Behavioral Treatment of Resonance and Nasal Emission

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Context

- VPI is best identified using a combination of perceptual and instrumental means
- A definitive diagnosis of VPI can only be made by direct examination of the VP port (e.g. using nasendoscopy, videofluoroscopy)
- When VPI is diagnosed, it should be managed physically (surgery or prosthetically).

However,

- Sometimes resonance disorders persist after physical management - and further physical management is not possible
- Sometimes physical management is not possible
- Sometimes a diagnosis of VPI is not clear-cut (borderline VPI, inconsistent VPI, or clear diagnosis cannot be made)

↑ **Behavioral treatment of resonance disorder**
(hypernasality and nasal emission)

Definition of "Behavioral Treatment"

- Not surgical
- Not prosthetic
- Not instrumental
- = "speech therapy"

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Differentiate:

- Techniques aimed at improving **velopharyngeal movement**
- Techniques aimed at improving the **perception of resonance disorders** (hypernasality, nasal emission)

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Behavioral treatment focused on improving VP status

- Indirect methods

  e.g. blowing, sucking, swallowing, articulation therapy
- Direct methods

  e.g. electrical or other stimulation of VP muscles, speech appliance (stimulate, then reduce/remove), Nasometery biofeedback, nasendoscopy biofeedback

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Several reviews of such treatment:

- **OVERALL: Behavioral methods aimed at improving VP closure have not been successful**
- A few techniques appear to be successful for some patients
  - ↑Need to identify those patients who will benefit
  - ↑More and better research is needed on treatment efficacy

Behavioral methods to improve resonance

- Focus on improving **perception** of resonance disorder (not actual VP movement)
- Perception of hypernasality can be influenced by other aspects of speech (e.g. voice disorder, articulation disorder, rate, pitch).

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Methods include:

- Reduce rate
- "Light contacts"
- Open mouth more widely
- Increase/decrease loudness
- Increase/decrease pitch
- Articulation therapy
- Discrimination training

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Reviews of efficacy

- Few systematic studies of the efficacy of these methods
- There is little evidence that these methods work!

➔ CAUTION (in clinical practice)

➔ NEED FOR MORE GOOD RESEARCH

Reduce rate

- Technique: reduce rate of connected speech
- Theory: ?gives velum more time to achieve correct articulatory gesture
- Evidence: no research evidence
  e.g. D'Antonio, 1982
- May work for some individuals

"Light contacts"

- Technique: more 'gentle' articulatory contacts during speech (e.g. bilabial and alveolar plosives)
- Theory: ? Reduces speech rate and respiratory effort
- Evidence: some positive clinical reports, but no research studies

Warning: some authors disagree; argue for "hard contact" instead (Golding-Kushner, 1995)

Open mouth more widely

- Technique: open mouth more widely during speech; (in front of mirror)
- Theory: decrease oral resistance; increase oral air flow, decrease nasal air flow
- Evidence: some evidence that this can lead to speech perceived as more oral

Warning: excessive opening may increase VP port?

(Peterson-Falzone et al. 2001)

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Increase/decrease loudness Increase/decrease pitch

- Disagreement re: increase vs. decrease!
- No research studies, few clinical reports of either
- Theory: may alter perception of hypernasality

Warning: altering pitch or increasing loudness may lead to voice disorder (hoarseness).

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Articulation therapy

- Technique: focus on articulation; no direct treatment of resonance disorder
- Theory: (1) improved articulation leads to better perceptual judgement of hypernasality
  (2) reduction of some compensatory articulatory patterns (glottal stops, pharyngeal fricatives) may lead to better VP closure
- Evidence: Clinical and research evidence that this approach works for some patients.

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Discrimination training

- Technique:improve patients ability to hear the difference between normal and abnormal resonance
  (a) in others (therapist simulates hypernasality; alternates with normal resonance)
  (b) in self (initially, by blocking and unblocking nose)
- Theory: Improved discrimination abilities will lead to better production
- Evidence: none?

Patients who may benefit

- Borderline VPI
  ("touch closure", "ABNQ" - almost but not quite)
- Inconsistent VPI
  ("SBNA" - sometimes but not always)
- Small velopharyngeal opening
- Mild resonance disorders

Documenting improvement

- Important to document carefully, so we can be sure real change took place
- Pre-treatment, (during treatment), post-treatment
- Note exactly when inconsistencies occur (random? pattern?)
- Be aware of possible clinician bias
  → tape record; multiple judges
- Consider instrumental measures to complement
  e.g. nasometry

Trial therapy

- Behavioral therapy (for VPI or for resonance) should be undertaken on a trial basis
- 1 month; 1-3 months; 3-6 months
- If improvement is going to occur, it should occur rapidly
- Do not undertake long periods of behavioral treatment - frustrating for patient and therapist.
- Recognize physical limitations

Behavioral treatment for nasal emission

- Determine whether 'general' nasal emission (related to VPI) or phoneme specific nasal emission (adequate VP closure, learned pattern).
- If phoneme-specific, treat as articulation disorder
- If general/VPI-related, some of the techniques covered here may be of value

In addition....

Visual feedback

- valuable in the treatment of nasal emission

- mirror (detect fogging/misting)
- strip of paper (movement during n. e.)
- Nasometer

Speech vs. Non-speech tasks

- Movement patterns for speech are different for speech than for nonspeech (same structures)
- Unlikely that gains made in nonspeech activities will generalize to speech
- Activities such as blowing, sucking, swallowing **do not** improve velopharyngeal closure for speech!

Case 4: Ting Ting (12/F)

- Cleft palate repaired - age 2
- Mild nasal emission
- Mild hypernasality
- Small fistula
- Class III malocclusion
- Numerous articulation errors
- Intelligibility fair-good

- Refer for direct examination of VP port (nasendoscopy, videofluoroscopy)
- Temporarily block fistula
  (differential diagnosis: impact of fistula vs. VPI on hypernasality, nasal emission, ?articulation)

Findings

- Borderline VPI ("touch closure")
- Fistula not contributing to hypernasality, nasal emission

∩ Possible candidate for behavioral treatment of resonance disorder

Recommendations

- Trial therapy (1-3 months)
- Collect thorough pre-treatment baseline data
  - Tape record, for reliability
  - Instrumental measures, if possible, to supplement
  - Careful determination of variability
- One treatment at a time
  - Allows determination of efficacy of each method
  - e.g. baseline - articulation therapy - baseline - 'mouth opening' - baseline - reduce rate - baseline

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