

The Tentorial Venous Sinuses: Anatomy and Pathology

Professor R. Shane Tubbs

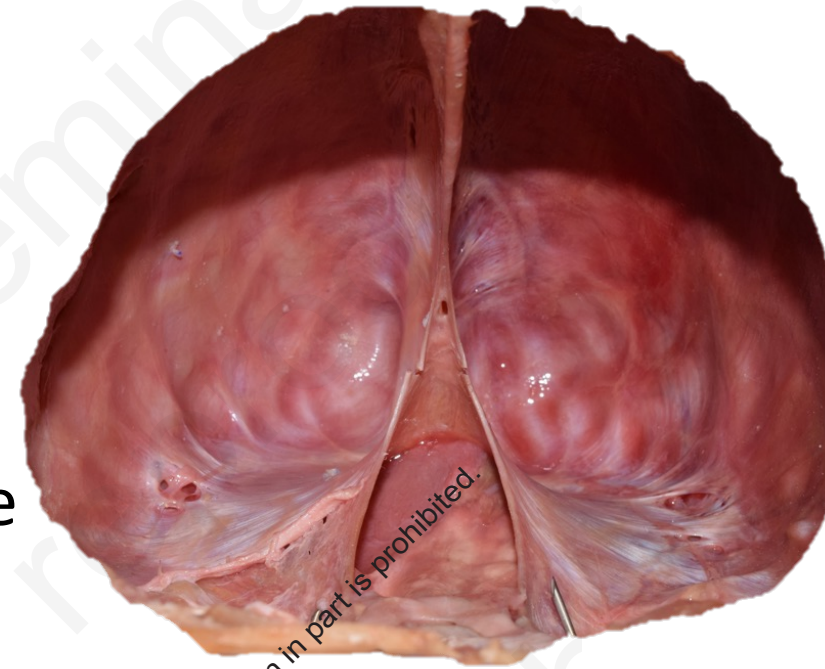
Departments of Neurosurgery, Neurology, Surgery and
Cellular Biology

Tulane University School of Medicine

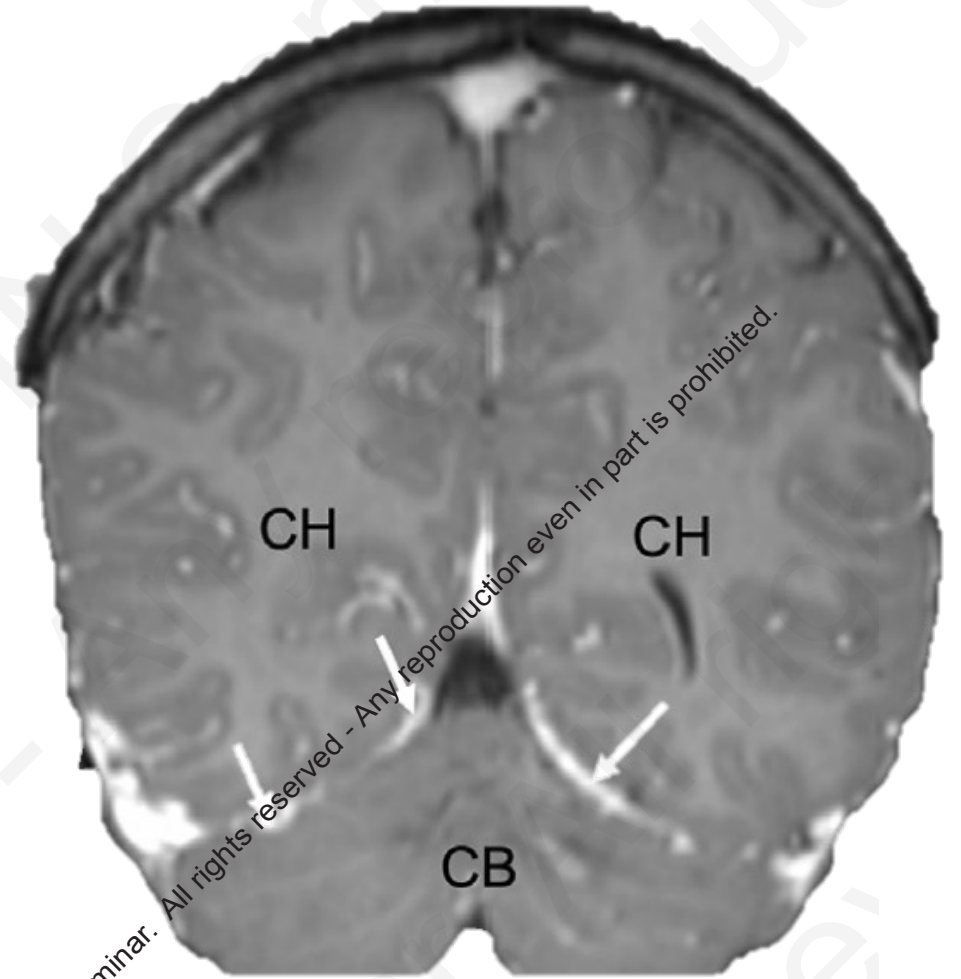
New Orleans, LA, USA

Tentorium cerebelli

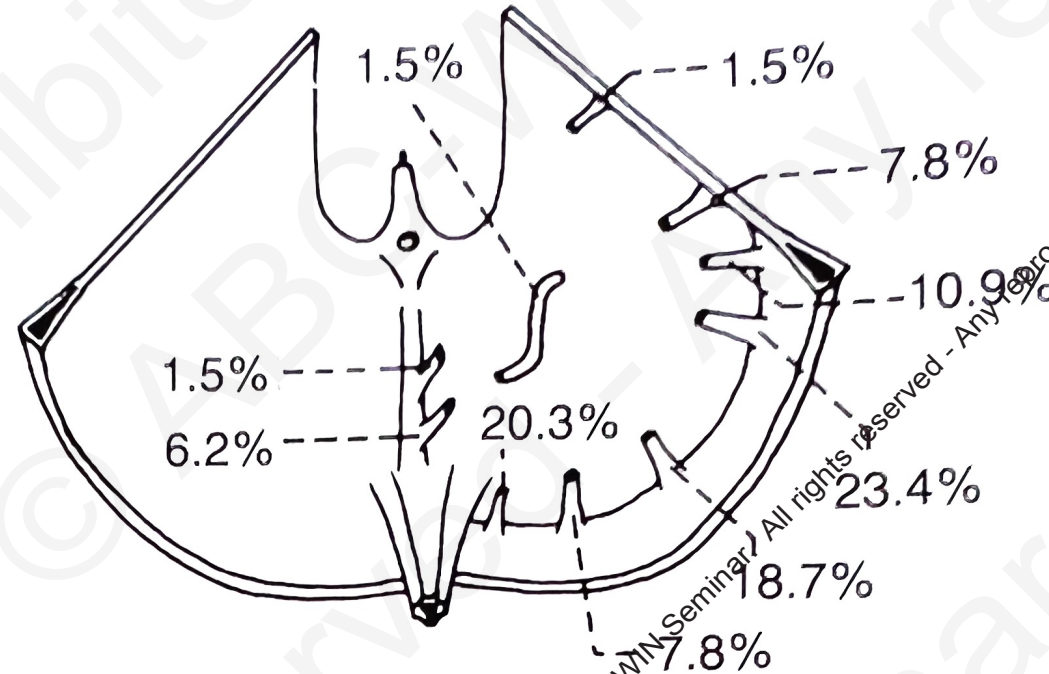
- Tentorium: *tentus* stretched out (on cords); tent made of stretched skins
- Tabernaculum: tent stretched out on a wooden frame
- Tentorium hypophyseos: diaphragma sellae
- Tentorium cerebelli
- Described by Galen
- Called processus durae matris secundus by Vieussens (1684)
- Named tentorium cerebelli by Winslow (1733) who also called it the diaphragm of the brain

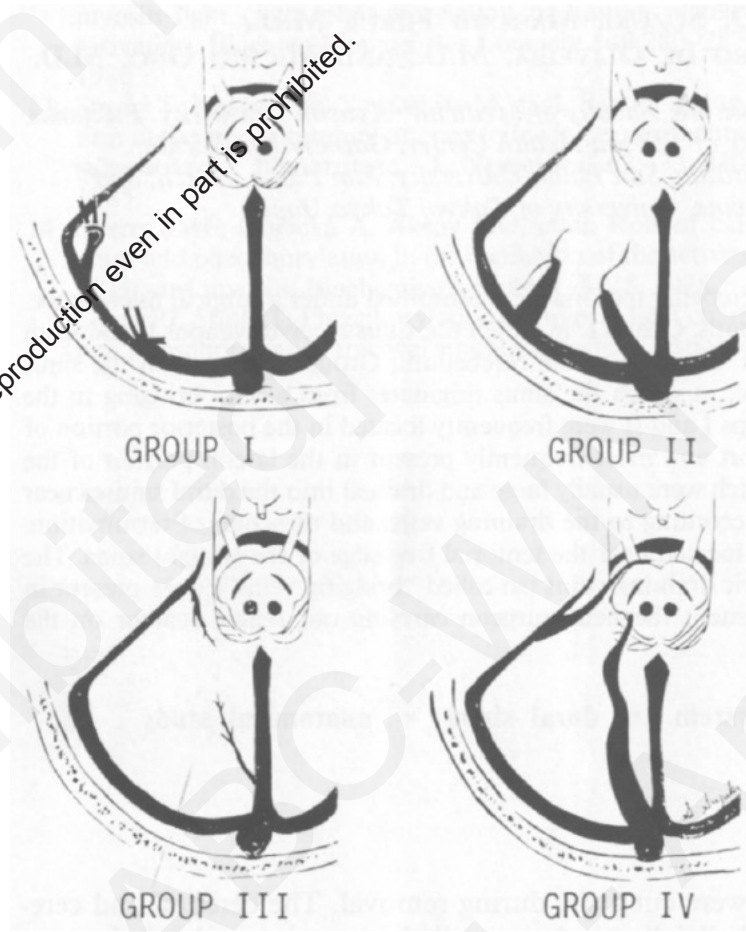


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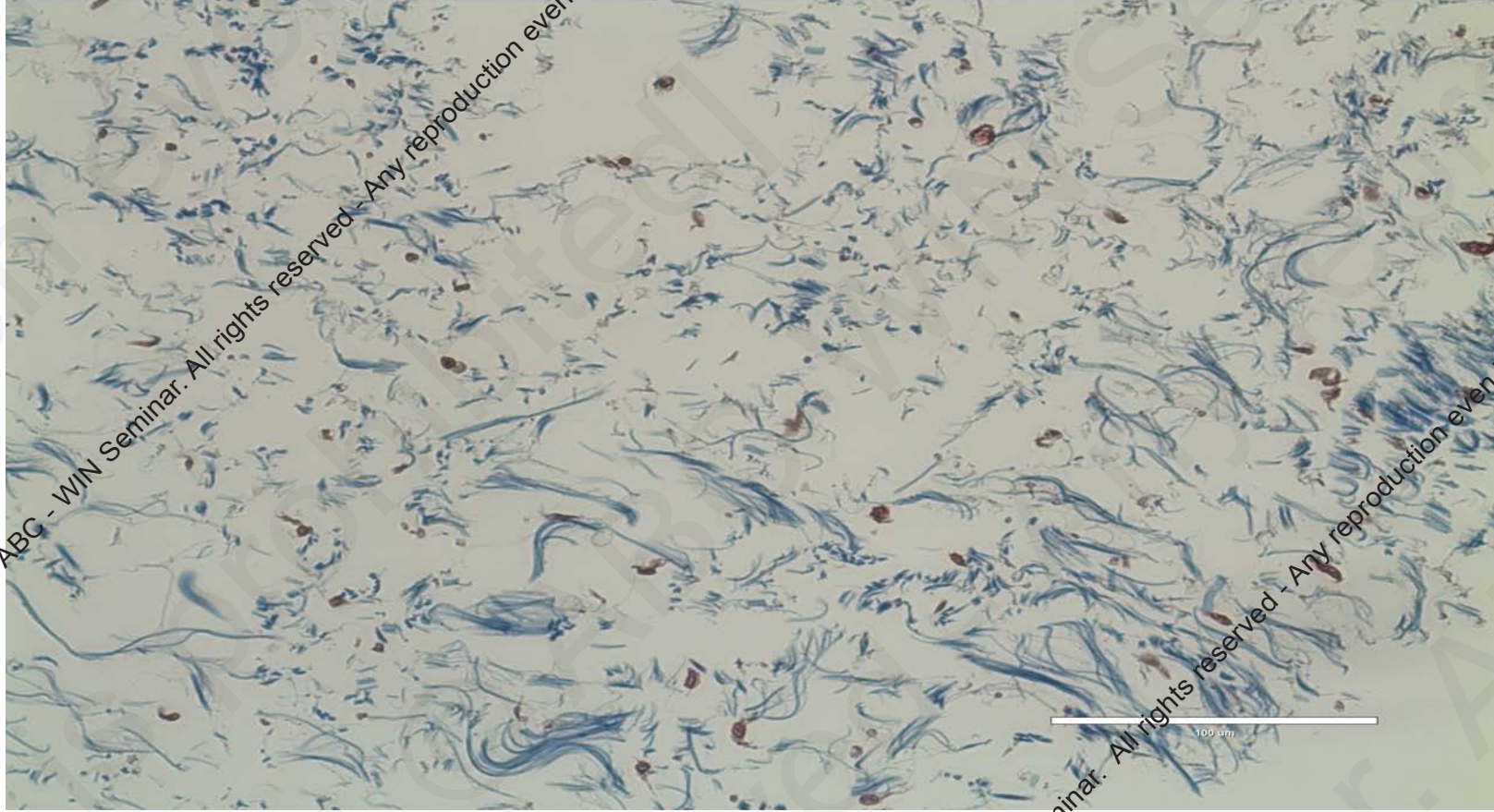


Microsurgical anatomy of the **tentorial sinuses**.

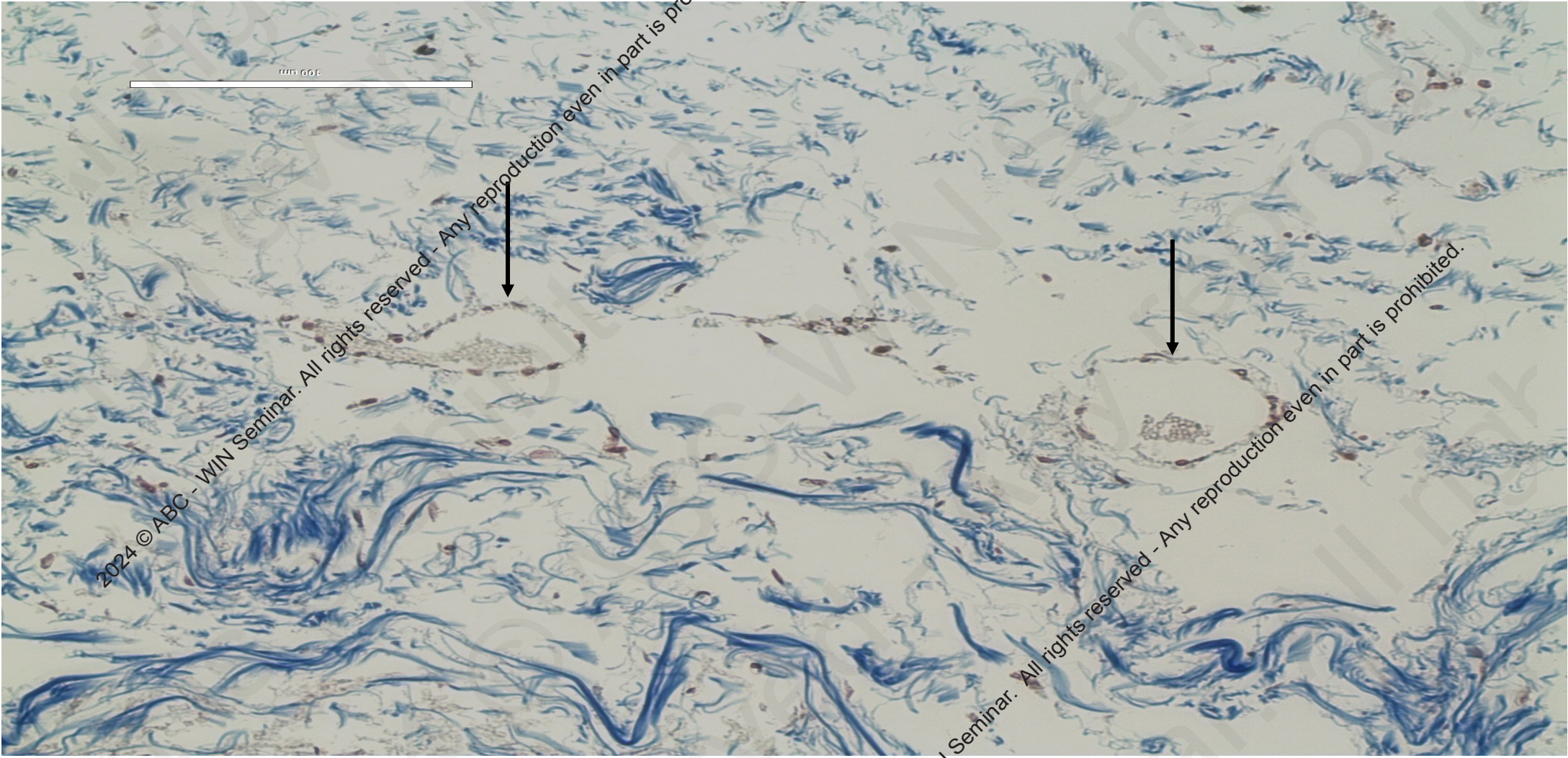
Matsushima T, Suzuki SO, Fukui M, Rhoton AL Jr, de Oliveira E, Ono M.

J Neurosurg. 1989 Dec;71(6):923-8. doi: 10.3171/jns.1989.71.6.0923.

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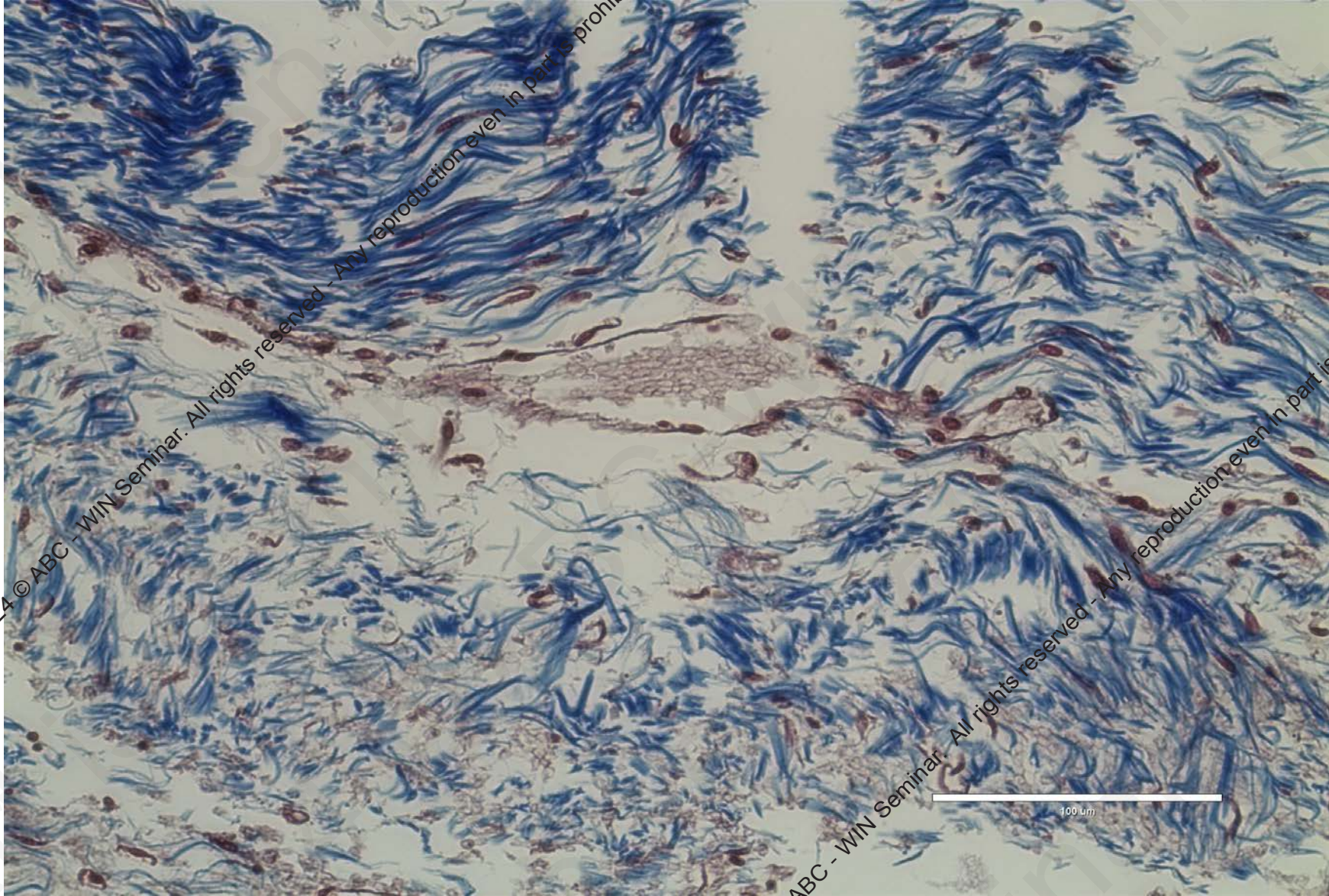


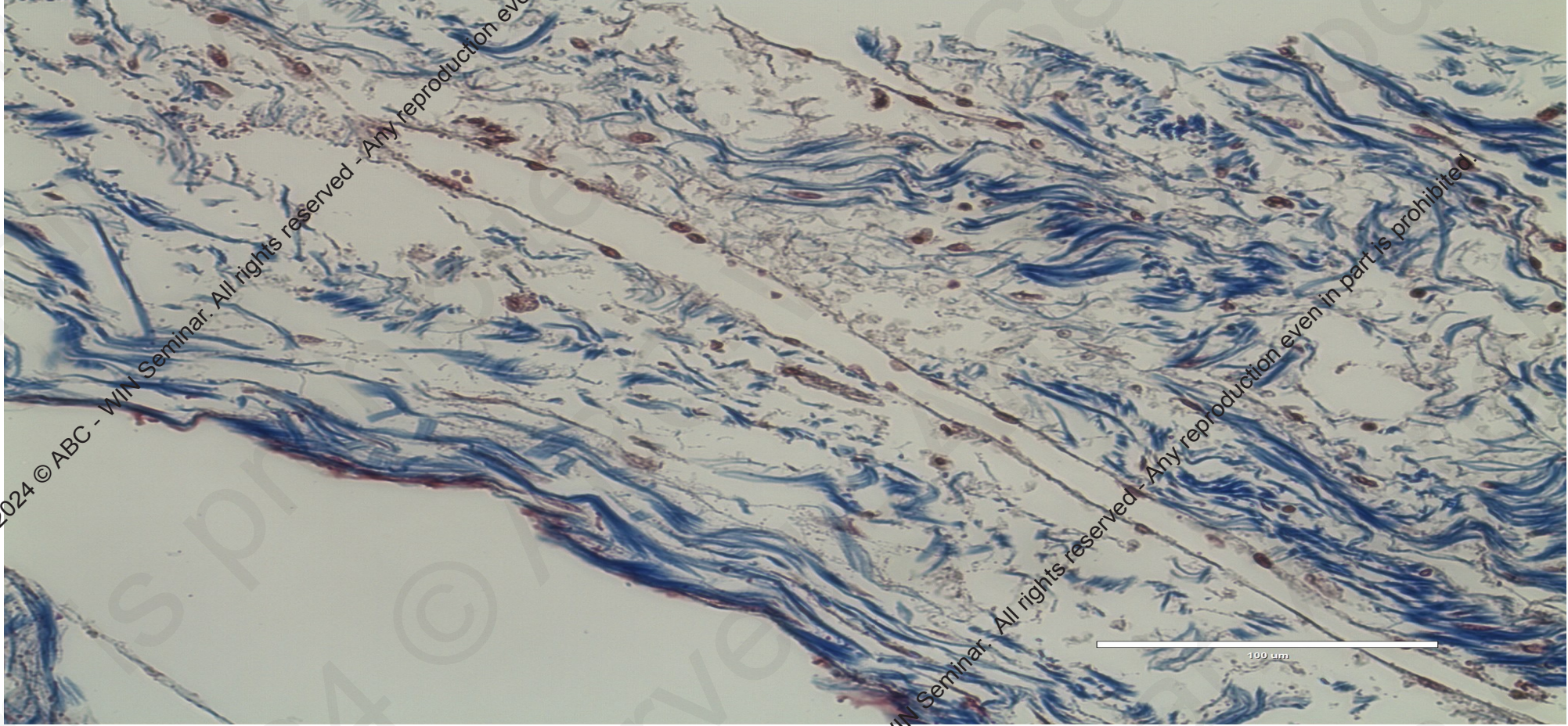
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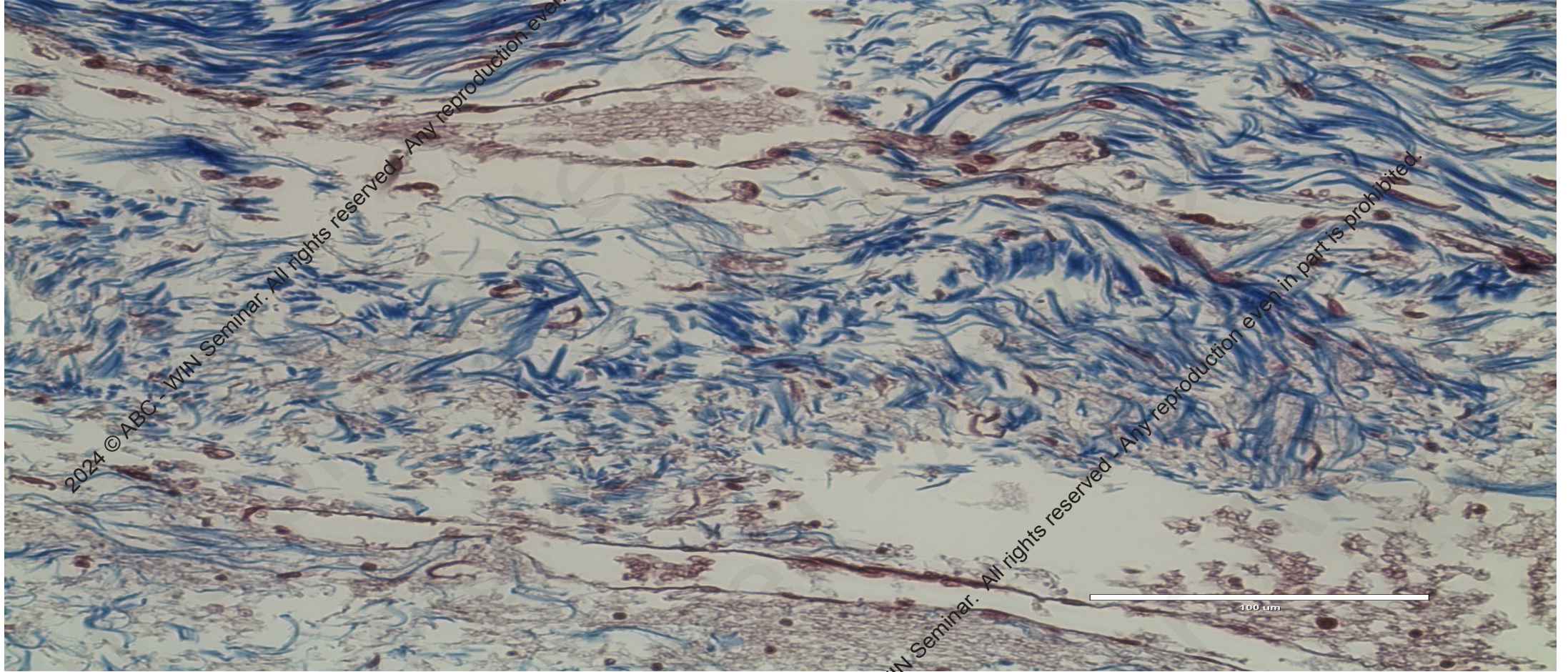
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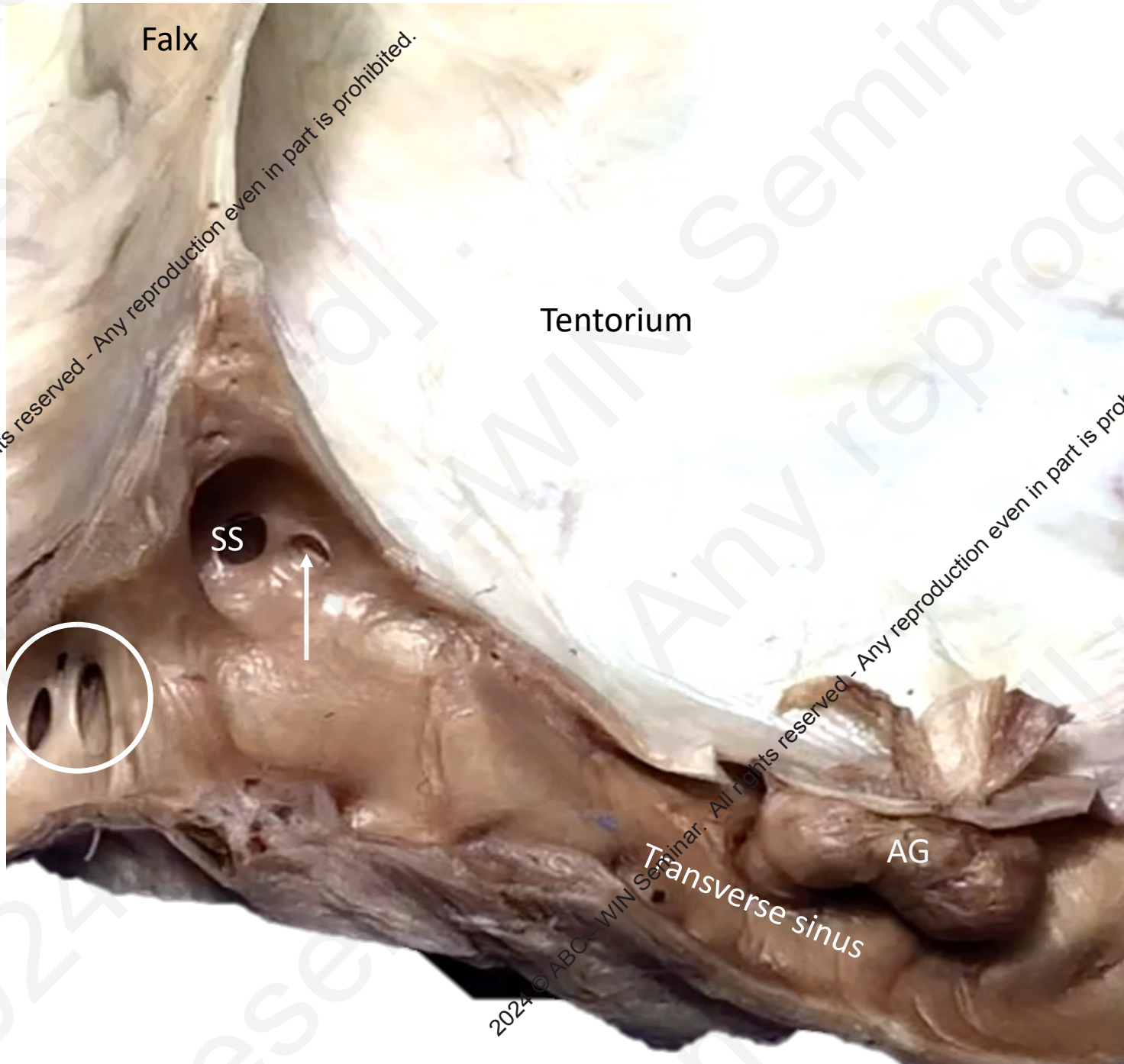
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Falx

Tentorium

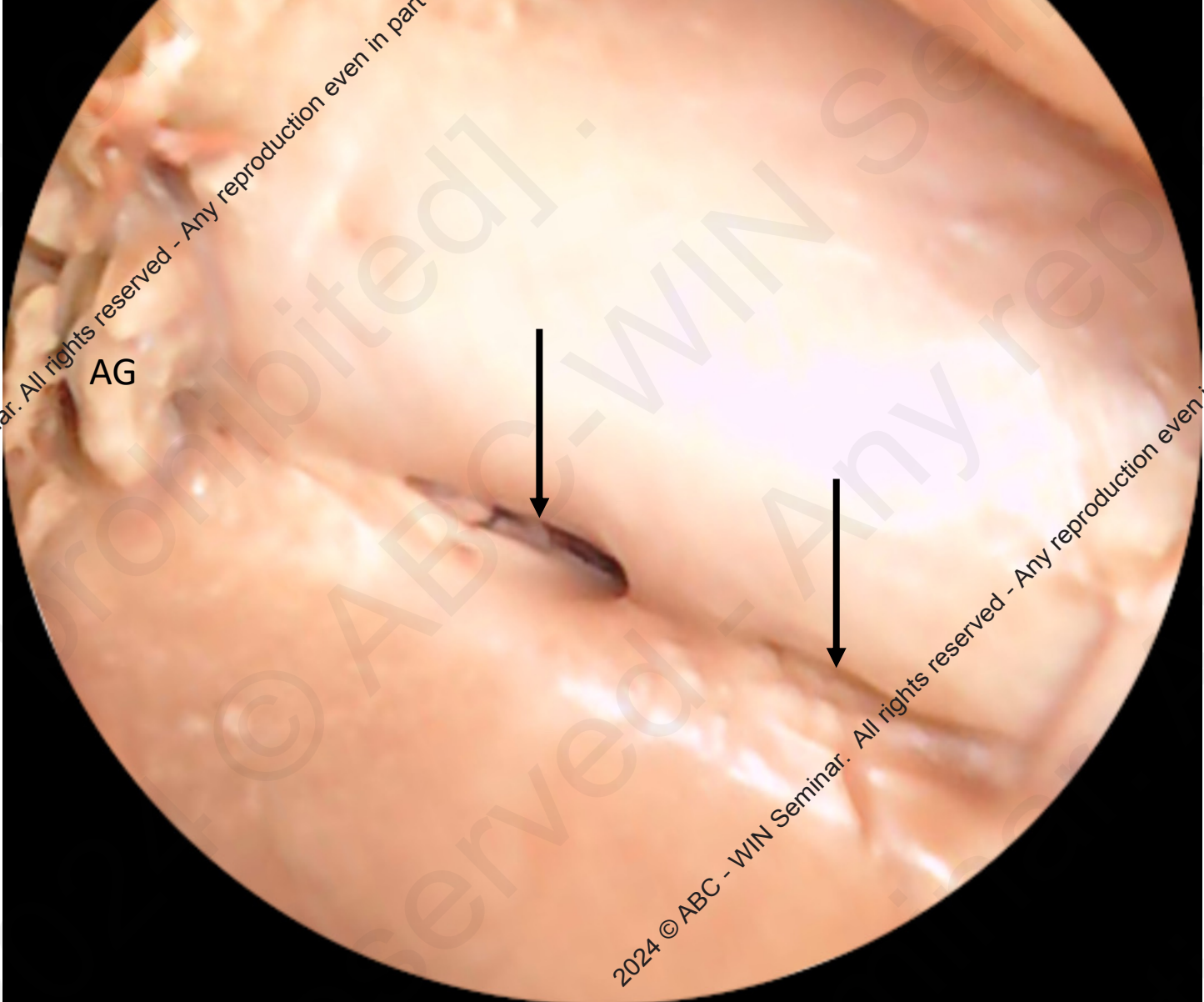
SS

Transverse sinus

AG

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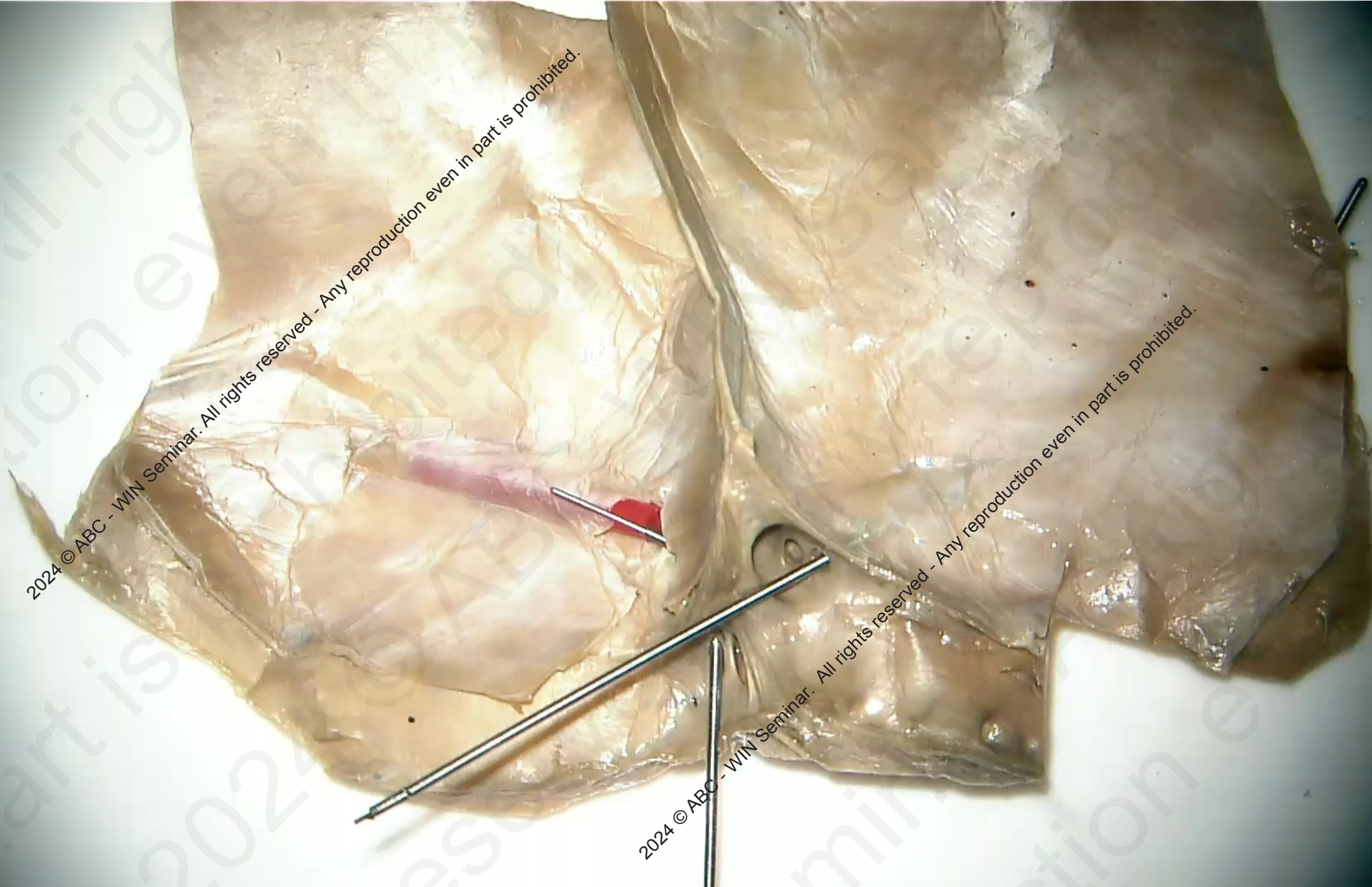
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AG

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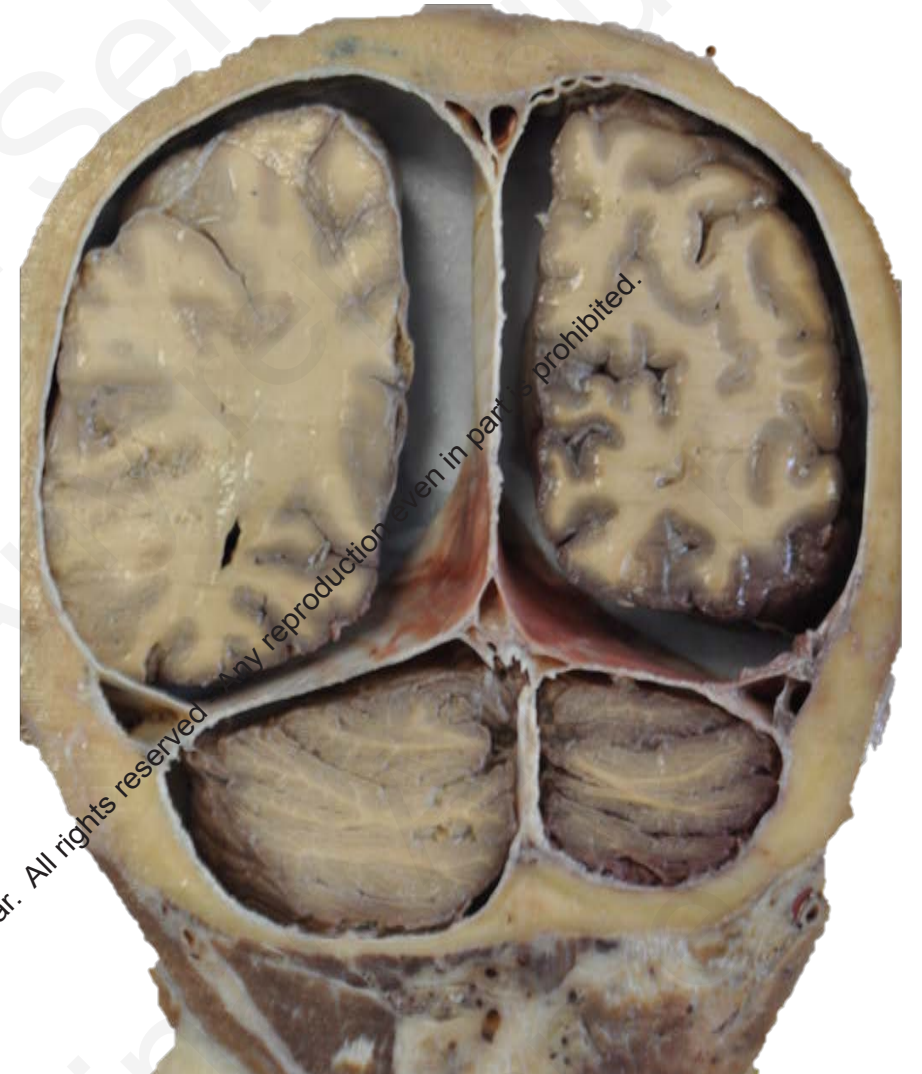
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Pathological Considerations

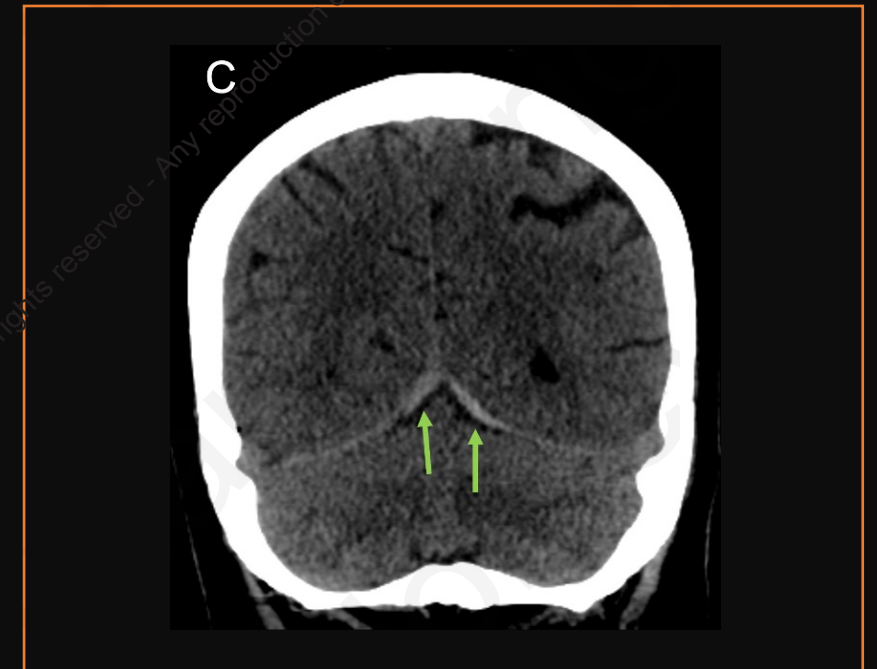
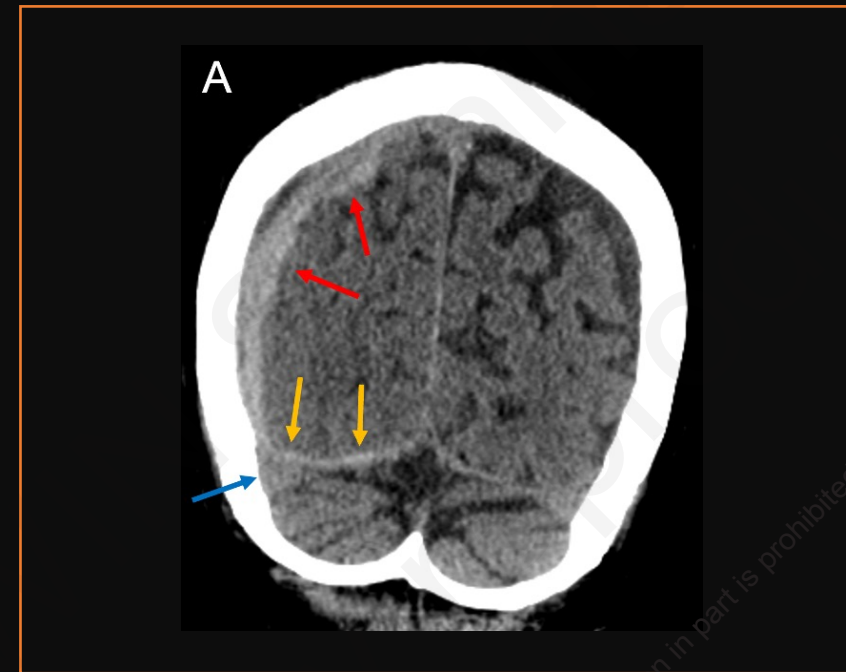
- Petrotentorial tumors
- Tentorial arteriovenous fistulas
- Supra/infratentorial subdural hematomas



Revisiting the Tentorial Venous Sinuses: Anatomical and Histological Study

Keaton N Ott¹, Arada Chaiyamoon², Juan J Cardona¹, Francisco Rana³, Ana Carrera³,
Joe Iwanaga⁴, Aaron S Dumont¹, Juan E Small⁵, R Shane Tubbs¹

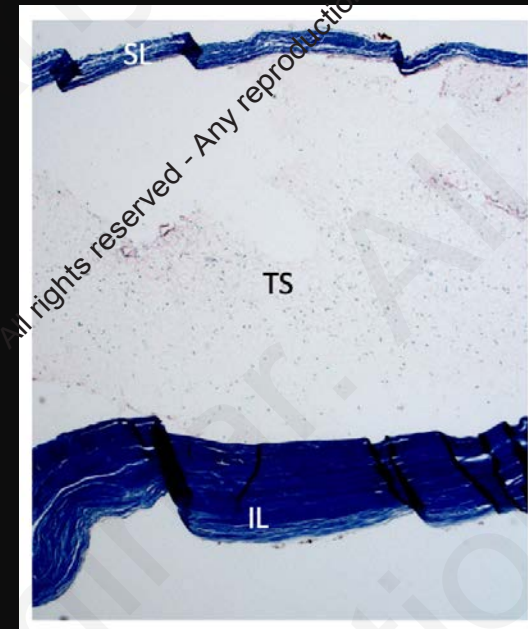
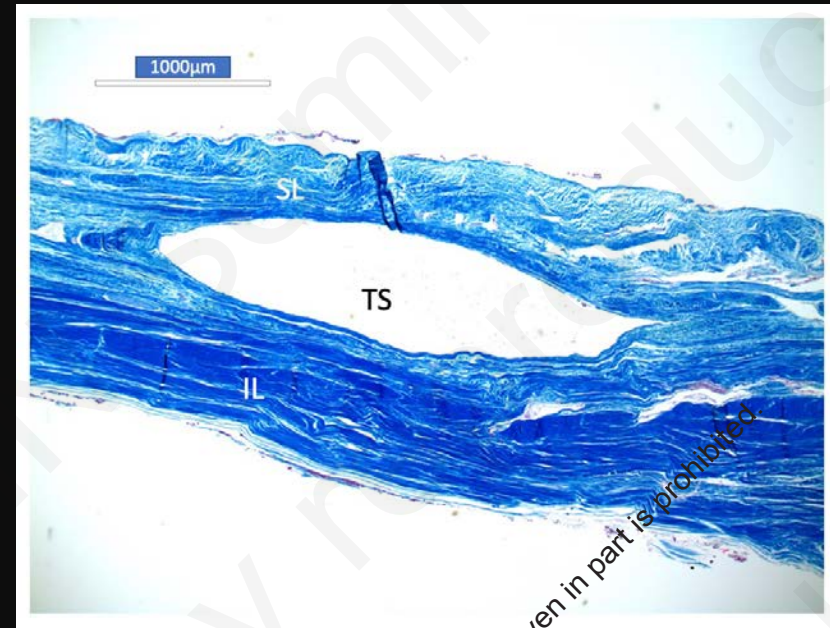
- Localized differences in the incidence of subdural hematomas have been observed regarding their position to the tentorium cerebelli, with supratentorial subdural hematomas being more common than infratentorial subdural hematomas
- Anatomical basis for this observation had not been investigated and histological studies of the tentorium cerebelli are scant
- Using 15 fresh-frozen, latex-injected, adult cadaveric specimens, the tentorial sinuses and their bridging veins were evaluated with microsurgical dissection and histology



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Thickness of TC Layers

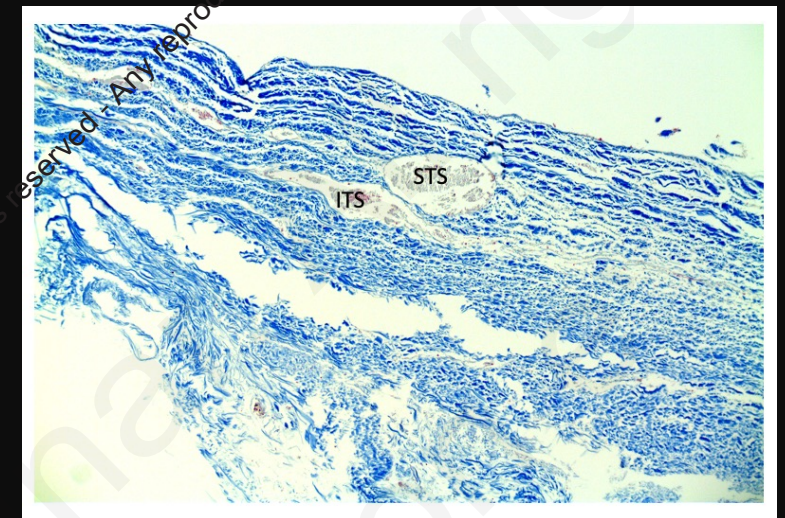
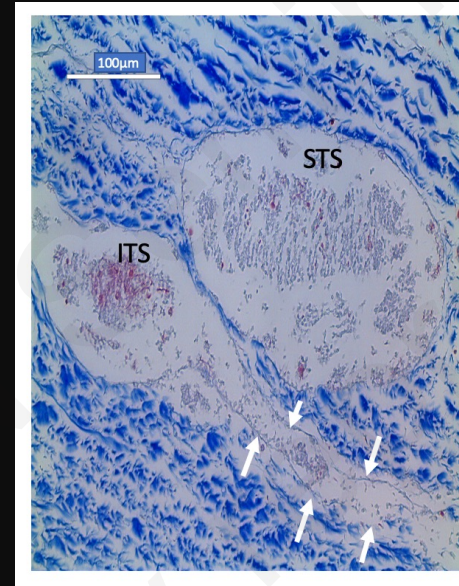
- Superior layer
 - Mean thickness of 0.22 mm
 - Range of 0.17-0.24 mm
- Inferior layer
 - Mean thickness of 0.26 mm
 - Range of 0.22-0.32 mm



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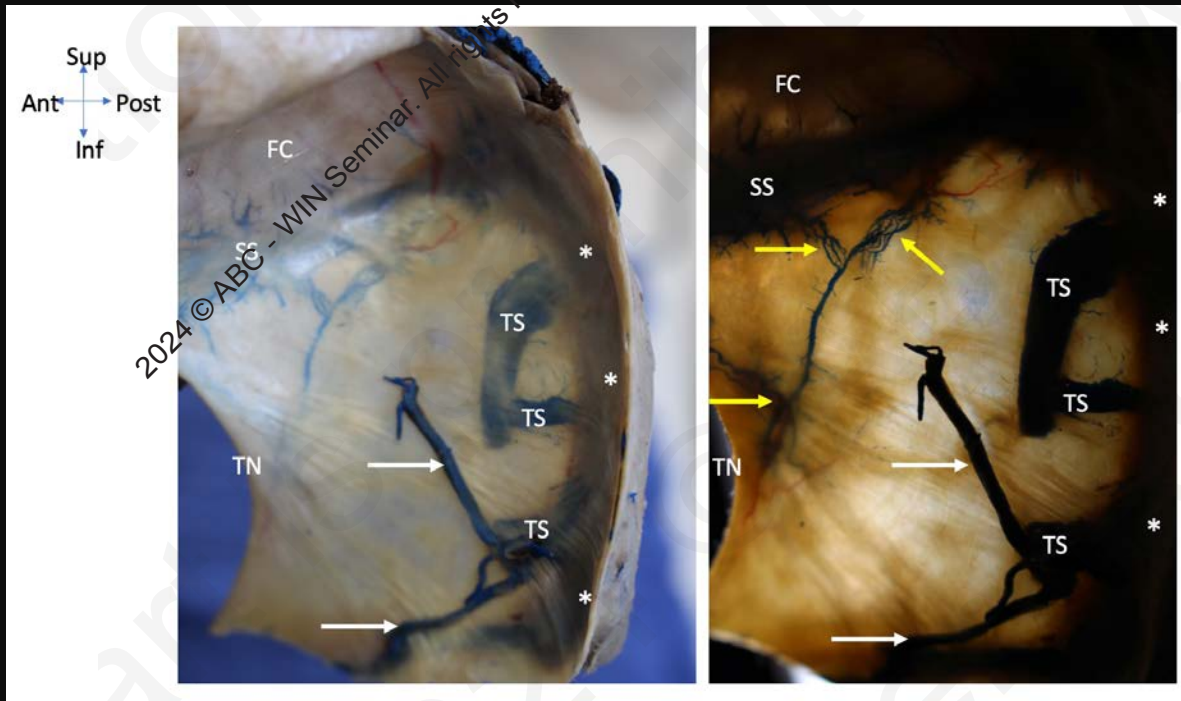
Superior and Inferior Tentorial Sinuses

- Observed in 8 of 15 (53.3%) specimens
- Two separate groups of tentorial venous sinuses
 - Superior tentorial sinus – draining cerebrum exclusively
 - Inferior tentorial sinus – draining cerebellum exclusively





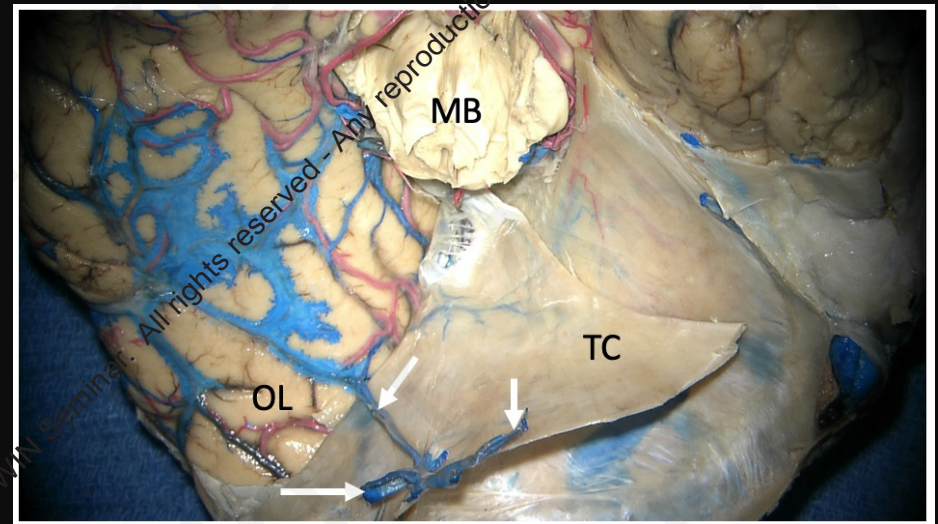
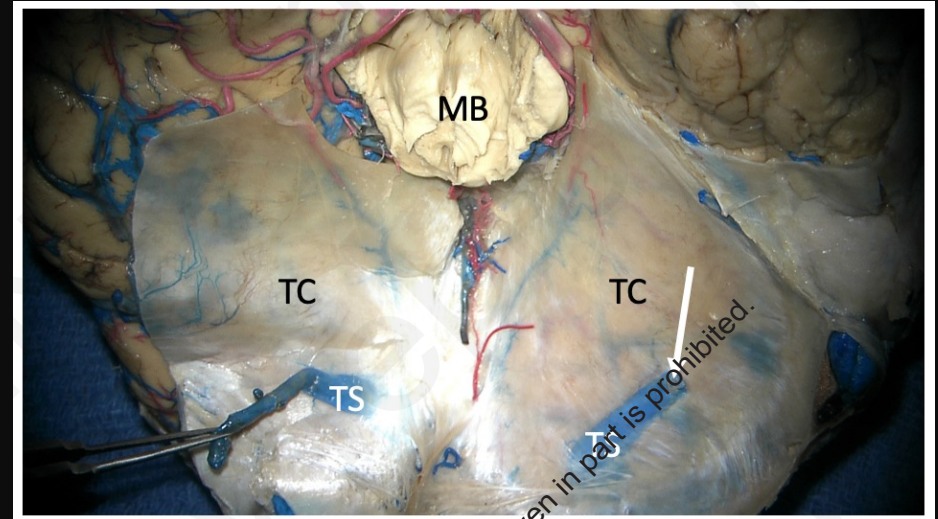
Types of Tentorial Sinuses

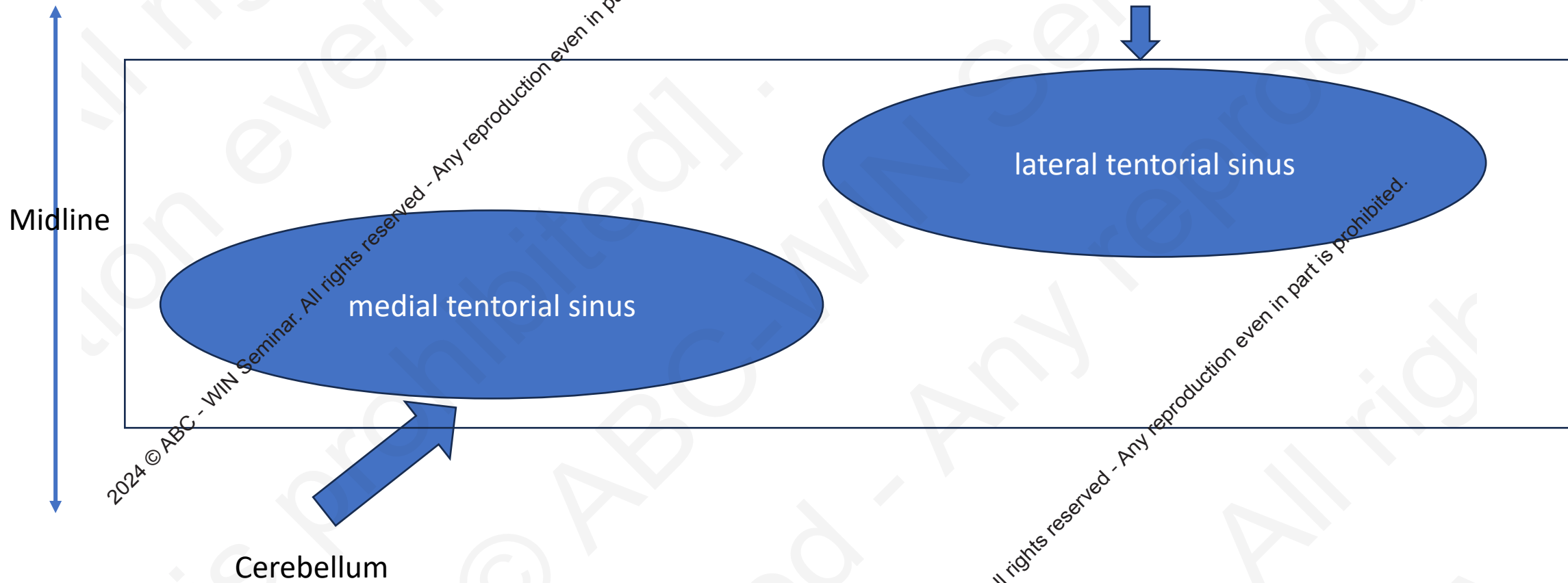


- Type 1
 - Small intrinsic plexiform sinus, <1 mm in diameter
 - Located more medially
 - No obvious connections to draining bridging veins on gross examination
- Type 2
 - Larger sinus, >1 cm in diameter
 - Located more laterally
 - Direct connections to bridging veins from the cerebrum and cerebellum

Superior and Inferior Bridging Veins

- Inferior bridging veins
 - More oblique course from cerebellar cortex to entry into the tentorium cerebelli
 - Majority traversed the tentorium as a distinct vein with an outer dural coat before entering the dilated tentorial venous sinus
- Superior bridging veins
 - More direct course from cerebrum, through superior layer of tentorium, into the tentorial sinus



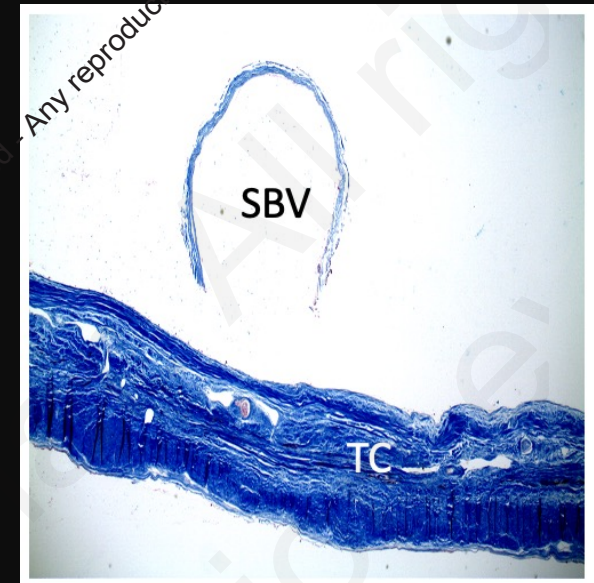
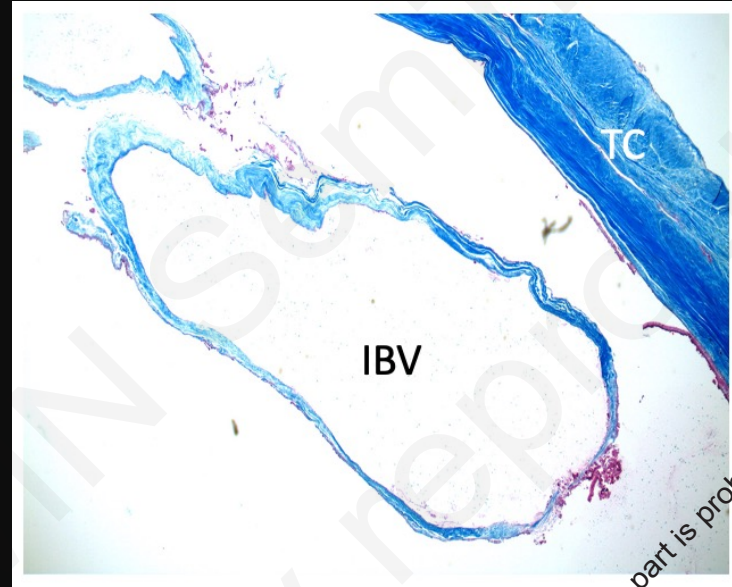


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Superior and Inferior Bridging Veins cont.

- Inferior bridging veins
 - More numerous
 - Thicker walls
- Superior bridging veins
 - Less numerous
 - Thinner walls

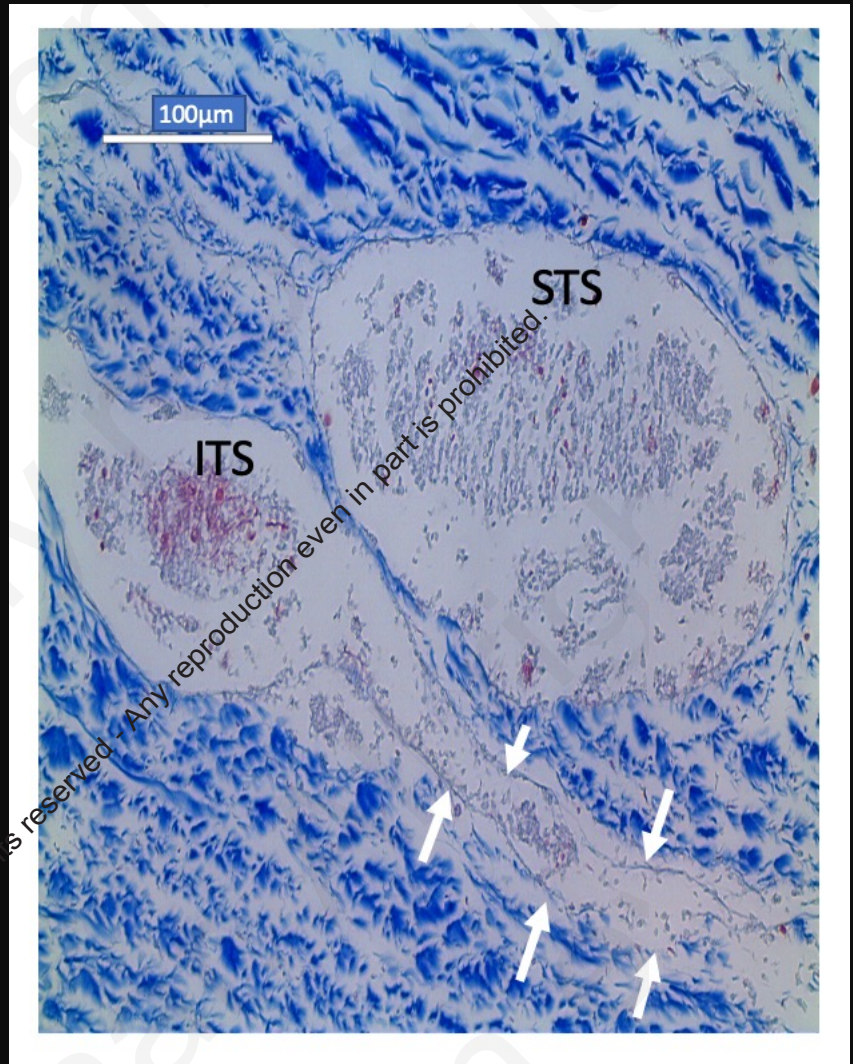
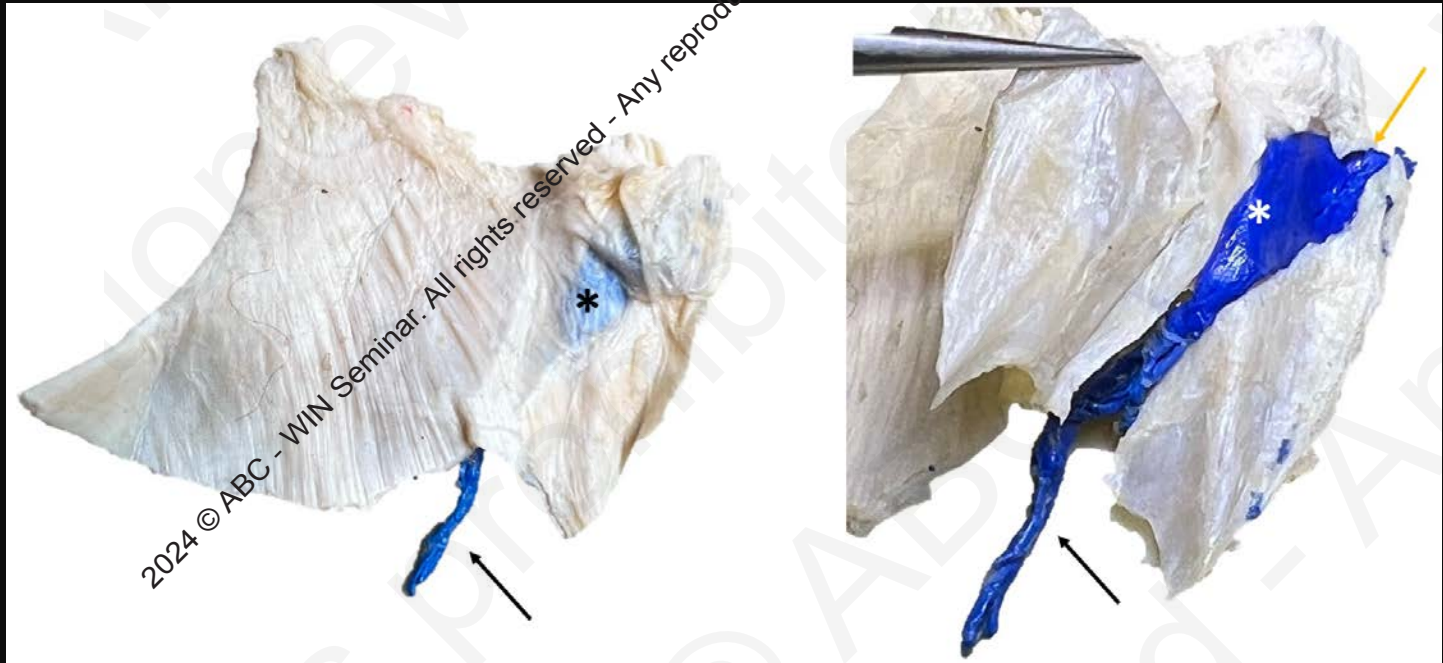


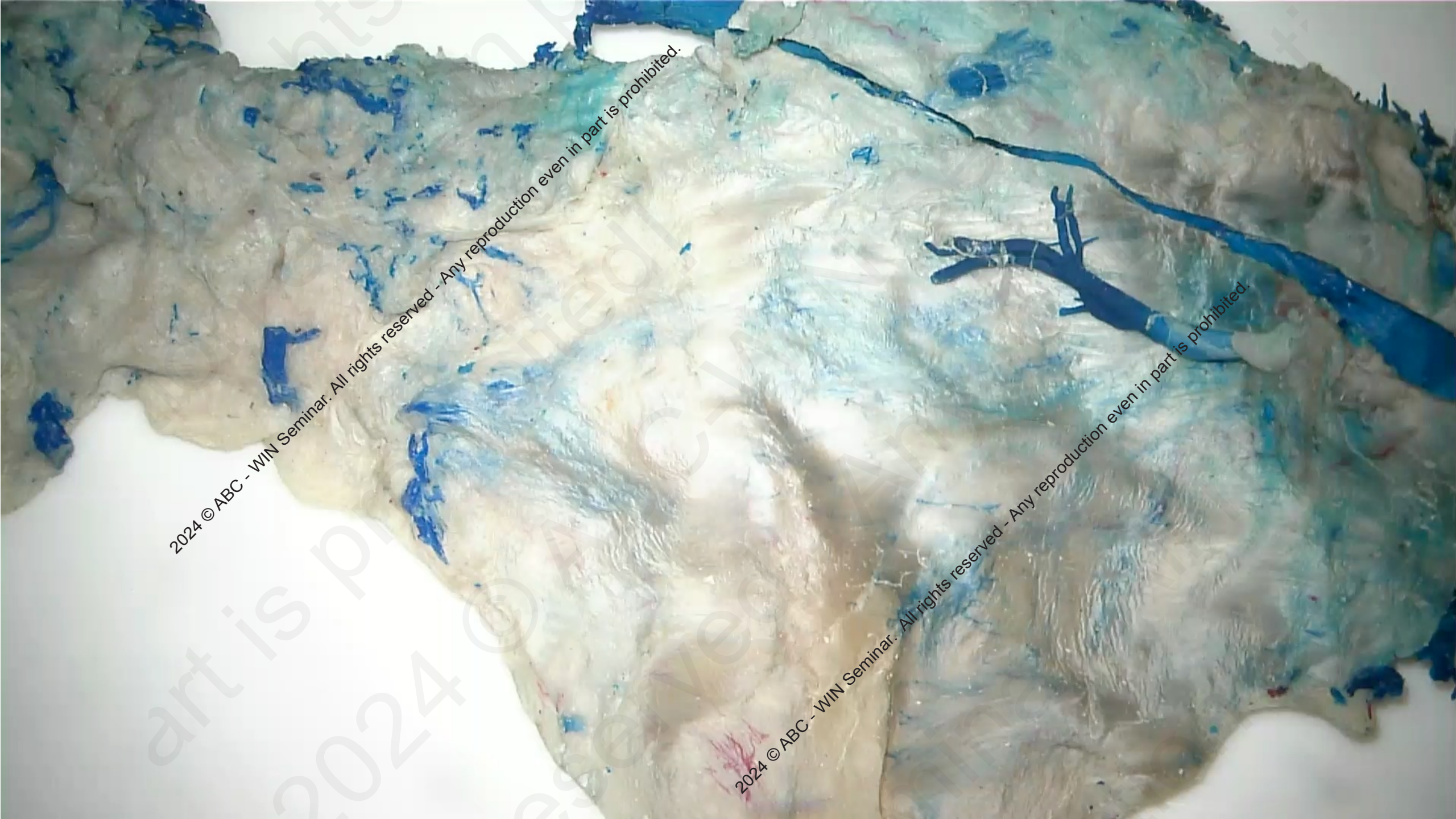
“Group I tentorial sinuses had the appearance of veins that were attached to or present just within the innermost layer of the tentorial dura, described by Seeger (1984) as a ‘subdural course’ of the veins.”

Microsurgical anatomy of the **tentorial sinuses**.

Matsushima T, Suzuki SO, Fukui M, Rhoton AL Jr, de Oliveira E, Ono M.

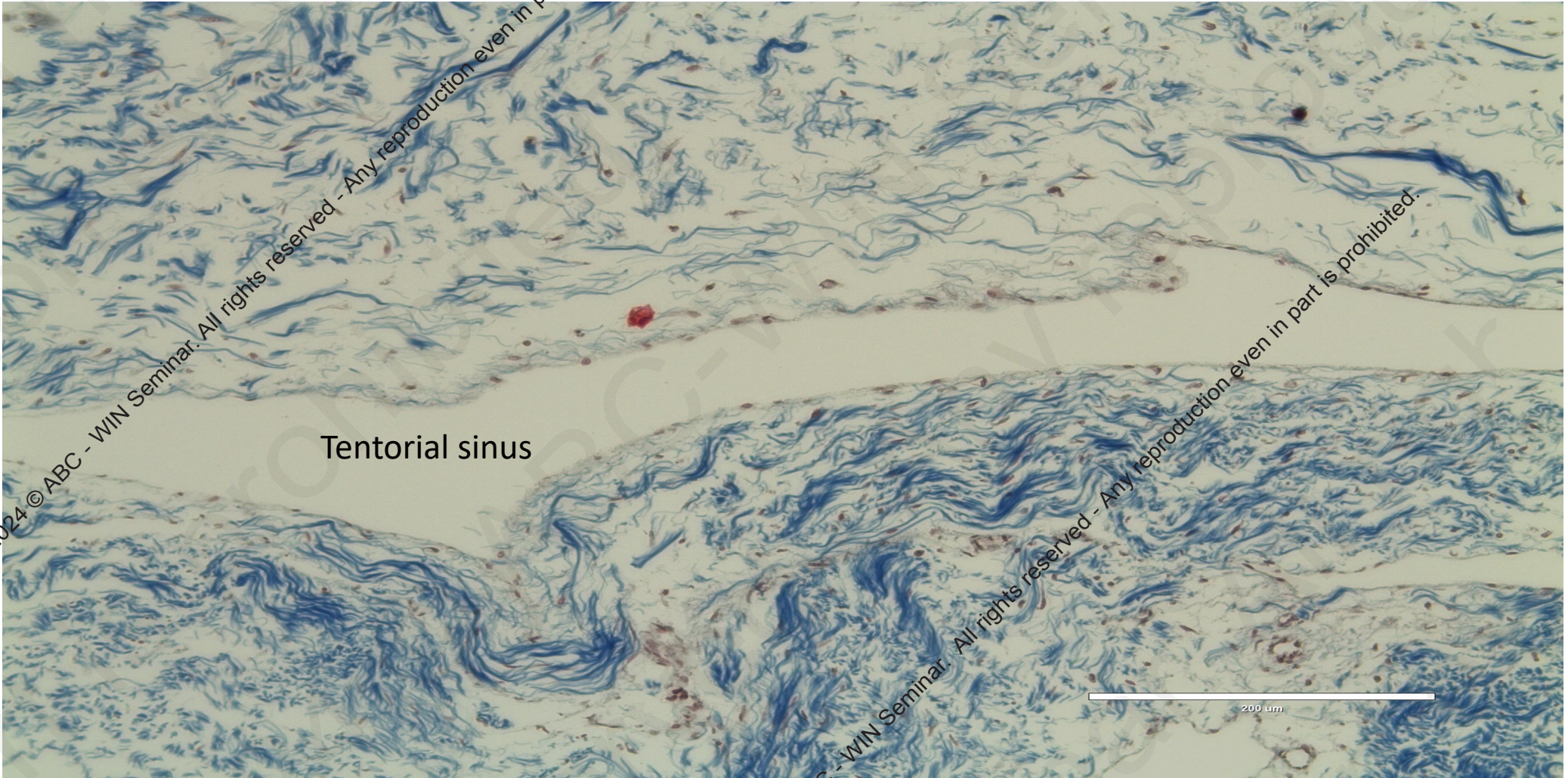
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Superior



Inferior

Tentorial sinus

200 um

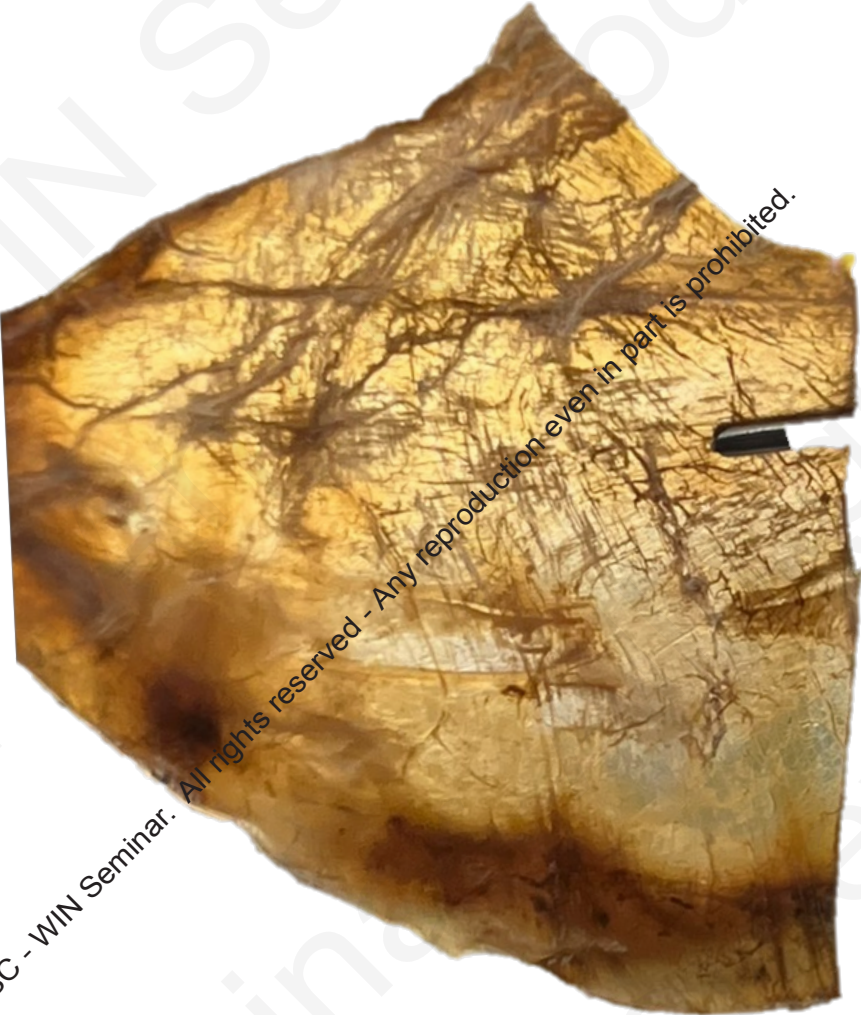
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Superior view

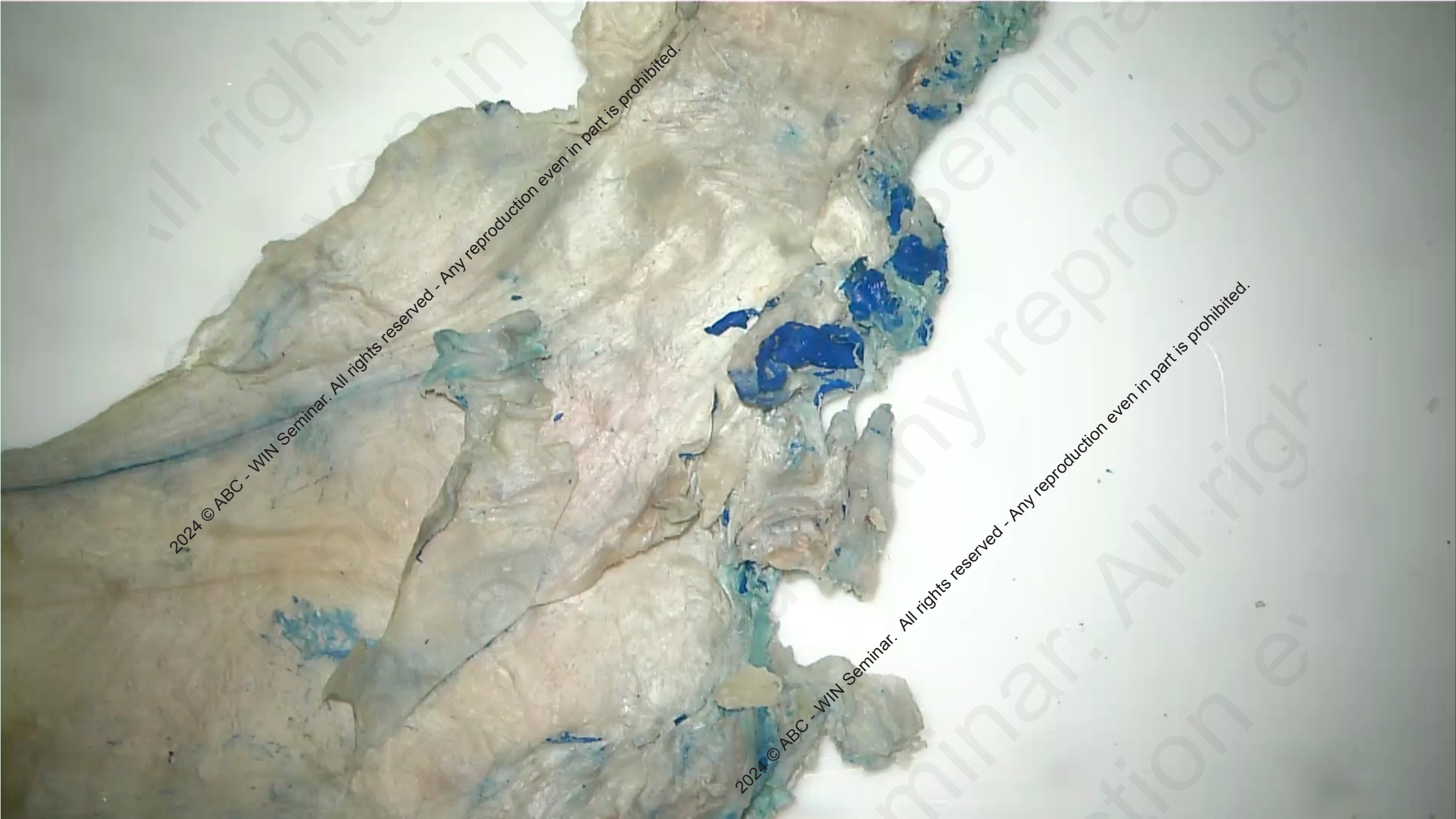


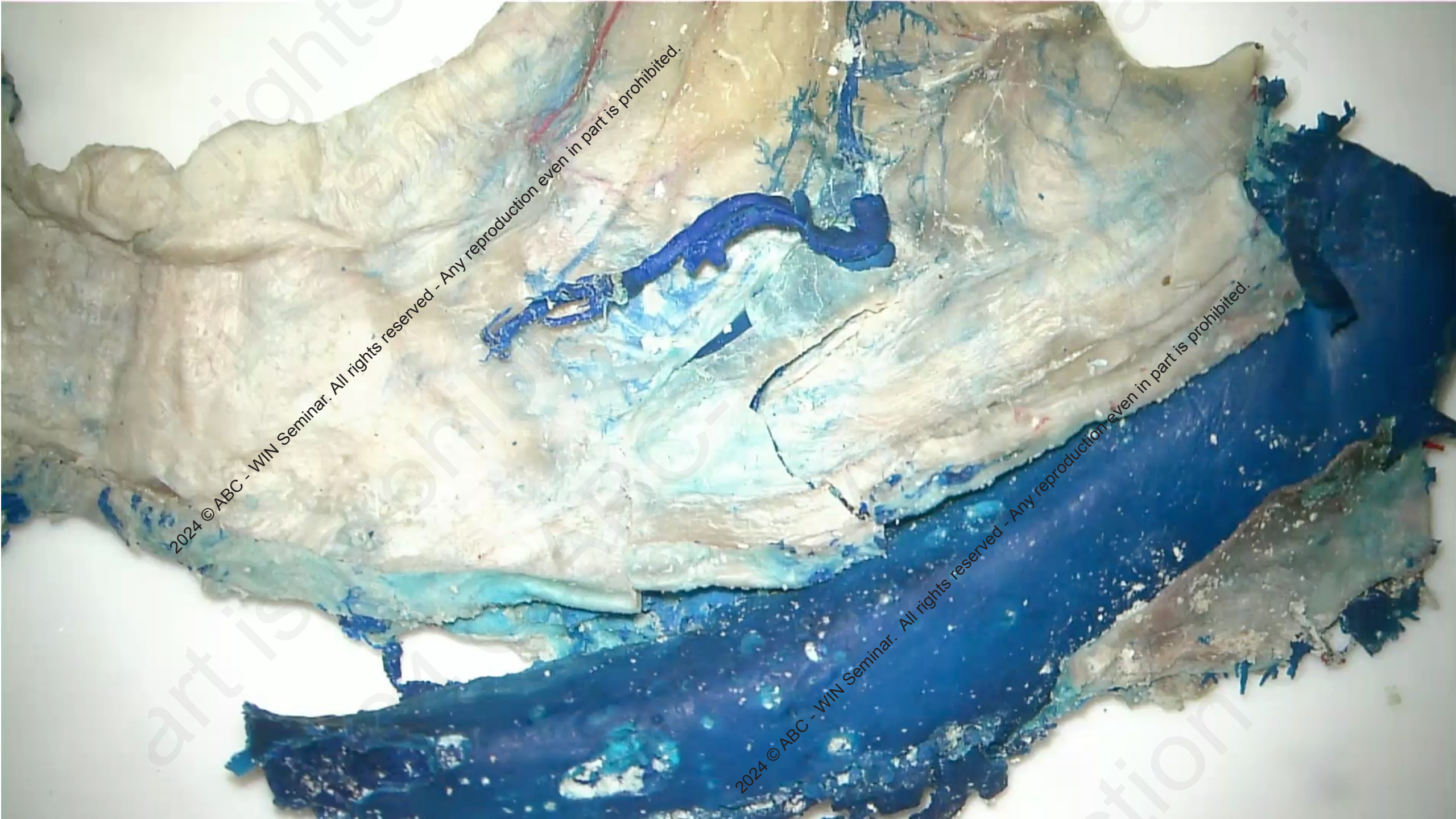
Inferior view



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Conclusions

- Two types of tentorial venous sinuses – a smaller (medial and more inferiorly located) intrinsic plexiform sinus and a larger (lateral and more superiorly located) sinus with connections to bridging veins
- Key anatomical and histological differences between the superior and inferior layers of the tentorium cerebelli and between the superior and inferior tentorial bridging veins
 - Superior layer thinner than inferior layer
 - Walls of superior bridging veins thinner than walls of inferior bridging veins
 - Inferior bridging veins possess a longer, more horizontal course within the tentorium compared to the shorter, more direct route of superior bridging veins

- These findings help provide an anatomical basis for the difference in incidence of supra versus infratentorial subdural hematomas
- Greater knowledge of the anatomy of the tentorium cerebelli and its venous sinuses is vital for microneurosurgical procedures around the tentorium, for procedures requiring trans-tentorial approaches to deep-seated lesions, and interventional procedures involving the tentorial sinuses

Merci
beaucoup!

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