Non-Invasive Bone Conduction Devices for Conductive Hearing Loss: Clinical Effectiveness, Cost-Effectiveness, and Guidelines
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Research Questions

1. What is the clinical effectiveness of non-invasive bone conduction hearing devices for patients with unilateral or bilateral conductive hearing loss?

2. What is the cost-effectiveness of non-invasive bone conduction hearing devices for patients with unilateral or bilateral conductive hearing loss?

3. What are the evidence-based guidelines regarding the use of non-invasive bone conduction hearing devices for patients with unilateral or bilateral conductive hearing loss?

Key Findings

One randomized controlled trial and four non-randomized studies were identified regarding the clinical effectiveness of non-invasive bone conduction hearing devices for patients with unilateral or bilateral conductive hearing loss. Additionally, no relevant economic evaluations or evidence-based guidelines were identified regarding the cost-effectiveness and use of non-invasive bone conduction hearing devices for patients with unilateral or bilateral conductive hearing loss.

Methods

A limited literature search was conducted by an information specialist on key resources including PubMed, the Cochrane Library, the University of York Centre for Reviews and Dissemination (CRD) databases, the websites of Canadian and major international health technology agencies, as well as a focused Internet search. The search strategy was comprised of both controlled vocabulary, such as the National Library of Medicine’s MeSH (Medical Subject Headings), and keywords. The main search concepts were non-invasive bone conduction devices and hearing loss. No filters were applied to limit the retrieval by study type. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2014 and October 29, 2019. Internet links were provided, where available.

Selection Criteria

One reviewer screened citations and selected studies based on the inclusion criteria presented in Table 1.

Table 1: Selection Criteria

<table>
<thead>
<tr>
<th>Population</th>
<th>Patients (any age) with unilateral or bilateral conductive hearing loss</th>
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<tbody>
<tr>
<td>Intervention</td>
<td>Non-invasive bone conduction hearing devices (e.g., the ADHEAR system)</td>
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<tr>
<td>Comparator</td>
<td>Alternative hearing devices (e.g., bone-anchored hearing devices, conventional hearing devices)</td>
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### Outcomes

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<td>Q1:</td>
<td>Clinical effectiveness (e.g., improvement in hearing, ease of use, comfort, safety, patient satisfaction)</td>
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<td>Q2:</td>
<td>Cost-effectiveness</td>
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<tr>
<td>Q3:</td>
<td>Evidence-based guidelines</td>
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### Study Designs

Health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, non-randomized studies, economic evaluations, and evidence-based guidelines.

### Results

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by randomized controlled trials, non-randomized studies, economic evaluations, and evidence-based guidelines.

One randomized controlled trial and four non-randomized studies were identified regarding the clinical effectiveness of non-invasive bone conduction hearing devices for patients with unilateral or bilateral conductive hearing loss. Additionally, no relevant health technology assessments, systematic reviews, meta-analyses, economic evaluations or evidence-based guidelines were identified.

Additional references of potential interest are provided in the appendix.

### Overall Summary of Findings

One randomized controlled trial and four non-randomized studies were identified regarding the clinical effectiveness of non-invasive bone conduction hearing devices for patients with unilateral or bilateral conductive hearing loss. The authors of the randomized controlled trial aimed to compare the average daily wearing time of an adhesive bone conduction device versus conventional bone conduction device in patients with conductive hearing loss. The authors found that there were no statistically significant differences in sound field audiometry, Freiburg monosyllables word test, the Oldenburg sentence test or quality of life between the two groups. Moreover, the authors of two non-randomized studies found that the adhesive bone conduction device significantly improved functional hearing thresholds compared to conventional bone conduction hearing devices or softband hearing aids. Alternatively, the last two non-randomized studies found no significant difference in hearing thresholds or sound field measurements between adhesive bone conduction devices and conventional bone conduction devices and whether they are implanted or attached to a softband. Authors of all four non-randomized studies found similar benefits in speech perception in quiet and noisy environments, between the adhesive device and conventional devices, as well as adhesive device and softband hearing aids.

### References Summarized

Health Technology Assessments

No literature identified.
Systematic Reviews and Meta-analyses

No literature identified.

Randomized Controlled Trials


Non-Randomized Studies


Economic Evaluations

No literature identified.

Guidelines and Recommendations

No literature identified.
Appendix — Further Information

Previous CADTH Reports
   https://www.cadth.ca/adhear-system-conductive-hearing-loss-clinical-effectiveness-0

Systematic Reviews
Comparator Not Specified
   PubMed: PM28167010

Intervention Not Specified

   PubMed: PM28101972

Randomized Controlled Trials – Alternative Population
    PubMed: PM29889785

Non-Randomized Studies - No Comparator
    PubMed: PM31377401

    PubMed: PM29889785

Additional References