Abstract

**Purpose:** Maximum phonation time (MPT) is a measurement of how long one can phonate a vowel, usually /a/. Normative MPT data have been reported in healthy younger adults and healthy older adults, but no studies have compared MPT between the 2 groups. We sought to compare MPT in healthy younger and older adults and to determine the effects of gender on MPT.

**Design:** Prospective study.

**Methods:** Participants were divided into 2 groups: 45 healthy adults between 18 and 40 years of age, and 53 healthy adults over 70 years of age. Participants took a maximal breath and held the vowel sound /a/ for as long as possible in their normal speaking voice. The effects of age, gender, and trial were assessed. A repeated measures analysis of variance was used for statistical analysis.

**Results:** There was a statistically significant main effect of age (p = 0.05) and gender (p = 0.03). That is, younger adults had longer MPTs than older adults (26.1 seconds [SE = 1.30] and 22.0 seconds [SE = 1.58], respectively). Women had a mean MPT of 21.8 seconds (SE = 1.43), while men had a mean MPT of 26.3 seconds (SE = 1.46). There was also a significant effect of trial (p = 0.02), with mean MPT for trials 1, 2, and 3 of 23.3, 23.9, and 25.0 seconds, respectively.

**Conclusions:** Age and gender significantly impacted MPT. These results generate an appreciation for separate normative data for gender and age.

Introduction

- Maximum phonation time (MPT) is a measurement of how long one can phonate a consonant or vowel. It has been used to assess dysphonia and to evaluate the effectiveness of voice therapy.\(^1\)
- MPT has high intrarater reliability.\(^2\)
- Normative data is important when using MPT to guide clinical decisions.
- Previously, we reported normative data in older adults, but no recent studies have compared younger and older adults.
- Several studies have shown that men have longer MPT than women.
- There may be an improvement in MPT with increasing number of trials.\(^3\)

Accordingly, the research questions of this study were:
1. Does MPT change as a function of age?
2. Is there a difference in MPT between men and women?
3. Is MPT affected by the number of trials?

Methods

**Participants**
- 53 healthy adults over the age of 70 years participated in our initial study of MPT. Their results were used in this study.
- 45 healthy adults between the ages of 18-40 years were recruited for the young comparison group.

**Apparatus**
- MPT was measured by the first 2 authors or the senior author utilizing a stopwatch.

**Procedure**
- Participants were seated upright and instructed to take a deep breath prior to saying /a/ in their normal speaking voice for as long as possible. Three trials were performed with a 1-minute break between trials.

Results

There was a significant main effect for age (p = 0.05) and gender (p = 0.02). There was also a significant main effect of trial (p = 0.02). There were no significant interactions.

<table>
<thead>
<tr>
<th></th>
<th>Mean, s</th>
<th>SEM(^1)</th>
<th>Range, s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women</td>
<td>21.8</td>
<td>1.43</td>
<td>7.0-39.3</td>
</tr>
<tr>
<td>Men</td>
<td>26.3</td>
<td>1.46</td>
<td>7.7-55.7</td>
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</tbody>
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\(^1\)SEM = standard error of the mean

Table 1. MPT as a function of gender

<table>
<thead>
<tr>
<th></th>
<th>Mean, s</th>
<th>SEM(^1)</th>
<th>Range, s</th>
</tr>
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<tbody>
<tr>
<td>Older</td>
<td>22.0</td>
<td>1.58</td>
<td>7.0-48.3</td>
</tr>
<tr>
<td>Younger</td>
<td>26.1</td>
<td>1.30</td>
<td>13.7-55.7</td>
</tr>
</tbody>
</table>

\(^1\)SEM = standard error of the mean

Table 2. MPT as a function of age

Conclusions

This study contributes to normative MPT data in the literature. Younger adults had significantly longer MPT than older adults. Men had significantly longer MPT than women. Mean MPT for trial 3 was statistically significant, although this result is probably not clinically significant. These results suggest that separate normative data should be gathered according to gender and age group. Future studies of MPT may consider examining BMI, height, and pulmonary function tests.

References