


VIBRANT SOUNDBRIDGE IN AURAL ATRESIA: HOW DOES ATRESIA SEVERITY MATTER?

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Atresiaplasty

- Only half of those patients meet criteria for conventional atresiaplasty
 - if the patient has an associated craniofacial syndrome, that percentage $\leq 25\%$ or less
- Bone conduction hearing aids are encouraged prior to surgical intervention,
- Surgical repair typically after the 6th birthday and following microtia repair.


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Atresiaplasty Results

- In appropriately selected candidates operated on by experienced surgeons,
 - 7 or higher had SRT ≤ 30 dB in 89% of surgeries
 - 6 or less had SRT ≤ 30 dB, in 45%
 - SRT of ≤ 25 dB are seen in 75%
 - Long term results suggest SRT ≥ 35 dB may be more typical
 - Poor pneumatization of the middle ear & mastoid best predictor of poor postoperative outcomes
 - Revision rate 15-20%
 - Recurrence of stenosis common
 - especially in Grade III microtia
- Long term results of revision surgery have less improvement in hearing thresholds as well

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BAHA Evidence-Based Outcomes

- Audibility
 - With BAHA \geq Without BAHA
- Localization
 - With BAHA \geq Without BAHA
- Speech Recognition
 - With BAHA \geq Without BAHA
- Quality of life
 - With BAHA \geq Without BAHA

Danhauer JL, Johnson CE, Nixon M. Does the evidence support use of the Baha implant system (Baha) in patients with congenital unilateral aural atresia? J Am Acad Audiol. 2010;21(9):274-86.

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VSB Outcomes

- Incus, Stapes, and Round Window
 - Mean functional gain of 45 dB
 - SDS $\geq 90\%$ at 65 dB
 - Bone thresholds stable
- Consensus statement has recommended in Jahrsdoerfer Score ≥ 8 ¹
 - Success reported in Jahrsdoerfer Score ≥ 3 ²

1. Cremers CW, O'Connor AF, Helms J, et al. International consensus on Vibrant Soundbridge implantation in children and adolescents. Int J Pediatr Otorhinolaryngol. 2010;74(11):1267-9.
2. Colletti L, Garner M, Mandala M, Veronesi S, Colletti V. The floating mass transducer for external auditory canal and middle ear malformations. Otol Neurotol. 2011;32(1):108-15.

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QALY in Otology

Service	QALY
Hearing Aids	\$17,072/QALY
Cochlear Implants	\$14,000-16,000/QALY
Middle Ear Implants	€16,085-€70,000/QALY
BAHA	£46,628-100,029/QALY
What is considered acceptable?	
US	≤ \$50,000/QALY
EU	≤ €40,000/QALY
UK	≤ £30,000/QALY

Quality-adjusted life year: health outcome measurement that combines duration and quality of life

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Methods

- Demographic data:
 - age, gender, laterality, associated syndromes, previous otologic surgery.
- Audiology data:
 - pre/postop air/bone, unaided and aided speech
- Clinical/Surgical:
 - CT imaging, approach, FN outcome, FMT placement, microtia repair.
 - Altman, Jahrdoerfer and Yellon scores

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Jahrdoerfer Grading System

2 points	Stapes present
1 point	Oval window present
1 point	Middle ear space
1 point	Facial nerve position
1 point	Malleus-incus complex
1 point	Mastoid pneumatized
1 point	Incus-stapes connected
1 point	Round window present
1 point	Appearance of external ear
10 points	Maximum

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Yellon-Branstetter Grading System

- A variation of the Jahrdoerfer system
 - Proposed 13 point scale, more detailed assessment of
 - the middle fossa tegmen level
 - position of the incudomalleolar complex
 - position of the facial nerve relative to the middle ear and oval window.
 - Has not been correlated to outcomes

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Results

- Average age 22 yoa, range 6-68 yoa
- Average follow up 17 months, range 2-42 months
 - Initial 3.7 months
- 16 (57%) M/12 (43%) F, 17 (61%) R/11 (39%) L
- 5 (18%) with Treacher-Collins
- All transmastoid, 1 transmastoid/transcanal
- No iatrogenic FN paresis/paralysis
- 2 had previous microtia repair
- One non-user, one not yet fitted

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Results

	N	Mean	Std Dev
Initial Post-op Aided Speech Threshold (dB)	18	39	11
Initial Post-op Aided Word Recognition (%)	18	96%	7%
Recent Post-op Aided Word Recognition (%)	24	94%	9%
Pre Bone PTA (dB)	28	24	15
Initial Post-op Bone PTA (dB)	24	28	15
Recent Post-op Bone PTA (dB)	22	26	15

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Results

Location of FMT	N	Initial Post-op Aided Speech Threshold		Initial Post-op Aided Word Recognition		Recent Post-op Aided Word Recognition	
		Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
1: Oval Window/Fenestra	5	42	12	88%	8%	93%	8%
2: Stapes	5	36	15	97%	7%	89%	10%
3: Round Window	4	38	5	100%	0%	100%	0%
4: Incus	4	39	10	100%	0%	100%	0%

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Results

	N	Mean	Std Dev	Minimum	Maximum
Altman	28	2.07	1.02	0	3
Jahrsdoerfer Score	28	6.89	1.93	4	9
Yellon score	28	8.82	2.84	4	12

- None of the severity scoring systems had predictive value.

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Results

Item Description	Initial Post-op Aided Speech Threshold (N = 18)		Initial Post-op Aided Word Recognition (N = 18)		Recent Post-op Aided Word Recognition (N = 24)	
	r _s [*]	p-value	r _s [*]	p-value	r _s [*]	p-value
Normal stapes present	-0.570	0.014	0.273	0.273	0.257	0.225
Middle ear space large and favorable	-0.565	0.015	0.108	0.670	0.025	0.907
Mastoid well pneumatized	-0.498	0.035	0.302	0.223	-0.273	0.196

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Reconsidering Aural Atresia VSB Criteria

- Atresia Severity not a contraindication.
- Jahrsdoerfer Score of 4 or better.
 - Some reports of benefits with JS 3.
- No age restriction determined yet.
- Determination of Placement requires careful preoperative and intraoperative assessment of ossicular chain and facial nerve position.
- New criteria to guide candidate assessment are needed

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