Tongue Resistance Training

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Technique Development

What is it?

- Load bearing exercise program used with intentions of strengthening skeletal muscle in the tongue that becomes weak due to age or disease
- Strengthening skeletal muscles of the tongue helps in dysphagia rehabilitation
- Training program is based off of evidence found by JoAnne Robbins, SLP

Rationale

- Tongue-pressure controls liquids through mouth and pharynx
  - Low pressure may lead to unprotected airway and residue in the pharynx

How is it performed?

- Utilizing compressions of an air-filled bulb (Iowa Oral Pressure Instrument), tongue behavior during a liquid swallow is mimicked

- Protocol developed based on evidence of sports medicine
  - Considers exercise intensity, load, fatigue in determining schedule and duration for treatment regimen
  - Developed to induce muscular fatigue through a series of repeated practiced tongue-pressure tasks

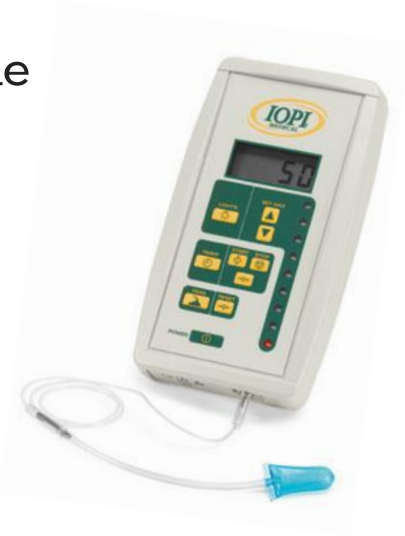
Procedure

- Eight week program
  - 60 tongue presses in 45-60 minute session
    - Set of 5 with 20 second rest between
  - Utilizes anterior and posterior tongue presses

- Pressure changes measured using Iowa Oral Pressure Instrument (IOPI)
  - Also used to set goals for session

Iowa Oral Pressure Instrument (IOPI)

- Used to:
  - Decide if tongue weakness is involved in dysphagia (oral phase)
  - Document tongue weakness and tongue resistance training justification
  - Assessing tongue pressure change over time
  - Exercising tongue



Research

Research

Lazarus, Logemann, Huang, and Rademaker (2003)
Results: eight weeks of tongue-pressure resistance exercise increased tongue pressures in both (healthy) young and adults. Tongue resistance exercises improved tongue strength.

Robins et al. (2005)
Results: Found tongue resistance exercises improved tongue strength and swallow pressures in 10 healthy seniors. They improved their pressure by 20%.

Research- Gender Differences/Age

Stierwalt & Youmans (2007)
Participants: Control group (normal/no dysphagia) Experimental group (dysphagia)
Results: Lingual weakness correlates with dysphagia. Participants with dysphagia had significantly lower strength. Males exhibited better tongue strength in both groups.

Kays et. al (2010)
Participants: Young healthy adults (20-35y) vs. Older healthy adults (65-82y)
Results: Young and old adults demonstrated reduced tongue strength and endurance after dining, but younger subjects showed greater declines in anterior tongue endurance while older adults exhibited signs of swallowing difficulty. Significant differences in pre-meal and post-meal tongue endurance times in young and old men, but not women, suggested a potential gender difference in tongue muscle fatigue.

Research-Special Populations

Dysphagia & Stroke:

Steele et. al. (2013)

Treatment: 24 sessions over course of 11-12 weeks of tongue resistance training

Results: Notable improvements in tongue pressure and further prevention of penetration aspiration. No improvements in pharyngeal residue; some patients showed an increase in pharyngeal residue after 12 weeks.

Robbins et al. (2007)

Results: Found tongue resistance exercises improved tongue strength & swallowing ability in 10 patients with dysphagia post stroke

Dysphagia & Head, Neck Cancer (H&N):

White et al (2009)

Results: Significant differences in oro-lingual pressure between H&N cancer patients versus healthy control group.

More Research

Steele et. al. (2013)
Procedure: Looked into Tongue Pressure Profile Training (TPPT) versus Tongue Pressure Strength-and-Accuracy Training (TPSAT)
Results: Tongue Pressure Profile Training proved to be more effective than the TPSAT protocol

Stelle et. al. (2010)
Results: Looked at which tongue resistance training tasks closely resemble water and nectar thick swallows. Saliva swallows were found to yield pressure release-slope profiles that closely resemble those typically seen in water and nectar-thick liquid swallows.

Research- Future

"Clinicians can look forward to new research results in the next five years that will shape recommendations for implementing tongue-pressure resistance training into dysphagia rehabilitation protocols"

"Scientific evidence is only one aspect of evidence-based practice. Clinician expertise and client values and preferences are other key factors that must be integrated into evidence-based clinical decision making."

-Tracy Schooling MA CCC-SLP

Associate Director National Center for Evidence-Based Practice

Target Population

After all of that research, who do we think we would most likely try these exercises with?

- Cognitively intact patients
- Patients who do NOT have a progressive deteriorating disorder
  - i.e. Parkinson's, ALS, etc.
- Oral cancer patients

Pros

Pros

- Like any exercise for the body, it increases muscle strength
  - The tongue becomes stronger
- Increased tongue volume
- It can be used in conjunction with other methods
- It can change the physiology of swallowing
  - Although...

Cons

Cons

- The treatment may change the physiology of swallowing
- Tongue resistance training cannot normally be done by cognitively impaired individuals
  - The instructions might confuse them
- Improved bolus clearance and reduced residue in the pyriform sinuses and valleculae have not been noted
- The duration and frequency needs to be high
  - People need to commit to their exercises as a part of their daily routines, which could be difficult to implement
- Swallowing pressures can fall short of the pressures that are being achieved through tongue strengthening
- The exercises are not specific enough
- The research doesn't give us exactly what we want

Discussion Questions

Discussion Questions

- Can you think of any other reasons why tongue resistance training would/would not work?
- By a show of hands, who WOULD try resistance training with their patients?
- What did you find surprising about tongue resistance training?
- Does anyone have any other questions?

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