OTHER IMPLANTABLE HEARING DEVICES
Electromagnetic chain vibration using an EAC driver and magnet on the ossicular chain (Richards, Memphis), early 1990s. Difficulties: aligning the driver, cerumen, re-insertion.
Similar chain vibration, using an intra-EAC driver. Problems: cerumen impaction, driver alignment, trauma, lesser power.
Chain vibration using an implanted driver. Microphone in the EAC (prone to reaction, debris occlusion).
Cochlear Auditory Brainstem Implant (ABI), used when a cochlear implant is impractical. Neurosurgical implantation into the cochlear nucleus, lesser quality sound than CI.
Nucleus ABI device. The small pad, right, has 16 electrode needles inserted into the nucleus. The other lead is a reference electrode, similar to a CI. Power via a CI external processor.
“Carina” device using a powered driver for chain vibration. Requires sophisticated surgery and siting. Stabilisation whilst maintaining exact driver positioning is difficult.

© Bruce Black MD
Variations of use of the Carina driver system: on to the incus; on to the stapes superstructure/footplate; on to the round window.
Envoy Esteem implant. The device employs a driver (top right) directed by a sensor (below) the latter monitors malleus vibration the directs driver action on the incus.
Plan of the Esteem system. Chain vibration using an implanted driver. Difficulties include positioning and the need to disarticulate the incus off the stapes to prevent feedback.
Sophono BC implant system. The twin magnets (right) are fixed to the skull. Transcutaneous transmission from the magnet-stabilised external processor (left).
Surgical Procedure

- Implant 6 cm from EAC
- 45 degrees from the horizontal
- Incision 7.5 cm from EAC
- Flat spot
- Local or general

Sophono system. Surgical details.
Who should I consider a candidate for the Alpha 1 (M) (indications)?

- Adults and children above the age of 5 with bone condition thresholds better than or equal to 45 dB HL, for cases of conductive or mixed hearing loss. *

- Patients with single sided deafness must have thresholds better than or equal to 20 dB HL on the good ear.

* see Physician’s manual REV A 50103-00p7

Sophono system. Surgical candidacy. Pressure problems due to the required magnetic attraction forces have been problematical.
Cochlear DACS system (Direct Acoustic Cochlear Stimulation). A CI-like Implant and processor operate via a driver mounted on a titanium guidance frame.
The DACS implant-driver system. The driver is mounted on the titanium mount that is fitted with a ball joint and slide, fastened when siting is complete. The driver vibrates the incus, a stapedectomy piston or possibly the round window.

© Bruce Black MD
The DACS implant and driver system. The latter is mounted within the slide of the titanium mount.
The DACS driver mount, fixed to the mastoid with the ball joint and slide that permit fine positioning. These are tightened once positioning is exact.
The DACS driver component, sited in the slide of the mount. The angled tip permits the attachment of a stapedectomy piston.

© Bruce Black MD
Detail of the working components of the DACS electromagnetic driver.
The DACS electromagnetic driver. This is attached to a direct driver bar or an artificial incus upon which a stapedectomy piston may be mounted.
Plan of the DACS siting system in the mastoid operative site.
Technological options for a range of deafness, indicating the potential role of the DACS implant vs. CI, BAHA or CI hybrid devices.