



# **Microtia Ear Surgery and Bone Anchored Hearing Devices**

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Craniofacial and Pediatric Plastic Surgery**

# My (Non-Traditional) Path

Architect/Artist



Plastic Surgeon



Craniofacial Surgeon



Microtia Surgeon



Bone Anchored Devices



# My (Non-Traditional) Path

PLASTIC SURGEON

VS.

OTOLARYNGOLOGIST (ENT)

# Treatment of Microtia & Atresia

- Microtia Options
  - No treatment
  - Prosthesis
  - Surgery
- Hearing Options
  - No treatment
  - Bone Anchored Hearing Devices
  - Canal Surgery (Atresia Repair)

# MICROTIA

Micro = Small  
Otia = Ear



# MICROTIA Facts

The cause of microtia is unknown:  
Genetic vs. Environment



# MICROTIA Facts

- Microtia means “little ear”
- 1 in 2,500 to 12,000 babies
- boys > girls
- right > left
- Bilateral microtia: 7 - 22%
- >90% of patients with Microtia & Atresia have a **conductive** hearing loss



# MICROTIA Facts



Treacher-Collins  
Syndrome

Hemifacial  
microsomia

Goldenhar  
Syndrome  
(OAV)



# All ears are not the same



# All MICROTIA ears are not the same



# Microtia Grading System



Grade 1

Small but  
almost  
normal



Grade 2

Some  
recognizable  
anatomy



Grade 3

Small  
rudiment of  
soft tissue and  
no ear canal



Grade 4

No external  
ear and no  
ear canal

# The Nature of Ear Reconstruction

- Complex 3-dimensional structure
- Structural support + soft tissue coverage
- High degree of technical difficulty
- Complex Issues
  - Psychosocial concerns
  - Hearing Restoration (bone anchored device, canal)



# MICROTIA OPTIONS

- No Treatment
- Prosthesis
  - Adhesive Retained Prosthesis
  - Implant Retained Prosthesis
- Surgery
  - Rib Cartilage
  - Medpor

Normal



◀ Prosthetic

Rib Cartilage ▶



Normal

Medpor ▶



Normal

# Ear Prosthesis

- Implant Retained  
(requires surgery)



- Adhesive Retained  
(attached with glue)



# Ear Prosthesis

## Advantages



- Realistic appearance
- No scars on other parts of the body
- Especially good for failed ear surgery
- The adhesive prosthesis does NOT require surgery



# Ear Prosthesis



# Ear Prosthesis



# Ear Prosthesis



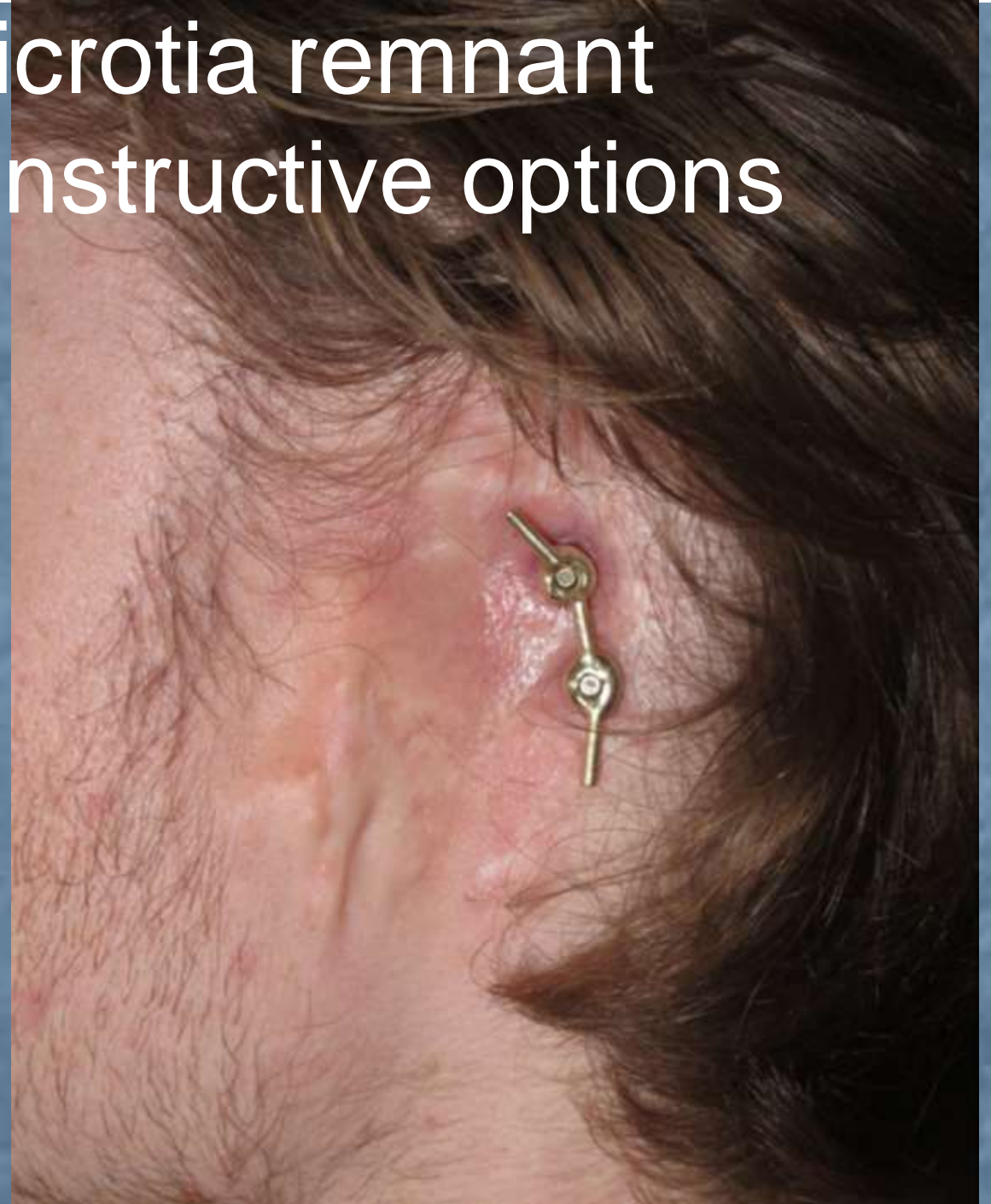
# Ear Prosthesis



# Ear Prosthesis

## Warning!

Removing the microtia remnant  
Can limit future reconstructive options



# Ear Prosthesis

## Disadvantages

- Even with the surgical abutment, the ear can still fall off
- Outcome depends on the skills of the anaplastologist
- Must be removed daily
- Will only last 2-5 years
- Difficult to match skin tones
- Infections and wound healing issues
- Requires a daily cleaning regimen



# Rib Cartilage Ear Surgery

- Traditional method for > 50 years
- Uses the patient's Rib Cartilage to make the structure of the ear
- The Rib Framework is placed inside a "skin pocket" under the scalp
- Uses ONLY the patient's own tissues



# Rib Cartilage Ear Surgery

cartilage remnant

lobule remnant

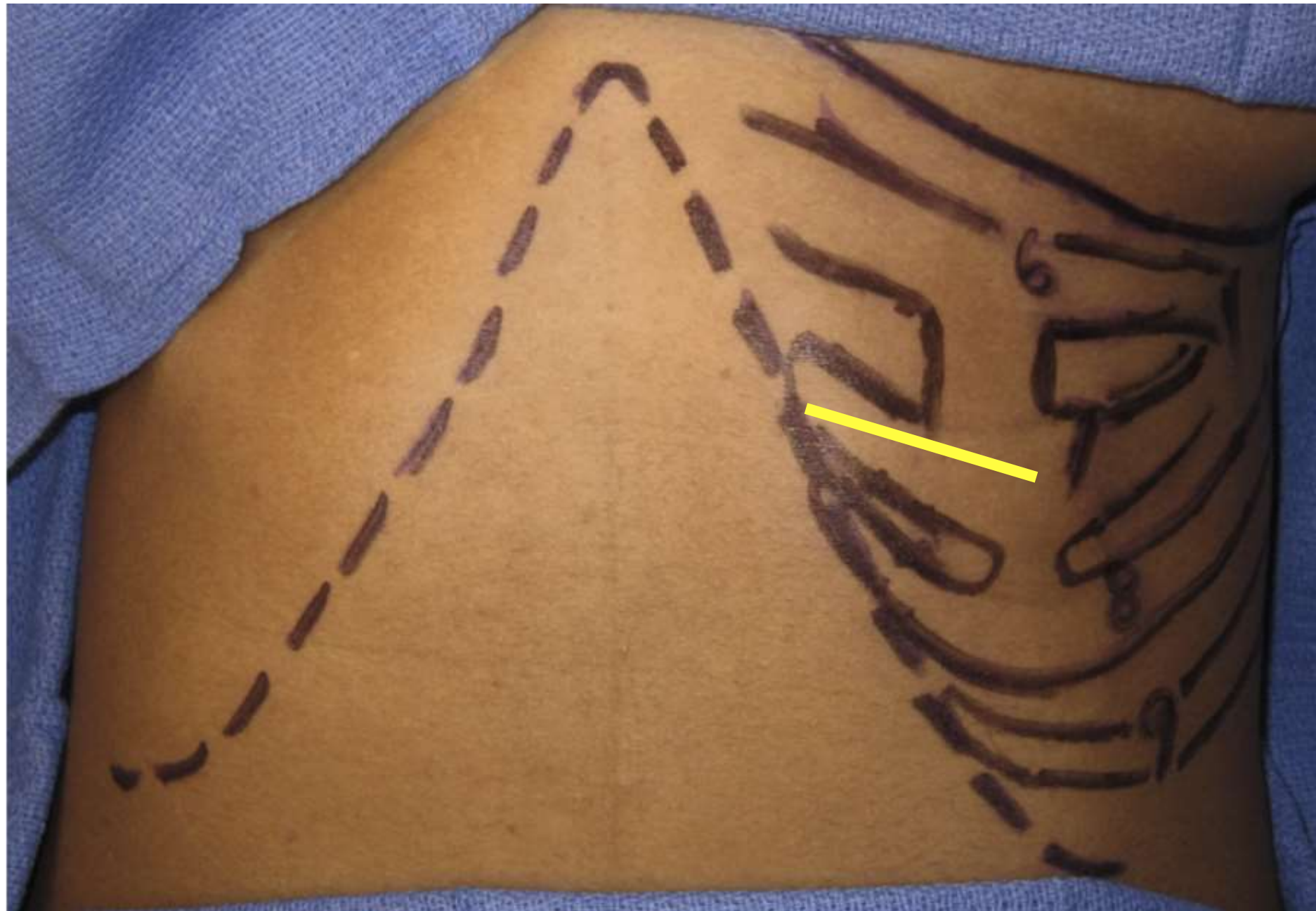




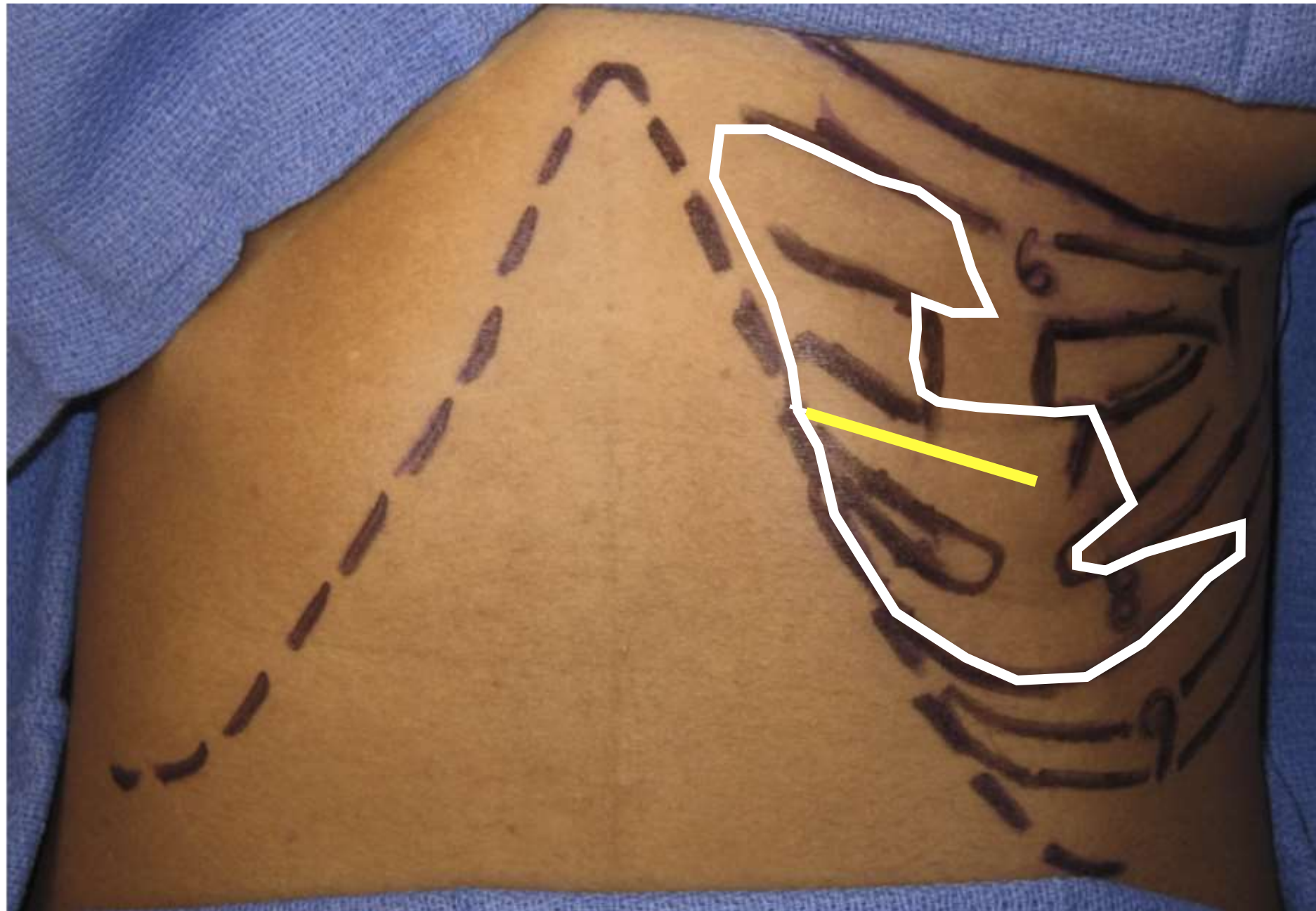
# Rib Cartilage Ear Surgery



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# Rib Cartilage Ear Surgery

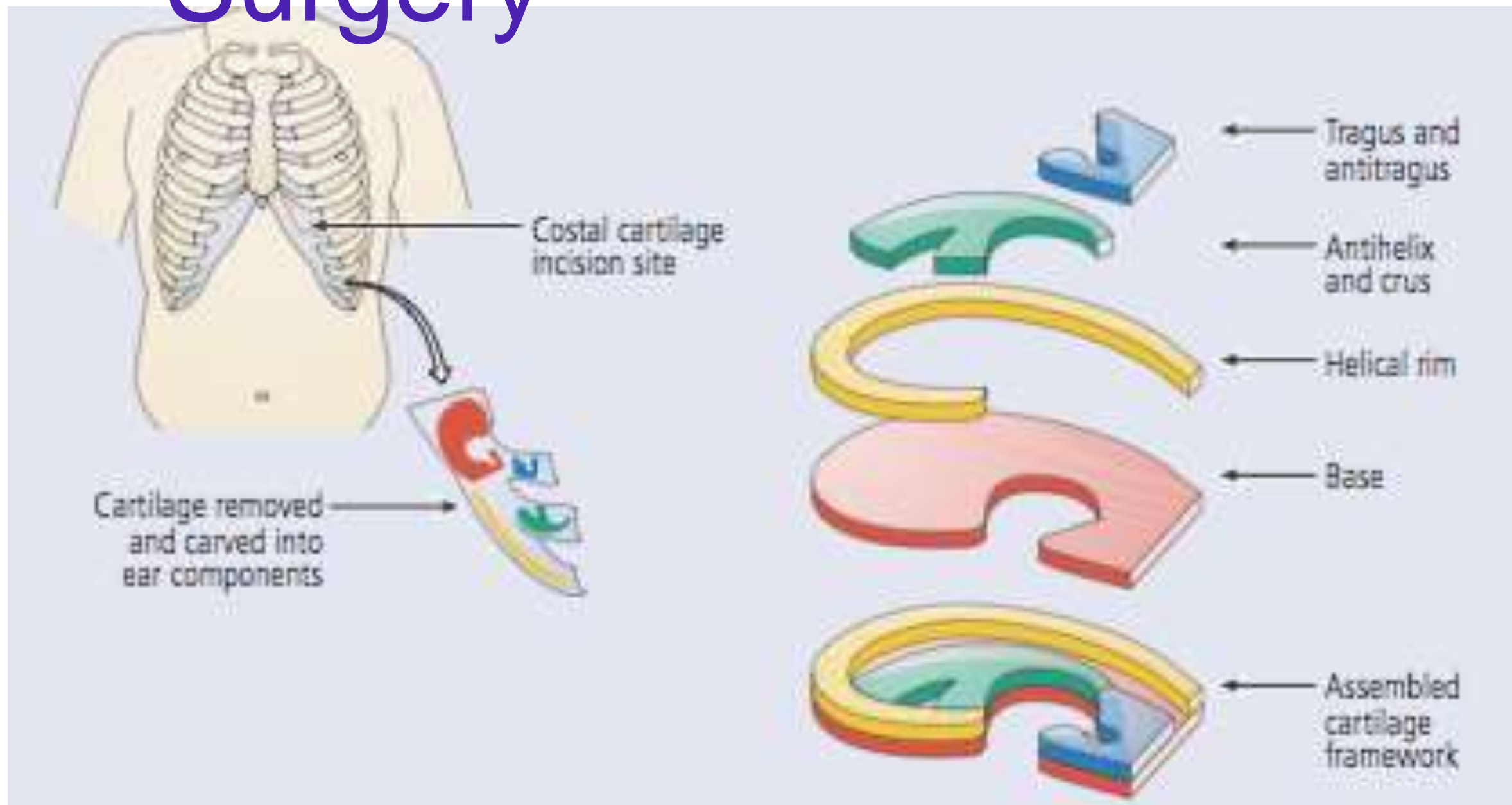


6<sup>th</sup> and 7<sup>th</sup> ribs



8<sup>th</sup> rib

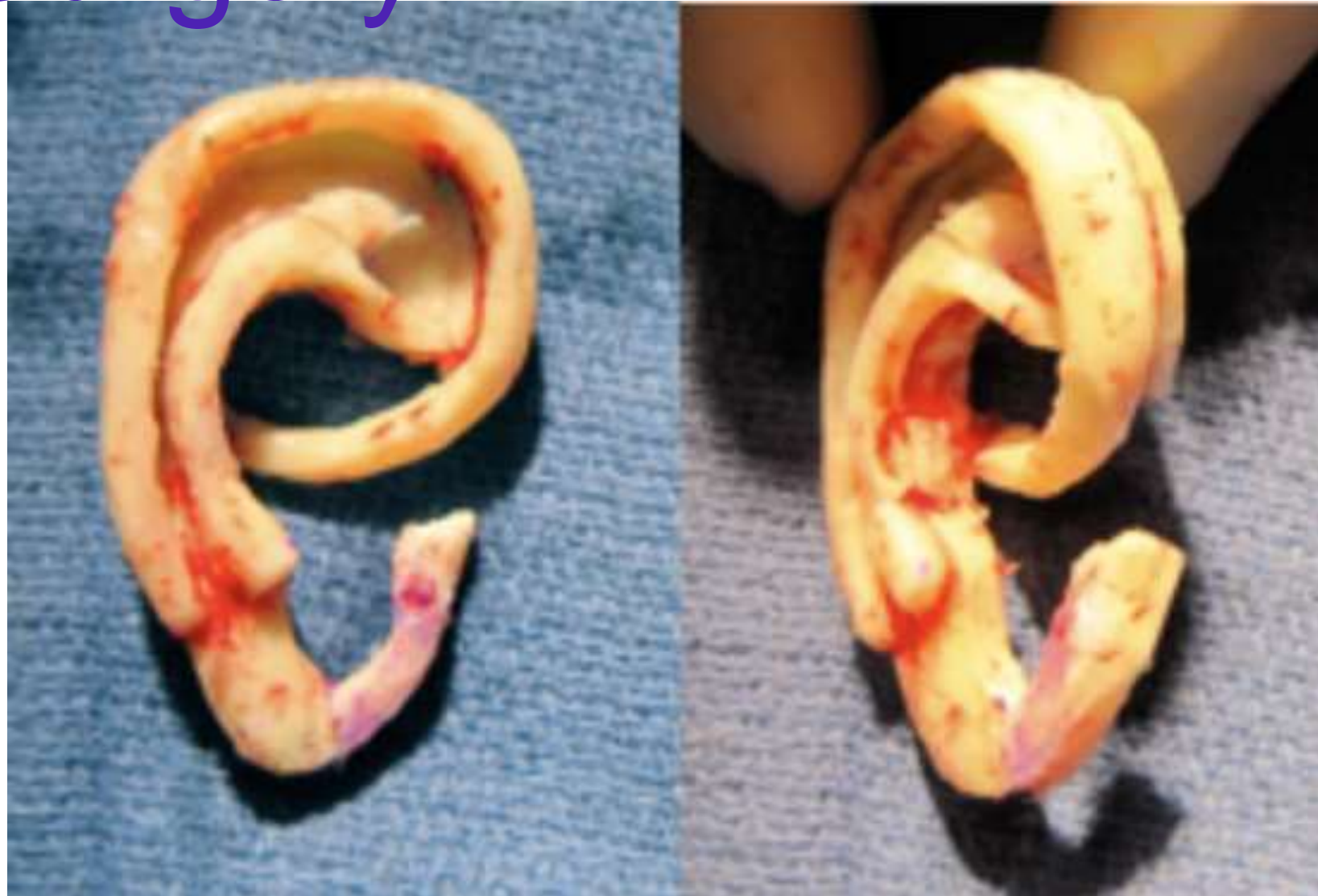
# Rib Cartilage Ear Surgery



This technique creates a 2-dimensional structure.

It does not create a thin, delicate framework

# Rib Cartilage Ear Surgery



# Rib Cartilage Ear Surgery



Native ear cartilage and rib cartilage are NOT the same

Thin, delicate and malleable VS. Thicker, brittle and hard

# Rib Cartilage Ear Surgery



The rib cartilage framework is placed under a skin pocket.  
A drain is used to suction the skin down to the ear



# Rib Cartilage Ear Surgery



Before and after the 1st rib cartilage surgery

# Rib Cartilage Ear Surgery

3 weeks after the 3<sup>rd</sup> surgery

Normal



# Rib Cartilage Ear Surgery

## ADVANTAGES

- Well-established safe technique
- Uses only the patient's own tissue
- Very good results in experienced hands
- Durable over many years

# Rib Cartilage Ear

## Surgery

### DISADVANTAGES

- The results are **NOT AS REALISTIC** as I would like
- Surgery can't be done until the child is **6 or OLDER** because the ribcage will be large enough to make an adult-sized ear.
  - The surgery requires **INPATIENT HOSPITALIZATION**
- It can be **PAINFUL**, requiring pain pumps /epidurals
- It requires **MULTIPLE SURGERIES** (up to 4)
- Requires **TECHNICAL EXPERTISE** for consistent results

# MY GOAL WITH MICROTIA SURGERY

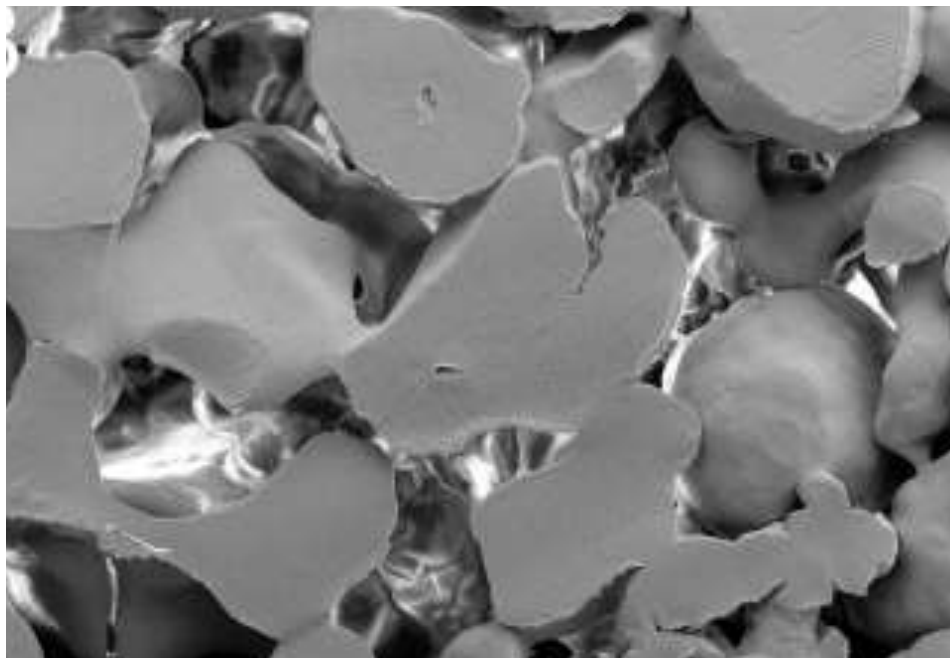
To create a **REALISTIC** appearing ear  
which is **SYMMETRIC** to the opposite side  
that can be reconstructed at a much **YOUNGER**  
**AGE** with **FEWER SURGERIES**  
in a **LESS INVASIVE WAY**  
with **MINIMAL PAIN**

# Medpor Ear Surgery

- A completely different technique than Rib Cartilage
- NOT a “plastic” Rib Framework
- Uses the patient’s own tissue “flap”
- Sits on top of the scalp, not tucked in a pocket

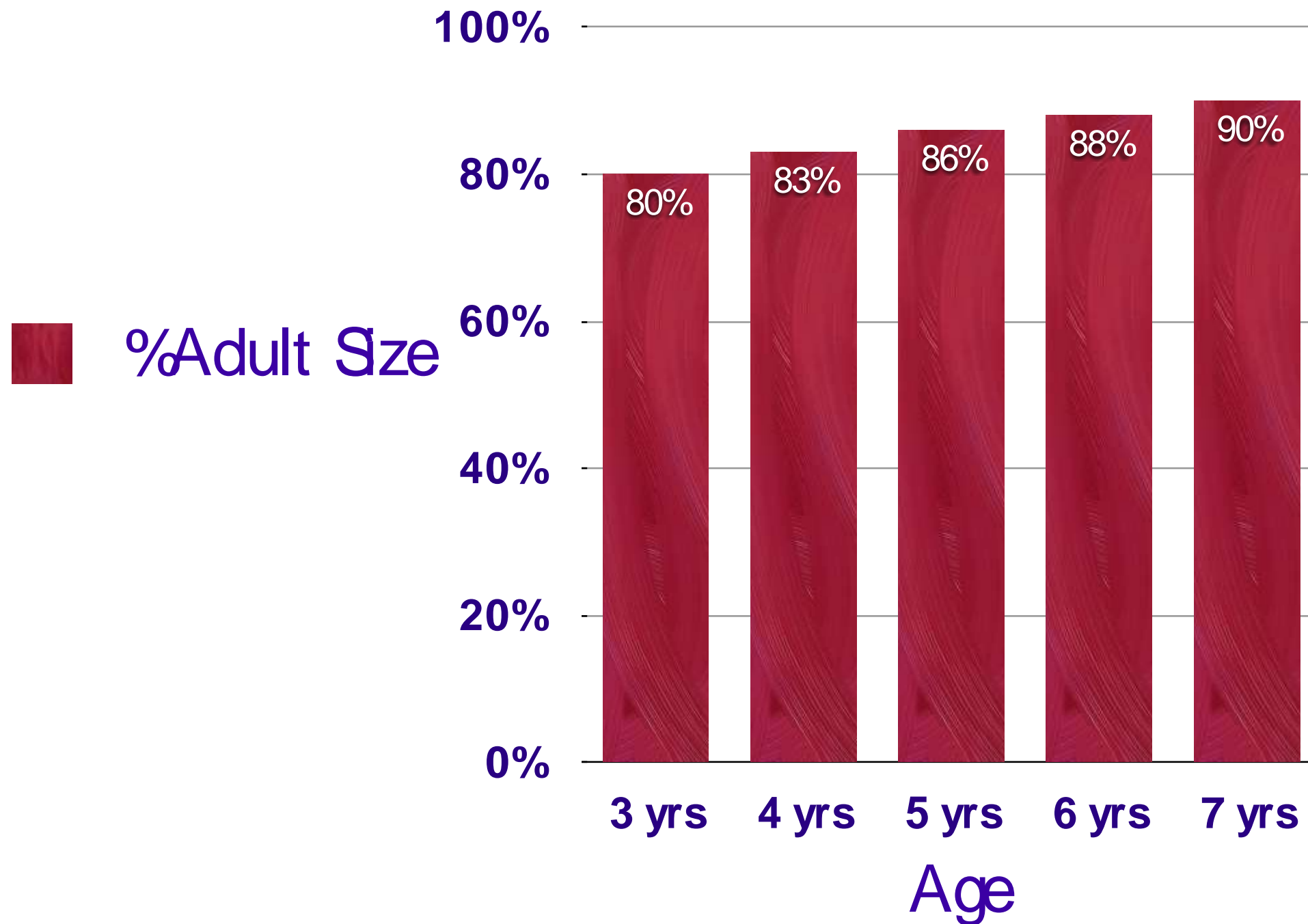


# Medpor Ear Surgery



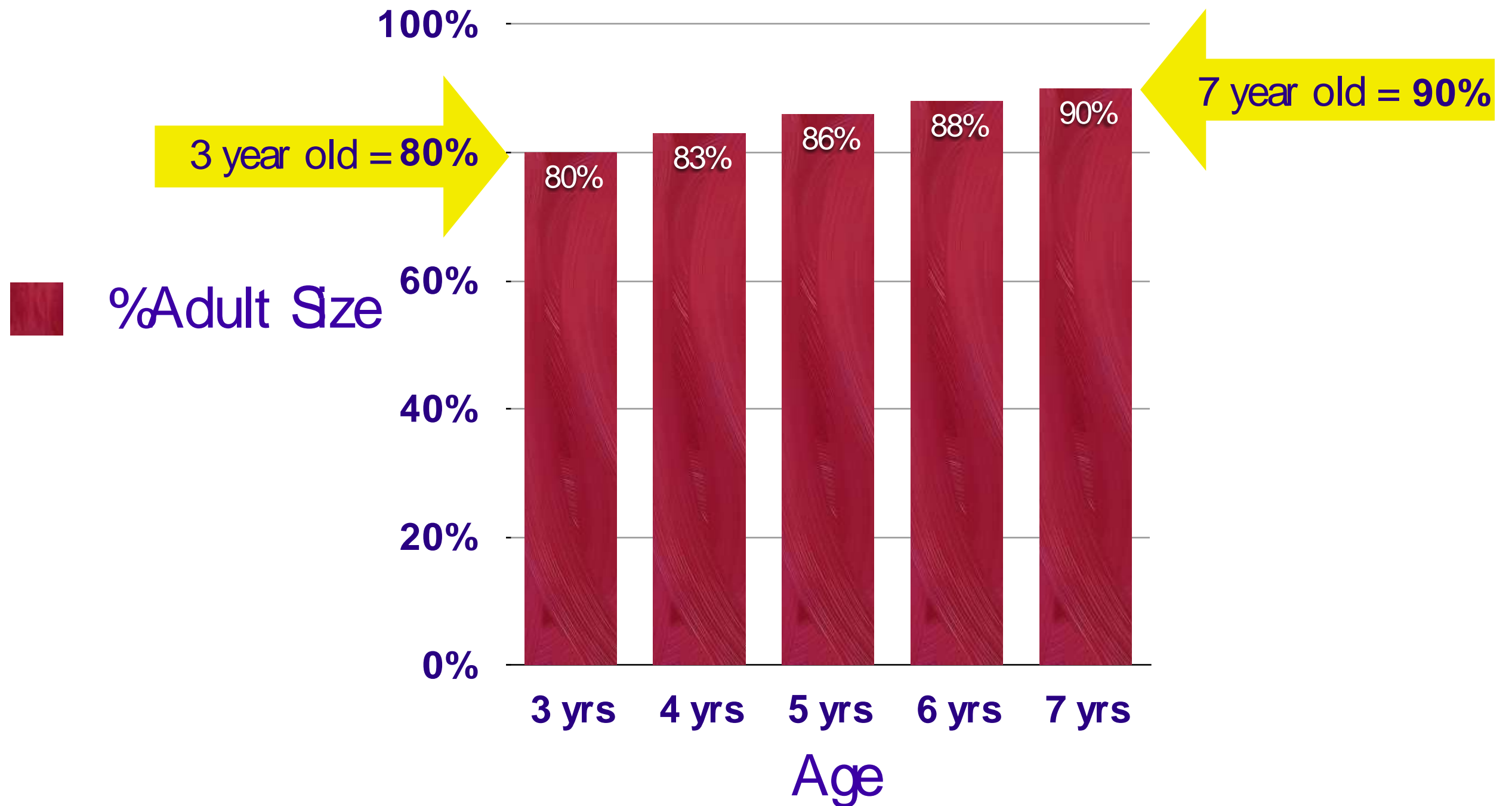
- Porous Polyethylene
- Light weight but strong (50% air)
- The body's tissue integrates into the Medpor "pores"

# How The Ear Grows

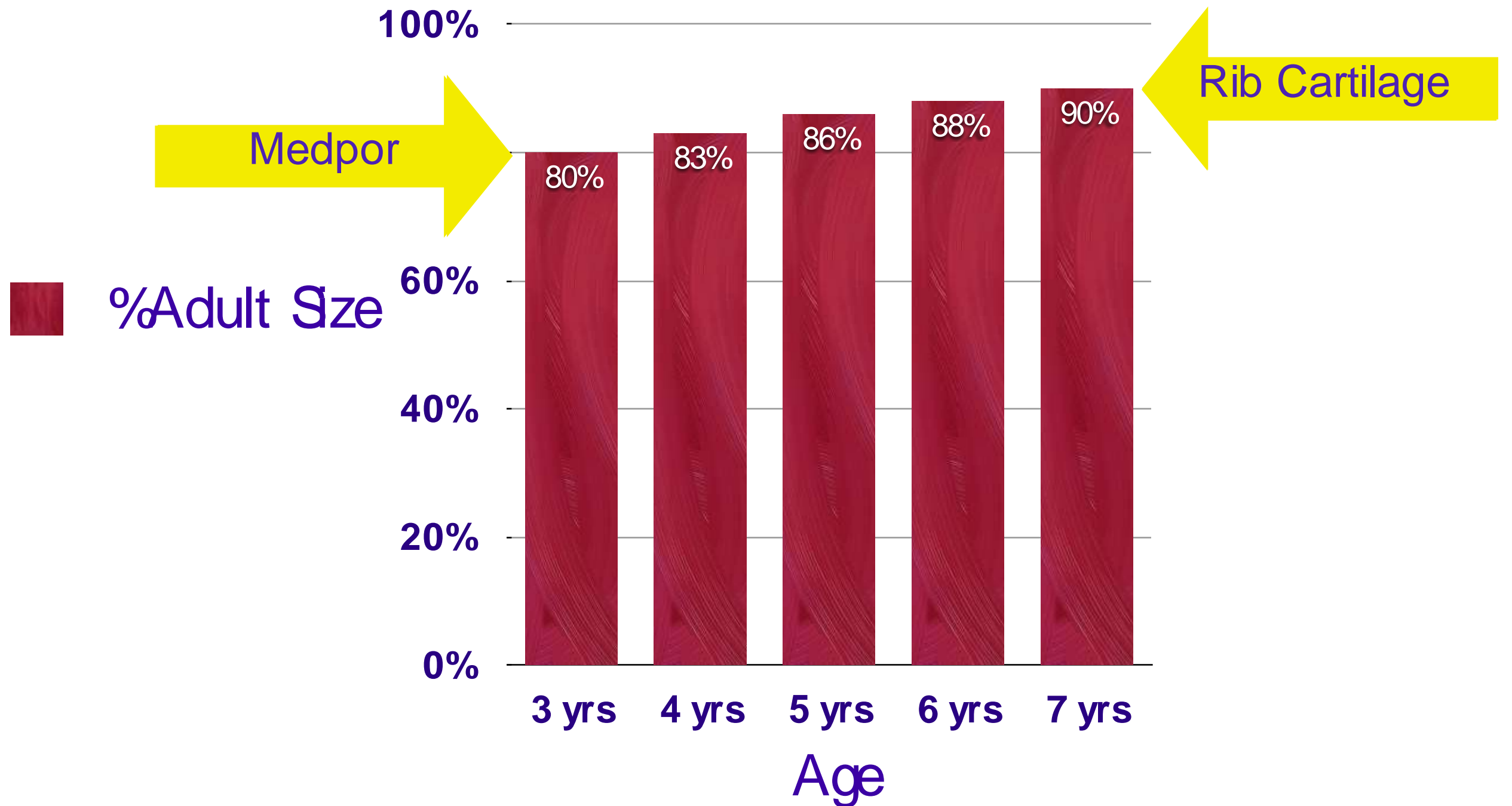




# How The Ear Grows



# How The Ear Grows



# The Medpor Technique

(video)

# Surgical Results with Medpor



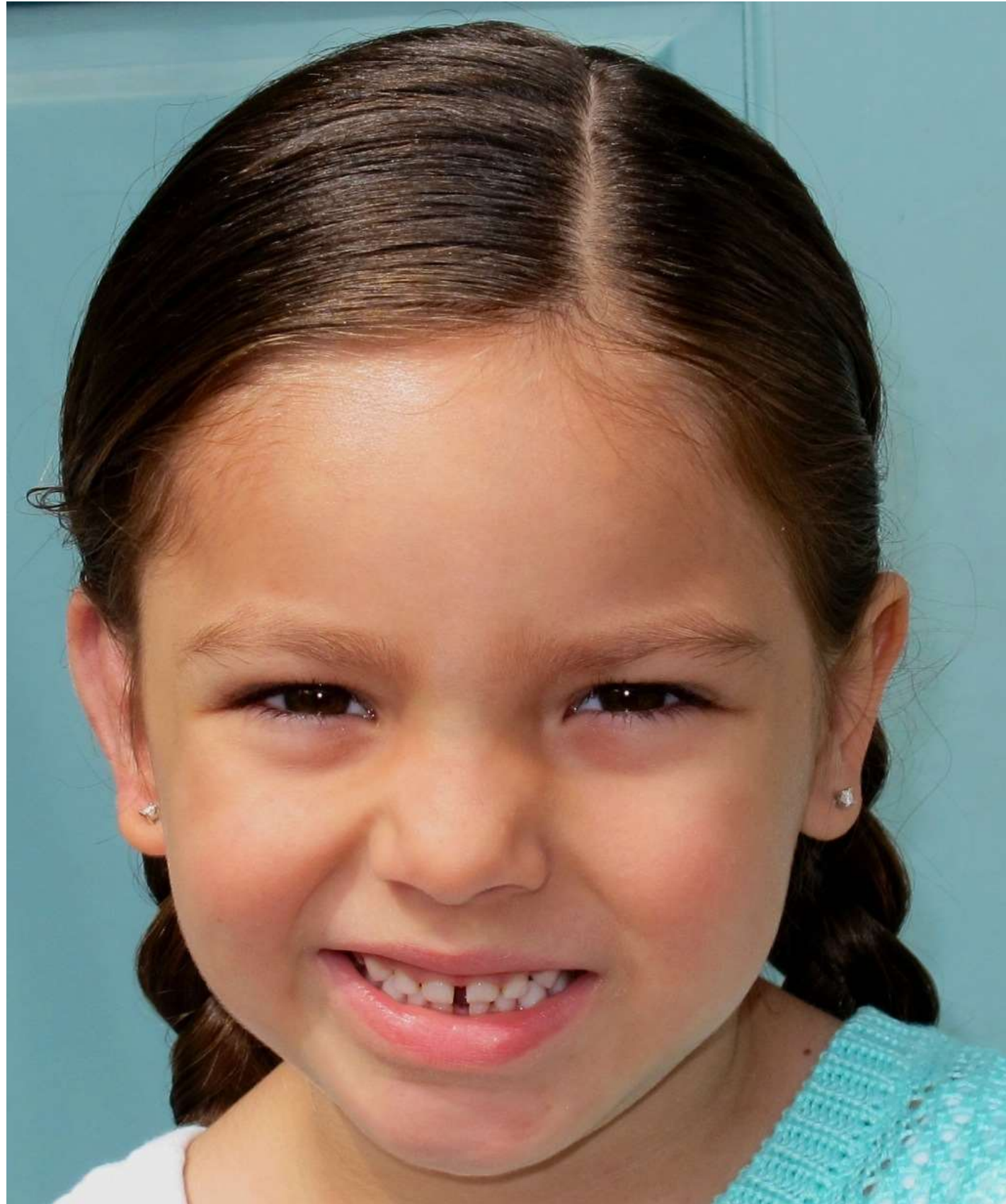
















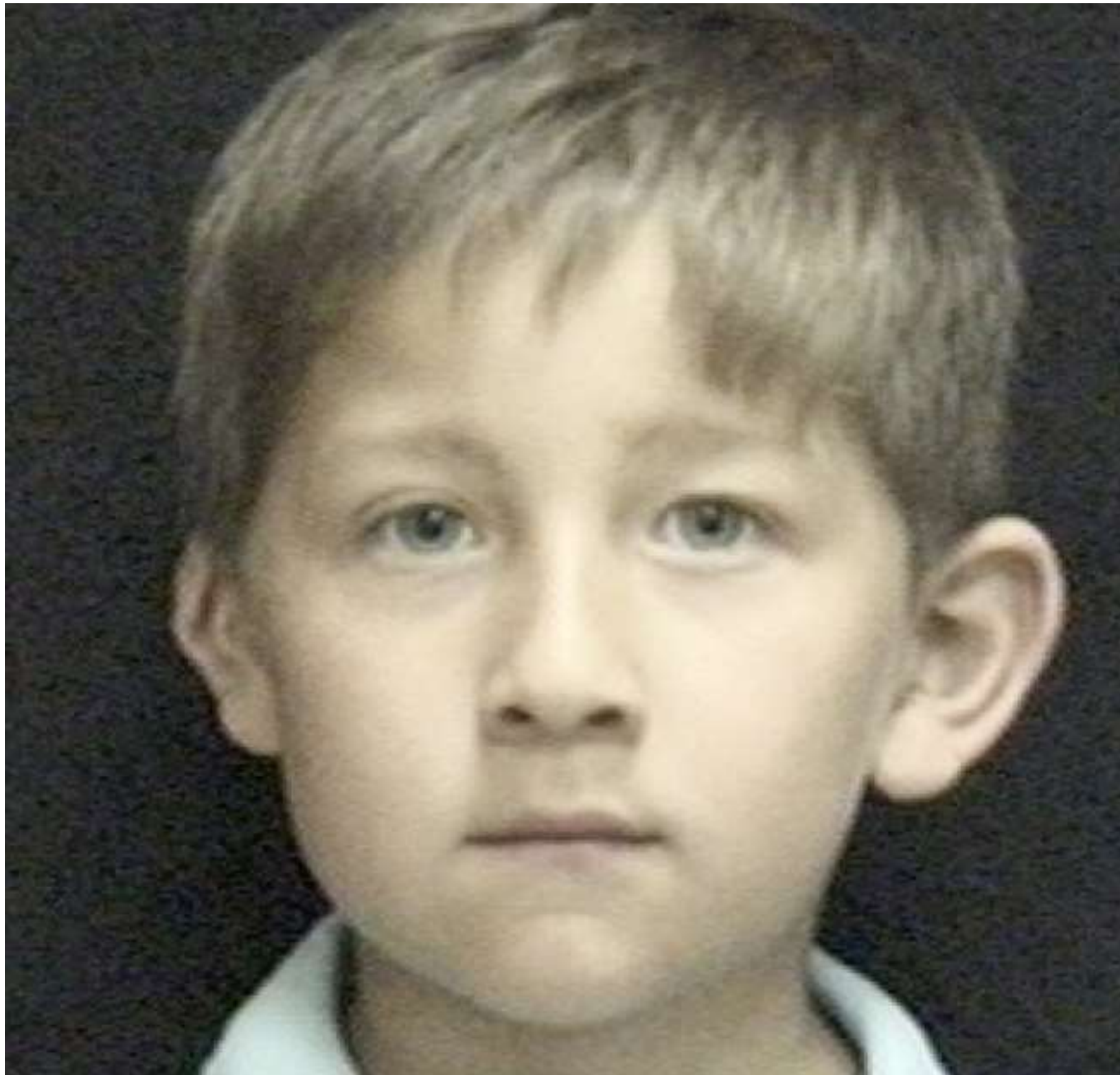






















# Medpor Ear Surgery

## ADVANTAGES

- © More realistic results in MY OPINION



# Medpor Ear Surgery

## ADVANTAGES

- © More realistic results in MY OPINION





# Medpor Ear Surgery

## ADVANTAGES

© Can create a symmetric ear in just ONE outpatient surgery



# Medpor Ear Surgery

## ADVANTAGES

- © Can be done as young as 3 years of age



# Medpor Ear Surgery

## ADVANTAGES

- An excellent technique for adults



# Medpor Ear Surgery

## ADVANTAGES

- Minimal Pain



# Medpor Ear Surgery

## ADVANTAGES

- Minimal scars



# Medpor Ear Surgery

## DISADVANTAGES

- Medpor is a synthetic material
- The long term outcome is unknown (beyond 23 yrs)
- If the Medpor becomes exposed, it won't heal the way a Rib Cartilage ear will heal
- Medpor surgery is technically very challenging
- Complications can be difficult to treat

# Medpor Ear Surgery

## COMPLICATIONS

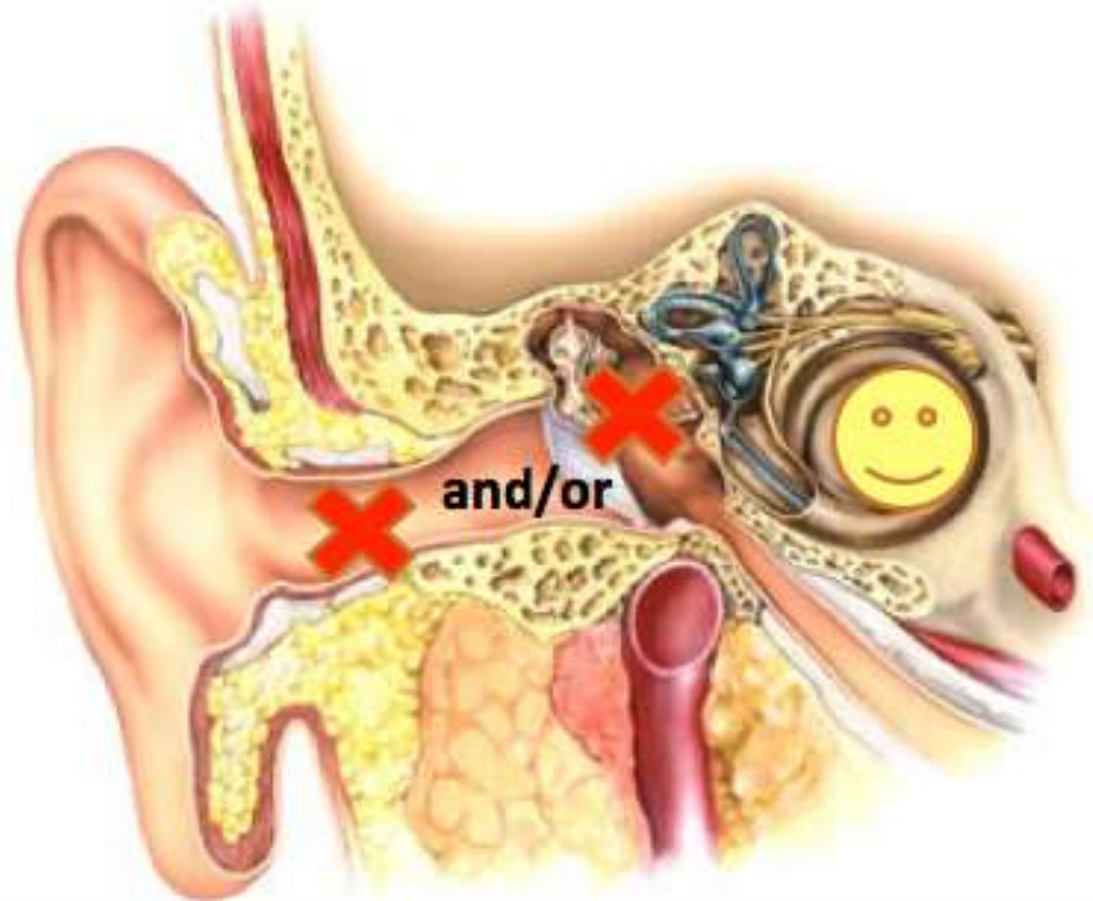
- Bleeding
- Infection
- Exposure (hole) - NOT rejection
- Fracture
- Failure

# Options for Aural Atresia

- If unilateral, may choose no treatment
- Bone Conduction Hearing Devices
- Atresia Repair to create a canal



# Conductive Hearing Loss



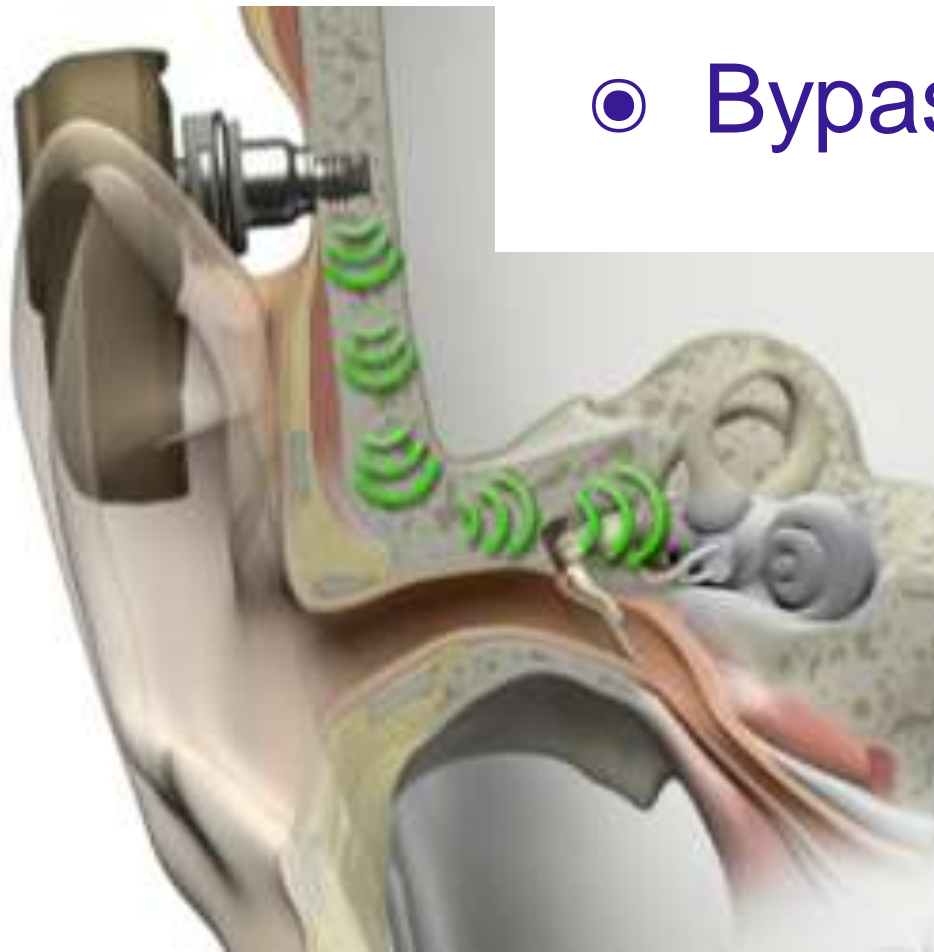
- Hearing Loss of the outer and/or middle ear
- Bone Conduction is NORMAL
- Air Conduction is ABNORMAL

# Bone Anchored Hearing Devices

- Converts sound into vibrations creating a **DRIVING FORCE**

Processor → implant → bone → cochlea

- Bypasses the canal and middle ear



# Bone Anchored Hearing Devices

## ADVANTAGES

- Better sound conduction
- “Low Risk, High Reward”
- Allows for better sound localization

## DISADVANTAGES

- Requires surgery
- Wound issues
- Appearance

# Bone Anchored Hearing Devices

## DIRECT DRIVE

The driving force (vibration) is in direct contact with the bone → Osseointegration

## SKIN DRIVE

The driving force (vibration) is on the skin, not in direct contact with the bone

# Bone Anchored Hearing Devices

## DIRECT DRIVE

The driving force (vibration) is in direct contact with the bone → Osseointegration

This is the most direct and efficient route for bone conduction with the best fitting range.

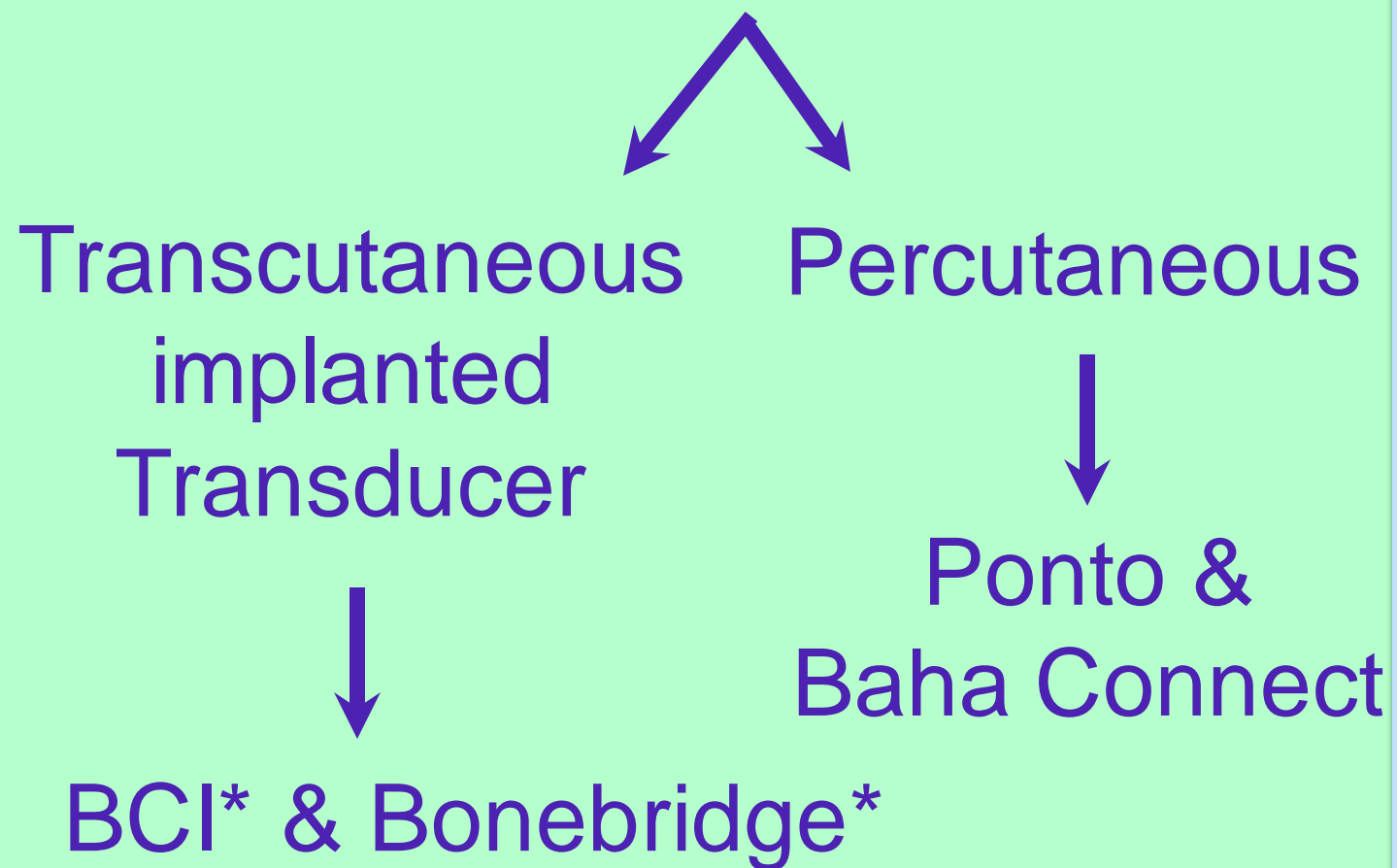
## SKIN DRIVE

The driving force (vibration) is on the skin, not in direct contact with the bone

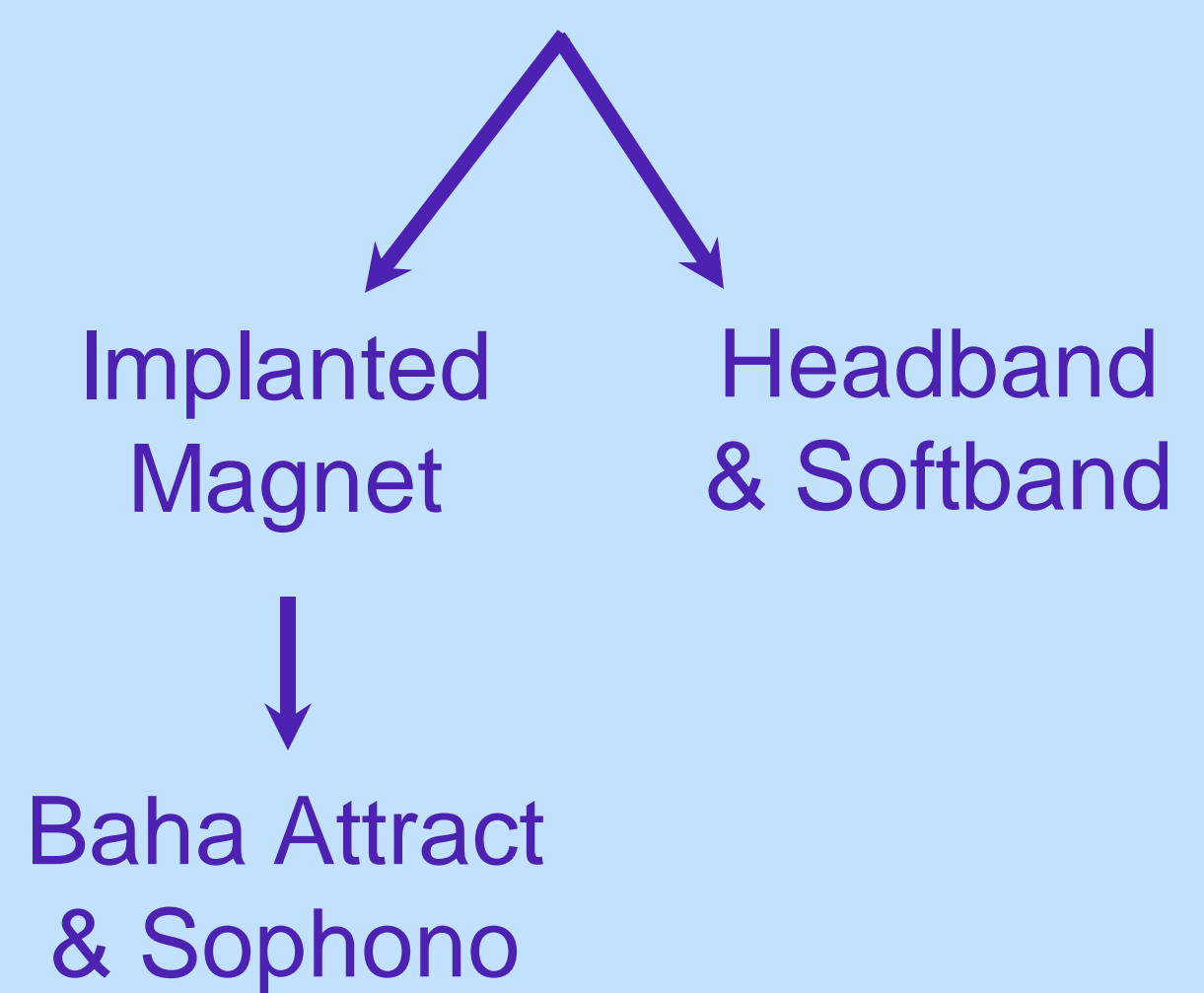
There is a transmission loss of at least 10 dB as compared to the direct drive, which limits the fitting range comparatively.

# Bone Anchored Hearing Devices

## DIRECT DRIVE



## SKIN DRIVE



\* Not currently commercially available in the US

# Bone Anchored Hearing Devices

3 parts:

1. Titanium implant

2. Abutment

3. Sound Processor



Oticon Medical Ponto Plus

# Bone Anchored Hearing Device

## Percutaneous



Oticon Medical Ponto Plus



# Bone Anchored Hearing Device

## Transcutaneous Systems



Cochlear Attract



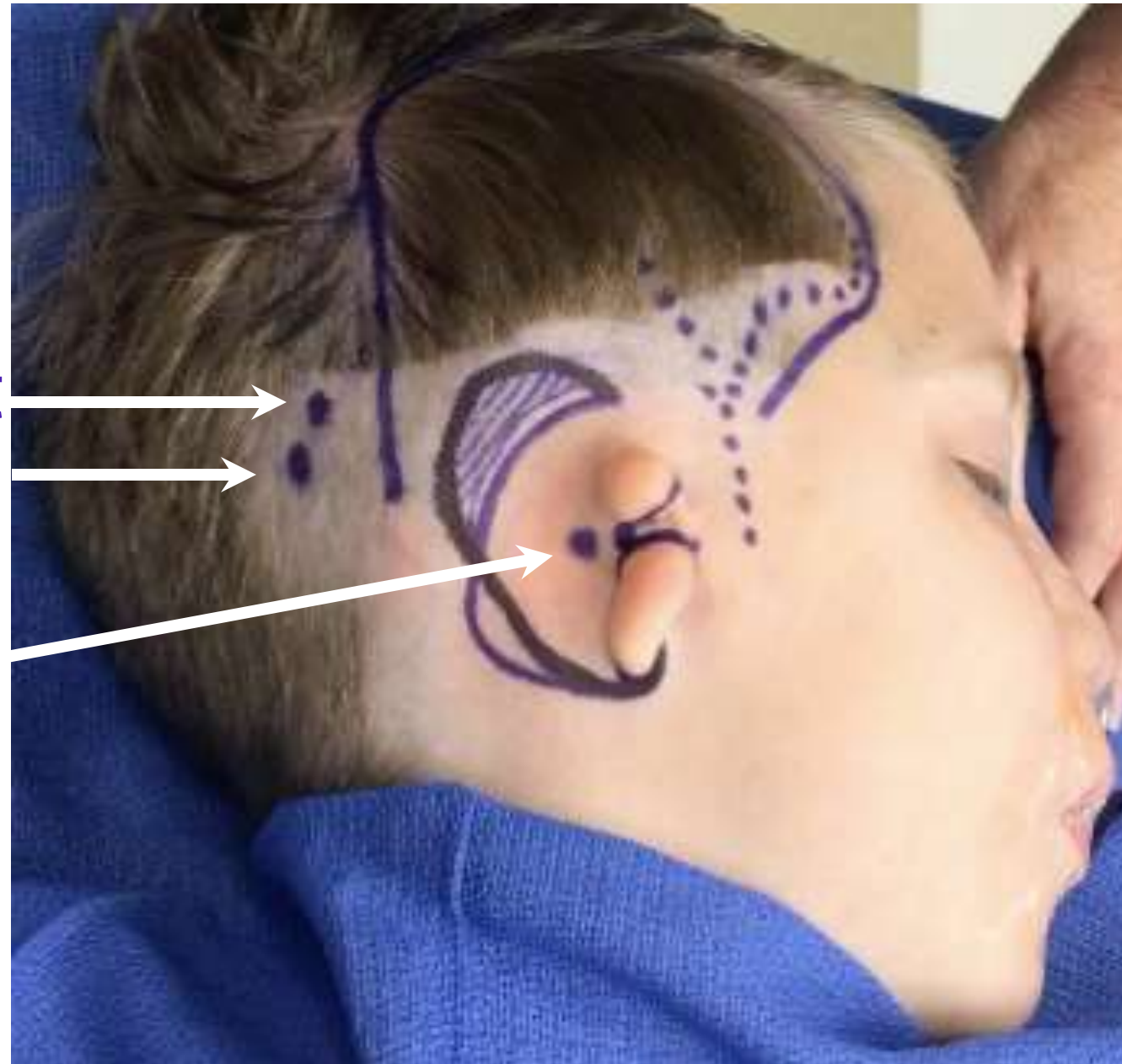
Sophono Alpha 2

When a Bone Anchored Hearing Device  
is combined with a  
1<sup>st</sup> stage Medpor Ear Reconstruction  
I use a SCARLESS technique for both  
Percutaneous and Transcutaneous Systems

# Combined Medpor Ear Surgery and Bone Anchored Implant

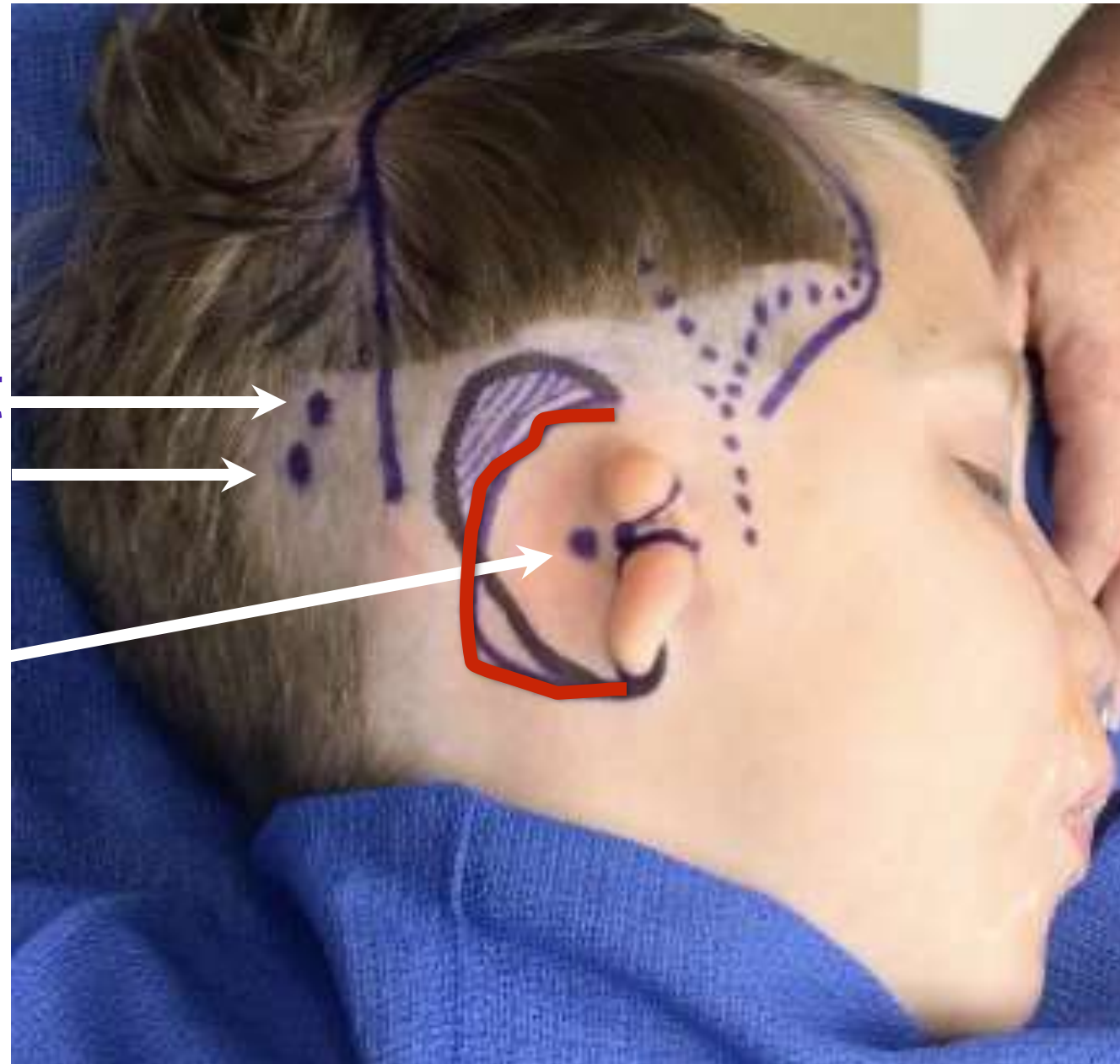
Implant placement  
"sleeper"

Location of canal



# Combined Medpor Ear Surgery and Bone Anchored Implant

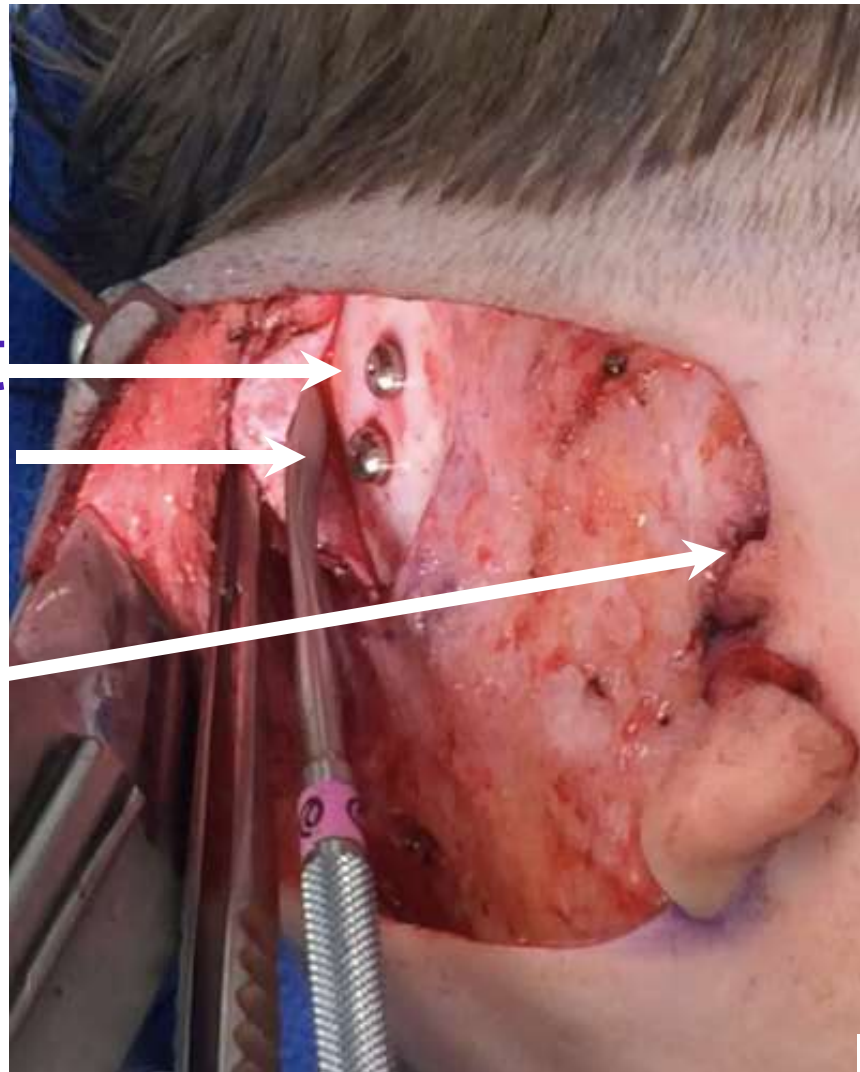
Implant placement  
"sleeper"  
Location of canal



# Combined Medpor Ear Surgery and Bone Anchored Implant

Implant placement  
"sleeper"

Location of canal

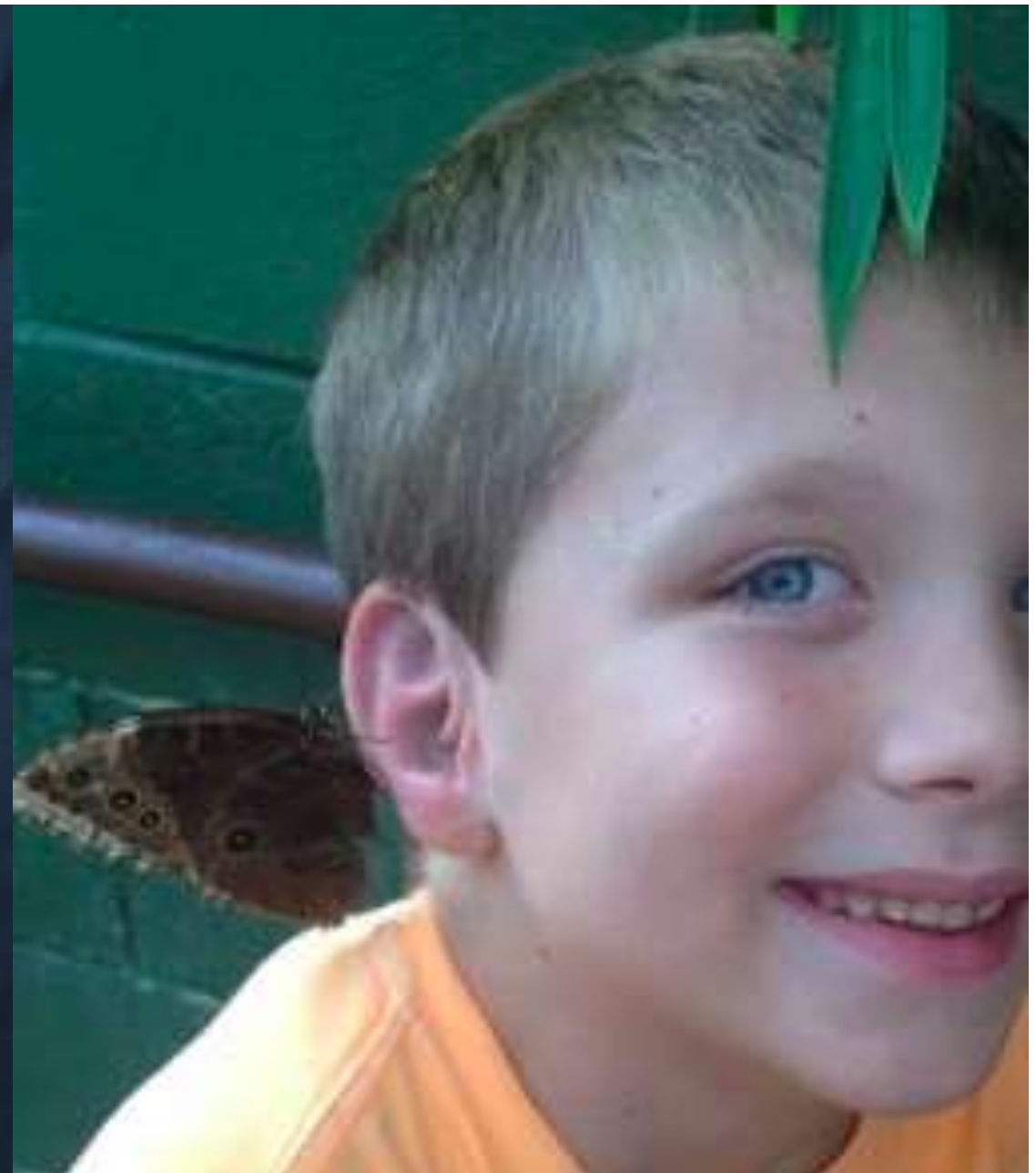


# Combined Medpor Ear Surgery and Bone Anchored Implant

Implant & Sleeper placed under scalp without any scar



In just 1 outpatient surgery,  
Patients can have a functional ear







# AFTERCARE

Healing cap and petroleum gauze is placed around the abutment

Post-operative check at 7-10 days

Gentle daily cleaning

Processor can be used 2-3 months after surgery for *percutaneous* systems

Processor can be used 1 month after surgery for *transcutaneous* systems

**IDEAL TIMING OF SURGERY**

**&**

**BONE ANCHORED DEVICES**

**When should the Bone Anchored device be placed?\***

**\*child must be at least 5 years old**

# IDEAL TIMING OF SURGERY

&

# BONE ANCHORED DEVICES

**When should the Bone Anchored device be placed?\***

Adhesive Retained Prosthesis: **IT DOESN'T MATTER**

\*child must be at least 5 years old

# IDEAL TIMING OF SURGERY

&

# BONE ANCHORED DEVICES

**When should the Bone Anchored device be placed?\***

Adhesive Retained Prosthesis: **IT DOESN'T MATTER**

Surgically Retained Prosthesis: **AT THE SAME TIME**

\*child must be at least 5 years old

# IDEAL TIMING OF SURGERY

&

## BONE ANCHORED DEVICES

**When should the Bone Anchored device be placed?\***

Adhesive Retained Prosthesis: **IT DOESN'T MATTER**

Surgically Retained Prosthesis: **AT THE SAME TIME**

Rib Cartilage Surgery: **AFTER the ear surgery**

\*child must be at least 5 years old

# IDEAL TIMING OF SURGERY

&

## BONE ANCHORED DEVICES

**When should the Bone Anchored device be placed?\***

Adhesive Retained Prosthesis: **IT DOESN'T MATTER**

Surgically Retained Prosthesis: **AT THE SAME TIME**

Rib Cartilage Surgery: **AFTER** the ear surgery

Medpor Surgery: **AT THE SAME TIME (ideally) or AFTER**

\*child must be at least 5 years old

# earracles

MIRACLES FOR EARS

A non-profit organization that helps children born without ears thrive through

Education

Advocacy

Research

Surgery

# earicles

MIRACLES FOR EARS



**ECMAC**  
Ecuador Microtia Atresia  
conference  
**2014**  
April 10 in Quito



**COLMAC**  
Colombia Microtia Atresia  
conference  
**2014**  
April 12 in Bogotá



**LAMAC**  
Los Angeles Microtia Atresia  
conference  
2nd Annual  
**2014**  
July 10 - 13



**miniMAC**  
CHICAGO Microtia Atresia  
conference  
**2014**  
August 9



**DCMAC**  
Washington Microtia Atresia  
conference  
**2015**  
August 8



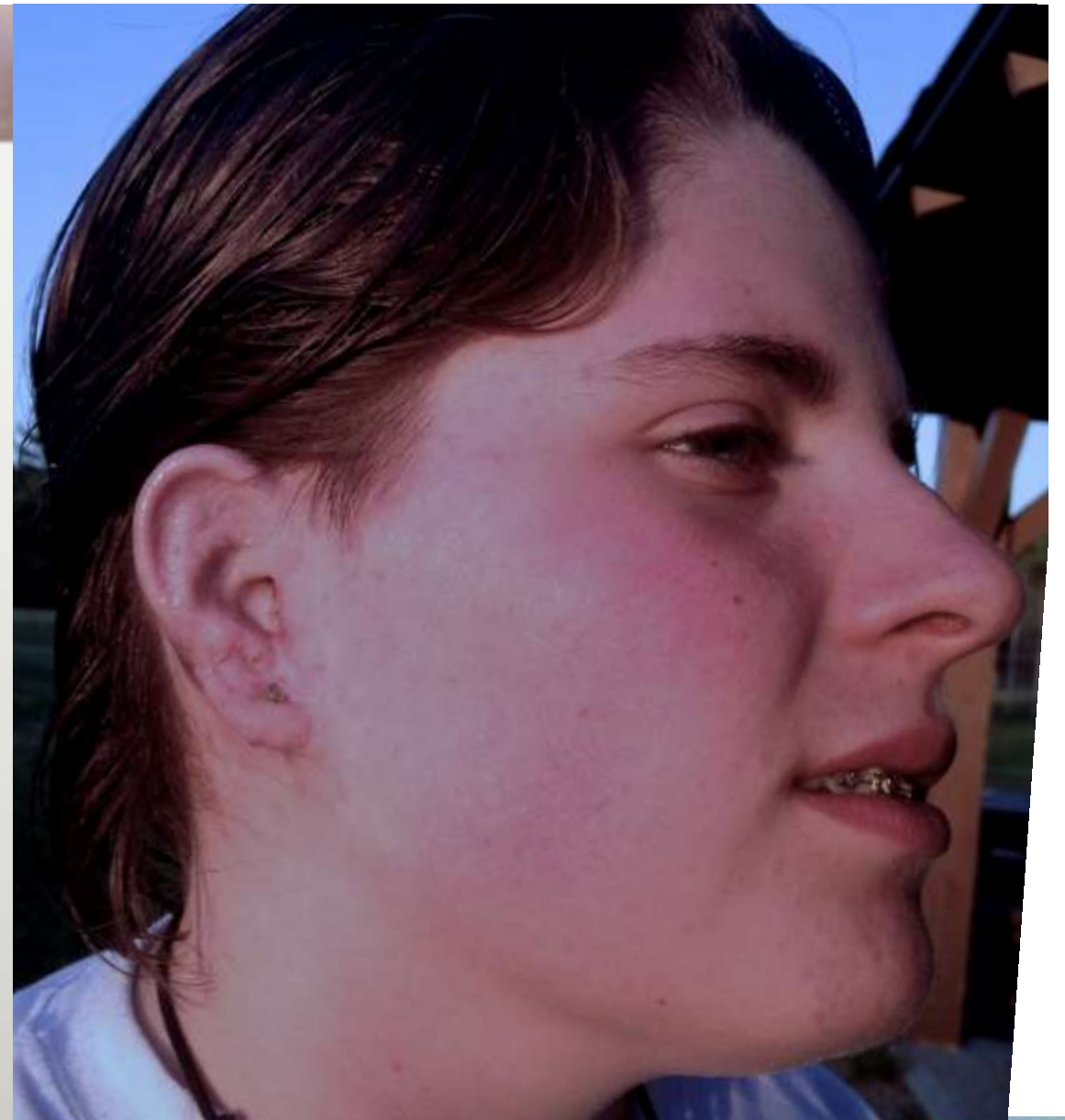
**MXMAC**  
Mexico Microtia Atresia  
conference  
**2015**  
April 18



# earicles

MIRACLES FOR EARS

## Patients with failed ear reconstructions



slewin@lewinmd.com  
www.MicrotiaEarSurgery.com



Thank You!