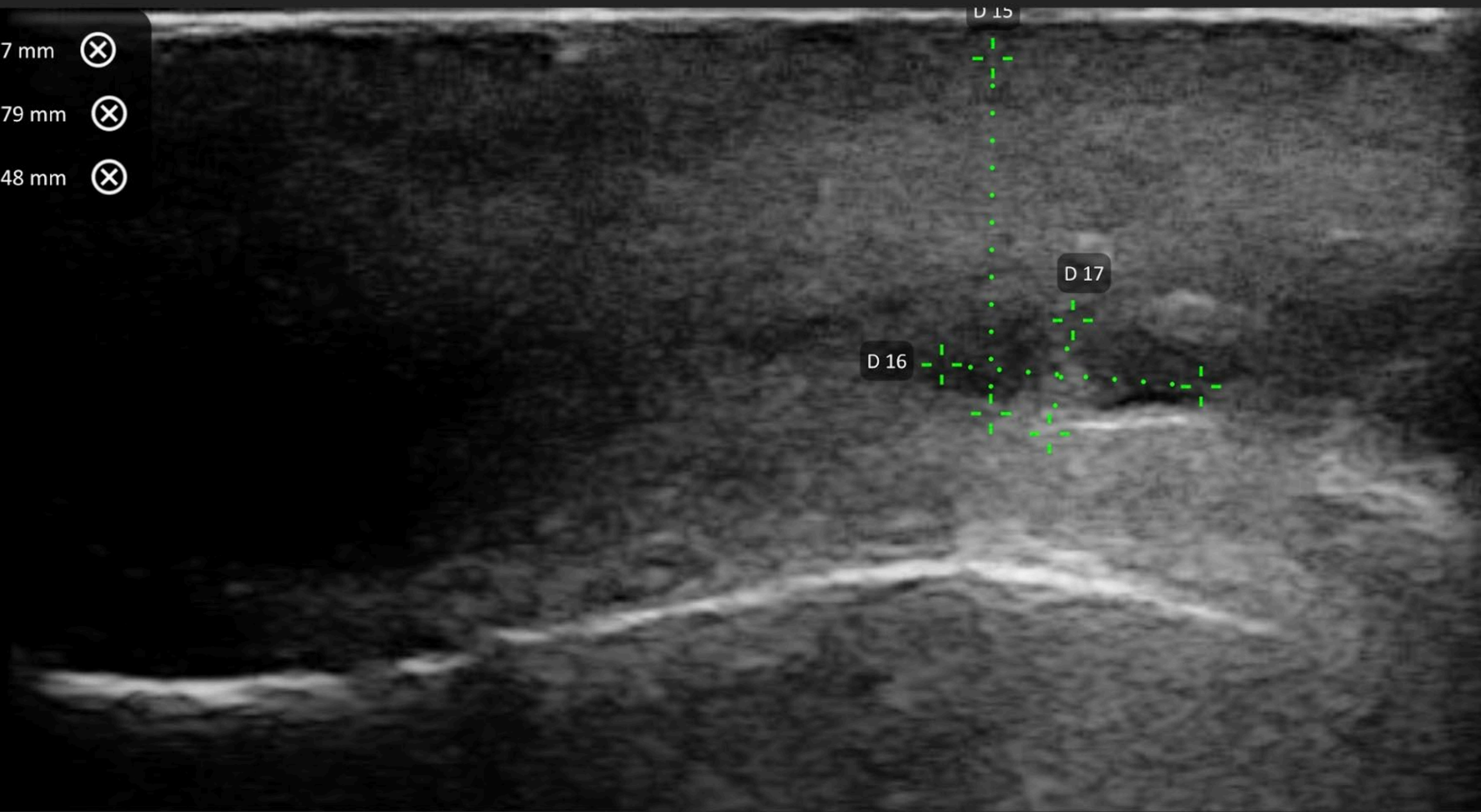
**5-** Inyección ecoguiada de toxina botulínica en el músculo **Mentalis**

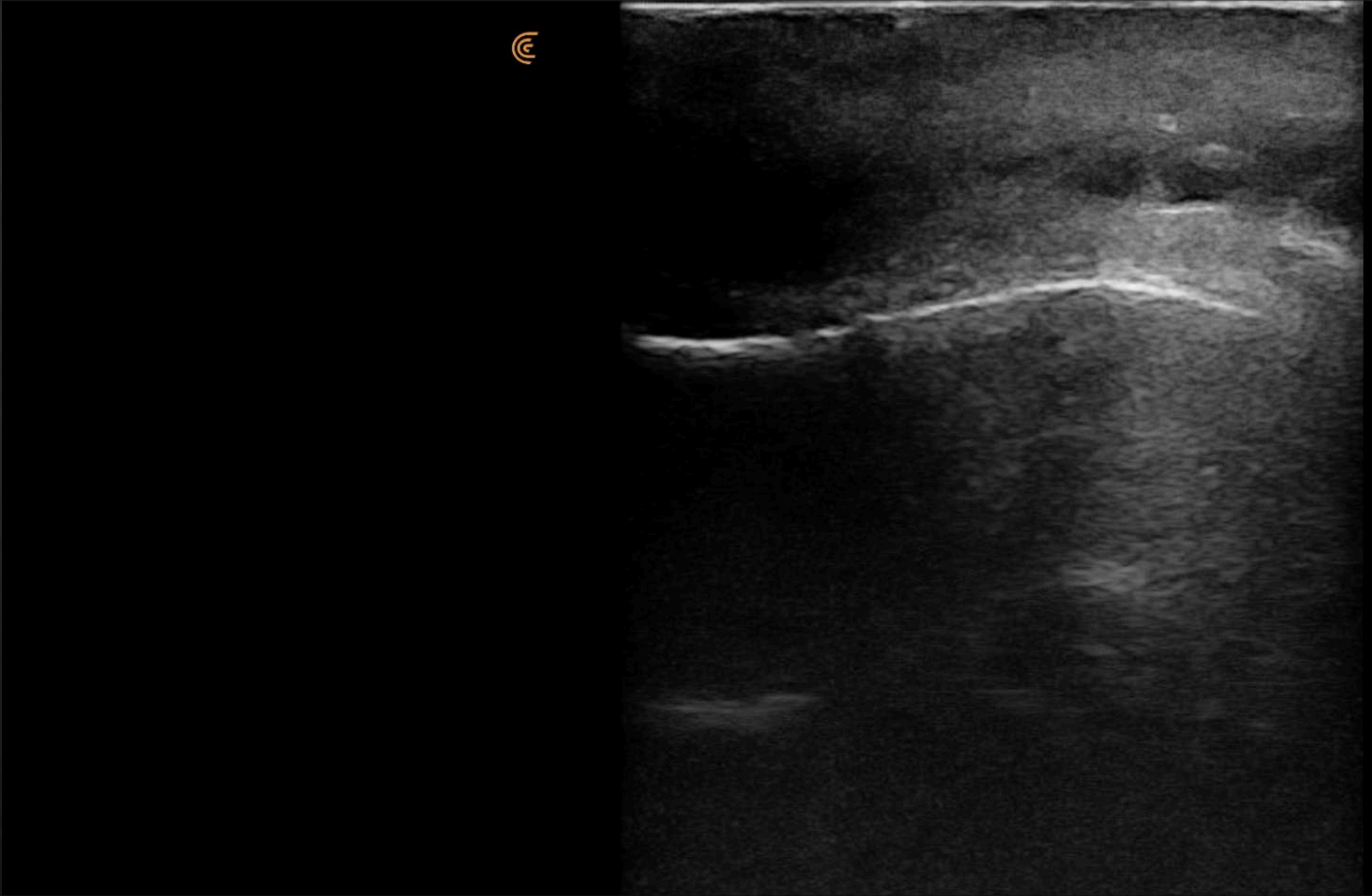


# Anatomía ecográfica del Músculo mentales

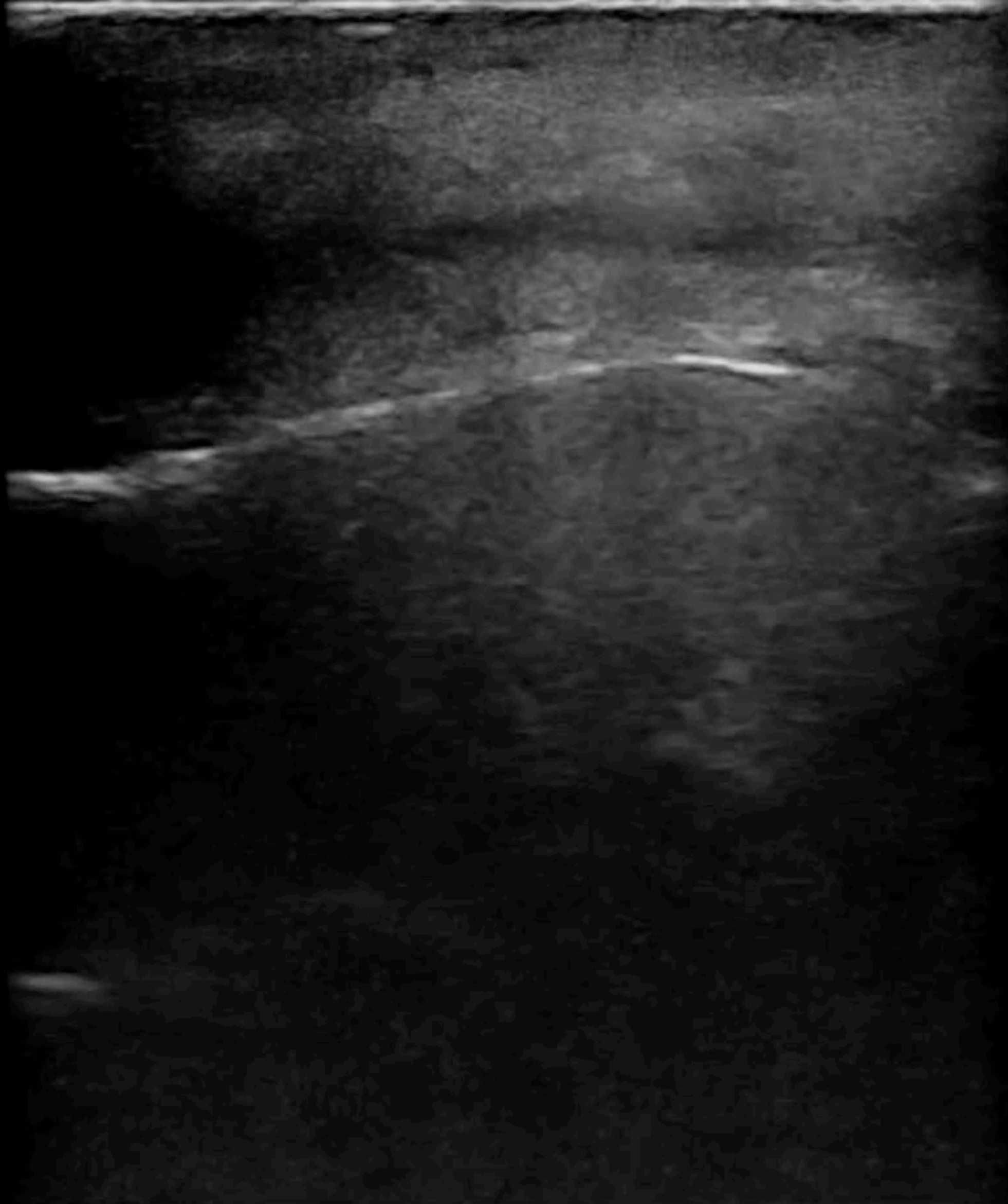


- D 15 5,97 mm
- D 16 4,379 mm
- D 17 1,948 mm









## Conclusiones

### Quimiodnervación TB ecoguiada HRUS

Localización exacta del músculo a inyectar

Visualización continua de la aguja

Evaluación dinámica y estática de la estructura muscular

Us es una de las técnicas mas importantes para guiar los tratamientos de quimiodenervación

Us es de fundamental importancia para evitar inocular estructuras no deseadas

Las inyecciones de quimiodenervación a ciegas son menos eficaces y menos seguras



## Conclusiones

### Quimiodnervación TB ecoguiada HRUS



Ajuste de dosis acorde a los espesores tisulares.

Inoculaciones son altamente precisas.

Útil para cosas de asimetrías marcadas (ajuste de la técnica)

Variantes anatómicas.



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**Dra Karina Ravera**  
Radióloga  
Medicina Estética

**Dra Patricia Oyole**  
Anatomista  
Cirujana Maxilofacial

# Muchas gracias

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**Shelley Guenther, CRGS, CRCS**

Responsable de Marketing Clínico



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- Clarius Live Telemedicina
- Usuarios ilimitados

# *Preguntas?*



*Dra. Karina Ravera*

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*Shelley Guenther*

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*Jeronimo Maluenda  
Doñate*

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¡Gracias!