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Academic Outcomes with Hearing Amplification Devices in Children with Unilateral Hearing Loss: A Systematic Review and Narrative Synthesis

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Keywords

Children · Academics · Unilateral hearing loss · Hearing Loss · Amplification

Abstract

Background: Many studies have shown increased academic problems in children with unilateral hearing loss (UHL). However, whether hearing devices can ameliorate the educational difficulties associated with UHL is not well studied. Therefore, the objective of the current systematic review was to answer the question: do nonsurgical amplification devices, bone-anchored hearing aids, and/or cochlear implants improve academic outcomes in school-aged children and adolescents with UHL? ***Methods:*** Embase, MEDLINE, Scopus, CINAHL, APA PsycInfo, ClinicalTrials.gov, and Cochrane databases were searched from inception to December 21, 2022. Published, peer-reviewed studies comparing academic outcomes in patients with UHL aged ≥5 and ≤19 years with and without hearing devices (nonsurgical amplification devices, bone-anchored hearing aids, or cochlear implants) were included. Results of studies were qualitatively synthesized, and the risk of bias was evaluated with the Effective Public Health Practice Project (EPHPP) Quality Assessment Tool. ***Results:*** A total of 5,644 nonduplicate publications were identified by the search, and four studies were included for synthesis, every one of which was investigating nonsurgical amplification. One small, single-arm study demonstrated significant improvement in subjective classroom listening difficulties after a 3- to 4-month trial with a behind-the-ear hearing aid. The other three studies of nonsurgical amplification devices showed no benefit across multiple academic outcomes with FM systems and conventional and CROS-style hearing aids. ***Discussion:*** The small sample sizes, heterogeneous and/or ill-defined study samples, and overall low quality of the available literature ultimately make it hard to draw definitive conclusions regarding nonsurgical amplification devices' effectiveness in improving academic outcomes in children with UHL. No articles were identified that studied cochlear implants or bone-anchored hearing aids. Further studies with high-quality study design, large sample sizes, and long-term follow-up are needed to answer this clinically important question.

Introduction

Published estimates of the current prevalence of unilateral hearing loss (UHL) among school-aged children range from 3.0 to 6.3% in the USA, depending on the definition of UHL that is used [1]. Despite having one normal hearing ear, children with UHL exhibit important auditory processing deficits, such as with sound localization and speech perception in noise [2, 3]. Before the advent of universal newborn hearing screening, unilateral

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hearing impairment in children was commonly detected at 3 to 6 years old, through school-based hearing screens or on diagnostic audiograms performed for behavioral or academic concerns [4]. Today, close to one-half of cases are diagnosed at 6 months of age or younger [4], allowing for the potential to intervene during or before an early critical period of language acquisition. Significantly earlier identification of UHL, technological advancements in hearing devices, and expanding indications for cochlear implants and bone-anchored hearing aids over the past 25 years have reignited discussions regarding the appropriate management of UHL in pediatric patients.

Although UHL was once thought to have little or no effect upon the academic outcomes of children, researchers in the mid-1980s reported pervasive academic problems in school-aged children with UHL that included lower average scores on the Wide Range Achievement Test (WRAT) and grade retention rates of 32–35% [5, 6]. Recently published systematic reviews support an overall trend toward worse speech-and-language outcomes and educational achievement in children with UHL [7, 8], as well as improved audiologic outcomes with nonsurgical amplification devices [9], bone-anchored hearing aids [9], and cochlear implants [10]. However, whether – as well as to what extent – hearing rehabilitation with amplification devices and cochlear implants can ameliorate the educational difficulties associated with UHL is not well studied. Therefore, the objective of the current systematic review was to answer the question: do nonsurgical amplification devices, bone-anchored hearing aids, and/or cochlear implants improve academic outcomes in school-aged children and adolescents with UHL?

Methods

Search Strategy and Study Selection

A systematic review addressing the question of whether hearing devices improve academic outcomes in school-aged children and adolescents with UHL was carried out and reported in accordance with the 2020 PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines [11]. Inclusion criteria for the systematic review were (1) published, peer-reviewed articles (2) with an available English full text (3) studying patients aged ≥5 years (the usual school entry age in the USA) and ≤19 (the upper limit of the WHO definition for adolescence [12]) years (or enrolled in K-to-12 education or a non-USA equivalent if month- or year ages were not explicitly reported) (4) with UHL (5) treated with and without hearing amplification devices or cochlear implants (6) and reporting measures of academic performance or achievement (e.g., school grades, standardized achievement scores, teacher- or parent-reported school performance, and/or grade retention rates), school-related quality-of-life, subject-matter competency (e.g., writing quality, spelling ability, receptive or expressive vocabulary, and/or reading level, comprehension, or delay), or classroom engagement.

Hearing amplification devices were defined to include frequency-modulated (FM) systems, bone-anchored hearing implants, nonsurgical bone conduction systems, and contralateral routing of signals (CROS) and conventional hearing aids. Studies with subjects aged <5 or >19 years old were included if subgroup analyses with relevant outcome measures were performed meeting the inclusion criteria for age. Emergent literacy measures, such as word count and rhyming, were excluded. Studies that exclusively evaluated educational placement (e.g., in mainstream vs. special schools) were also excluded, as educational placement is confounded by cultural factors, parental/familial preferences, and regionally available resources (e.g., special schools for the deaf). Editorials, commentaries, case reports, review and opinion articles, meta-analyses, and strictly descriptive and qualitative studies were excluded.

A medical librarian (L.Y.) searched the Embase, MEDLINE, Scopus, CINAHL, APA PsycInfo, ClinicalTrials.gov, and Cochrane databases from inception to December 21, 2022 for articles relating to the research question, using search terms such as “Hearing loss,” “School-aged children,” and “Academic performance.” The complete search strategy is outlined in online supplementary Material #1 (for all online suppl. material, see https://doi.org/10.1159/000539513). Search results were uploaded into the Covidence systematic review management system. Duplicates were removed manually by the authors, automatically by the Covidence software, and via the EndNote-based method described by Bramer et al. [13]. Two authors (D.R. and S.S.) independently screened the titles and abstracts of non-duplicate articles for relevancy and inclusion in the full-text review. Conflicts were resolved by discussion and consensus. Potentially relevant articles underwent an independent full-text review by the same two authors (D.R. and S.S.), with conflicts again resolved by discussion and consensus.

Data Extraction and Synthesis

Age (i.e., years or grade level), sex, hearing loss severity (e.g., degree, pure-tone average), the number of subjects, the comparator or intervention, the academic outcomes measured, and the results of statistical comparisons were extracted and tabulated. Information regarding additional educational assistance, daily device usage, and nonverbal IQ scores was also extracted when available. Results of studies were synthesized qualitatively and grouped for analysis into the following categories: Nonsurgical amplification, bone-anchored hearing aids, and cochlear implants. Outcome effect measures were presented as reported in the source studies.

Risk of Bias Assessment

Risk of bias was evaluated with the Effective Public Health Practice Project (EPHPP) Quality Assessment Tool [14], which is a tool developed at McMaster University to assess the quality of a wide range of study types. A weak, moderate, or strong rating is assigned to each of six domains (Selection Bias, Study Design, Confounders, Blinding, Data Collection Methods, and Withdrawals and Dropouts), and a global rating is determined according to the total number of weak ratings (0: strong; 1: moderate;

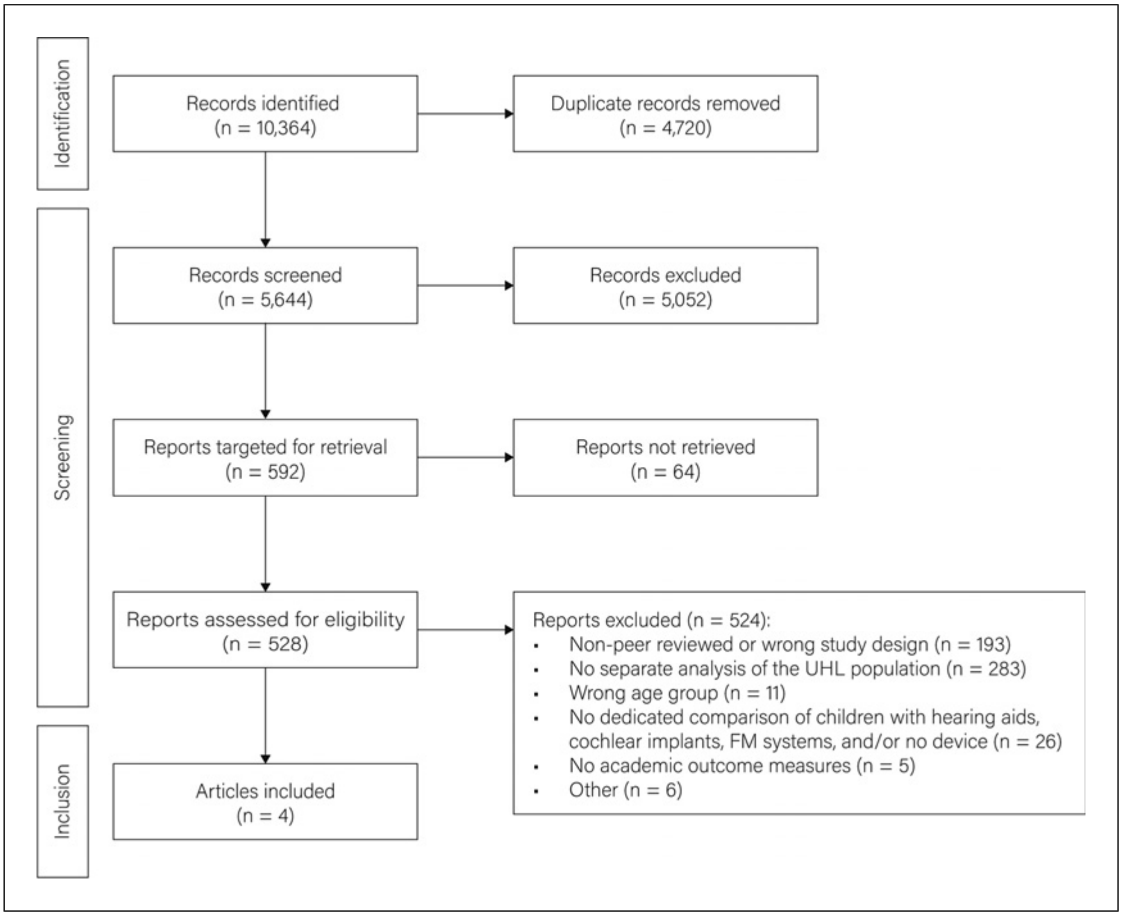

Fig. 1. Flowchart of the article selection process.

and ≥2: weak). Two authors (D.R. and S.S.) independently assigned the EPHPP domain and global ratings, and conflicts were resolved by discussion and consensus.

Results

The article selection process is depicted in Figure 1. A total of 5,644 non-duplicate publications were identified by the search, and after abstract and title screening, 592 records were chosen for full-text review. However, an English full text was available for only 528 articles. One hundred ninety-three were either a case report, conference presentation, opinion article, editorial, commentary, dissertation, clinical trial protocol, narrative or systematic review, or meta-analysis and therefore were excluded. Another 331 articles were excluded for reasons outlined in Figure 1, and four studies were identified meeting inclusion criteria. The intended meta-analysis was not possible because of incomplete data reporting and considerable heterogeneity in study design, intervention, and outcome measure. A narrative synthesis was therefore conducted.

Nonsurgical Amplification

Four studies were identified comparing the academic outcomes of school-aged children and adolescents with and without nonsurgical amplification devices for UHL (Table 1). Two studies had prospective, single-arm interventional designs [15, 16], and the other two were cross-sectional, observation studies [17, 18]. The devices in the studies included FM systems, and conventional behind-the-ear (BTE) and CROS-style hearing aids [15–17]. However, in two studies [17, 18], it was unclear if the hearing aid group was wearing a conventional or CROS-style hearing aid, or a mix of both. No studies reported causes of UHL within the samples, and only one of the four [15] reported type(s) of hearing loss(es) (which were mixed in $n = 2/8$ subjects, conductive in $n = 1/8$ subjects, and sensorineural in $n = 5/8$ subjects),

Table 1. Studies that compared academic outcomes in children with and without nonsurgical amplification for UHL

Author (year)	Study design	Subjects (*n*, sex)	Hearing loss severity	Intervention/ comparison (*n*, sex)	Academic outcome measures	Findings
Briggs et al. [15] (2011)	Prospective, single-arm interventional	7- to 12-year-old children with UHL (6 male, 2 female)	Hearing threshold >20 dB HL and <70 dB HL at four-or-more consecutive frequencies in the worse ear; hearing threshold ≤20 dB HL at 250–3,000 Hz in the normal hearing ear	BTE hearing aid for 3–4 months	SIFTER scores, LIFE Student Additional Situations score, LIFE Student Classroom Listening score	Statistically significant improvement in LIFE Student Additional Situations (78.6 vs. 57.9, p = 0.001) and LIFE Student Classroom Listening (81.3 vs. 65.1, p = 0.016) scores, no statistically significant difference in SIFTER scores
Dancer et al. [17] (1995)	Cross-sectional, observation	5- to 17-year-old children with UHL (12 male, 6 female)	Mild-to-profound hearing loss in the worse ear	Hearing aid (5 male, 2 female), FM system (3 male, 3 female), or neither (4 male, 1 female)	SIFTER results	No statistically significant association of SIFTER results with hearing device
Kwak et al. [16] (2021)	Prospective, single-arm interventional	7- to 13-year-old children with UHL (3 male, 5 female)	PTA in the worse ear ≥58.75 dB HL; average PTA in the worse ear = 95.9±21.8 dB HL; average PTA in the normal hearing ear = 6.6±7.4 dB HL	CROS-style hearing aid for 12 months	KNISE-ABC subscores	Statistically significant improvement in the KNISE-ABC Related Behavior at the 6-month timepoint alone, no statistically significant differences in the other subscores at 3, 6, or 12 months
Most and Tsach [18] (2010)	Cross-sectional, observation	School-aged children with UHL (33)	PTA >55 dB HL in the worse ear; average PTA in the normal hearing ear = 17±4.3 dB HL	Hearing aid (12) or no device (21)	SIFTER domain scores	No statistically significant differences in SIFTER domain scores

BTE, behind-the-ear; CROS, contralateral routing of signals; dB HL, decibel hearing loss; KNISE-ABC, Korea National Institute for the Special Education-Auditory Behavioral Checklist; LIFE, Listening Inventory For Education; PTA, pure-tone average; SIFTER, Screening Identification for Targeting Educational Risk; UHL, unilateral hearing loss.

nonverbal IQ scores (which ranged from 78–129), or aided word recognition scores (WRS) (which ranged from 24 to 92%).

Average daily device usage was recorded and reported by the two single-arm studies and was 3.5 h (range = 1–7) in Kwak et al. (2021) and 5.1 h (range = 0.7–9.4) in Briggs et al. (2011). Daily usage was obtained from the BTE hearing aids in Briggs et al. (2011) via device data logging, whereas the method(s) that Kwak et al. (2021) used to determine a child's daily device usage were not described in the manuscript. Most and Tsach (2010) reported the numbers of consistent- (n = 6/12 subjects), inconsistent- (n = 4/12 subjects), and non-hearing aid wearers (n = 2/12 subjects) among those fitted with hearing aids. However, the authors did not provide a definition for consistent use or report daily device usage (e.g., in hours). Hearing aid and FM system use were not reported by Dancer et al. (1995). Information regarding additional educational assistance (e.g., individualized education plans, specialized testing conditions, tutoring) was absent from the studies.

Relevant outcome measures included student- and teacher-completed surveys: the SIFTER (Screening Instrument for Targeting Educational Risk), KNISE-ABC (Korea National Institute for Special Education-Auditory

Behavioral Checklist), and LIFE (Listening Inventory For Education) Student and Teacher. The SIFTER is a validated, teacher-completed questionnaire developed for the identification of educationally at-risk children with hearing loss and contains 15 questions, which are rated on a 1-to-5 scale and grouped into content areas of Attention, Academics, Communication, School Behavior, and Class Participation. The KNISE-ABC is a 36-item survey designed for children with hearing loss, with questions about attention, communication, and other possible school-related difficulties. Subscores are calculated for Learning, Listening, Communication, Auditory Memory, Related Behavior, Auditory Attention, and Listening in Background Noise. The LIFE Student Classroom Listening and Additional Situations are student-completed surveys designed to evaluate the situational listening difficulties of children with hearing loss at school. The LIFE Teacher is a post-intervention, teacher-completed survey designed to evaluate the benefits of hearing aids with respect to classroom listening and learning behaviors.

In the cross-sectional study by Dancer et al. (1995), a cohort of children with UHL was identified from the records of a tertiary care hospital. The children's teachers completed SIFTERs for the children with UHL (n = 18), as well as an equal number of normal hearing, classroom-matched controls. Children with UHL scored significantly worse on 13-of-15 questions and 5-of-5 content areas compared to their normal hearing peers. However, a subgroup analysis of the children with UHL revealed no significant association of hearing device (i.e., FM system, hearing aid, or neither) with SIFTER results. The other cross-sectional study [18] showed similar results, with worse SIFTER scores in children with UHL (n = 33) compared to a normal hearing control group (n = 14), and no significant difference in the SIFTER domain scores of children with hearing aids (n = 12) and children without one (n = 21) [18]. In the Most and Tsach (2011) study, the hearing aid group was defined to include all children who were fitted with hearing aids, regardless of adherence.

Briggs et al. (2011) shared the results of a prospective, single-arm interventional study in which a group of children with UHL (n = 8) was treated with a BTE hearing aid for at least 3 months. SIFTER scores, as well as speech perception scores in quiet and noise, demonstrated no improvement at the 3- to 4-month endpoint. The subjects did, however, demonstrate significant improvement on the LIFE Student Classroom Listening and the LIFE Student Additional Situations, and one-half (n = 4/8) of subjects' teachers reported benefit on the LIFE Teacher, with the rest reporting either no change (n = 3/8) or having not returned the survey (n = 1/8). In the other prospective single-arm study by Kwak et al. (2021), the KNISE-ABC was completed by 7- to 13-year-old children with UHL (n = 8) at the start of the study and at 3, 6, and 12 months of treatment with a CROS-style hearing aid. The study's authors reported a statistically significant improvement in the KNISE-ABC Related Behavior at the 6-month timepoint alone, with no corresponding improvement in the KNISE-ABC Related Behavior at the 3- or 12-month timepoints, nor in any of the other subscores at 3, 6, or 12 months of treatment.

Cochlear Implants and Bone-Anchored Hearing Aids

No studies were identified that compared academic outcomes in school-aged children with UHL with and without cochlear implants or bone-anchored hearing aids.

Risk of Bias Assessment

Every included study received a weak global quality rating on the EPHPP Quality Assessment Tool (Table 2). Rating sheets for the two reviewers (D.R. and S.S.) are available in online supplementary Material #2.

Discussion

Many studies have shown increased academic problems in school-aged children with UHL [8]. Recent systematic reviews have synthesized the literature on audiologic outcomes in children with UHL with nonsurgical amplification [9], bone-anchored hearing aids [9], and cochlear implants [10]. However, whether – as well as to what extent – hearing rehabilitation with amplification devices and cochlear implants actually improves the speech-and-language, quality-of-life, and academic outcomes of children with UHL is not well studied, and the appropriate audiological management of unilateral hearing impairment in pediatric patients is currently unsettled [19, 20]. Therefore, we performed a systematic review and narrative synthesis to answer the question: Do nonsurgical amplification devices, bone-anchored hearing aids, and/or cochlear implants improve academic outcomes in school-aged children and adolescents with UHL? Four studies were identified meeting inclusion criteria, every one of which was investigating nonsurgical amplification. Conclusions were tempered by small sample sizes and weak EPHPP global quality scores. No articles were identified that studied cochlear implants or bone-anchored hearing aids. Further

Table 2. EPHPP quality scores for the four included studies

Author (year)	Selection bias	Study design	Confounders	Blinding	Data collection methods	Withdrawals and dropouts	Global
Briggs et al. [15] (2011)	Weak	Moderate	Strong	Weak	Strong	Strong	Weak
Dancer et al. [17] (1995)	Moderate	Weak	Weak	Weak	Strong	N/A	Weak
Kwak et al. [16] (2021)	Weak	Moderate	Strong	Weak	Weak	Weak	Weak
Most and Tsach [18] (2010)	Moderate	Weak	Weak	Weak	Strong	N/A	Weak

N/A, not applicable.

studies with high-quality study design, large sample sizes, and long-term follow-up are needed to answer this clinically important question.

Nonsurgical Amplification

Four studies were identified that addressed the question of whether nonsurgical amplification improves academic outcomes in school-aged children and adolescents with UHL [15–18]. One small, single-arm study involving eight school-aged children [15] demonstrated significant improvement in subjective self-assessments of situational classroom listening difficulties after a 3- to 4-month trial with a BTE hearing aid. However, subjects showed no corresponding improvement in SIFTER scores. The other three studies of nonsurgical amplification showed no benefit on multiple academic outcomes, including two observation studies that also showed no better SIFTER scores in children with UHL treated with FM systems [17] or hearing aids [17, 18]. Every included study received a weak global quality rating on the EPHPP Quality Assessment Tool, and interpretation is complicated by a large amount of within- and between-study variability with respect to hearing devices, outcome measures, sample makeup, intervention adherence (e.g., daily device usage), additional educational assistance, and study design.

FM systems and conventional and CROS-style hearing aids are fundamentally nonequivalent interventions, and hearing aids and FM systems are – furthermore – non-mutually exclusive. FM systems simply transmit sound to the student by pairing a microphone-transmitter on the teacher with a receiver that is attached to a speaker or earphones, or coupled with hearing aids or implants. CROS-style hearing aids route sound from a microphone-transmitter in the poorer hearing ear to a receiver in the normal hearing ear, and do not restore the physical and processing advantages associated with binaural hearing, such as binaural squelch and redundancy, the head shadow effect, and interaural time and level differences [21]. Therefore, these devices provide fundamentally distinct acoustic input and are generally indicated for different populations, and so should be considered separately and within the context of well-defined patient populations. Unfortunately, where the types of nonsurgical amplification devices were adequately described [15–17], no two hearing devices were shared between studies, rendering meaningful interstudy comparisons impossible. Daily device usage varied widely in the two prospective, single-arm interventional studies [15, 16], and only half of the children with hearing aids in the Most and Tsach (2011) observational study were consistently using them. Non-usage is critical to consider when interpreting the results of studies, as this may mask a device's capacity to improve outcomes (devices will not work unless they are used) or conversely be attributed to a limited perceived benefit by patients with hearing loss. Additionally, non- or underuse for any reason (e.g., social stigma) will significantly reduce the real-world effectiveness of hearing devices. The reasons for non-usage were not explored by the authors.

Children with UHL comprise an incredibly heterogeneous population, with hearing loss ranging from a mild conductive loss with relatively normal aided speech perception to a complete sensorineural deafness with minimal serviceable hearing in the involved ear, and these patients' special needs, expected outcomes, and audiological management will not be the same. Moreover, several common causes of congenital or childhood-onset, nongenetic unilateral hearing impairment (e.g., meningitis, prematurity, congenital cytomegalovirus infection) are associated with neurological complications, global delays, and other sensory deficits [22]. Because no studies reported cause(s) of hearing loss(es), and only one [15] reported nonverbal IQ scores, concomitant developmental disabilities are a major source of potential uncontrolled extraneous variables in the available literature. In the Most and Tsach (2011) study, additional learning and/or attention difficulties were reported in 15/33 children, but were not controlled or even broken down by group.

The highest quality, currently available evidence was from the two prospective, single-arm interventional studies by Briggs et al. (2011) and Kwak et al. (2021). However, the studies both reported only subjective academic outcome measures completed by the studies' subjects or their unblinded school instructors, and the single-arm designs are unable to distinguish a true effect from those of placebo, natural history, a concurrent intervention (e.g., individualized education plans), and/or observation itself (i.e., the Hawthorne effect). The other two studies were cross-sectional, observation studies, with additional methodological limitations. School performance is a major consideration in the decision to prescribe a student with UHL a hearing aid [19, 20], and variables independently associated with academic outcomes in children with hearing loss, such as nonverbal intelligence and socioeconomic status [23, 24], are therefore potentially important confounders in observational research on educational outcomes. Unfortunately, the two observational studies did not report or control for any independent predictors of educational performance, and the studies' results are therefore highly susceptible to confounding. The small sample sizes, heterogeneous and/or ill-defined study samples, and overall low quality of the available literature ultimately make it hard to draw definitive conclusions regarding nonsurgical amplification devices' effectiveness in improving academic outcomes in children with UHL at this time.

Bone-Anchored Hearing Aids

The current systematic review identified no articles looking at academic outcomes in children with UHL with bone-anchored hearing aids. However, previous research on cognitive outcomes may provide some insights, as short-term and working memory capacity are significant predictors of reading ability in children with hearing loss [25, 26]. In a recent verbal working memory (VWM) study [27], otherwise normally developing children with mild-to-severe congenital unilateral sensorineural hearing loss were pseudo-randomized to one of several treatment groups: (1) amplification with a BTE hearing aid (n = 16), (2) amplification with a percutaneous bone-anchored hearing implant (n = 16), or (3) no amplification (n = 13). Tests of VWM were completed by subjects in quiet and noise at the start of the study and at 6 months of treatment. Children treated with conventional and bone-anchored hearing aids demonstrated significant improvements in VWM in noise. No significant improvement was observed on any measure in controls. At present, it is unknown if this improved VWM will translate into an improvement in academic outcomes. However, the study's results provide reason for optimism that surgical and nonsurgical amplification devices may improve working memory-mediated academic outcomes (e.g., reading ability) in children with UHL.

Cochlear Implants

Following their approval for pediatric single-sided deafness (SSD) by the FDA in 2019, cochlear implants have become another surgical option for children ≥5 years old with severe-to-profound unilateral sensorineural hearing loss. Multiple studies have demonstrated significant improvements in audiological measures after cochlear implantation in children with SSD [10]. However, the current systematic review identified no studies looking at academic outcomes in school-aged children treated with and without cochlear implants for the indication of SSD. In a recent longitudinal multicenter study [28], cochlear implant provision was significantly associated with grammatical development over the 2- to 5-year age range in children with severe-to-profound prelingual unilateral sensorineural hearing loss. However, the study was non-randomized, meaning that children who were not implanted were excluded from treatment for specific reasons (i.e., cochlear nerve deficiency, parents declined, or too old), biasing the results. The study's linear mixed model, moreover, included only maternal education, birth order, and patient sex as covariates, neglecting important predictors of academic performance and achievement in children with hearing loss, such as nonverbal intelligence [23, 24]. It also remains an open question if the grammatical improvement associated with cochlear implantation continues into the grade school years.

Conclusions

A systematic review and narrative synthesis were performed addressing the question of whether amplification devices and cochlear implants improve academic outcomes in school-aged children and adolescents with

UHL. Four studies were identified comparing the academic outcomes of children with and without nonsurgical amplification devices for UHL. The small sample sizes, heterogeneous and/or ill-defined study samples, and overall low quality of the available literature ultimately made it hard to draw definitive conclusions regarding nonsurgical amplification devices' effectiveness in improving academic outcomes in pediatric patients with unilateral hearing impairment. No articles were identified that studied cochlear implants or bone-anchored hearing aids. Further studies with high-quality study design, large sample sizes, and long-term follow-up are needed to answer this clinically important question.

Statement of Ethics

An ethics statement is not applicable, as the study was based exclusively on published literature. Systematic reviews are considered exempt from IRB approval.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

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Author Contributions

Daniel R. Romano: assisted in study design, collected and analyzed data, and drafted and revised the manuscript. Sampat Sindhar: assisted in study design, collected and analyzed data, and critically revised the manuscript. Lauren Yaeger: designed and performed the initial search and critically revised the manuscript. Judith E.C. Lieu: conceived and designed the study, supervised data collection and analysis, and critically revised the manuscript.

Data Availability Statement

Data used in the current systematic review are available in the source articles. Inquiries can be directed to the corresponding author (J.L.).

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