

# The Effects of Magnesium on Vocal Qualities in a Woman Susceptible to Hypothyroidism

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## Disclosure Statement

- ▶ No authors have any relevant financial or nonfinancial relationship for the content presented in this presentation.

## Background

- ▶ Dysphonia has been reported in patients with hypothyroidism; thyroid hormone replacement results in improved vocal function
- ▶ Low magnesium levels are associated with hypothyroidism
- ▶ A prevalent complaint of women with hypothyroidism (an underactive thyroid, common in woman nearing menopause) is a decrease in perceived pitch due to water retention in the vocal folds.

## Background

- ▶ Magnesium supplements may improve vocal function
- ▶ NOTE: The main side effect of magnesium is diarrhea, which can cause the body to become dehydrated. Daily magnesium dosage should be approved and monitored by a medical professional.

## Hypothesis

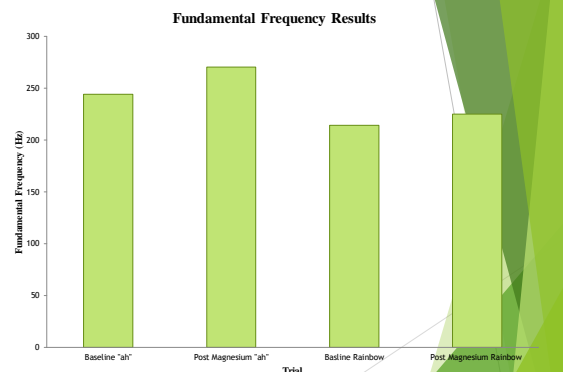
- ▶ Research Question: What effect does magnesium have on vocal quality in a woman susceptible to hypothyroidism?
- ▶ Hypothesis: A daily oral dosage of magnesium will improve vocal quality in a woman susceptible to hypothyroidism

## Methods

- ▶ The single participant for this study was recruited from VSU, and had no history of voice disorders.
- ▶ Two recordings were obtained using the Computerized Speech Lab (CSL) (KAY Pentax). One recording was obtained before the participant began a daily oral dosage of magnesium, and one was obtained after the participant had been taking this daily oral dosage for 19 days.
- ▶ The participant was asked to read the Rainbow Passage 3 consecutive times, then produce a prolonged /a/ sound 3 consecutive times for each recording.
- ▶ The acoustic measures used to analyze voice in this study included fundamental frequency (Hz), loudness (dB), jitter (%), shimmer (%), and noise to harmonic ratio (dB).

## Results

- ▶ Results obtained for this study reflect the mean of the data from all 3 attempts for each trial.
- ▶ Fundamental frequency showed a 26.39 Hz increase as shown in Figure 1.
- ▶ Since humans can perceive as little as 15 Hz., it can be assumed that this increase would be perceptually obvious to listeners.
- ▶ There was no notable change in jitter, shimmer, loudness, or noise to harmonic ratio.



## The Effects of Magnesium on Vocal Qualities

| Parameters              | Baseline /a/ | Post-magnesium /a/ | Baseline Rainbow Passage | Post-magnesium Rainbow Passage |
|-------------------------|--------------|--------------------|--------------------------|--------------------------------|
| Loudness                | 62.28        | 59.17              | 51.39                    | 48.94                          |
| Jitter                  | .41          | .36                | 2.66                     | 3.84                           |
| Shimmer                 | 2.91         | 2.33               | 9.91                     | 11.45                          |
| Noise to Harmonic Ratio | .12          | .12                | .29                      | .26                            |
| Fundamental Frequency   | 244.07       | 270.46             | 214.15                   | 224.97                         |

## Discussion

### RELATION TO HYPOTHESIS

- ▶ A chief complaint of women nearing menopause is an apparent decrease in pitch, and a hoarse quality to voice. Since these qualities improved with the increase in fundamental frequency, the hypothesis would be accepted for this measure only.

### INTERPRETATION

- ▶ An increase in pitch suggests less swollen vocal folds. Since pitch increased, it can be assumed that the vocal folds lost mass. It is hypothesized that this change was associated with the intake of a daily magnesium supplement.

### IMPLICATIONS

- ▶ These findings suggest that magnesium may be useful in treating vocal dysfunction in menopausal women. Further research is necessary to clarify the impact of magnesium on voice

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