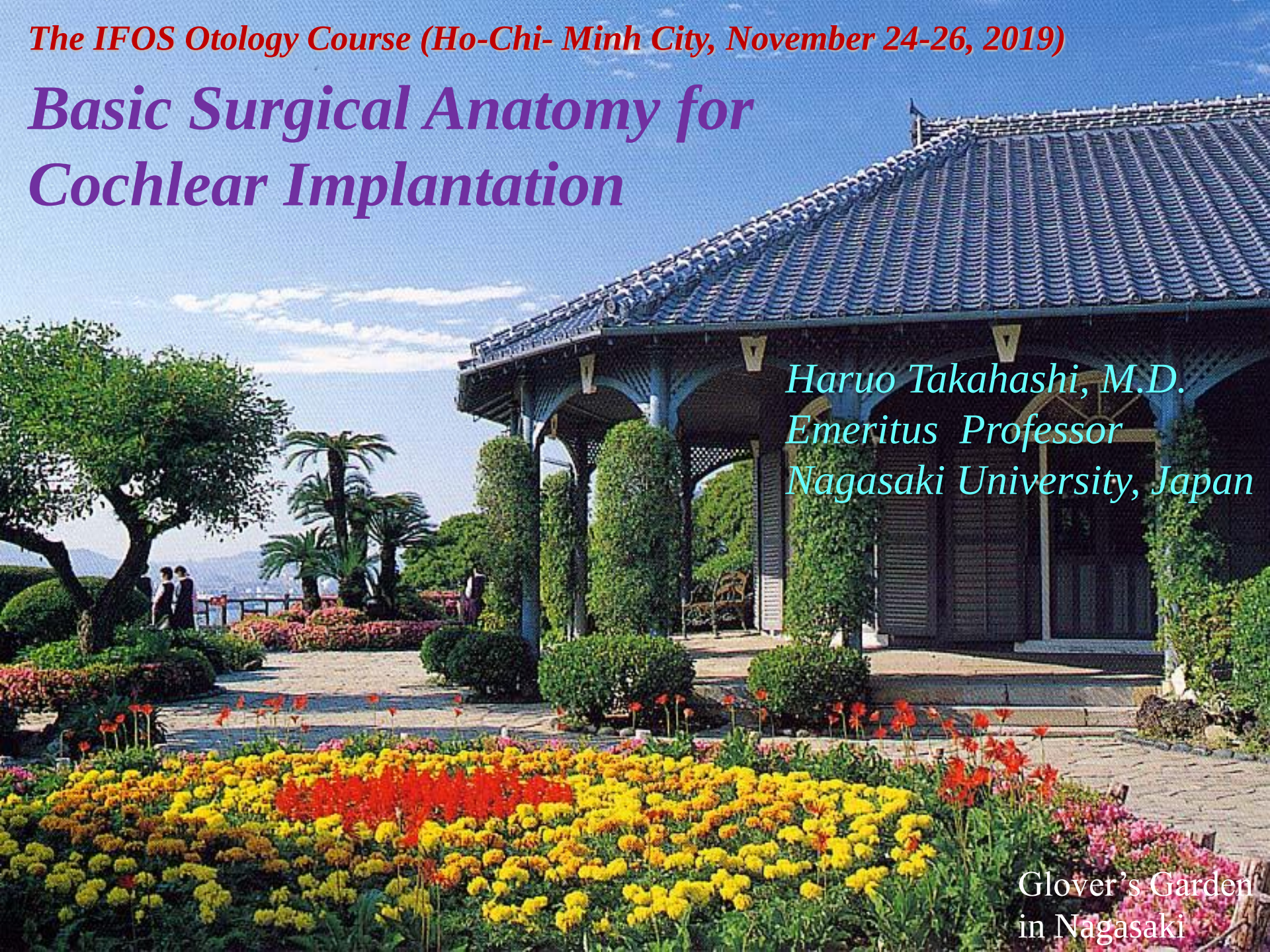
Faculty Disclosure

The following presentation will not include discussion on any commercial products or service of the APSCI 2017.

The IFOS Otology Course (Ho-Chi- Minh City, November 24-26, 2019)

Basic Surgical Anatomy for Cochlear Implantation



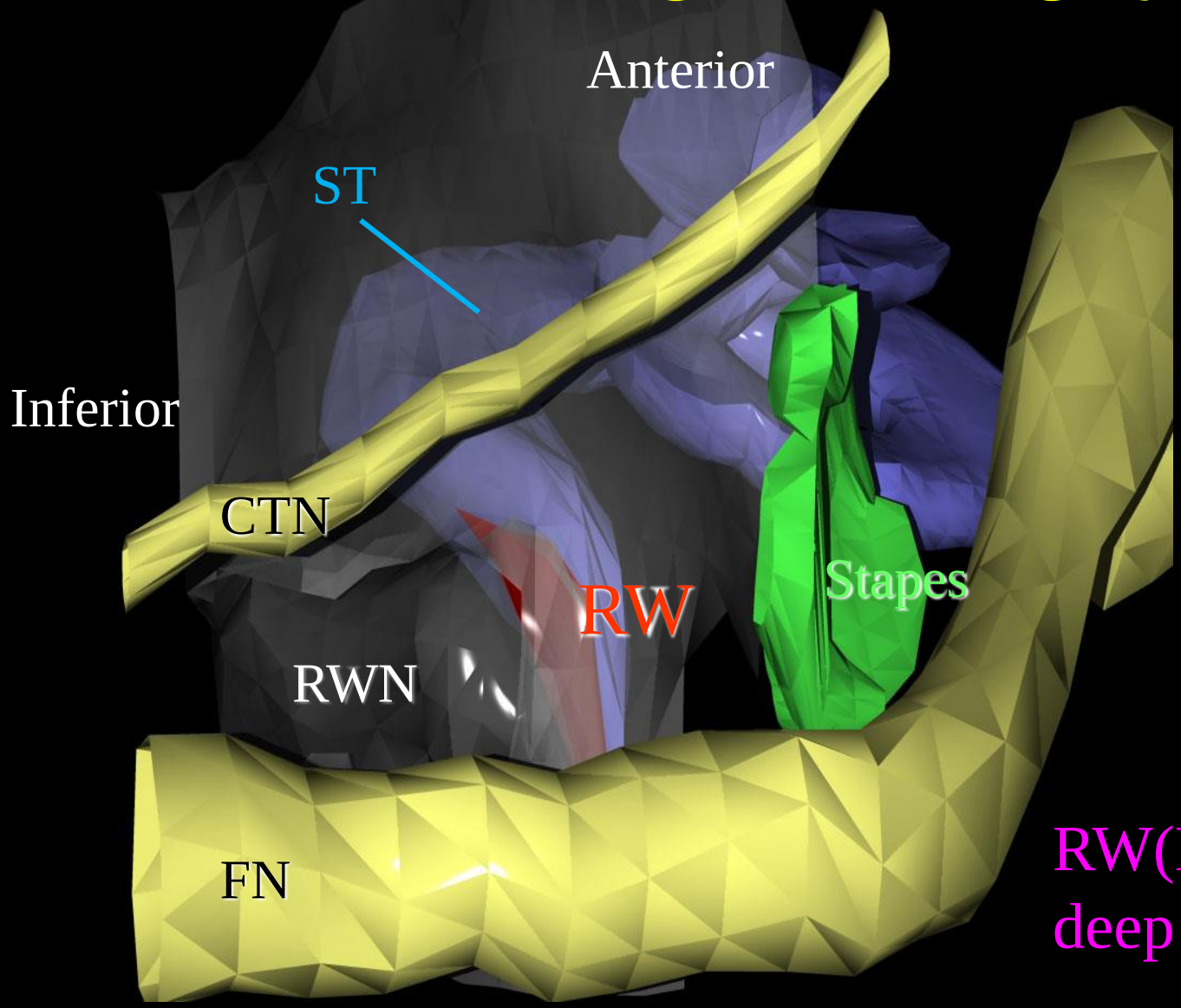
Haruo Takahashi, M.D.
Emeritus Professor
Nagasaki University, Japan

Glover's Garden
in Nagasaki

Contents

1. Anatomy of the round window niche (RWN)
2. Anatomy of the round window (RW) and its membrane (RWM)
3. Interrelations of the RW and its neighboring structures including the scala tympani of the cochlea related to cochlear implant (CI) surgery

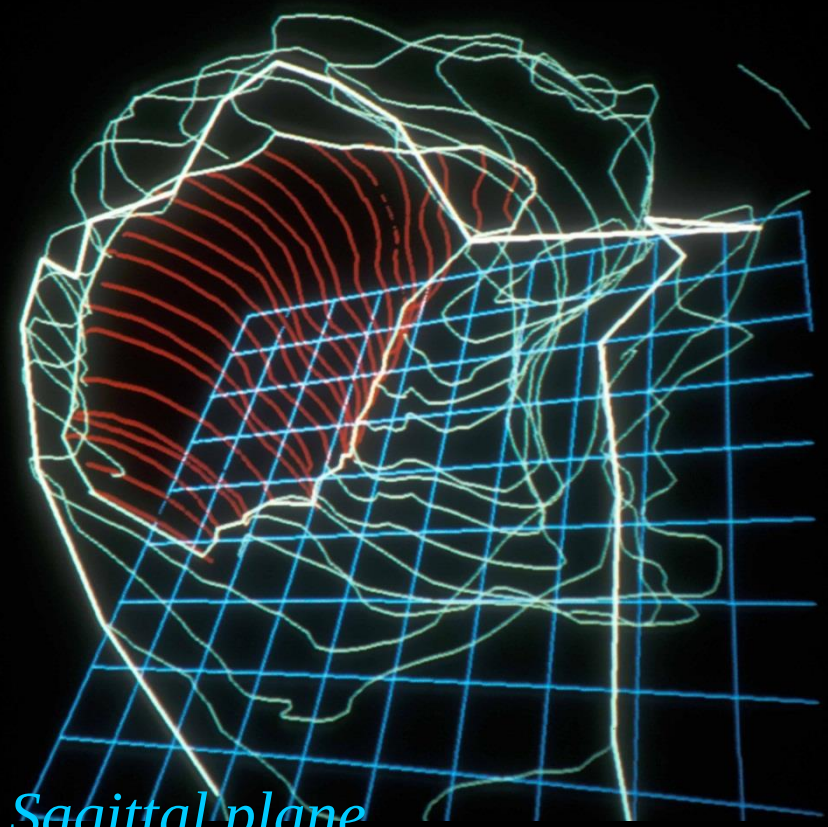
RW and surrounding structures viewed from the direction during the CI surgery (left ear)



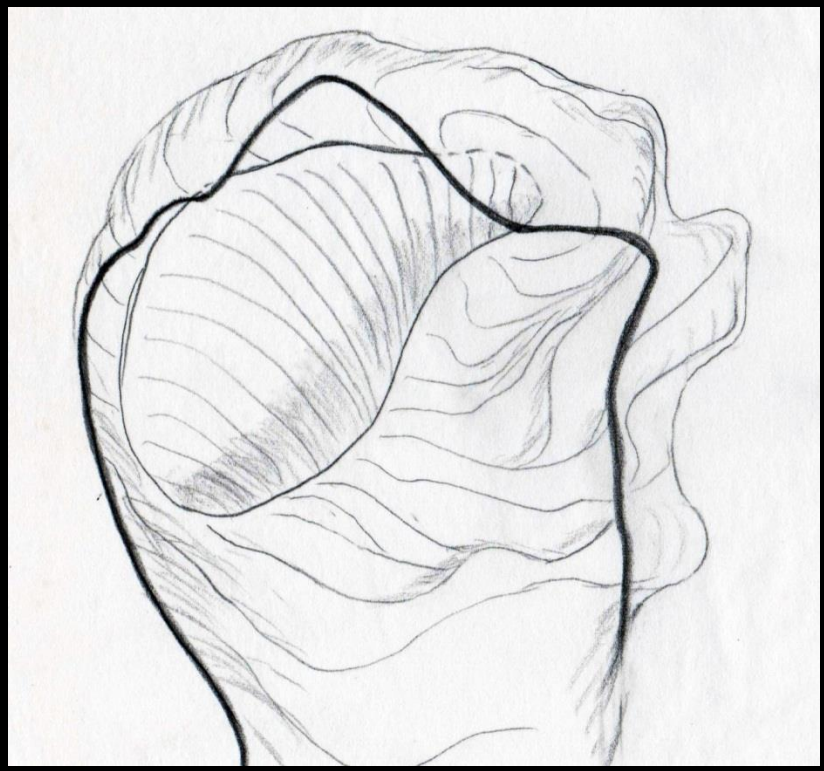
RW(M) is located deep inside the RWN.

(Modified from Takahashi H, et al, Laryngoscope 1990)

Round window viewed from posterolateral-inferior direction through the aperture of the niche (left ear)



Sagittal plane

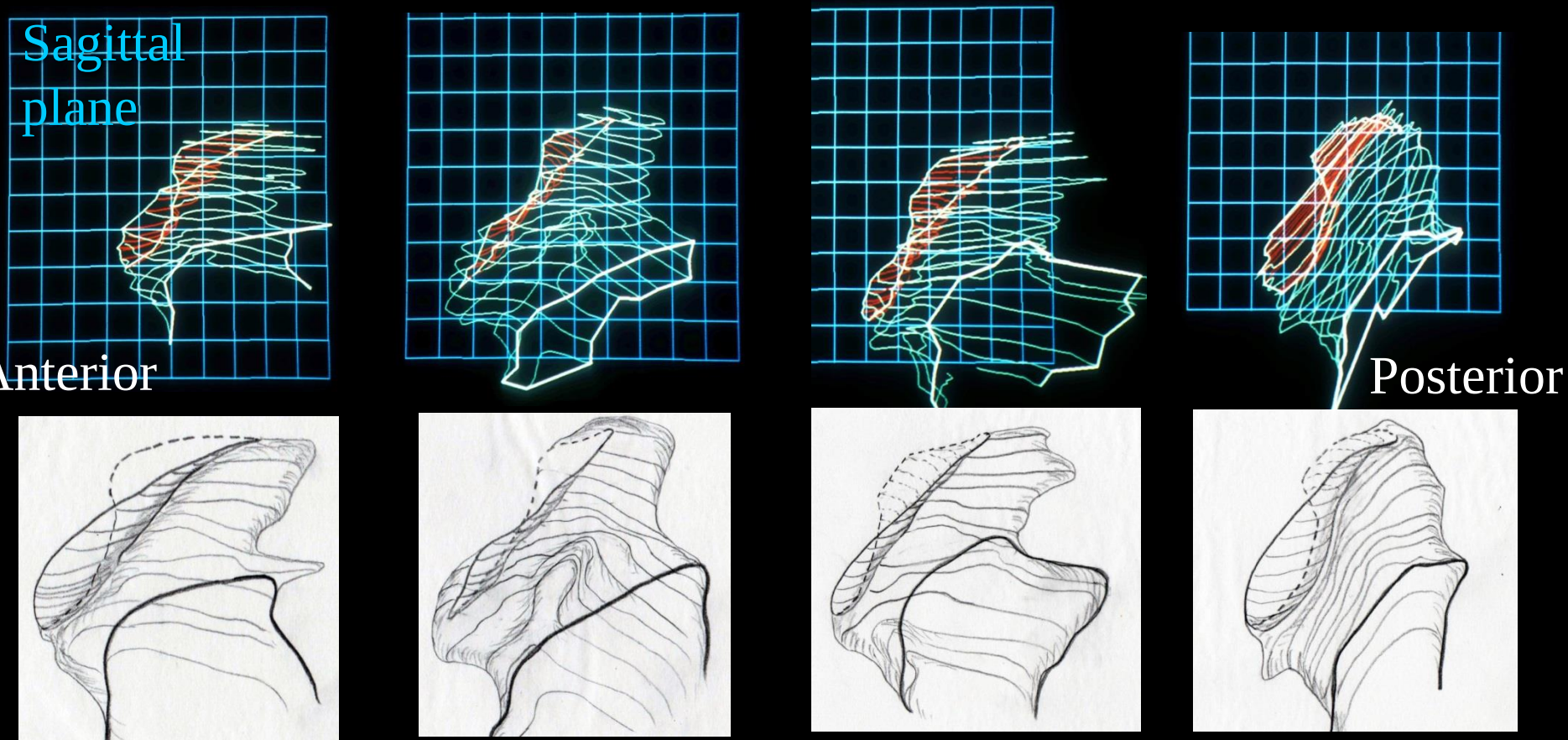


The round window niche is shaped like an inverted pouch.

(Takahashi H, et al, Otolaryngol Head Neck Surg, 1989)

Variation in the shape of the RWN (left ear)

Superior

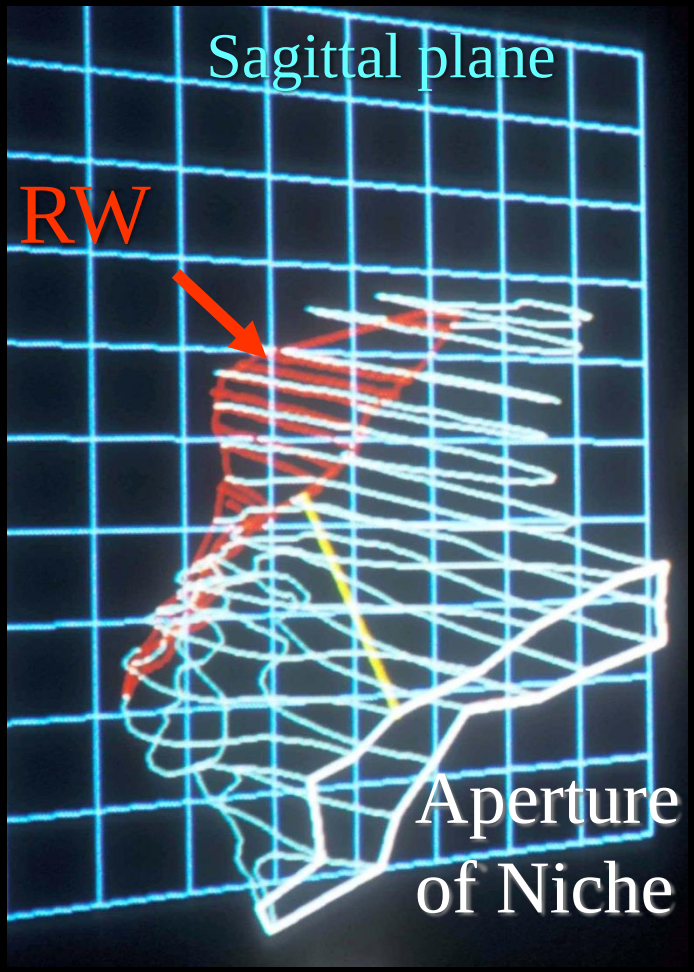


Inferior

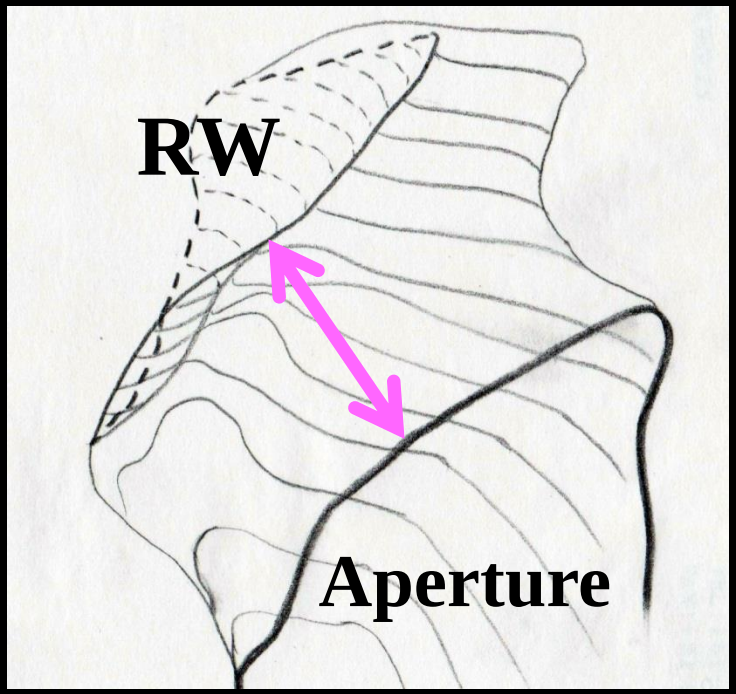
Variation was unexpectedly small.

(Takahashi H, et al, Laryngoscope 1989)

Shortest distance from the aperture of RWN to the lateral margin of RWM



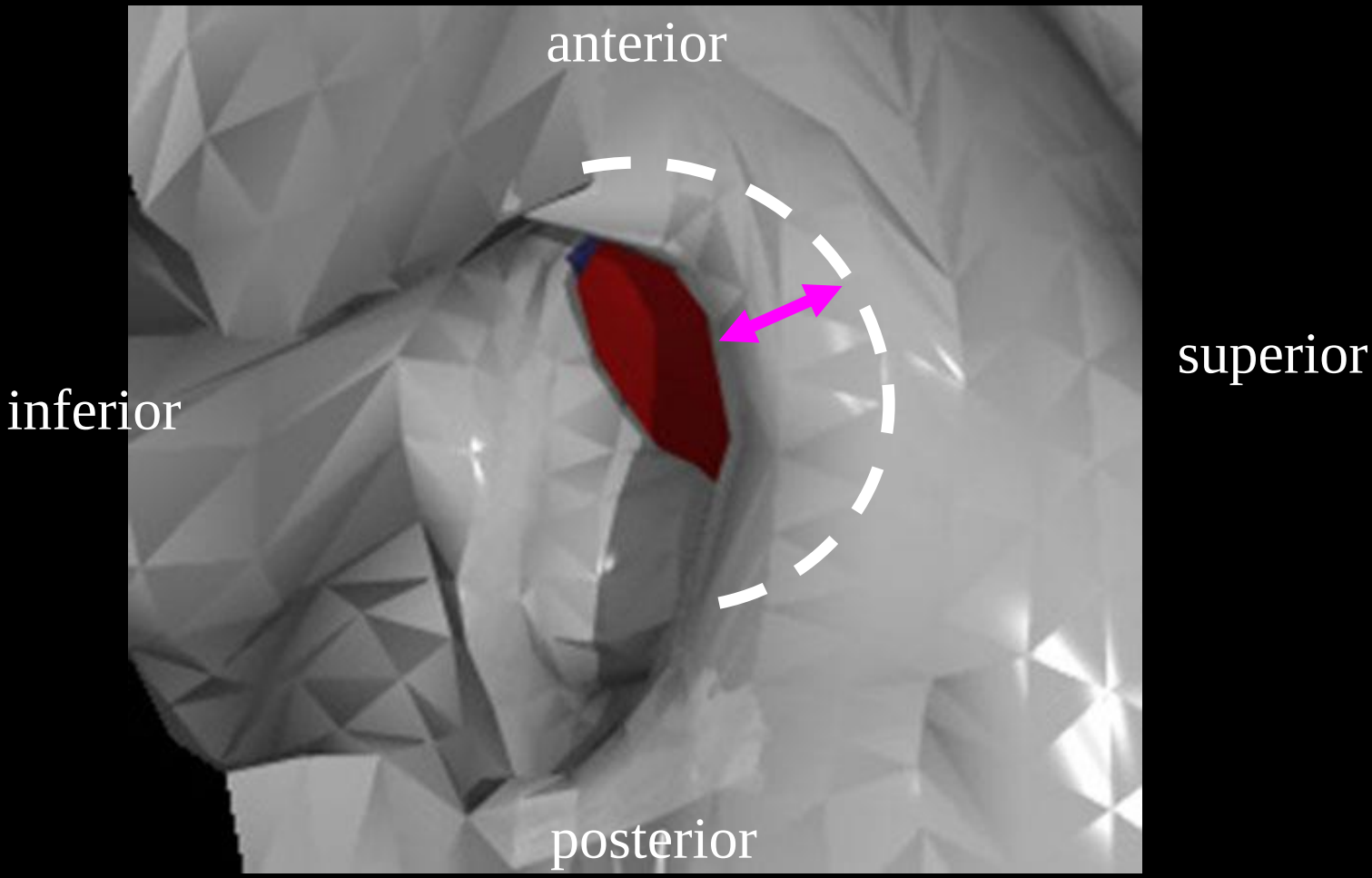
It is important to know how much we can drill the lateral bony overhang.



0.66 ±0.16 mm

(Takahashi H, et al, Laryngoscope 1989)

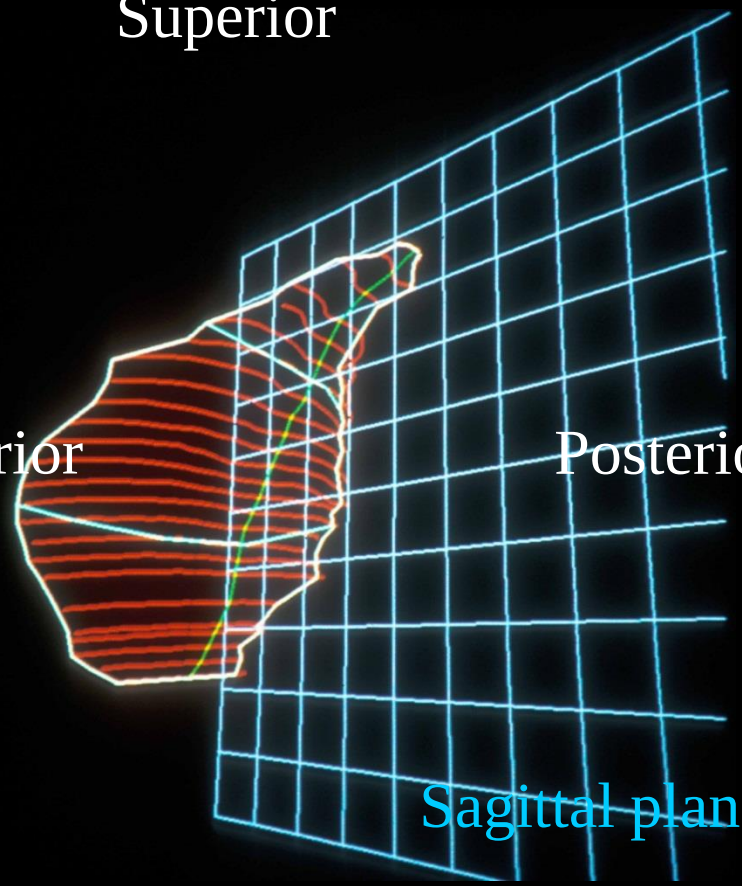
How much can we remove the bony overhang of the round window niche? (left)



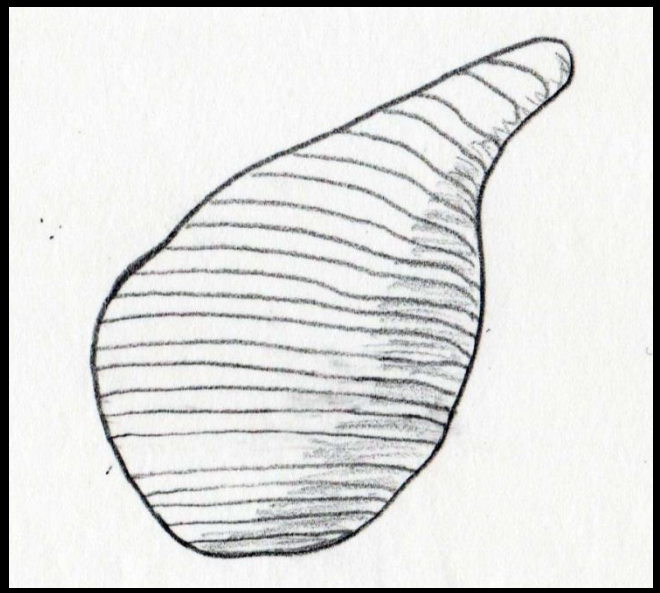
The distance range from ***0.34*** – *0.98 mm*!!

(Modified from Takahashi H, et al, Laryngoscope 1989)

RW(M) viewed from posterolateral direction (left ear)



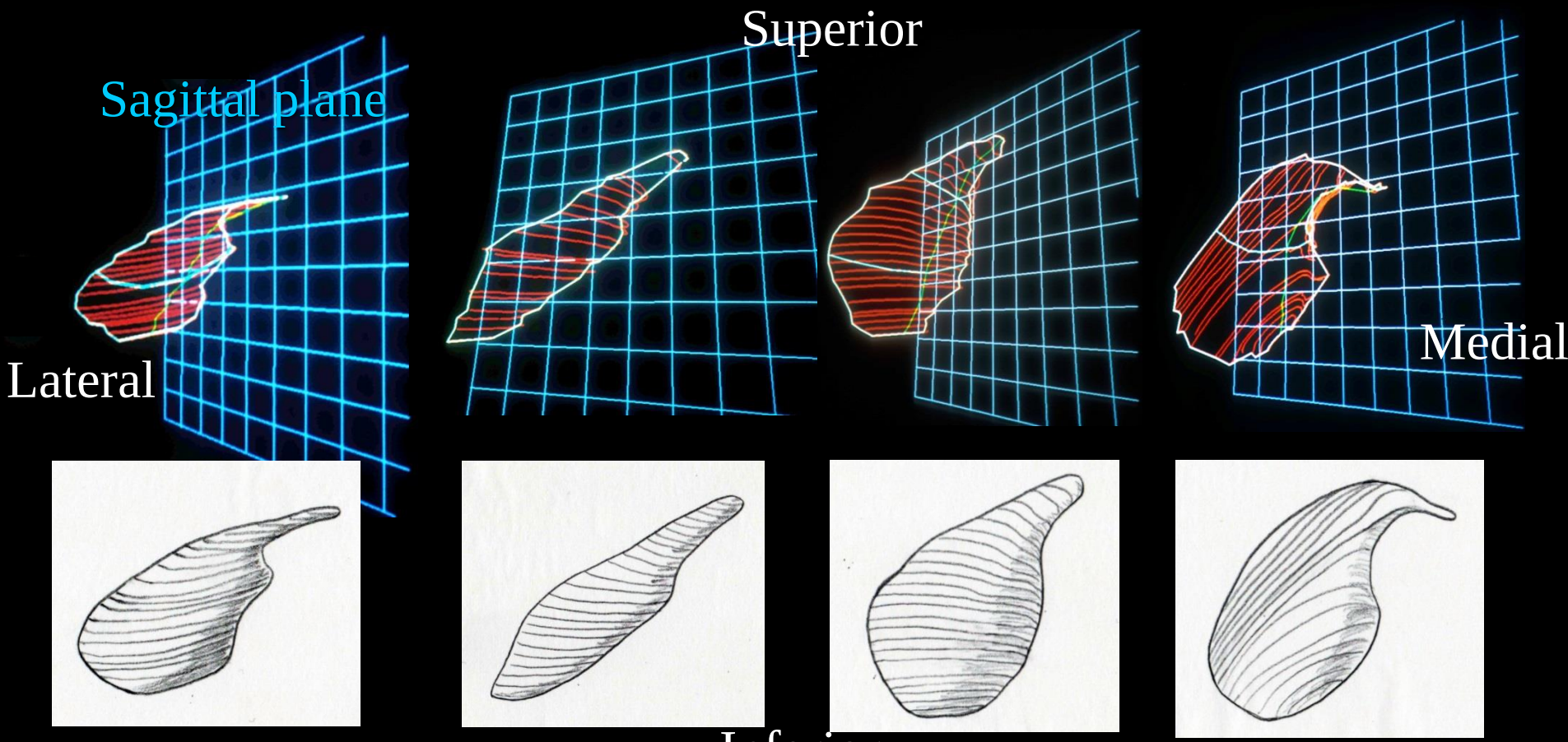
Area of the RW
$2.70 \pm 0.43\ mm^2$



The RWM is convex in the coronal plane and concave in the sagittal plane, thus shaped like a saddle, tapered toward the vestibular end.

(Takahashi H, et al, Otolaryngol HNS, 1989)

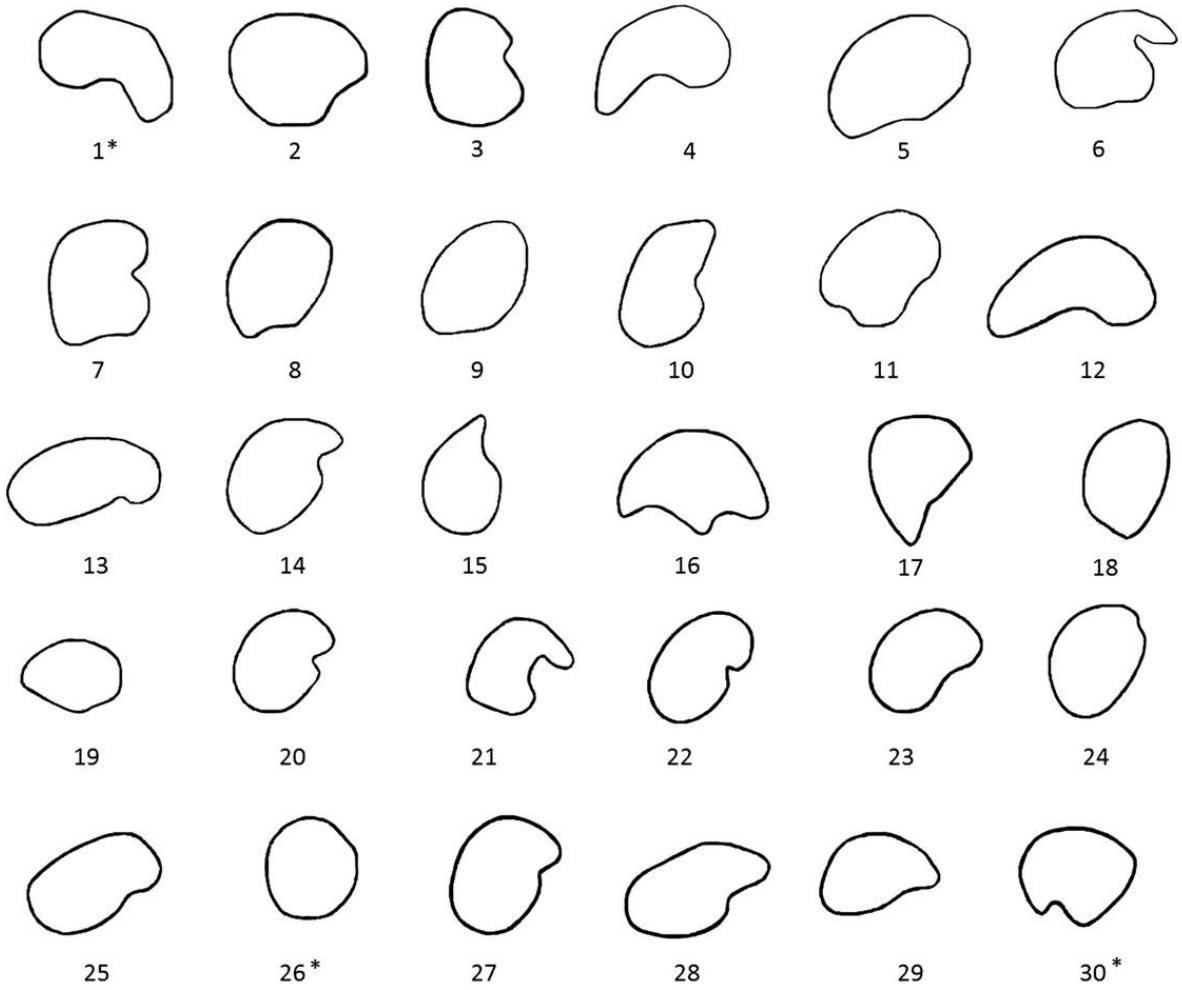
Variation in the shape of the RW (left ear)



Shape was found to have considerable variety.

(Takahashi H, et al, Otolaryngol Head Neck Surg, 1989)

Variation in the shape of the RW

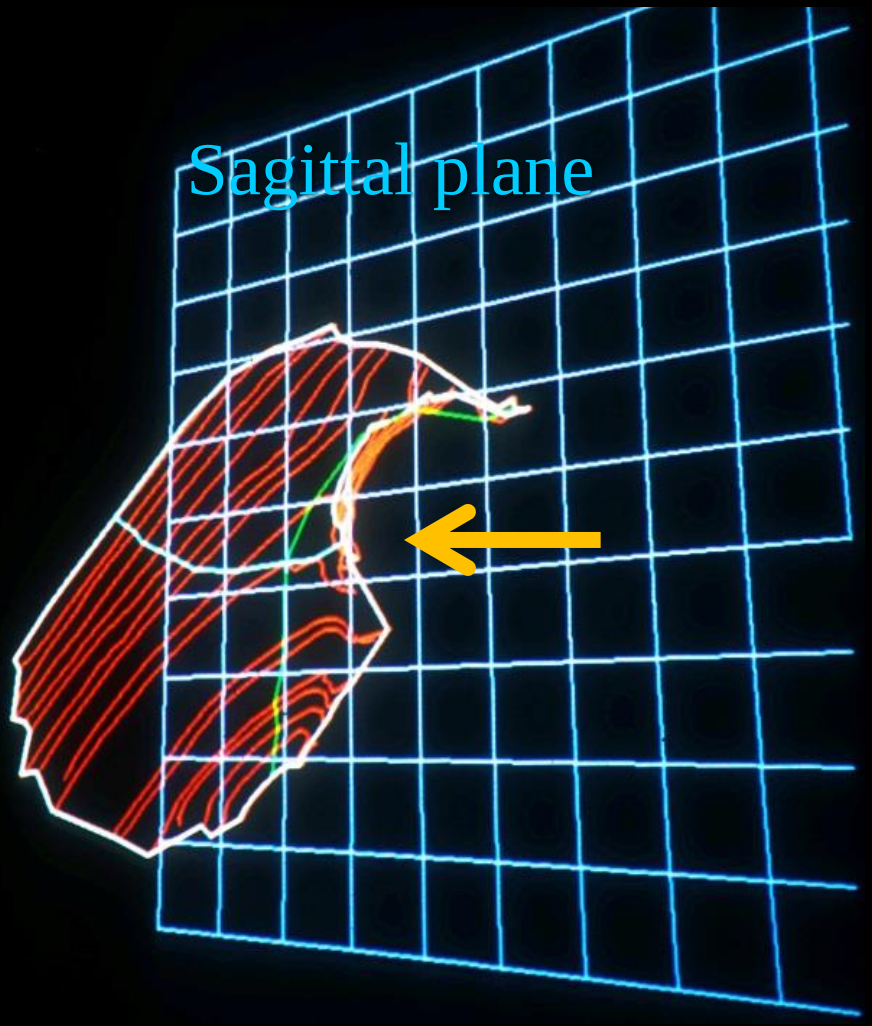


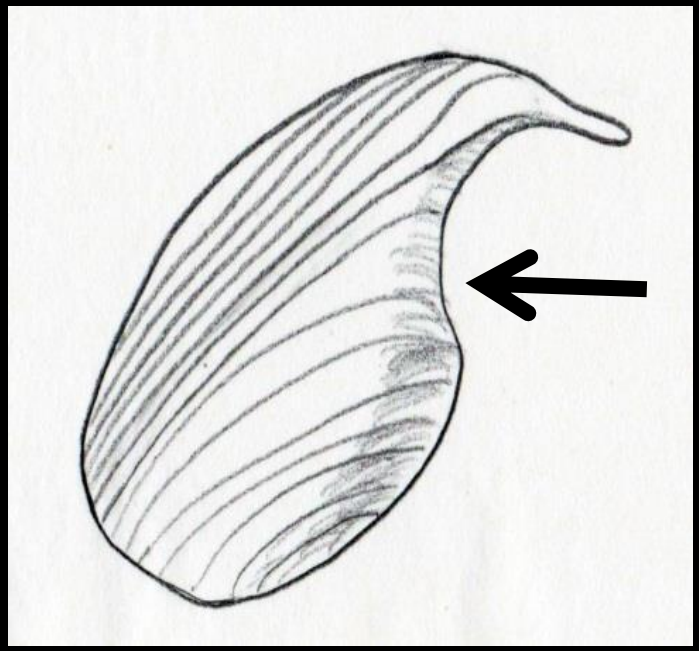
* right

Tremendous variation in the shape of round window was shown.

(Atturo F, et al, Otol Neurotol 2014)

Crista semilunaris (left ear)

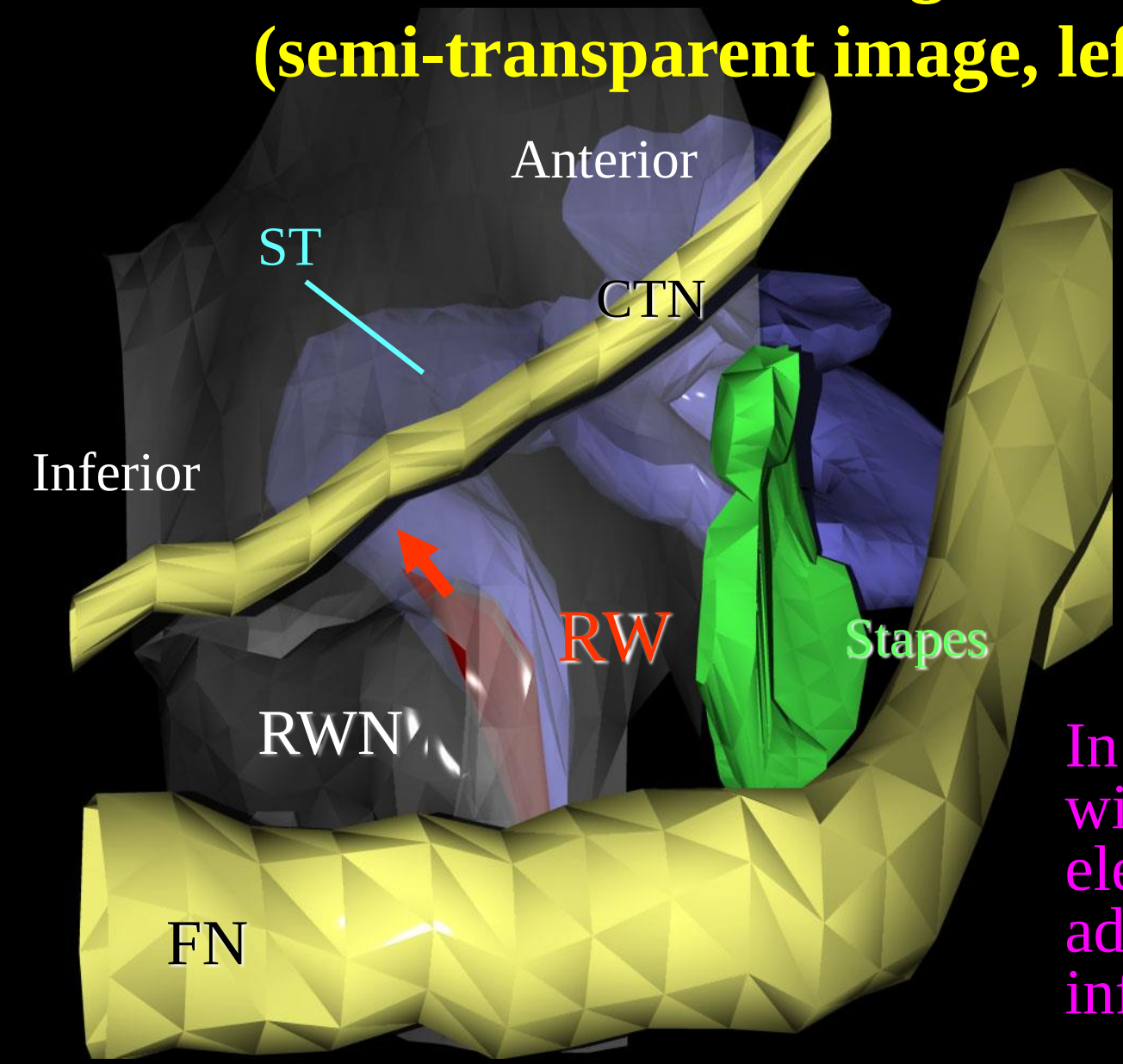




It sometimes disturbs electrode insertion through the RW.

(Takahashi H, et al, Otolaryngol Head Neck Surg, 1989)

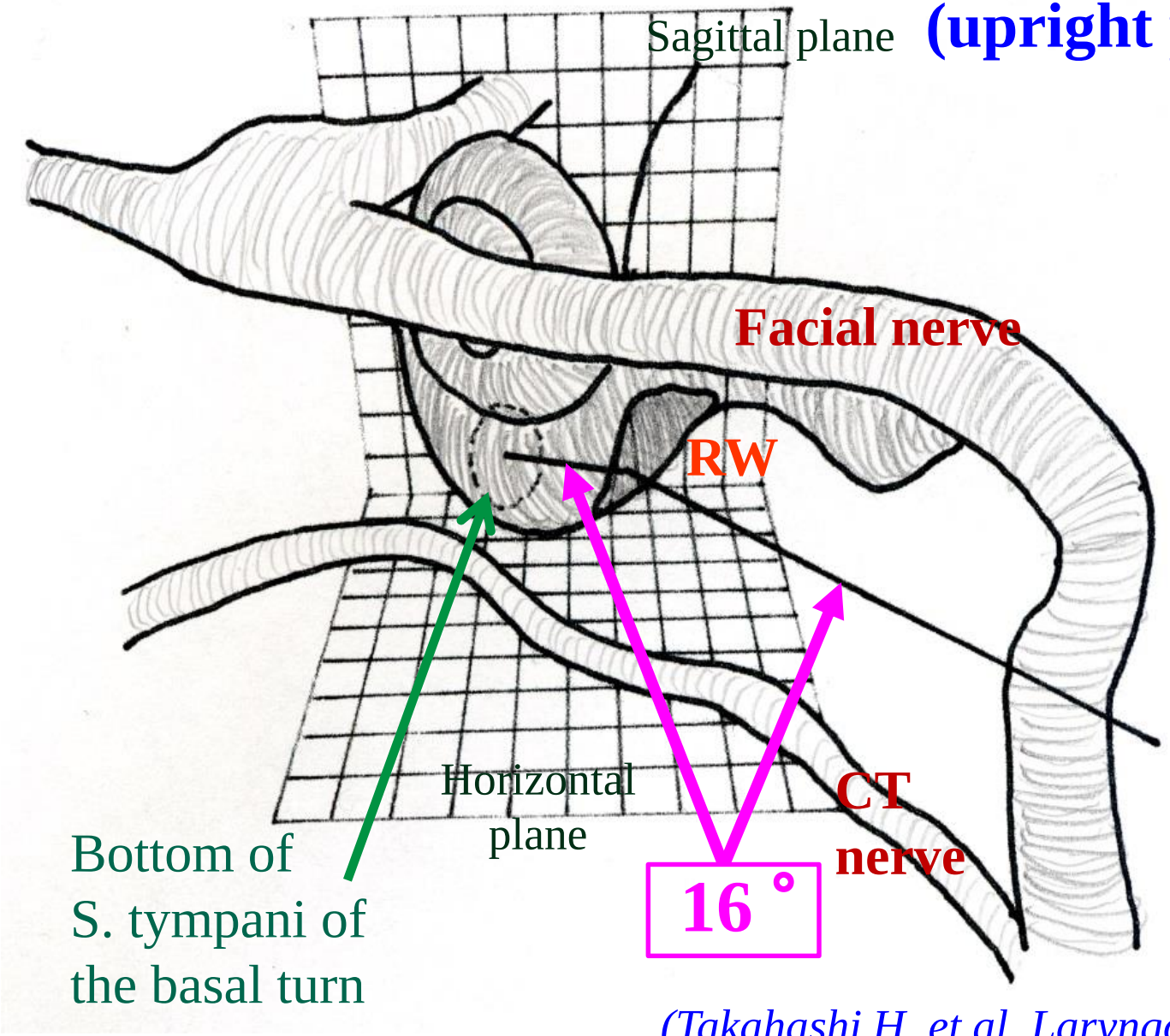
RW viewed from the CI-surgical-view direction (semi-transparent image, left ear)



In case of round window insertion, the electrode should be advanced to antero-inferior direction.

(Takahashi H, et al, Laryngoscope 1990)

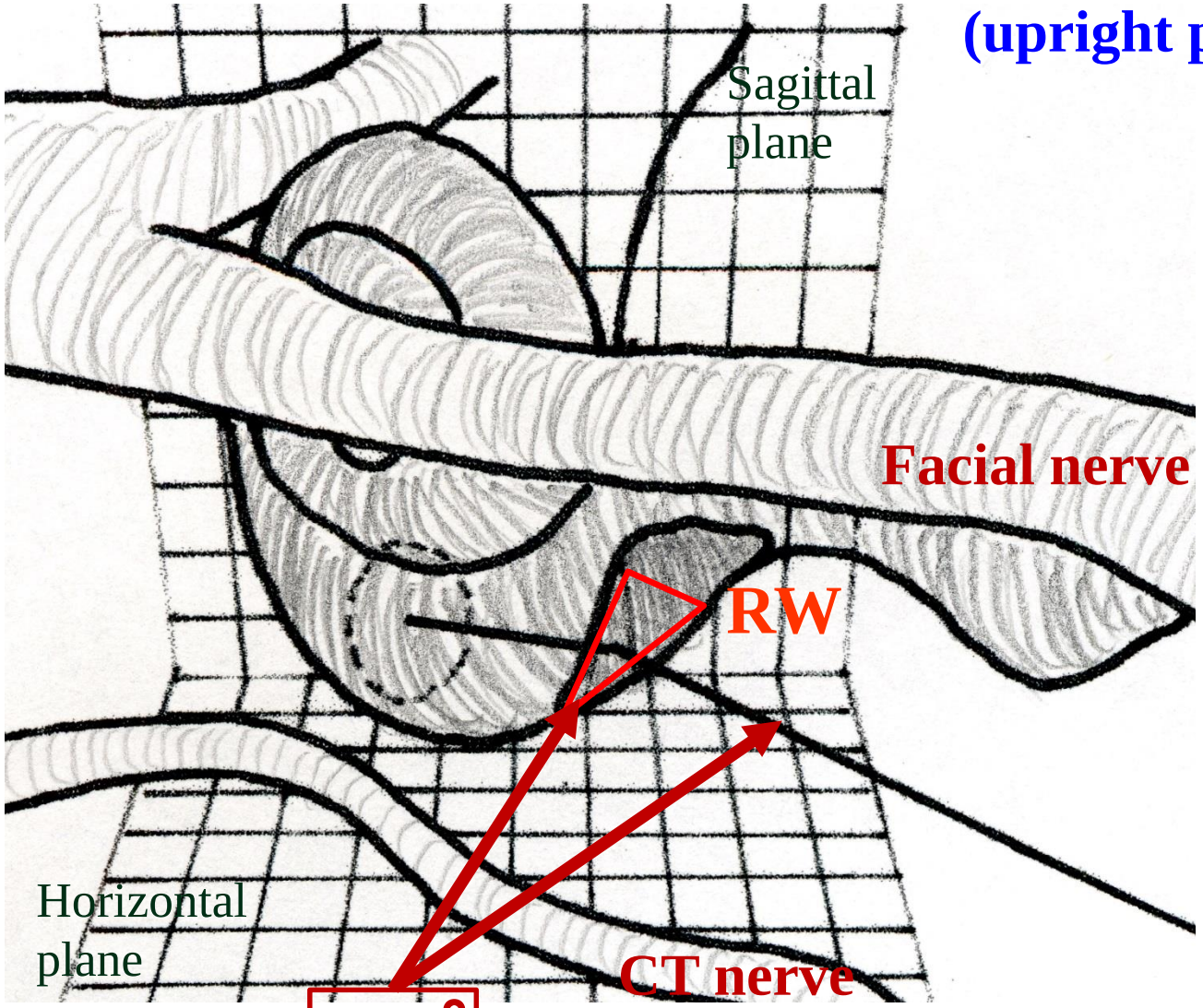
Angle between the trajectory of electrode of facial recess approach and that of RW to bottom of the basal turn (upright position)



(Takahashi H, et al, Laryngoscope 1990)

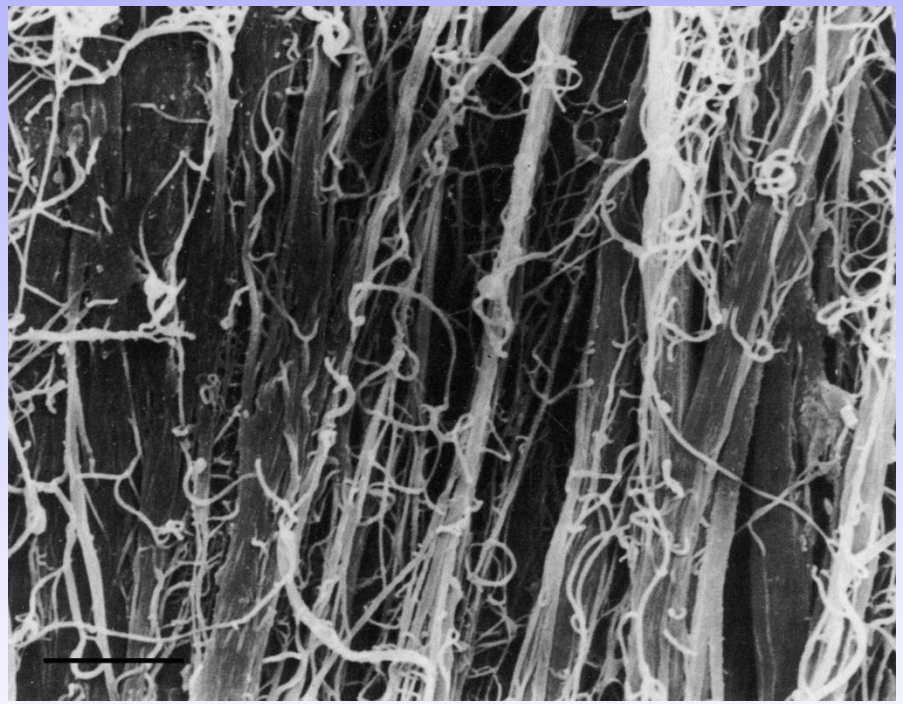
Angle between the trajectory of electrode of facial recess approach and the anteroinferior part of RW

(upright position)

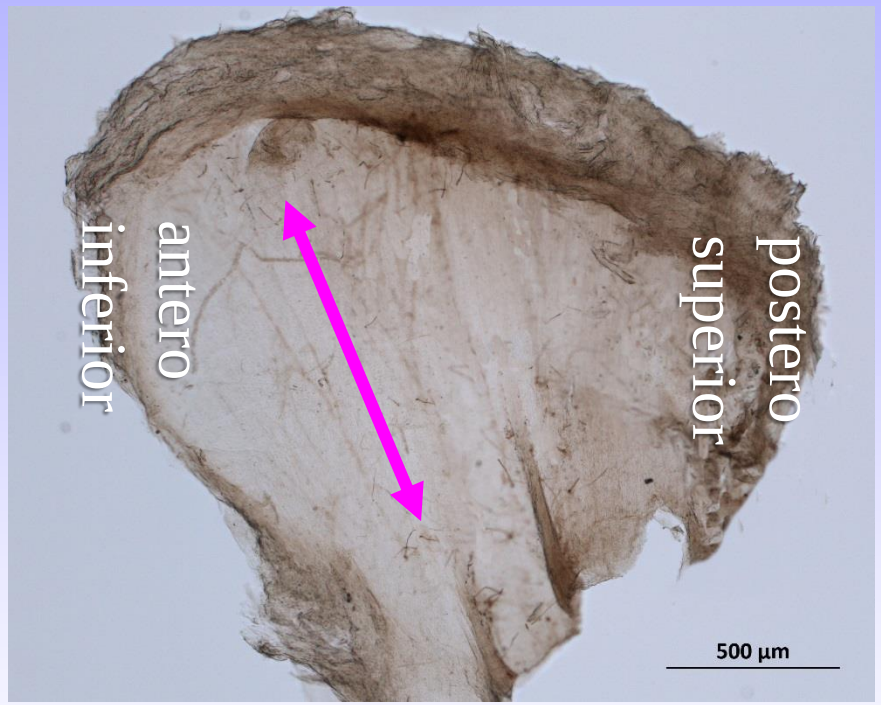


(Takahashi H, et al, Laryngoscope 1990)

Structure of RWM
- special reference to RW incision -



SEM



Macroscopic

Horizontal incision on the RWM may be smoother.

(Courtesy of Dr. Yasuya Nomura)

Summary

RWN - pouch-shaped, variation +

RWM - saddle-shaped, variation +++

Crista semilunaris - where OSL meets margin of RW

Electrode - advanced 16 degrees anterolateral from RW to bottom of basal turn scala tympani

RW - facing the trajectory of electrode with 30 degrees

RWM - Fibers run horizontally – horizontal incision

Thank you for your attention.

Nagasaki Windjimmer Festival