Vocal hyperfunction: a complex behavior

- Modifications of speech articulation
- Use of «pressed» voice, most often louder
- Loss of verticality, forward head projection, global increase of tension in postural and cervical muscles
- Modifications of the breathing pattern with predominance of upper part of thorax


**3D Studies**

- Designed for a better analysis of:
  - Segmental displacements
  - Synchronization with voice and speech

**Postural data acquisition**

- **SMART 3-D System**
  - 19 markers
  - 5 infra-red cameras

**Vocal data**

- **EVA System**
  - Vocal signal, intensity
  - EGG, frequency, closed quotient
Synchronization

Experimental design: subjects
- 20 Female speakers
- 20-40 y
- French-native
- Without any voice complaint

Experimental design: the task
- Objective: to observe «spontaneous» vocal effort behavior
- Realistic situation of communication
  - Dictation of numbers without voiceless consonants (…1018…)
  - No indication of loudness
  - Listener supposed to write the number on a paperboard visible by the speaker
  - In case of error, speaker was incitated to try again

Inducing vocal effort
- 1 – VN: in silence, distance 4m
- 2 – VP: in silence, distance 10m
- 3 – VF: Vocal effort implicitly induced by a «cocktail» noise at 84 db (Lombard effect) in earphones (speaker and listener)
Situation #3 (VF), patient #7

Résults : voice parameters

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Int (dB) F0 (Hz)

vn vp vf

* p<0.05

-4 -3 -2 -1 0 1 2 3

VP myampl maxcuisse
VF myampl maxtrontc

-5 0 5 10 15 20 25 30 35 40

VP myampl maxtete rotation
VF myampl maxtete rotation

Projected voice (VP)
20 subjects with rotation of the head

Vocal effort (VF)
20 subjects with rotation of the head
18 subjects with significant forward trunk movement

direction and amplitude of movements

head

trunk

thighs

Projected voice (VP)
20 subjects with rotation of the head

Vocal effort (VF)
20 subjects with rotation of the head
18 subjects with significant forward trunk movement
Temporal aspects: speech parameters

Temporal aspects: duration of movements

Temporal relationship

Amplitude
Postural Strategies

- Ankle strategy
  - 10 subjects

- Hip strategy
  - 8 subjects

Conclusions

- Head and trunk movements are constitutive parts of spontaneous vocal effort behavior

- Pending questions
  - Relationship with prosodic events
  - Signification of different postural strategies (ankle vs hip) and relationship with breathing patterns
  - Relationship with global and segmental muscular tensions

Perspectives
Perspectives?

Wii Fit SpTh edition