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Impact of Testosterone Therapy on Voices in Trans-Masculine People: A Scoping Review

Samuel E. Hedine
Portland State University

Jeff Conn
Portland State University

Deanna Britton
Portland State University

Impact of Testosterone Therapy on Acoustic Measures of Voice in Trans-Men: A Scoping Review

S. Hedine[1] ; J. Conn[1] ;D. Britton[1,2& 3]

1. Department of Speech and Hearing Sciences (SPHR), Portland State University (PSU), Portland, OR, USA;
2. Northwest Center for Voice and Swallowing (NWCVS), Department of Otolaryngology – Head & Neck Surgery, Oregon Health & Science University (OHSU), Portland, OR, USA
3. University of Washington, Department of Rehabilitation Medicine, Seattle, WA, USA

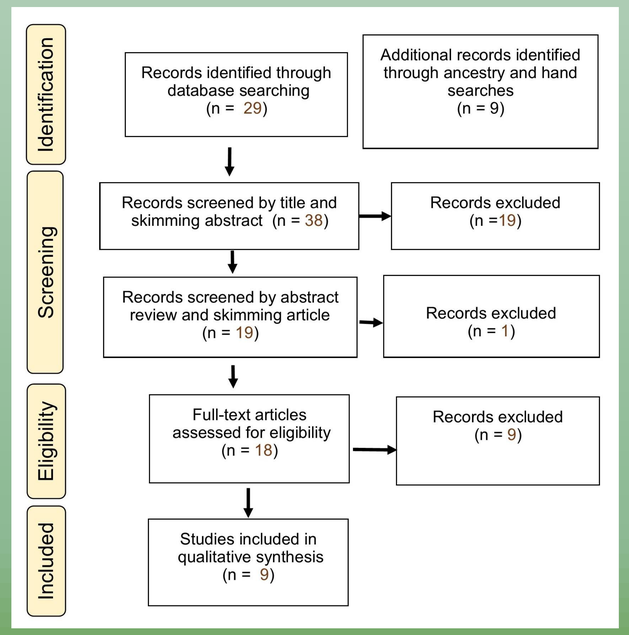
Background: Treatment of trans people by speech-language pathologists (SLPs) dates back to at least the 1980s. However, the majority of early research on the voices of trans people focused on trans-women. More recently, the field of speech-language pathology has garnered more interest in the effects of testosterone therapy in trans-masculine individuals.

Purpose: To review current research and compile the known effects of testosterone therapy in the trans-masculine population on common acoustic indices of voice production, including fundamental frequency (pitch), decibels/sound pressure level (dB SPL; loudness) and cepstral peak prominence (CPP voice quality), and vocal track length (VTL).

Methods:

A scoping literature search was conducted from January 2024 to March 2024 via PubMed as well as from manual and ancestral searches.

Prisma Flow Chart



Results:

Across 9 studies, there were a total of 173 participants, followed for ≥. 1 year. Included were 5 longitudinal studies, 2 cross-sectional studies, a single case study, and a retrospective study.

Measure	# of Studies	Summarized findings
F_0	5	• Voice lowering begins to occur after 2 weeks (Deuster et al., 2016). • The most significant change occurs between 8 and 12 weeks (Deuster et al., 2016) • After 6 months, 90% of trans men reach a cis-male habitual range, and after 1 year, all did, though their SD is higher than cis-men. (Cler et al., 2020) • On average the subjects' voices lowered by 49 Hz. (Irwig et al., 2017) • Range was measured by 3 authors and had varied results. Cheng et al. found that 64% of participants had increased vocal range, 33% decreased their range and the remaining 3% had no significant change.
dB SPL	2	• Habitual vocal intensity (measured via phonetically balanced readings) increased on average by 0.86 dB SPL (Hancock et al., 2017). However, all authors noted that the increase was not considered significant.
CPP	1	• No significant changes in voice quality as measured by CPP. (Cler et al., 2020)
VTL	2	• Vocal tract length (VTL) was derived from F3 and F4 averaged formant measures, using an equation. In order to estimate VTL, formants were calculated using the acoustic recordings of the vowel sounds /ɛ/ and /ɒ/.Transmen's estimated VTL was significantly longer than ciswomen but shorter than cismen. Further, 23% of the VTL estimates were smaller in transmen than the lowest value in our cismen sample (Hodges et al., 2022)

Example Findings from Hodges et al., 2022

	f_o (Hz)	f_o -SD (Hz)	VTL (cm)
Transmen (N = 30)	116.8 (± 16.9)	17.8 (± 7.4)	15.7 (± 0.8)
	93.7–150.9	7.8–36.3	14.3–17.2
Cismen (N = 34)	110.6 (± 16.6)	13.9 (± 4.8)	16.9 (± 0.9)
	89.5–151.8	6.9–23.0	15.3–19.0
Ciswomen (N = 32)	192.5 (± 25.7)	32.9 (± 11.8)	15.0 (± 0.7)
	133.4–238.6	12.6–54.1	13.7–16.6

Conclusions: HRT is effective for lowering fundamental frequency. HRT did not lead to substantial changes in vocal loudness or vocal quality. There is very little research regarding phonatory airflow of trans-men on HRT.

There are many components which make up a "voice"; Acoustic measurements reflect only some of these factors. About 10% on HRT still may choose to seek gender affirming voice therapy from an SLP, or seek an SLP due to voice complications while on testosterone (less than 1%) (Deuster et al., 2016).

References will be provided upon request.