



ENT IMPERIAL

Delivering Excellence in Surgical Care

## Otology: Phacon 3D-printed Temporal Bone Drilling

In this station you will carry out the following tasks:

- Initial bone cuts
- Defining anatomic limits
- Open the antrum
- Thin posterior EAC cortex
- Posterior atticotomy

You will be assessed throughout, please ensure that all forms are filled in

Thank you



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## OTOLOGY: TEMPORAL BONE DRILLING ON A 3D-PRINTED MODEL

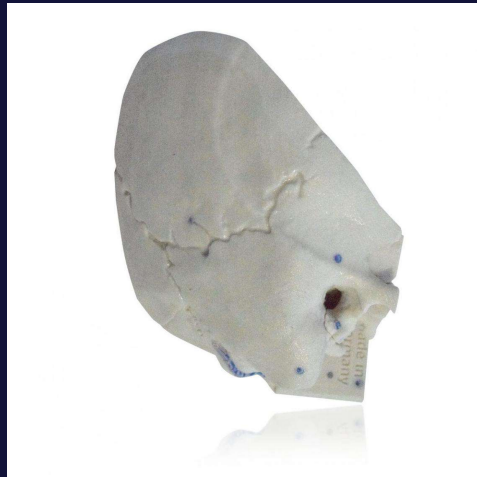
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### 3D-printed (Phacon) Temporal bone



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- Artificial bone-like material
- 3D-printed temporal 'bone'
- Hand-made soft tissue structures e.g. nerves and blood vessels placed into the 3D-printed
- Advantages:
  - More readily available
  - Anatomical accuracy gleaned from CT scans
  - Similar behaviour when drilled to actual bone

## Objectives



- During this session you will have the opportunity to perform and be assessed on the following aspects of temporal bone drilling:
  - Initial bone cuts
  - Defining anatomic limits
  - Open the antrum
  - Thin posterior EAC cortex
  - Posterior atticotomy

## Before starting



- Adjust the eyepiece height and inter-pupillary distance to your need.
- The specimen has been placed in the position to give you best view and focus.
- There will also be direct supervision and assessment, so make sure all faculty members are watching what you are doing.

## Debrief and feedback



- At the end of the session you will receive personalised feedback regarding your performance
- You will also be asked to complete a feedback form assessing face and content validity of the simulation

## Task specific assessment – Phacon temporal bone

(Items that didn't achieve task-specific content validity were removed)

Trainee:	Assessor:			
T14 Exposes incudostapedial joint/stapes suprastructure		N	D	S
T16 Drills mastoid bone to allow removal of disease		N	D	S
T22 Demonstrates competence at safe and effective use of drill including appropriate selection of burrs		N	D	S

Tasks		Unable to perform	Performs with minimal prompting			Performs easily with good flow	
1. Initial bone cuts	a. Placement of superior cut	1	2	3	4	5	
	b. Placement of canal cut	1	2	3	4	5	
2. Defining anatomic limits	a. Identification and definition of tegmen	1	2	3	4	5	
	b. Sharpen posterior EAC cortex	1	2	3	4	5	
	c. Define sigmoid sinus and sino-dural angle	1	2	3	4	5	
3. Open antrum	a. Deepen dissection at sino-dural angle	1	2	3	4	5	
	b. Open antrum from posterior to anterior	1	2	3	4	5	
	c. Reveal short process of incus (atraumatic)	1	2	3	4	5	
5. Thin posterior EAC cortex	a. View posterior EAC en face	1	2	3	4	5	
	b. Use side/front of appropriate bur	1	2	3	4	5	
	c. Saucerization	1	2	3	4	5	
7. Posterior Atticotomy	a. Thin superior EAC cortex	1	2	3	4	5	
	b. Thin anterior tegmen	1	2	3	4	5	
	c. Remove intervening bone	1	2	3	4	5	
	d. Identify epitympanic anatomy to supratubal recess	1	2	3	4	5	

## Global assessment – Phacon temporal bone

(Items that cannot be assessed were removed)

Trainee:						Assessor:		
G1 Follows an agreed, logical sequence or protocol for the procedure	N		D		S			
G2 Consistently handles tissue well with minimal damage	N		D		S			
G5 Uses instruments appropriately and safely	N		D		S			
G6 Proceeds at appropriate pace with economy of movement	N		D		S			
Overall performance and outcome	0		1	2	3	4		

Use of otologic drill	Chooses inappropriate bur and/or repeatedly awkward use of drill	Chooses appropriate bur and occasionally awkward use of drill			Uses appropriate bur and drill effortlessly
	1	2	3	4	5
Respect for surgical limits	Uses unnecessary force or caused damage by inappropriate use of instruments	Careful handling of tissue but occasional inadvertent damage to tissue			Consistently handled tissues appropriately with minimal damage
	1	2	3	4	5
Time and motion	Many unnecessary moves	Efficient time/motion and maximum efficiency			Clear economy of movement
	1	2	3	4	5
Flow of operation	Frequently stopped and unsure of next move	Some forward planning with reasonable progression			Obviously planned course of operation with effortless flow
	1	2	3	4	5
Overall surgical performance	Poor	Performs majority of surgery acceptably			Outstanding
	1	2	3	4	5

## Face and content validity – Phacon Temporal Bone

<b>Name:</b>	<b>Grade:</b>				
State the level of agreement with the following statements:	strongly disagree	disagree	Un-decided	agree	strongly agree
<b>Face</b>					
Appearance of anatomical structures is realistic	1	2	3	4	5
Tissue feel is realistic	1	2	3	4	5
Depth perception is realistic	1	2	3	4	5
Drilling and feedback is realistic	1	2	3	4	5
Use of microscope is realistic	1	2	3	4	5
Use of suction/irrigation is realistic	1	2	3	4	5
<b>Global Content</b>					
This model is useful for teaching anatomy	1	2	3	4	5
This model is useful for teaching surgical planning	1	2	3	4	5
This model is useful for improving operative technique	1	2	3	4	5
This model is useful for improving hand-eye coordination	1	2	3	4	5
This model is useful as an over all training tool	1	2	3	4	5
<b>Task Specific Content</b>					
This model is useful for teaching Initial bone cuts	1	2	3	4	5
This model is useful for teaching defining anatomic limits	1	2	3	4	5
This model is useful for teaching opening the antrum	1	2	3	4	5
This model is useful for teaching digastric dissection	1	2	3	4	5
This model is useful for teaching EAC wall thinning	1	2	3	4	5
This model is useful for teaching facial nerve dissection	1	2	3	4	5
This model is useful for teaching posterior tympanotomy	1	2	3	4	5
This model is useful for teaching Mod Rad Mastoidectomy	1	2	3	4	5
<b>Curriculum</b>					
Skills I learned are transferable to the operating theatre	1	2	3	4	5
This model should be incorporated into curriculum	1	2	3	4	5
I would recommend this model to trainees	1	2	3	4	5