Tamer Mesallam MD, PhD,
Ass. Professor of Phoniatrics
Communication and Swallowing Disorders
Unit (CSDU)
ORL/HNS Department
King Saud University
Communication and Swallowing Disorders

Tamer Mesallam MD
Objectives

- Understand physiology of communication.
- Recall classifications of communication and swallowing disorders.
- Differentiate between different causes of communication and swallowing disorders.
- Understanding the assessment and management of these disorders.
Communication Disorders

Swallowing Disorders

Voice Disorders
Speech Disorders
Language Disorders
**Language**
A symbolic arbitrary system relating sounds to meaning.

**Speech**
A neuro-muscular process whereby language is uttered. It includes the coordination of respiration, phonation, articulation, resonation and prosody.

Tamer Mesallam MD
Voice
The result of vibration of the true vocal folds using the expired air.

Swallowing
The process of successful passage of food and drinks from the mouth through pharynx and esophagus into the stomach.
Language Disorders
I. Language Disorders:

[1] Delayed Language Development (DLD)

[2] Dysphasia
[1] Delayed Language Development (DLD)

Definition of DLD:

Delay or failure to acquire language matched with age.
Central language control

- The left hemisphere is the processor of language functions in almost all people regardless handedness. It is the dominant hemisphere.

- Language areas are distributed along the rolandic fissure

- Anterior language area mainly in the temporal region concerned with expressive aspect.

- Posterior language area mainly in the parietal region concerned with receptive aspect.

Tamer Mesallam MD
Structural domains of language:

- Semantics; meaning.
- Phonology; articulation
- Syntax; grammar
Stages of normal language development

• 2-4 months; Babbling
• 6 months; Vocal play
• 9 mo-1 year; 1st word
• 1-1/2 years; 20 words
• 2 years; 200 words, 2 word sentence
• 3 years; 2000 words, 3 word sentence
• 4 years; 4 word sentence
• 5-7 years; Full maturation of all language modalities.

Tamer Mesallam MD
Pre-requisites of normal language development

- Intact brain functions (conceptual, motoric and cognitive abilities).
- Intact sensory channels; Auditory, Visual, Tactile, Kinesthesthetic
- Intact psyche.
- Stimulating environment.

Tamer Mesallam MD
Etiology of delayed language development

- Brain damage
  - Diffuse subcortical lesion (M.R.).
  - Localized brain damage with motor handicap (BDMH).
  - Minimal brain damage (ADHD).

- Sensory deprivation.
  - Hearing impairment
    - Conductive
    - Sensorineural
    - Mixed
    - Central auditory processing disorder
  - Visual impairment
Etiology of delayed language development (Cont.)

- Psychiatric illness
  - Autism.
  - Autism Spectrum Disorder (ASD).

- Environmental deprivation

- Idiopathic (Specific Language Impairment).
Assessment of language development

I. History taking.
II. Physical examination.
III. Investigations:
   Psychometry (IQ).
   Audiometry.
   Brian Imaging
   EEG
   Ophthalmological consultation

Tamer Mesallam MD
Management of DLD:

- Early detection.
- Providing the suitable aid
  - Hearing (HA or CI).
  - Visual Aid.
  - Physiotherapy
- Family counseling.
- Direct language therapy (Individual- group).
- Medications (Autism and ADHD).

Tamer Mesallam MD
I. Language disorders:

[2] Dysphasia:

**Definition:**
Language deterioration after its full development due to brain insult: infarction, hemorrhage, atrophy, etc.
Broca’s area
Formulates a speech response and stimulates motor cortex

Motor cortex
Stimulates muscles that produce speech

Wernicke’s area
Processes incoming speech and comprehends it
Etiology:

- CVA
- Neoplastic
- Traumatic
- Inflammatory
- Degenerative
- Metabolic
- Poisoning

Tamer Mesallam MD
Types of dysphasia:

1. Expressive.
2. Receptive.
3. Mixed predominantly expressive.
4. Mixed predominantly receptive.
5. Global.
Assessment of Dysphasia

I. History taking.
II. Physical examination: … , neurological exam.
III. Investigations:
   - CT / MRI brain.
   - Dysphasia test.
   - Psychometry (IQ).
   - Audiometry.

Tamer Mesallam MD
Management of Dysphasia

- Management of the cause.
- Physical rehabilitation (Physiotherapy).
- Family counseling.
- Language therapy.
- Alternative and augmentative communication.
Speech Disorders

Tamer Mesallam MD
II. Speech disorders:
   1. Dyslalia (Misarticulation):

   Definition:
   Faulty articulation of one or more of speech sounds not appropriate for age.
Types of dyslalia:

A) **Sigmatism** (/s/ defect):
   - Interdental sigmatism.
   - Lateral sigmatism.
   - Pharyngeal sigmatism.
B) **Back-to-front dyslalia**:
   - /k/   /t/
   - /g/   /d/
C) **Rotacism** (/r/ defect).
D) **Voiced-to-nonvoiced dyslalia**:
   - /g/   /k/
   - /d/   /t/
   - /z/   /s/ etc…

Tamer Mesallam MD
Assessment of dyslalia:

I. History taking.
II. Physical examination: … , tongue, …
III. Investigations:
   - Audio recording.
   - Articulation test.
   - Psychometry (IQ).
   - Audiometry.

Tamer Mesallam MD
Management of dyslalia:

- Treatment of the cause:
  - Tongue tie.
  - Dental anomalies.
  - Hearing aids

- Speech therapy.

Tamer Mesallam MD
II. Speech disorders:
   2. Stuttering:

   **Definition:**
   The intraphonemic disruptions resulting in sound and syllable repetitions, sound prolongations, and blocks.
Normal dysfluency:

- Less than 6 years.
- Only repetitions.
- No associated muscular activity.
- Not aware.

Tamer Mesallam MD
Incidence of stuttering: 1%.

Onset:
- Earliest = 18 months.
- Latest = 13 years.

Epidemiology:
- more in families with history of stuttering.
- can occur in mentally retarded.
- very rare in the hearing impaired.

Tamer Mesallam MD
Gender ratio:
4 : 1 (male : female)

Theories of Stuttering:
The exact cause is unknown.
- Organic theory.
- Neurosis theory.
- Learning theory.
Assessment of stuttering:

I. History taking.
II. Physical examination: APA, VPA, ...
III. Investigations:
   - Audio and video recording.
   - Stuttering severity (eg SSI).
   - Articulation test.
   - Psychometry (IQ).

Tamer Mesallam MD
Auditory Perceptual Analysis (APA):

A. Core behaviors:
   - Intraphonemic disruption.
   - Repetitions.
   - Prolongations.
   - Blocks.

B. Secondary reactions:
   - Muscular activity and struggle.
   - Interjection.
   - Word substitutions and circumlocution.

C. Concomitant reactions:
   - Fear.
   - Breathing (antagonism, interruption, prolongation, cessation, …).
   - Eye contact.
   - Skin pallor/flushing.
Management of stuttering:

- Family and patient counseling.

- Speech therapy:
  a. Indirect therapy: if not aware.
  b. Direct therapy: if aware.
II. Speech disorders:
  3. Hypernasality:

Definition:
Faulty contamination of the speech signal by the addition of nasal noise. It results from velopharyngeal insufficiency (VPI).
Management of stuttering:

- Family and patient counseling.
- Speech therapy:
  - Indirect therapy: if not aware.
  - Direct therapy: if aware.

Tamer Mesallam MD
Velum: At rest and during speech

Normal Velopharyngeal Function

Fig. 1 Velum at rest.

Fig. 2 Velum during speech.
Causes of hypernasality:

I. Organic:

1. Structural: (VP Insufficiency)
   a) Congenital:
      - Overt cleft palate.
      - Submucous cleft palate.
      - Non-cleft causes:
         . Congenital deep pharynx.
   b) Acquired:
      - Adenotonsillectomy.
      - Palatal trauma.
      - Tumors of the palate & pharynx.

2. Neurogenic: (VP Incompetence)
   - Palatal upper motor neuron lesion.
   - Palatal lower motor neuron lesion.
Causes of hypernasality (cont.):

II. Non-organic (Functional) VP Mis-learning:
   - Faulty speech habits.
   - Mental retardation.
   - Neurosis or hysteria.
   - Hearing impairment.
   - Post-tonsillectomy pain.
Effects of VPD:

- Feeding problems: nasal regurgitation.
- Psychosocial problems.
- Communicative problems:
  . Speech: hypernasality.
  . Language: DLD.
  . Voice: hyper or hypofunction.
Assessment of hypernasality (VPD)

- Parent interview
- Perceptual
  - Simple tests:
    - Gutzman’s (a/i) test.
    - Czermak’s (cold mirror) test.
  - Resonance
  - Articulation
  - Nasal air emission
  - Voice
- Intra-oral evaluation
- Instrumental: - Nasopharyngoscopy
  - Nasometry

Tamer Mesallam MD
Submucus Cleft

Tamer Mesallam MD
Flexible nasopharyngoscopy
Normal closure

Tamer Mesallam MD
Severe VPD

Tamer Mesallam MD
Nasometry

Tamer Mesallam MD
Management of VPD
- Multidisciplinary team
- Family counseling
- Management of feeding problem
- Management of otological and audiological problems
- Surgical intervention
- Orthodontic intervention
- Phoniatric intervention (language, speech, voice)
Treatment Decision

- Velopharyngeal insufficiency
  - surgery (speech therapy post-op)

- Velopharyngeal incompetence
  - surgery (speech therapy post-op)
  - prosthetic devices
  - speech therapy

- Velopharyngeal mislearning
  - speech therapy

Tamer Mesallam MD
Surgery

- Pharyngeal flap.
- Sphincter-platoplasty
- Post-pharyngeal wall augmentation.

Tamer Mesallam MD
Pharyngeal flap

Tamer Mesallam MD
Prosthetic Devices

- Palatal lift: to raise the velum when there is poor velar movement (i.e. dysarthria)

- Platal obturator: to occlude an open cleft or fistula

- Speech bulb: to occlude nasopharynx

Tamer Mesallam MD
II. Speech disorders:

4. Dysarthria:

Definition:
Any combination of disorders of respiration, phonation, articulation, resonance, and prosody, that may result from a neuromuscular disorder.
Types of dysarthria:

1. *Flaccid dysarthria:*
   - Lesion: lower motor neuron level.
   - Communication:
     * breathy phonation.
     * hypernasality.

2. *Spastic dysarthria:*
   - Lesion: upper motor neuron level.
   - Communication:
     * strained strangled phonation.
     * labored breathing.
Types of dysarthria (cont.):

3. *Ataxic dysarthria*:
   - Lesion: cerebellum level.
   - Communication:
     * increased equal stresses.
     * irregular articulatory breakdown.
Types of dysarthria (cont.):

4. **Dyskinetic dysarthria:**
   - Lesion: basal ganglia level.
   
   **A. Hypokinetic type (Parkinsonism):**
   * breathy phonation.
   * rapid rate.
   * short rushes of speech with final decay.

   **B. Hyperkinetic type:**
   i. Quick hyperkinetic (Chorea):
      * variable rate and loudness.
   
   ii. Slow hyperkinetic (Athetosis):
      * slow rate.
Types of dysarthria (cont.):
5. **Mixed dysarthria:**
   - may the most common.
   - Examples:
     * Motor neuron disease …… Flaccid + Spastic.
     * Multiple sclerosis …….. Ataxic + Spastic.
     * Wilson’s disease ……… Ataxic + Spastic + Hypokineti
Assessment of dysarthria:

I. History taking.

II. Physical examination: … , mouth, palate, … , neurological exam, …

III. Investigations:
- Audio recording.
- Fiberoptic nasopharyngolaryngoscopy.
- CT/MRI brain
- Dysphasia test.
- Psychometry (IQ).
- Articulation test.
- Audiometry.
- Nasometry.
- MDVP.
- Aerodynamics (Aerophone II).

Tamer Mesallam MD
Management of dysarthria:
Individualized:

- Management of the cause.
- Patient counseling.
- Communicative therapy:
  - Articulation.
  - Phonation.
  - Resonance.
  - Respiration.
  - Prosody.
- Alternative and augmentative communication.

Tamer Mesallam MD
Voice Disorders
Prerequisites of “normal” voice production:

1. Normal range of movement of vocal folds.
2. Normal mobility of mucosa on deep layers.
3. Optimal coaptation of vocal folds’ edges.
5. Optimal pulmonary support.
6. Optimal timing between vocal fold closure and pulmonary exhalation.
7. Optimal tuning of vocal fold musculature (int. & ext.).
Usually the presenting symptoms in voice disorders are:

- **Dysphonia**: Any change of the patient’s voice from his habitual one.
- **Aphonia**: Loss of the patient’s voice (functional or organic).
- **Phonasthenia**: A subjective complaint of dryness, tightness, globus feeling and voice fatigue, while the patient’s voice and larynx is normal.
- **Dysodia**: Change of the singing voice while the speaking voice is normal.
Definition of dysphonia:

- “Difficulty in phonation”.
- “Change of voice from his /her habitual”.
- “Hoarseness” = roughness & harshness of voice.
Etiological classification of dysphonia:

I. Organic Causes

II. Non-Organic Causes

III. Minimal Associated Pathological Lesions (MAPLs)

IV. Accompaniment of Neuro-psychiatric Ailments

Tamer Mesallam MD
III. **Voice disorders:**

A) Organic voice disorders:

- Congenital.
- Inflammatory.
- Traumatic.
- Neurological.
- Neoplastic.
- Hormonal.
- Status post-laryngectomy.
Management of stuttering:

- Family and patient counseling.
- Speech therapy:
  - Indirect therapy: if not aware.
  - Direct therapy: if aware.
Laryngomalacia

Tamer Mesallam MD
Congenital vocal folds web

Tamer Mesallam MD
Laryngeal cleft
Sulcus Vocalis

Tamer Mesallam MD
Laryngopharyngeal Reflux

Tamer Mesallam MD
Fungal infection

Tamer Mesallam MD
Laryngoscleroma

Tamer Mesallam MD
Laryngeal carcinoma

Respiration

Phonation

Tamer Mesallam MD
Cancer

Tamer Mesallam MD
Left vocal fold paralysis

Respiration

Phonation

Tamer Mesallam MD
Trauma

Respiration

Phonation

Tamer Mesallam MD
III. Voice disorders:

B) Non-organic voice disorders:
   i. Habitual:

   1. Hyperfunctional childhood dysphonia.
   2. Incomplete mutation.
   3. Phonasthenia (Voice fatigue).
   4. Hyperfunctional dysphonia.
   5. Hypofunctional dysphonia.
Hyperfunctional dysphonia

Respiration

Phonation

Tamer Mesallam MD
Phonasthenia

Respiration

Phonation

Tamer Mesallam MD
B) Non-organic voice disorders (cont.):
   ii. Psychogenic:
      1- Psychogenic dysphonia.
      2- Psychogenic aphonia.
III. Voice disorders:
C) Minimal associated pathological lesions (MAPLs):

1. Vocal fold nodules.
2. Vocal fold polyps.
3. Vocal fold cysts.
4. Reinke’s edema.
5. Contact granuloma.
Vocal Fold Nodules: Adult Type

Respiration

Phonation

Tamer Mesallam MD
Vocal Fold Nodules: Juvenile Type

Respiration

Phonation

Tamer Mesallam MD
Left Vocal Fold Polyp with a Reaction

Respiration

Phonation

Tamer Mesallam MD
Left Vocal Fold Polyp

Respiration

Phonation

Tamer Mesallam MD
Right Vocal Fold Polyp

Tamer Mesallam MD
Left Vocal Fold cyst

Tamer Mesallam MD
Bilateral Reinke’s edema

Tamer Mesallam MD
Bilateral Reinke’s edema

Tamer Mesallam MD
Right-sided Contact Granuloma

Respiration

Phonation

Tamer Mesallam MD
Right-sided Contact Granuloma

Tamer Mesallam MD
Assessment of dysphonia:

I. History taking.
II. Physical examination: APA, …, neck, …

III. Investigations:
- Audio recording.
- Digital laryngostroboscopy.
- Digital laryngokymography.
- Acoustic analysis (MDVP).
- Aerodynamic analysis (Aerophone II).
- GERD (LPR) work-up.
- CT neck.
KAUH-Strobe Examination Report

Name: M Al-Badahi, Hails, M
Exam Original Date: 3/13/2004 9:46:18 AM
Patient ID: 00465849 RKH

Selected Stills (Image Compression - 15:1)

Thank you for referring this patient.

Telescopic videolaryngostroboscopy done, and showed:

I. Continuous light examination:
   - Left vocal fold paralysis (asterisk).
   - Paralytic phonatory glottal gap of about 2-3 mm at maximum width posteriorly (Figure 2).
   - A patch of submucous hematoma at the middle third of membranous part of the right vocal fold (arrow).
   - Mild ventricular hypertrophy.

II. Stroboscopic light examination:
   - Decreased amplitude and mucosal waves on the left vocal fold.
   - Asymmetry in amplitude and mucosal waves between both vocal folds.
   - Aperiodicity in amplitude and glottal cycle time at the left vocal fold.
   - Phase is predominantly open.

Diagnosis:
Left vocal fold paralysis with glottal gap of about 2-3 mm at maximum width posteriorly.
Computerized speech lab. (CSL)
Phonatory Aerodynamic System (PAS)

Tamer Mesallam MD
Management of voice disorders:

- Pharmacological agents.
- Surgical procedures (Phonosurgery).
- Technical aid devices.
- Voice therapy.
Tracheo-esophageal puncture

Tamer Mesallam MD
Swallowing Disorders
Phases of normal swallowing:

1. Oral preparatory phase
2. Oral propulsive phase
3. Pharyngeal phase
4. Esophageal phase
Definition of dysphagia:

- “Difficulty in moving food from the mouth to the stomach”.
- “Odynophagia” = painful swallowing due to a disorder of the esophagus.

Tamer Mesallam MD
Consequences of dysphagia:

- Dehydration.
- Weight loss.
- Aspiration pneumonia.
- Airway obstruction.
- Loss of joy of eating.
Causes of dysphagia:

**Dysphagia**

**Oropharyngeal**
- Structural
- Neuromuscular
- Head & Neck Surgery
- CVA

**Esophageal**
- Mechanical
  - [Solids]
- Neuromuscular
  - (Esophageal Dismotility)
  - [Solids & Liquids]
- Tumors
- Achalasia
Assessment of dysphagia:

I. History taking.

II. Physical examination:
   - General examination.
   - Language and Speech assessment.
   - Vocal tract examination.
   - Neck examination.
   - Trail feeding.

III. Investigations:
   - FEES.
   - VFES (MBS).
   - GERD (LPR) work-up.
Tamer Mesallam MD
FEES protocol of evaluation (Langmore, 2003):

I. Anatomic and physiologic assessment.

II. Assessment of food and liquid swallowing.

III. Assessment of therapeutic interventions.
Normal FEES

Tamer Mesallam MD
Tamer Mesallam MD
Residue
Residue

Tamer Mesallam MD
Penetration

Tamer Mesallam MD
Penetration

Tamer Mesallam MD
Aspiration

Tamer Mesallam MD
Management of dysphagia:

- Swallowing therapy:
  - Diet modification.
  - Postural techniques.
  - Swallowing maneuvers.
  - Sensory enhancement techniques.
  - Motor exercises.

- Surgical treatment, eg medialization laryngoplasty.
- Medical (Drug) treatment, eg anti-parkinsonism drugs.
- Intraoral prosthesis.
- Alternative routes of feeding, eg NG tube feeding.

Tamer Mesallam MD
Communication Disorders

Swallowing Disorders

Voice Disorders

- Organic
- Non-organic
- MAPLs

Speech Disorders

- Stuttering
- Cluttering
- Misarticulation
- Hypernasality
- Dysarthria

Language Disorders

- DLD (Children)
- Dysphasia (Adults)

Tamer Mesallam MD
Thank You

Tamer Mesallam MD