

VSB, mixed hearing loss, conductive hearing loss, middle ear implant, vibroplasty and combinations of them. Data were only extracted if reported in the text or tables, or if they could be accurately calculated from graphs, figures, or raw data sets. Information was extracted from each article on 1) sample characteristics (age, gender, aetiology, diagnosis, treatment received/receiving), 2) type of intervention (use of HA, surgical approach, audio processor type), and 3) type of outcome measures (testing intervals, surgical complications, AC and BC pure tone thresholds, sound-field thresholds, functional gain, hearing preservation, speech perception/recognition at various presentation levels in quiet and noise, results of questionnaires). The evidence presented in the selected studies was assessed and classified using the levels of evidence defined by the Oxford Centre for Evidence-based Medicine.

As demonstrated by the variety of studies reported, the VSB and the specific surgical techniques developed (“vibroplasty”) have enabled to adapt this active, electronic middle ear implant to nearly every pathophysiological situation within the middle ear and to restore hearing by amplification of residual hearing. This new strategy in hearing rehabilitation has led to an improved quality of hearing and life of the patients, respectively.

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### Free Papers (F662)

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#### Prognostic Factors in Paediatric Cochlear Implantation: Definition Location Evaluation

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#### Learning Objectives:

*Objectives:* Accurate prognostication in paediatric cochlear implantation (PCI) is essential for informed counselling of a child's outlook during the pre-operative period. This work sought to devise a methodology by which researchers could more clearly define, locate and evaluate adverse factors in PCI to formulate an accurate prognosis to counsel the family prior to implantation, the key to success in PCI.

*Method:* Three steps in the prognostic process are addressed 1) the exact site, action, probability and severity of the individual adverse factors are assessed using refined descriptors to more clearly denote the pathology and action of these influences 2) illustration of the anatomical location of the factors along the route of PCI stimulation, location of the pattern of influences and their potential impact on the functional aspects of the auditory pathway 3) an evaluation method is presented that allows location of individual factors, their impact on ability, then an estimation of their cumulative effect, the prognosis. Six domains of ability are assessed: cortical maturation, neurological function, otological, general medical, psychological and family.

*Result:* Considerable difficulties and deficiencies of prior prognostic works are demonstrated. The work provides a “road map” by which clinicians may assemble an orderly estimation of the threats present in a particular case. The evaluation technique, yet to be validated by clinical research, offers a sensibility method of prognostic assessment in PCI.

*Conclusions:* PCI prognostication requires precise evaluation of the site, pathology and action of adverse factors with focus on the specific pathology, systematic examination of the auditory pathway and a method of evaluation of the combined effect of several impaired domains. However, the overall impact remains an individual study, case-by-case due to the complexity of each situa, particularly in the complicated management of the child with multiple difficulties.

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### Free Papers (F662)

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#### Keyhole cochlear implantation surgery: adaptation to Soundbridge and Bonebridge devices

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*Introduction:* Cochlear implantation (CI) techniques have evolved towards progressively minimalist surgery. Three guiding principles have emerged. Firstly, brief, limited surgery, to minimise the overall impact, particularly in small infants. Secondly, safety issues: good outcomes with minimal complications. Thirdly, acceptable psychological/cosmetic results, especially with respect to the families of children.

Hitherto, similar surgical principles for the implantation of other devices has attracted only limited comment.

*Materials and Methods:* Keyhole CI surgery, as outlined in previous work, has achieved the above outcomes effectively. A later modification stabilises the device in situ using a soluble percutaneous suture passed around the neck of the device, when in the pericranial pocket, replacing previous stabilisation methods. Bony retention wells are avoided.

The Keyhole method has been adapted to the Med EL Soundbridge and Bonebridge devices. The former requires a larger posterior tympanotomy to permit fixation to the incus, and this may be supplemented by a transcanal approach.

The Bonebridge surgery employs a slightly larger auricular incision and a loose pericranial pocket, as fixation is not problematic. The larger pocket facilitates implant positioning over the fixation points.

*Results:* In over 600 CI cases, plus 36 Soundbridge and 25 Bonebridge cases the keyhole approach has achieved optimal outcomes in terms of the three principles above, being brief, with minimal trauma and scarring.