

# LIFETIME OF SINGING

## The Evolving Voice: Profound at Every Age

Presented by

**Karen Brunssen**

March 2, 2013

Sponsored by: North Shore Choral Society

### Babies

- Cry 500 Herz
- No difference vocally between male and female
- Jaw not fully developed
- Babies have 270 bones while adults have 206
- Soft spots in head
- Cartilage of larynx softer and is 1/3 size of adult
- High level of hyaluronic acid so they can withstand crying for hours
- Vocal cords have a single cellular structure – no vocal ligament (vocalis muscle)
- Larynx is at around the 2<sup>nd</sup> vertebrae and neck is short
- Head is ¼ of body
- Brain is closest to adult size and shape, and develops at an astounding rate through toddlerhood
- At birth millions of neurons connect
- Babies can see 10" – 12" away at birth
- First breath is taken because there is no oxygen provided by the mother anymore and carbon dioxide needs to be replaced by oxygen
- Growth spurts happen....sometimes there's little growth, but in one night a baby can grow and inch.

### Children

- 7 – 8 years cry 275 Herz
- Thyroid cartilage is more rounded for infants and children, not V-shaped like adults
- First noticeable differences vocally between male and female at around 8 or 9
- 1 ½ octave range
- Loss of baby teeth as adult teeth come in
- Larynx above C6 vertebrae
- From approximately age 5 – 12 a hormonal period of stability
- Children capable of doing all vocal textures

### Adolescence

- Third layer of epithelium cells grow on vocal cords
- By the end of puberty the vocalis muscle is finally formed
- Neck, Thoracic cage, lungs and brain grow
- Epiglottis flattens, tonsils and adenoid tissues atrophy
- Vocal tract grows in length and circumference until 22 years of age
- Larynx grows to 44mm (men) and 36mm (women)
- Larynx below C6 vertebrae
- 

### Male

- Thyroid tips
- Voice lowers up to one octave lower
- Alto to tenor, soprano to baritone/bass
- Androgens (Testosterone ... Tanner stage 4 a while before significant facial hair growth)
- Vocal cords thicken and lengthen 63%
- Left brain

### Female

- Angle of the thyroid stays at about 120 degrees
- Voice lowers by a third
- Brain equally develops on both sides
- Estrogen and progesterone

- Vocal cords lengthen 34%
- Mutational change for some girls

#### Adult

- Progesterone provokes thickening of vocal folds
- Estrogen makes vocal timbre greater vibratory amplitude
- Estrogen in women/Androgen in men
- HA (Hyaluronic Acid) is lower, at a level that offers stability for vigorous singing.
- Men have higher level of HA, therefore more shock absorbency in vocal cords???
- Pharynx is fully grown
- Longest period of stability vocally
- Men's vocal folds: .75" – 1.0"
- Women's vocal folds: .50" - .75" and more white than in men.
- Menopause 47-55
  - Hormonal change for women when the ovaries quit producing estrogen monthly cycle stops
  - Vocal folds not as lubricated
  - The voice lowers
  - Sometimes sudden drop in upper range
  - Less elasticity as the epithelium atrophies
  - Hormone replacement therapy risks should be considered carefully in consultation with one's doctor
  - Estrogen depletion
  - Susceptible to more swelling of the vocal cords

#### Senior Citizen

- Vagus nerve slower nervous conduction
- Muscles of the larynx begin to atrophy
- Less lubrication
- Lungs weaken and bronchial efficiency diminishes 40% between 40 – 80 years of age
- Hearing affected
- Men at 70 have up to 50% less testosterone.... This happens gradually over a much longer period of time as compared to the female menopause.
- Can develop a slackness of the vocal folds so they don't provide sufficient resistance to the flow of air. P 133 Davids
- Can develop a lack of proper breath support due to general physical inactivity of the thoracic abdominal and rib musculature. Page 133, Davids
- Other health issues present themselves: vision, hearing, hip and knee replacements, surgeries for prostate, heart conditions, etc. limit ability to stand, etc. Recovery from strokes.

#### Geriatric – Presbyphonia – 80 and older

- Vocal folds loose suppleness
- Atrophy
- Women cords thinner and finer so deepened menopausal voice now becomes higher, more delicate and sometimes even shrill
- Loss of hydration and lubrication
- Vocal cord arch not making proper contact
- Less intensity
- Register narrows
- Inflammation of cords more possible
- Joints in larynx and jaw less supple
- Less overall movement results in less oxygenation
- More digestive system issues as secretions decrease

**BEFORE 50 NO ATROPHY AFTER 70 72% ATROPHY AFTER 80 81% ATROPHY**