VOCAL NODULES IN CHILDREN

Kimme Norton

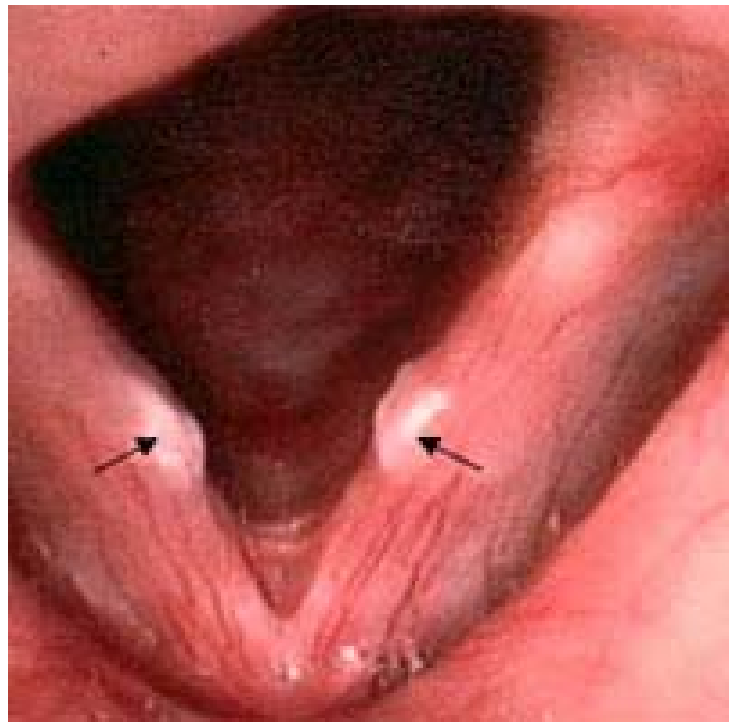
Spring 2009

VOCAL NODULES

- Definition:
  - A slight "protuberance on the free margin of the vocal fold at the junction of the anterior and middle third" (Aronson, 1980, as cited in Allen, Petit, & Sherblom, 1991)

- Presentation:
  - Typically bilateral
  - Shape: roundish
  - Size: pinhead-pea
  - Early stages:
    - Soft tissue
    - Pinkish/Reddish
  - Later stages:
    - Hard tissue/fibrous
    - Whitish

(Stemple, Glaze, & Klaben, 2000)



(NYU Medical Center, 2005)

REVIEW OF THE LITERATURE

- 2 Textbooks:
  - *Voice therapy: Clinical studies* (Stemple, 2000)
  - *Clinical voice pathology: Theory and management* (Stemple, Glaze, & Klaben, 2000)

- 27 Peer-Reviewed Journal Articles:
  - Language, Speech, and Hearing Services in Schools (6)
  - Journal of Speech and Hearing Disorders (4)
  - Journal of Voice (4)
  - International Journal of Pediatric Otorhinolaryngology (3)
  - Journal of Speech, Language, and Hearing Research (3)

RESEARCH: ARRANGED BY FOCUS

Focus	Number of Articles
Anatomy & Physiology	1
Symptomatology	1
All-Inclusive	2
Demographics & Incidence	2
Behavioral & Psychological Characteristics	4
Assessment	4
Treatment	13

See handout

RESEARCH: ORDER OF PUBLICATION

Years Published	Number of Articles
2004-2009	9
2000-2003	3
1990-1999	8
1980-1989	4
1970-1979	3

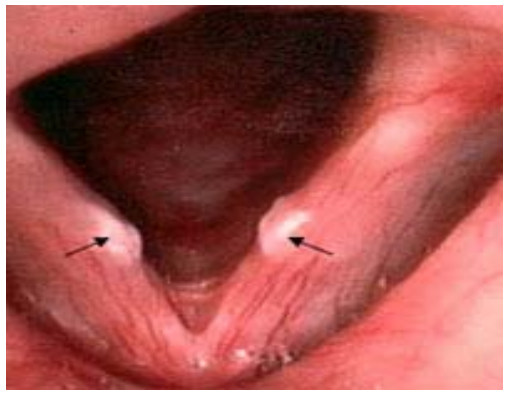
See handout

ANATOMICAL STRUCTURE: VOCAL NODULES VS. POLYPS

- Similarities:
  - Benign
  - Location
  - Size
  - Shape
- Differences:
  - Vocal nodules result in:
    - Thicker epithelial tissue
    - Hyaline degeneration
    - Disruption to the basal lamina
  - Polyps typically materialize from a deeper anatomic layer

(Sapienza, Ruddy, & Baker, 2004; Wohl, 2005)

Vocal Nodules



(NYU Medical Center, 2005)

Polyp

(Voice Medicine, 2004)

PREVALENCE, INCIDENCE AND DEMOGRAPHIC INFORMATION

- Prevalence:
  - One million+ children in the U.S. have vocal nodules
- Study: 731 children exhibiting laryngeal pathologies
  - Incidence of vocal nodules:
    - N = 128
    - 17.5%
  - Demographics:
    - Male to female ratio = 2:1
    - Age ranges most affected:
      - Ages 4-5; N = 29
      - Ages 6-11; N = 60

http://www.ci.pasadena.tx.us/citygram/child_yelling.jpg

(Dobres, Lee, Stemple, Kummer, & Kretschmer, 1990; Pannbacker, 1999)

ETIOLOGIES

- Vocal abuse and misuse:
  - Yelling
  - Talking in excess
  - Singing
  - Laughing
  - Crying
  - Cheering
  - Animal noises
  - Sound effects
- Psychological factors:
  - Anxiety
  - Aggression
  - Depression
  - Interpersonal conflict
- Medically-related factors:
  - Excessive cough/throat clearing
  - Allergies/upper respiratory conditions
  - Dehydration
  - Gastric reflux
- Physiological factors:
  - Increased laryngeal effort
  - Increased intra-abdominal pressure
  - Elevated larynx
  - Compensatory muscular tension of the larynx

(Pannbacker, 1999)

SYMTOMATOLOGY

- Key features:
  - Hoarseness
  - Laryngeal hyperfunction
  - Reduced pitch
  - Breathy vocal quality
  - Dysphonia
- Symptoms vary in accordance with:
  - Extent of lesion
  - Length of time since onset
  - Laryngeal inflammation
- Some children may be asymptomatic

(Pannbacker, 1999; Stemple et al., 2000)

ASSESSMENT

- Quick Screen for Voice:
  - Provides an assessment of respiration, phonation, resonance, and nonverbal vocal range and flexibility

    (Lee, Stemple, Glaze, & Kelchner, 2004)

- /S/ to /Z/ Ratio:
  - Unaffected

    (Rastatter & Hyman, 1982)

- Voice Range Profile Index:
  - Affects on highest fundamental frequency

    (Heylen, Wuyts, Merterns, De Bodt, Pattyn, Croux, & Van de Heyning, 1998)

MOST PREFERABLE TREATMENT

Type of Intervention	Number of Articles
No Intervention	1
Voice Therapy	10
Surgical Intervention	1
Other	1

See handout

TREATMENT

- Voice Hygiene
  - Educate the client about:
    - Normal voice production
    - Vocal nodules
      - Potential etiologies
      - Effects on voice
  - Identify vocally abusive behaviors and environments
  - Decrease vocal abuse

- Voice Therapy:
  - Voluntary management of voice
    - Decrease voice usage time
    - Reduce loudness
  - Tension reduction in musculature of the larynx
    - Increase the flow of breath during phonation
    - Easy onset of vocal fold adduction
    - Progressive relaxation exercises (e.g., neck rolls, shoulder lifts, soft humming)
  - Carryover activities

(Deal, McClain, & Sudderth, 1976; Hillman, Hammarberg, Sodersten, Doyle, & Holmberg, 2001; Wohl, 2005)

TREATMENT (CONTINUED)

- Surgical Intervention
  - Advantages:
    - Immediate removal of vocal nodules
    - High rate of initial success
  - Disadvantages:
    - Nodules are likely to:
      - Recur if strategies are not learned and maintained
      - Resolve at puberty
    - Post-operatively patients must observe:
      - One week of voice rest
      - Four to six weeks of using a soft voice only
      - Strict adherence to antireflux medications and dietary restrictions
    - Additional risks:
      - Scarring
      - Anesthetic complications

(Mori, 1999; Pannbacker, 1999; Wohl, 2005)

FUTURE RESEARCH

- Additional research should:
  - Examine the effects of one specific treatment approach
  - Include longitudinal studies which focus on:
    - Spontaneous resolution of vocal nodules in adolescence
    - Recurrence of nodules over time for children who underwent voice therapy vs. surgical intervention
  - Determine widespread agreement for criteria for surgical intervention
  - Investigate the specific effects and treatment of vocal nodules in children
  - Place greater emphasis on evidence-based practices in reporting treatment outcomes

REFERENCES

- Allen, M. S., Pettit, J. M., & Sherblom, J. C. (1991). Management of vocal nodules: A regional survey of otolaryngologists and speech-language pathologists. *Journal of Speech and Hearing Research*, 34, 229-235.
- Boyle, B. (2000). Voice disorders in school children. *Support for Learning*, 15 (2), 71-75.
- Deal, R. E., McClain, B., & Sudderth, J. F. (1976). Identification, evaluation, therapy, and follow-up for children with vocal nodules in a public school setting. *Journal of Speech and Hearing Disorders*, 41 (3), 390-397.
- De Bodt, M.S., Ketelslagers, K., Peeters, T., Wuyts, F.L., Mertens, F., Pattyn, J., Heylen, L., Peeters, A., Boudewyns, A., & Van de Heyning, P. (2007). Evolution of vocal fold nodules from childhood to adolescence. *Journal of Voice,* 21 (2), 151-156.
- Dobres, R., Lee, L., Stemple, J. C., Kummer, A. W., & Kretschmer, L. W. (1990). Description of laryngeal pathologies in children evaluated by otolaryngologists. *Journal of Speech and Hearing Disorders*, 55, 526-532.
- Fisher, H. B., & Logemann, J. A. (1970). Objective evaluation of therapy for vocal nodules: A case report. *Journal of Speech and Hearing Disorders*, 35 (3), 277-285.
- Green, G. (1989). Psycho-behavioral characteristics of children with vocal nodules: WPBIC ratings. *Journal of Speech and Hearing Disorders,* 54, 306-312.
- Heylen, L., Wuyts, F. L., Merterns, F., De Bodt, M., Pattyn, J., Croux, C., & Van de Heyning, P. H. (1998). Evaluation of the vocal performance of children using a voice range profile index. *Journal of Speech, Language, and Hearing Research*, 41, 232-238.
- Hillman, R. E., Hammarberg, B., Sodersten, M., Doyle, P., & Holmberg, E. B. (2001). Efficacy of a behaviorally based voice therapy protocol for vocal nodules. *Journal of Voice*, 15 (3), 395-412.

REFERENCES (CONTINUED)

- Hooper, C. R. (2004). Treatment of voice disorders in children. *Language, Speech, and Hearing Services in Schools*, 35, 320-326.
- Kilic, M. A., Okur, E., Yildirim, I., & Guzelsoy, S. (2004). The prevalence of vocal fold nodules in school age children. *International Journal of Pediatric Otorhinolaryngology*, 68, 409-412.
- Lee, L., Stemple, J. C., Glaze, L., & Kelchner, L. N. (2004). Quick Screen for Voice and supplementary documents for identifying pediatric voice disorders. *Language, Speech, and Hearing Services in Schools*, 35, 308-319.
- Moran, M. J., & Pentz, A. L. (1987). Otolaryngologists' opinions of voice therapy for vocal nodules in children. *Language, Speech, and Hearing Services in Schools*, 18, 172-178.
- Mori, K. (1999). Vocal fold nodules in children: Preferable therapy. *International Journal of Pediatric Otorhinolaryngology*, 49, S303-S306.
- Mueller, P. B., & Larson, G. W. (1993). Voice therapy practices and techniques: A survey of voice clinicians. *Journal of Communication Disorders*, 25, 251-260.
- Nienkerke-Springer, A., McAllister, A., & Sundberg, J. (2005). Effects of family therapy on children's voices. *Journal of Voice*, 19 (1), 103-113.
- NYU Medical Center (2005). *NYU Voice Center: Vocal cord nodules*. Retrieved April 30, 2009, from http://www.med.nyu.edu/voicecenter/resources/photo/vc_nodules.html.
- Pannbacker, M. (1999). Treatment of vocal nodules: Options and outcomes. *American Journal of Speech-Language Pathology*, 8, 209-217.
- Ramig, L. O., & Verdolini, K. (1998). Treatment efficacy: Voice disorders. *Journal of Speech, Language, and Hearing Research*, 41 (1), S101-S116.
- Rastatter, M. P., & Hyman, M. (1982). Maximum phonation duration of /s/ and /z/ by children with vocal nodules. *Language, Speech, and Hearing Services in Schools*, 13, 197-199.

REFERENCES (CONTINUED)

- Roy, N., & Bless, D. M. (2000). Personality traits and psychological factors in voice pathology: A foundation for future research. *Journal of Speech, Language, and Hearing Research*, 43, 737-748.
- Roy, N., Holt, K. I., Redmond, S., & Muntz, H. (2007). Behavioral characteristics of children with vocal nodules. *Journal of Voice*, 21 (2) 157-168.
- Sander, E. K. (1989). Arguments against the aggressive pursuit of voice therapy for children. *Language, Speech, and Hearing Services in the Schools*, 20, 94-101.
- Sapienza, C. M., Ruddy, B. H., & Baker, S. (2004). Laryngeal structure and function in the pediatric larynx: Clinical applications. *Language, Speech, and Hearing Services in Schools*, 35, 299-307.
- Sapienza, C. M., & Stathopoulos, E. T. (1994). Respiratory and laryngeal measures of children and women with bilateral vocal fold nodules. *Journal of Speech and Hearing Research*, 37, 1229-1243.
- Stemple, J. (2000). *Voice therapy: Clinical studies 2nd Ed.* Clifton Park, NY: Singular Thomason Learning.
- Stemple, J., Glaze, L., & Klaben, B. (2000). *Clinical voice pathology: Theory and management 3rd Ed.* Clifton Park, NY: Singular Thomason Learning.
- Trani, M., Ghidini, A., Bergamini, G., & Presutti, L. (2007). Voice therapy in pediatric functional dysphonia: A prospective study. *International Journal of Pediatric Otorhinolaryngology*, 71, 379-384.
- Voice Medicine (2004). Polyp. Retrieved April 29, 2009, from http://www.voicemedicine.com/polyp.htm.
- Wilson, F. B., & Lamb, M. M. (1974). Comparison of personality characteristics of children with and without vocal nodules based on Rorschach protocol interpretation. *Acta Symbolica*, 5 (1), 43-55.
- Wohl, D. (2005). Nonsurgical management of pediatric vocal fold nodules. *Archives of Otolaryngology – Head Neck Surgery*, 131, 68-70.