Protocol for a Systematic Review of Speech and Language Therapy Interventions for Presbyphonia

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Introduction

One in three people experience a problem with their voice during their life,¹ affecting one’s ability to communicate and interact. Such voice disorders affect 7% of the total population at any given time.¹⁻³ For people over 65, the number is four times higher at 30%, rising still higher (40%) for those in care homes.⁴⁻⁸

Presbyphonia is a form of dysphonia caused by age-related biomechanical changes; it is the most commonly reported voice complaint in the over 65 cohort,⁹⁻¹¹ and is on the increase.¹² People with presbyphonia experience hoarseness, strain, reduced loudness, tremor, and breathlessness.¹³⁻¹⁵ Largely a diagnosis of exclusion,¹⁶ it is driven by degenerative changes in the larynx, respiration, and resonance/articulation. Deterioration in muscle mass and performance, disrupted neurological control and thinning vocal folds result in progressive reductions in laryngeal efficiency.¹⁷

Around 50% of people with presbyphonia experience significantly reduced quality of life and are more socially isolated.⁵ Additionally, as older people are increasingly remaining in employment due to extended retirement ages or financial need, a healthy voice is needed for work; the literature indicates that between 20⁻35% of voice patients over 65 are still employed.¹²,¹⁸

The first-line treatment for presbyphonia is speech therapy.¹⁹ It seeks to improve neural control of the subsystems of voice, strengthen the vocal folds, coordinate airflow with phonation, optimise resonance, pitch, loudness, and undo maladaptive patterns of laryngeal constriction.²⁰⁻²³ Although clinical experience points to speech therapy being an effective treatment for presbyphonia, there has been only one systematic review conducted to date on presbyphonia.²⁴ This 2018 qualitative synthesis review searched only one database (PUBMED), was restricted to publications in English, and was focussed more broadly on epidemiology, pathophysiology, diagnostic considerations, surgical treatment in addition to voice therapy interventions. Other review publications have not employed a prospectively systematic search of the literature²⁵ or were not primarily focussed on the effectiveness of speech therapy treatments for presbyphonia.¹⁴,¹⁶,¹⁸,²⁶,²⁷

Objective/review questions

How does voice therapy affect voice outcomes for patients over the age of 50 with presbyphonia?
Inclusion criteria

Types of participants

- Inclusion: This review will consider all studies that involve human subjects over the age of 50 with a diagnosis of presbyphonia, age-related dysphonia or vocal fold atrophy who undergo speech therapy for their voice complaint.
- Exclusion: Adults over the age of 50 with concurrent additional laryngeal pathology or neurological/progressive degenerative disease, adults under the age of 50.

Types of intervention

Any intervention delivered by/within the scope of a speech and language therapist/speech-language pathologist/phonatrician. For the purposes of this review, neuromuscular/functional electrical stimulation (NMES/FES) interventions will be excluded.

Types of outcome measure

- The primary outcomes of interest are patient reported voice outcomes (vocal handicap and/or voice-related quality of life).
- Secondary outcomes concern objective/perceptual measures of voice quality and function.

Types of studies

Randomised control trials, non-randomised control trials, quasi-randomised trials, controlled before-and-after studies, retrospective reviews, historically controlled study, cohort observational studies, case series or case reports (n>5).

Exclusion: Case series or case reports (n<5), conference posters, conference abstracts.

Search strategy

The search strategy will be designed to access both published and unpublished materials and will comprise three stages:

1. A limited search of MEDLINE to identify relevant keywords contained in the title, abstract and subject descriptors.
2. Terms identified in this way, and the synonyms used by respective databases, will be used in an extensive search of the literature.
3. Reference lists and bibliographies of the articles collected from those identified in stage two above will be searched.

Databases to be searched: CINAHL, Embase, Emcare and MEDLINE and grey literature (scholar.google.com [first 20 pages of results]). See Appendix A for a draft search strategy for MEDLINE.

The resulting list of studies will undergo an initial screen of title and abstract by one of the review team to decide upon full text retrieval. Articles identified through reference list and bibliographic searches will also be considered for data collection based on their title. Full texts will be reviewed independently against inclusion criteria by BSK and FG in consideration of eligibility for full data extraction. Any discrepancies regarding eligibility will be resolved at a meeting between reviewers. All screening to be carried out via the Covidence.org interface.

Critical appraisal

Identified studies that meet the publication criteria will be assessed independently for methodological validity by BSK and FG using the Risk of Bias 2 tool (RoB 2)28 or the Methodological Index for Non-Randomized Studies (MINORS).29
depending on study design. Any disagreements that arise between the reviewers will be resolved through discussion and with the assistance of a third reviewer where required. Findings of bias will be noted in data collection. Exclusion of publications on the grounds of quality will be decided upon by consensus at a meeting between reviewers.

Data collection

BSK and FG will independently perform data extraction utilising a custom data extraction form on the Covidence platform. Any disagreements that arise between the reviewers will be resolved through discussion and with the assistance of a third reviewer when necessary. Data to be extracted will include:

- Study Design
- Participant info (demographics, etc.)
- voice therapy intervention details, characterised by RTSS-Voice targets and ingredients
- treatment dose, frequency, duration and any follow-up period
- pre/post patient-reported voice measures (vocal handicap, voice-related quality of life)
- pre/post objective and measures of voice production/voice quality
- risk of bias level

Data synthesis

Findings will be presented in narrative form. Where the data is sufficiently robust and the outcomes homogenous across studies, we will seek to do a quantitative synthesis reporting standardised mean differences and their 95% confidence. If appropriate with available data, results from comparable groups of studies will be pooled into statistical meta-analysis using Review Manager 5.4 software from the Cochrane Collaboration. Heterogeneity between combined studies will be tested using Higgin’s I². Should heterogeneity prove persistently high, a sensitivity analysis will be performed whereby studies which are clinically or methodologically different are excluded, or a random-effects model (rather than a fixed-effects model) will be applied to the data.

Meta-bias

Bias across studies/reporting bias will be assessed via a funnel plot and addressed in systematic review text. Should a funnel plot indicate the presence of reporting bias, comparison will be made between random-effects and fixed-effects models of analysis to identify if this improves asymmetry in the funnel plot.

References


### Appendix A: Draft search strategy for MEDLINE

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<tr>
<td>1</td>
<td>Aging/ or aged/ or &quot;aged, 80 and over&quot;/ or frail elderly/ or middle aged/ or Retirement/ or atrophy/ or muscular atrophy/ or Age Factors/</td>
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<td>larynx/ or glottis/ or laryngeal cartilages/ or laryngeal mucosa/ or laryngeal muscles/ or voice disorders/ or aphonia/ or dysphonia/ or hoarseness/ or Voice/ or Voice Quality/ or Vocal Cords/ or Phonation/ or Laryngeal Diseases/</td>
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<td>3</td>
<td>(elderly or geriatric or senescent or age-related or &quot;older adult&quot; or &quot;senior citizen&quot; or &quot;old age&quot;).tw.</td>
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<td>4</td>
<td>(dysphon* or &quot;voice disord*** or voice or phonat* or hoarse&quot;).tw.</td>
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<td>5</td>
<td>(presbyphon* or presbylary* or &quot;vocal fold atrophy&quot; or &quot;vocal fold bowing&quot; or &quot;bowed vocal fold&quot;** or &quot;ag* larynx&quot; or &quot;ag* voice&quot; or &quot;glott* insufficiency&quot; or &quot;glott* gap&quot;).tw.</td>
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<td>6</td>
<td>speech therapy/ or voice training/ or Speech-Language Pathology/</td>
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<td>7</td>
<td>(voice therap* or (speech adj1 therap*) or (speech adj1 path*) or voice train* or vocal* train* or (voice adj1 exercis*) or (vocal adj1 exercis*)).tw.</td>
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