Voice Feminization Therapy and Quality of Life in Transgender Women: A Critical Review and Case Study

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This study reports a critical review and case study examining the relation between voice feminization therapy for transgender women and changes in quality of life (QoL). For the critical review, studies evaluated included two single group pre-posttest studies, two single group posttest studies, and two survey studies. In the case study, an adult transgender woman received weekly voice feminization therapy over 10 weeks. Overall, findings from both the critical review and case study suggest that voice feminization therapy for transgender women may contribute to positive increases in voice-related QoL.

Introduction

The Centres for Disease Control and Prevention (CDC) have defined health-related quality of life (QoL) as "an individual or group's perceived physical and mental health over time" (2000). There is extensive research on voice-related QoL for individuals who have vocal pathologies such as vocal nodules, vocal paralysis, or laryngectomies. However, there is considerably less research on voice-related QoL on a population that does not have vocal pathology per se, but can still experience distress caused by their voice: the transgender population.

"Transgender" is a term used to refer to a person whose sex assigned at birth does not match their gender identity. "Trans" is an "umbrella term that describes people with diverse gender identities and gender expressions […] It includes, but is not limited to, people who identify as transgender, transsexual[1], cross-dressers, or gender non-conforming (gender variant or genderqueer)" (Rainbow Health Ontario, 2016). Therefore, for the purposes of specificity, 'transgender,' and not the umbrella term 'trans,' will be used in this paper to refer to research participants.

"Transition" refers to the process by which a person may undergo certain activities to affirm their gender identity. Rainbow Health Ontario (2016) cautions that such transitions involves substantial personal, legal, financial, social and medical risks and should never be viewed as a precondition to validate a person's gender identity[2].

When developing a new questionnaire to measure voice-related QoL in transgender individuals, Dacakis et al. (2013) found that "the most frequently experienced psychosocial impact reported was distress at being perceived as a man because of the individual's voice." In a qualitative study involving focus groups of transgender women, Pasricha, Dacakis and Oates (2008) reported that participants "labeled voice as the principal feature likely to betray their biological gender [sic][3]". Furthermore, these participants expressed frustration at being able to achieve a feminine appearance, and thus being 'read' as female by others, but were 'given away' by their voice. This phenomenon was even more exaggerated on the phone, where visual cues are unavailable to the listener when evaluating the speaker's gender.

Approximately two-thirds of trans people in Ontario have avoided public spaces or situations, including the healthcare system, for fear of harassment or being 'outed' as trans (Bauer & Scheim, 2015). As voice is one of the quickest ways we make judgments about people's genders, having a voice that is either 'too' conventionally feminine or masculine in relation to one's gender presentation could lead to these individuals being 'outed' as trans. Being 'outed' carries certain risks in that trans people experience higher levels of harassment, assault, or ridicule often resulting in further perpetuating a cycle of shame and fear. Unfortunately, this is a real threat because TransPULSE (Bauer & Scheim, 2015) found that 20% of trans people had been physically or sexually assaulted, and another 34% had been verbally harassed – just for being trans.

[1] The terms 'transsexual' and 'transvestite' are no longer considered appropriate to use, unless the individual self-identifies as such.

[2] It should be noted that transitioning is a process that may take a lifetime to complete. Therefore, using "before her/their transition", "after his/their transition", etc. is problematic.

[3] Rainbow Health Ontario (2016) advises that the terms 'biological gender' and 'biological sex' are inappropriate to use when referring to transgender people. The terms 'biological female' (when referring to trans men) and 'biological male' (when referring to trans women), are similarly inappropriate. The phrase 'sex assigned at birth' should be used instead, when necessary.

Voice therapy may be necessary for some transgender women to achieve a more feminine voice, as taking 'female' hormones (estrogen, progesterone) does not alter the voice. Voice is constrained by the physical size of the larynx, which cannot be altered once a person assigned male at birth goes through puberty and is exposed to testosterone (Hancock & Helenius, 2012). Common treatment goals including raising pitch/fundamental frequency (F0) to at least the gender-neutral threshold of 165 Hz (Adler, Hirsch, & Mordaunt, 2012), increasing intonation, and increasing forward/ 'head' resonance. Other treatment goals may focus on more stereotypically feminine behaviours, should the client desire to achieve them, such as more feminine word choice, the use of tag questions/up speak, smiling more, and using more gestures when speaking (Alder, Hirsch, & Mordaunt, 2012).

There are also pitch-raising surgeries, including cricothyroid approximation, the Wendler glottoplasty (shortening of the vocal folds), anterior commissure advancement, and laser vaporization of the surfaces of the vocal folds (Casado et al., 2014); however, the efficacy of such surgeries is controversial.

There are several questionnaires that can be used to measure voice-related QoL, the most common being the Voice Handicap Index (VHI; Jacobson, Johnson, Grywalski, et al., 1997). The VHI is a 30-item questionnaire that asks participants about their voice and its effect on their life, with subscales that measure functional, emotional, and physical effects. This is considered a gold-standard measure to ascertain voice-related QoL for individuals with voice disorders.

Recently, a questionnaire has been developed that has been modeled on the VHI, but is tailored for the transgender client: the Transgender Self Evaluation of Voice Questionnaire (TSEQ; Davies, 2006). This is a 30-item questionnaire with a five-point scale, with 'one' corresponding to "never" and 'five' corresponding to "always". It is scored out of 150, with higher scores indicating worse impacts on QoL.

Shelagh Davies and colleagues (Dacakis et al., 2013, Davies & Johnston, 2015) have recently updated the TSEQ to the new Transsexual Voice Questionnaire (Male to Female; TVQ^{MTF})[4], which asks similar questions. This 30-item questionnaire was modeled on the VHI to reflect the experiences of trans women. It uses a four-point Likert severity scale to rate experiences such as "my voice makes me feel less feminine than I would like", with 'one' corresponding to "never or rarely", and 'four' corresponding to "usually or always"/more severe. This is a validated measure, but does not yet have normative data. Again, higher scores indicate a lower QoL. It should be noted that currently there is no equivalent TVQ for transgender men, even though the TSEQ could be used for either transgender men or transgender women.

In a survey study of 77 transgender women, Bodoin, Byrd, and Adler (2014) found that many individuals were not aware that speech and voice therapy from speech-language pathologists was available to them as a treatment option to aid with their transition. Of those who were aware, the majority reported that speech therapy was an important aspect of transition, and those who had received voice therapy were either moderately or very satisfied with their progress (more so than for alternative voice-altering methods such as self-training from the Internet or using peer mentors). Finally, most of the participants in this study said they would seek out voice therapy if it were more available and more affordable.

This paper will focus on transgender women and not on transgender men because of the lack of research on transgender men and healthcare more broadly, and especially related to transgender men and voice therapy more specifically.

Objectives

The primary objective of this paper was to critically review the existing literature regarding the link between voice feminization therapy for transgender women and their self-reported QoL. The secondary objective of this paper was to investigate participation in individual voice feminization therapy, and to compare pre- and post-therapy QoL measures. The tertiary objective of this paper was to propose clinical implications and evidence-based recommendations for Speech-Language Pathologists (SLPs) practicing voice feminization therapy with clients who are transgender women.

Study 1: Critical Review

Methods

Search Strategy

Computerized databases including PubMed and Google Scholar were searched using the following search strategy: [(trans* OR transgender OR transsexual OR gender) AND (voice* OR speech* OR speech therapy OR voice therapy) AND (QoL)]. Reference lists of

[4] Note: Rainbow Health Ontario (2016) advises that the terms 'MTF' and 'FTM' are now considered inappropriate to use when referring to trans women and trans men, respectively. These terms will be used when referring to the titles of the questionnaire, but the author does not condone the use of these terms outside of this purpose and encourages future researchers and clinicians to be mindful of their language.

previously searched articles were also used to obtain other relevant studies.

Selection Criteria

Studies selected for inclusion in this review were required to measure QoL from self-identified transgender women. All studies had to include transgender women who had participated in voice feminization therapy with a speech-language pathologist. Studies that only reported on changes in fundamental frequency, voice satisfaction, or perceived voice femininity, but did not employ QoL measures such as the VHI, TSEQ, or TVQ^{MTF} were excluded from the current review.

Data Collection

Results of the literature search yielded seven studies that met the selection criteria. These articles included four Level 3 research evidence studies: two single group pre-post-test studies (Casado, O'Connor, Angulo, & Adrián, 2016; Hancock & Garabedian, 2012), and two single group post-test studies (McNeill, Wilson, Clark, & Deakin, 2008; Hancock, Krissinger, & Owen, 2011). Three Level 4 non-experimental studies were also included: two survey studies (Hancock, 2016; Schwarz et al., 2016), and one case study (Hancock & Helenius, 2012). Designation of levels of evidence was based on Archibald (2009).

Results

Single-Group Pre-Post Test Studies

Casado et al. (2016) completed a single group, pre-post test study to examine quality of life outcomes in 10 transgender women (age 30-52 years) who had received gender confirmation surgery, and who had also undergone the Wendler glottoplasty pitch elevation surgery and post-surgery voice therapy in Spain between January 2012 and July 2013. Participants completed approximately 24 voice therapy sessions (45 minutes each) starting two weeks post surgery. Details regarding voice therapy goals indicated procedures commonly adapted for voice disorders rather than individuals having undergone voice surgeries. The person conducting the treatment was not specified.

Outcome measures and pre- and post-treatment included laryngostroboscopy examination, fundamental frequency (F0), maximum phonation time, perceptual evaluation of voice sample by four expert listeners; and a completion of the Spanish translation of the TSEQ, of which only the TSEQ were of interest to the present review. Appropriate statistical analyses revealed increased scores on the TSEQ post surgery. There were reportedly four follow-up sessions with the clients, (one, three, and six months over the phone or Skype), and at 12 months at the clinic however, only two data points were presented for TSEQ scores. As well, TSEQ scoring and interpretation was unclear and appeared nonstandard.

Due to weaknesses in the study design and procedures, this study provides equivocal evidence that voice feminization surgery and subsequent voice therapy is associated with significant improvements in voice-related QoL.

Hancock & Garabedian (2012) completed a retrospective single group, pre-post treatment study to examine outcomes following voice feminization therapy for 25 transgender women (age 21-60). Therapy varied widely across participants, usually weekly, ranging from 2-77 sessions, carried out by student clinicians supervised by a speech-language pathologist, and with a range of goals commonly included in this type of therapy. Only four of the 25 clients had completed the TSEQ before and after their therapy block, three of whom made gains descriptively.

Overall, the evidence that voce feminization therapy leads to improved QoL for transgender clients provided by this study is equivocal.

Single Group Post-Test Studies

McNeill et al. (2008) conducted a single-group post-test study with 12 transgender women (32-65 years) who had received voice therapy (mean = 12 months; range = 2-30 months). Two participants had also had cricothyroid approximation surgery (a pitch raising procedure). Participants completed the VHI (Jacobson et al., 1997) and the Glasgow Benefit Inventory (GBI; Robinson et al., 1996) as measure of their voice-related QoL. They also completed two visual analog scales: one was to examine their perceptions of their voice's femininity (0=very masculine, 10=very feminine); the second was to determine their happiness with their voice (0=very unhappy, 10=very happy). Voice samples were played for listeners (40 naïve, 15 SLPs), who completed visual analog scales to rate perceived femininity.

Appropriate statistical analyses indicated that self-perception, and not listener ratings (or fundamental frequency), was more strongly correlated with happiness with voice. Happiness with voice was positively correlated with better vQoL scores on the GBI and VHI. Low self-perceived femininity ratings were correlated with worse vQoL scores. It is also of interest to note that they could not find a significant correlation between length of therapy and self-perceived happiness or with femininity of voice.

Overall, this study provides equivocal evidence that voice feminization therapy results in improved QoL, however it provides suggestive evidence that the client's perceptions of and happiness with their voice are correlated with QoL measures.

Hancock, Krissinger, & Owen (2011) conducted a single group post-test study with 20 transgender women (age range 23-63) who were currently or previously enrolled in voice feminization therapy. All participants were reported to be living and presenting as a woman 100% of the time. The women completed the TSEQ and the VHI, as well as rate the likability and femininity of their voices on visual analog scales. They also had five cisgender women and five cisgender men as control subjects, for a total of 30 participants. Each recorded a voice sample, and these were presented to 25 naïve listeners (12 men, 13 women), who rated likability and femininity on visual analog scales.

Results found a significant negative correlation between TSEQ scores (lower scores = higher QoL) and self-ratings of voice femininity and likability. Correlations between listener ratings and TSEQ scores were statistically insignificant. In addition, they found moderately strong correlations between self-ratings of femininity and likability. Results of this study indicate that the client's perceptions of their own voice may be more related to their QoL than listener's perception.

Overall, this study provides suggestive evidence that changes in voice from voice feminization therapy can be related to positive changes in QoL.

Survey Studies

Hancock (2016) completed a survey study of 81 transgender women (age range = 19-80) to collect information relating to demographics, gender identity, and their experience with their transition to their true gender, as well as scores on the VHI and TSEQ (though completion of both of these measures was inconsistent across participants). 20 participants were recruited from a university clinic, and the rest were members of the public who completed the survey on the Internet. Of the 81 participants, 46% had participated in voice therapy, and the authors reported that at least one of these people had engaged in self-training (i.e. did not see an SLP).

The TSEQ and VHI scores were strongly correlated. Reported dissatisfaction with voice, according to self-rating or the perceptions of how others view them was common among participants. They found a significant correlation between higher (more affected) VHI scores and older ages. No significant differences in vQoL were found between people who had had voice therapy and those who had not. However, both the VHI and TSEQ scores were comparable to cisgender people who had mild self-reported voice handicaps. It should be noted that there was a wide range in scores on both the VHI (0-113) and TSEQ (30-133).

In the survey, the authors did not ask questions about the details of the voice therapy the participants received (treatment goals, number of sessions, outcome measures). Furthermore, the authors excluded the data from 25 transgender men who completed the survey, as well as from seven individuals who identified with a term other than 'male-to-female', including bigender or queer. As queer is an umbrella term, and it is fairly common for people to identify as trans outside of the gender binary (and due to the fact that it is now considered incorrect to refer to transgender women as 'male-to-female'), it is unclear why the data from these individuals were not included and flagged as such.

This study suggests that voice therapy does not contribute to improved vQoL, however the level of evidence is equivocal.

Schwarz et al. (2016) completed a retrospective survey study with 47 transgender women (age range 18-50) who participated in a gender identity program in Brazil. Demographic information, information relating to their transition, and visual and auditory perceptual ratings completed by the clinical interviewer (laryngeal prominence, femininity of voice, and femininity of face) were collected from their medical records. Participants completed the Portuguese version of the TVQ^{MTF} (Dacakis et al., 2013).

Of the 47 participants, 11 (23.4%) reported participating in speech therapy, which ranged from one session to two years in length. The average TVQ^{MTF} score was 51.55/120 (minimum = 30, maximum 97, SD = 18.90). There was no significant difference in vQoL for those who had participated in voice therapy and those who had not. Significantly higher total TVQ^{MTF} scores were found for those who were under 30 years of age, or over 40 years of age, as well as those who were perceptually rated as having a more masculine face.

The authors acknowledged that the majority of individuals in this study already had voices that were perceptually rated as feminine. In addition, women having deeper voices may be more culturally acceptable in Brazil. The small sample size, confounded by the even smaller proportion of individuals who had undergone voice therapy may have skewed the results. In addition, exclusion criteria included those who had had phonosurgery, professional voice use, alcohol dependence, or illicit drug use. It is unclear why these

participants were excluded, especially as individuals who smoked (legal drug use) were not excluded.

This study suggests that voice therapy does is not related to vQoL, though the level of evidence is deemed to be equivocal.

Case Study

Hancock & Helenius (2012) completed a case study with a fifteen-year old transgender girl to examine whether voice therapy was as effective in teens as it is for adult transgender women. She was referred for voice therapy as her voice made her feel less feminine and embarrassed. She was reportedly living and presenting as a girl 100% of the time when therapy began, but the authors estimate she was using her 'male' voice approximately 85% of the time. She also had strong social support during her transition.

She received 15 sessions of voice therapy over seven months. She completed the TSEQ three times: at the initial assessment she scored 106/120; six months later she scored 79/120; four months later (and two months post-therapy), she scored 53/120. The authors also reported that the client indicated increased self-confidence and overall satisfaction with therapy progress related to her new voice.

Vocal habits and patterns that may be present in older transgender women who are transitioning may not have been as established due to her youth, and therefore may have been more easily extinguished. In addition, the client had begun hormone therapy when she was 14 years old, so this early intervention may have halted the effect of testosterone on lowering her voice to a severity that older transgender women may experience.

Overall, this paper provides suggestive evidence that voice feminization therapy can contribute to increased voice-related QoL in transgender teens.

Discussion

The results of these seven reviewed studies provide limited suggestive evidence that voice therapy for transgender women can provide positive improvements in QoL. Few of the studies included QoL measures at pre- and post-treatment; an approach needed to more objectively gauge the client's perception of their progress and happiness with therapy outcomes.

Study 2: Case Study

Case studies provide a rich source of information about the potential benefits of treatment with individual clients. Given the individual needs of trans women, case study approaches may be effective in building the evidence base, as provided by the present study.

Methods

Participant

HG was a 62 year-old transgender woman who self-referred to the clinic to receive help to make her voice sound more feminine. She had no history of other voice problems. She reported having limited familial support related to her transition, which presented as a barrier for her to practice using her 'new' voice at home. She had tried using smartphone apps to help raise her pitch, but had not pursued any other formal voice therapy prior to her coming to the clinic. HG had been receiving hormone therapy for over two years, and was presenting as androgynous in over 75% of situations.

Procedures

HG participated in a total of 10 weekly sessions over three months with the student clinician and supervisor, including two pre- and one post-assessment session.

Therapy goals targeted voice changes related to pitch, intonation, breath support, resonance, articulation, as well as use of gestures and word choice.

Outcome Measures

Voice: Audio samples were taken of HG completing a sustained vowel (/a/) production, counting from 1-10, completing a reading sample, and spontaneous conversation. Fundamental frequency and range were measured using the Kay-Pentax VisiPitch™ program.

Other informal measures of voice, resonance, intonation, gesture, articulation and word choice were completed, but are not included in the present report.

Quality of Life: HG completed TVQ^{MtF} (Dacakis et al., 2013) at pre and post assessment.

Perceptual Ratings: To determine how unfamiliar listeners perceived her voice after receiving therapy, five SLP graduate students completed a perceptual rating scale. One-minute voice samples of three cisgender men, three cisgender women, and three transgender women, including HG, were rated by the listeners on a five-point scale, with 'one' being "very feminine", 'five' being "very masculine", and 'three' being "gender neutral."

Results

Voice-related outcomes

Table 1 presents pre and post measures of fundamental frequency.

	Pre-Treatment F0	**Post-Treatment F0**
Sustained /a/	124 Hz (B_2)	174 Hz (F_3)
Counting	104.49 Hz ($G^{\#}_2$)	171 Hz (F_3)
Reading	117.85 Hz ($A^{\#}_2$)	142 Hz ($C^{\#}_3$)
Monologue	108.39 Hz (A_2)	127 Hz (C_3)

Quality of Life outcomes

At the initial assessment, HG scored 76 overall (out of 120) on the TVQ with two questions unanswered. HG rated her current voice as "somewhat male" and her ideal voice as "somewhat female."

At post-treatment, HG scored 42 overall (out of 120) with 1 question unanswered on the TVQ^{MTF}. This score was reduced by almost 50% when compared with the pre-treatment score of 76. There was a decrease in endorsing of items related to negative effects of her voice in relation to her gender identity and confidence in her voice. HG rated her current voice as "gender neutral" and her ideal voice as "somewhat female."

In the re-assessment post-treatment, HG indicated that she was "very close to overjoyed" with her progress in therapy and with what she has learned regarding how to achieve a more feminine voice. She also reported that she feels more confident about her voice since completing therapy.

Perceptual outcomes

All five participants rated HG's post-treatment voice as "gender neutral."

Discussion

Results of this case study provides suggestive evidence that feminization therapy with a speech-language pathologist may contribute not only to perceptual and objective changes in voice, such as fundamental frequency and listener's perceptions of femininity, but also to positive changes in the client's self-reported vQoL.

General Discussion

A critical analysis of the existing literature examined if perceptions of voice in transgender women (specifically being perceived as 'too masculine') may contribute to lower vQoL scores. This relationship was further explored through a case study examining a 10-week block of therapy with a transgender woman. Of the seven articles that examined the association between voice and vQoL in transgender women, only two (Hancock & Helenius, 2012; Hancock, Krissinger & Owen, 2011) involved empirically driven procedures sufficient to provide evidence at the suggestive level with all remaining evidence at the equivocal level (Archibald, 2016). Across the two suggestive studies, results indicated that voice feminization therapy *may* contribute to an improved vQoL. Converging evidence from the case study provided further evidence for this link.

Two interesting trends emerged from the research. First, two papers found that the client's self-perceptions of their voice (on the variables of likability and femininity) were more strongly related to better vQoL measures than listener ratings (Hancock, Krissinger, & Owen 2011; McNeill et al., 2008). These findings suggest that transgender women who perceived their voice to be more likeable or feminine are overall more satisfied with their voice. Further, Hancock (2016) found that concerns about other's perceptions were a common theme reported by participants; however, the self-perceptions had a stronger correlation with vQoL scores. It may be that a client's opinion about their voice is more influential to their quality of life despite their concern over the perceptions of others.

Second, Schwarz et al. (2016) and Hancock (2016) found significantly worse vQoL scores in older transgender women compared to their younger peers. It is unclear if this is because they pursued transition later on in life, or simply due to age-related changes in voice. This is a variable worthy of further study, especially as the transgender population is gaining more social acceptance and many transgender people are coming out and transitioning earlier in life.

Limitations of the critical review include comparing several studies by the same author, Adrienne Hancock, which could lead to a bias in the information reported. However, Hancock is one of the major researchers in vQoL for transgender individuals, so this bias was difficult to avoid when collecting appropriate and applicable articles. In addition, the studies used different vQoL measures, which make it difficult to directly compare results. Limitations of the case study include the small sample size, which lead to limited ability to generalize these findings to the larger and more diverse transgender population. While results from this paper should be interpreted with caution due to these limitations, these findings should be investigated in a

larger sample, and with more qualitative data to augment and support objective findings.

Future research recommendations

It is recommended that further research be conducted to investigate the relationship between voice therapy for transgender people and changes in self-reported vQoL. In order to improve the level of evidence in the existing literature, it is recommended that future studies take the following recommendations into account:

a) Future research should use study designs that provide a stronger level of evidence and larger sample sizes, so that the results can be better applied to clinical practice.
b) Future research should always include a standardized measure of vQoL for transgender people, such as the TVQ^{MTF} (Dacakis et al., 2013), in order to better capture concerns about voice that are specific to this population. These measures should be routinely given before therapy commences, after therapy has ended, and again at later date to account for stability of these scores.
c) Future research should aim to provide normative data for the TVQ^{MTF} (Dacakis et al., 2013) so the scores obtained from these measures can be appropriately interpreted and given a severity rating.
d) Future studies should examine the variable of social support and its effect on the success of voice therapy as measured by subjective measures (like intonation and F0) and measures post-treatment.
e) Future research should examine the effects of masculinization voice therapy for transgender men, as this is an overlooked population with little research done to support evidence-based practice.
f) Future research should examine which therapy strategies and goals are the most salient to use in transgender voice therapy, as well as which is the best combination for SLPs to use in their clinical practice.
g) Future research should not exclude participants based on the percentage of time they are presenting as their authentic gender in their daily lives, or whether or not they have undergone gender confirmation surgery.
h) Future research should not exclude individuals based on arbitrary criteria not directly related to voice, such as a history of illicit drug use or mental illness.
i) Future research should not exclude individuals who are intersex but who identify as transgender.
j) Future research should also examine voice feminization or masculinization therapy for individuals who do not identify as a trans woman or a trans man, but rather as non-binary, agender, genderqueer, or genderfluid (provided that they want to change their voice).

Clinical Implications

Due to the limited evidence surrounding the link between voice feminization therapy and vQoL in transgender women, there is a large responsibility on the part of the clinician to individually evaluate the effectiveness of their therapy and to continue to evaluate this link in their own clinical practice. In Ontario, transgender voice therapy is usually fee for service; therefore, unless it is covered under the individuals' private insurance, transgender individuals may have to pay significant fees out of pocket for this service. It is imperative not only for speech-language pathologists to be aware of the current body of research surrounding appropriate therapy goals and techniques, as well as a basic understanding of transgender identity. Furthermore, the effectiveness of this therapy - not only on elevating pitch, but also on vQoL and other appropriate measures such as perceptual ratings - should be further examined, through experimental and qualitative research to ensure that these individuals are not paying large sums of money for potentially little gain.

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