Auditory Perceptual Assessment
of
Voice and Speech Disorders

By

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Auditory perceptual assessment (APA) of the patient with communication disorders is a basic skill that phoniatricians and speech language pathologists should develop.

“The clinically well trained ear will always be the primary and most important means of examination”. [Fex, 1992]

Auditory Perceptual Assessment of Voice and Speech Disorders

► The aim of this presentation is to identify the different protocols of auditory perceptual assessments.
► Voice and speech samples will be presented in order to orient the phoniatrians and speech pathologists with different voice and speech disorders.
Voice disorders

Symptomatology of the voice disorders:

- **Dysphonia**: is a perceptually audible change of patient’s habitual voice as self-judged or judged by his/her listeners.
- **Aphonia**: Loss of voice.
- **Phonasthenia**: Voice fatigue.
- **Dysodia**: change of the singing voice, although the speaking voice is intact.

Voice Disorders

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Minimal Associated Pathological Lesions (MAPLs)

1) Vocal fold polyp.
2) Vocal fold nodules.
3) Reinke’s edema and polypoid degeneration.
4) Contact granuloma.
5) Vocal fold cysts.

Accompaniment of neuropsychiatric ailments:

1) Neural: element of dysarthrophonia.
2) Psychiatric: element of mood and personality changes.

Voice Disorders

Diagnosis of Voice Disorders: (Kotby, 1986)

I - Elementary Diagnostic Procedures.

(A) Patient’s interview.
(B) Auditory Perceptual Assessment (APA).
(C) Visual impression of the voice source (Laryngeal examination).

II - Clinical Diagnostic Aids.

III - Additional Instrumental Measures.

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APA of Voice Disorders

- Dysphonia grade (G):
- Character: S Strained
  L Leaky
  B Breathy
  I Irregular (rough)
- Pitch: (increased / decreased / diplophonia).
- Register: Habitual register: modal / falsetto.
  Vocal fry (Y / N)
  Register breaks (Y / N).
- Loudness: (excessive – soft – fluctuating)
- Glottal attack: (normal – soft – hard).
- Associated laryngeal function (cough / laughter / whisper).
Clinical examples of APA of Non-organic voice disorders

Non-Organic Voice Disorders

**Habitual Causes**

(1) Hyperfunctional childhood dysphonia:
- Children who are temperamental and abusing their voices.
- Boys > girls.
- **APA:** strained leaky, low pitched voice.
(2) Mutational voice disorder:
- Failure in the change of the high pitched voice of the pre-adolescent period to the lower pitched voice of adults.
- **APA:** weak, thin and monopitched voice with register breaks (alternating high pitched and low pitched voices).

(3) Hyperfunctional dysphonia:
- **Aet.** misuse / abuse of voice (most common).
- **APA:** Hard glottal attacks, strained leaky low pitched voice with increased loudness and sometimes transient phases of voice breaks.
Non-Organic Voice Disorders (cont.)

Habitual Causes (cont.)

(4) Hypofunctional dysphonia:
- An outcome of longstanding hyperfunctional dysphonia with reduction of the muscle control of the glottis during phonation.
- APA: soft glottal attack, weak breathy voice with raised pitch.

(5) Ventricular dysphonia:
- Aet.
  (i) Prolonged exposure to the laryngeal insulting factors (prolonged hyperfunctional dysphonia) OR
  (ii) In order to compensate for non-vibrating V.Fs. e.g. V.F. paralysis.
- APA: strained leaky low pitched harsh voice with reduced loudness and diplophonia.
Non-Organic Voice Disorders (cont.)

Habitual Causes (cont.)

(6) Phonasthenia:
- Affects commonly professional voice users.
- The phonasthenic manifestations consist of:
  * Voice fatigue following prolonged voice use and the patient would like to stop talking.
  * Dryness, tightness and soreness in the throat.
  * Frequent throat clearing.
  * Feeling of sticky mucous fixed in the throat which can not be swallowed.
  * Difficulty in swallowing saliva but not drinks or foods.
  * Sometimes sense of mass in the throat (globus sensation).
- APA: Voice is not changed in most of the cases but it may show variable degrees of hyper- or hypofunctional dysphonia.

Non-Organic Voice Disorders (cont.)

Psychogenic dysphonia & aphonia

- Most of the cases are of habitual nature rather than a real psychiatric illness. The continuation of aphonia results from absent proprioceptive acoustic feedback due to glottal waste.
- APA:
  * Only whisper which may be hypofunctional (breathy) or hyperfunctional (strained).
  * Non-verbal phonation as coughing, laughing and crying are normal.

Pre-therapy

Post-therapy
Clinical examples of APA of Some organic voice disorders

Unilateral V.F. Paralysis following thyroidectomy:

Unilat. VFP pre-therapy

APL: breathy, diplophonic.

Unilat. VFP post-therapy
Spasmodic Dysphonia (SD)

Definition:
It is a disorder of laryngeal motor control to which diagnosis is based almost on APA of voice and characterized by intermittent voice stoppage that manifests almost markedly during production of connected speech.

Types:
SD is categorized on the basis of the nature of the spasms exhibited

1) Adductor spasmodic dysphonia: associated with glottal squeezing and a strained-strangled phonatory pattern.
2) Abductor spasmodic dysphonia: associated with intermitted glottal widening and a breathy phonatory pattern.
3) Mixed spasmodic dysphonia: characterized by mixed set of symptoms; moments of breathness occur alternately with moments of strained voice or voice arrest.

APA of rehabilitated laryngectomized patients

1) Pseudo-glottis voice: Produced by vibration of the pharyngo-esophageal segment (PES).
   a) Unaided Esophageal speech:
   b) Aided Esophageal speech (TE speech):
      - TE voicing with manual stoma occlusion.
      - TE speech in Patient using stoma valve.

2) Electronic vibrator voice:
Speech Disorders

* Definition:

It is a group of communication disorders which affects the process of production of the individual speech sounds i.e. articulation.

It includes also a group of disorders that affect the process of linking the various speech sounds in a chain (fluency).

* Categories of speech disorders:

(1) Articulatory delays (dyslalia).
(2) Disturbed nasality (resonance disorders).
(3) Stuttering.
(4) Dysarthria.
(1) **Articulatory delays (Dyslalia):**

* **Definition:**
  is the persistence of defective individual speech sounds in an age at which the sounds should be properly articulated.

* **Common types:**
  - Misarticulated /s/ sound: interdental, lateral, or pharyngeal.
  - Misarticulated /r/ sound: may be replaced by /L/ , /j/ , /w/ , /n/ ..etc sounds.
  - Misarticulated posterior plossives (/k/ and /g/) and replaced by anterior plossives (/t/ and /d/).

(2) **Disturbed nasality:**

(a) **Hyponasality:**

* **Definition:**
  An audible reduced nasal resonance during speech production due to any lesion that may interfere with the airway above the level of velo-pharyngeal valve.

* **Effect on speech:**
  The speech of the patient sounds "dead" and /m/ may become /b/ and /n/ becomes /d/.
Speech Disorders

(2) **Disturbed nasality:** (cont.)

(b) **Hypernasality:**

* **Definition:**
  
  An audible excessive nasal resonance during speech production due to velo-pharyngeal incompetence.

* **Effect on speech:**
  
  a) Excessive nasal resonance (nasalization of vowels).
  b) Audible nasal emission of air during speech.
  c) Imprecise consonant production.
  d) Faulty compensatory articulatory mechanisms as glottal articulation of (/p/, /t/, /k/) and facial nasal grimace.

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APA of Resonance disorder

1. **Nasality:** Type: (Open-closed).
   
   Degree: (mild – moderate – severe)

2. **Consonants** (imprecised – distorted – omitted): ........

3. **Compensatory articulatory mechanisms:** (glottal / Pharyngeal).

4. **Facial grimace** (P / A).

5. **Audible nasal air escape** (P / A).

6. **Overall intelligibility** (good- fair- poor).

7. **Factors causing unintelligibility** (open nasality / consonant impression / glottal articulation / pharyngalization of fricatives / nasal emission)

8. **Simple clinical tests:**

   - Cold mirror test [ /a/, /i/, /s/, /v/ ]
   - a/i test ( +ve / -ve )
Speech Disorders

(3) **Stuttering**

* **Definition:**
It is a condition in which the flow of speech is interrupted.

* **Clinical picture:**

(a) **Verbal manifestations:**
- intra-phonemic disruption (core behavior).
- repetitions of certain speech sounds.
- prolongation of sounds.
- tonic blocks.

(b) **Non-verbal manifestations:**
- avoidance of eye-contact during conversation.
- associated movements that involve the face muscles, extremities and/or the whole body.

APA of stuttering

(1) **Rate of speech:** (very slow – slow - normal – fast – very fast).

(2) **Spontaneous speech:**
- Interphonemic disruption (IPD):
- Blocks.
- Prolongations.
- Interjected speech fragments (ISF):
- Associated body movements (BM):

(3) **Automatic speech:** (IPD / blocks / prolongations / ISF / repetitions / BM).
Speech Disorders

**Dysarthria:**

*Definition:*
- It is a defective articulation due mainly to a disorder of the motor system.
- The articulation problem may be accompanied with a disturbed phonation, a condition referred to as dysarthrophonia.

*Etiology:*
- Central nervous system lesion (in the cortex, pyramidal system, extrapyramidal system, and/or cerebellar system);
- Peripheral nerve and muscle lesions that affect the articulatory motor system.

### APA of Dysarthria

**Kotby MN; Elsady SR; Khidr AA; Alloush T; Abdel-Nasser NH; Gamal N; Mahmoud H; El-Sharkawi AE and Kamal A (1995):**

Speech Disorders

(4) **Dysarthria:** (cont.)

* **Types of dysarthria:**

1. **Spastic dysarthria** due to suprabulbar lesions (usually bilateral cortical lesions).
   - The patient's speech is stressed, strangled and characterized by a noticeable crying impression.

2. **Flaccid dysarthria** due to a bulbar lesion (usually multiple cranial nerve lesions).
   - The patient's speech is characterized by pronounced excessive open nasality.

3. **Flaccid-Spastic dysarthria** due to motor neurone disease.

(4) **Dysarthria:** (cont.)

* **Types of dysarthria:** (cont.)

4. **Cerebellar dysarthria** due to cerebellar lesions.
   - The patient's speech is characterized by irregular articulatory breakdowns with excess equal stress.

5. **Extrapyramidal dysarthria:** The lesion is usually in the basal ganglia of which two types may be identified:
   - **Hypokineti**c as in Parkinson's disease.
     - The patient's speech is characterized by short rushes of speech at the end of the utterences.
   - **Hyperkinetic** as in chorea and athetosis.
     - The patient's speech is characterized by inappropriate stress patterns that varies from moment to moment.

6. **Mixed type of dysarthria** may be encountered with.
Thank You