

# The acquired neurogenic communication disorders

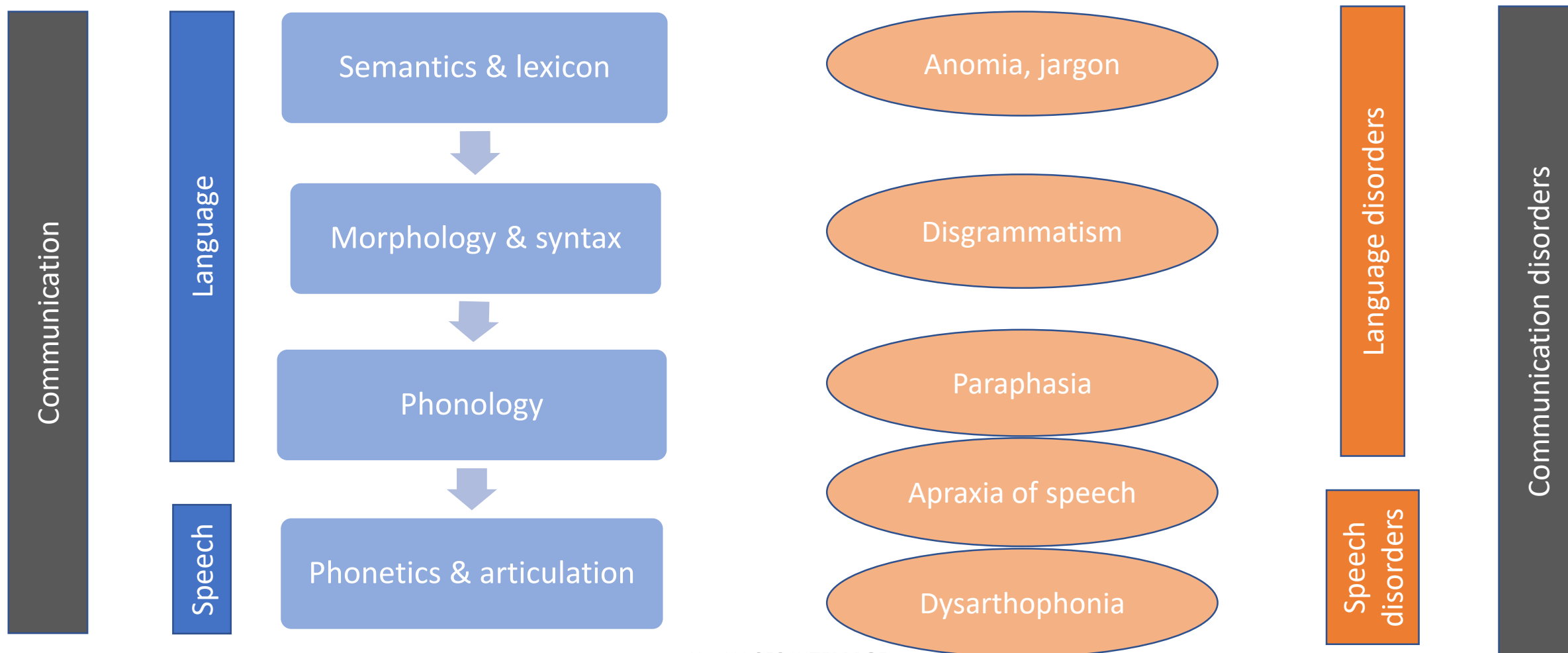
Baiba Trinite, PhD  
Liene Gutmane, MSc  
Liga Priedena, MD

No. LLI-352  
**INTERPROF**

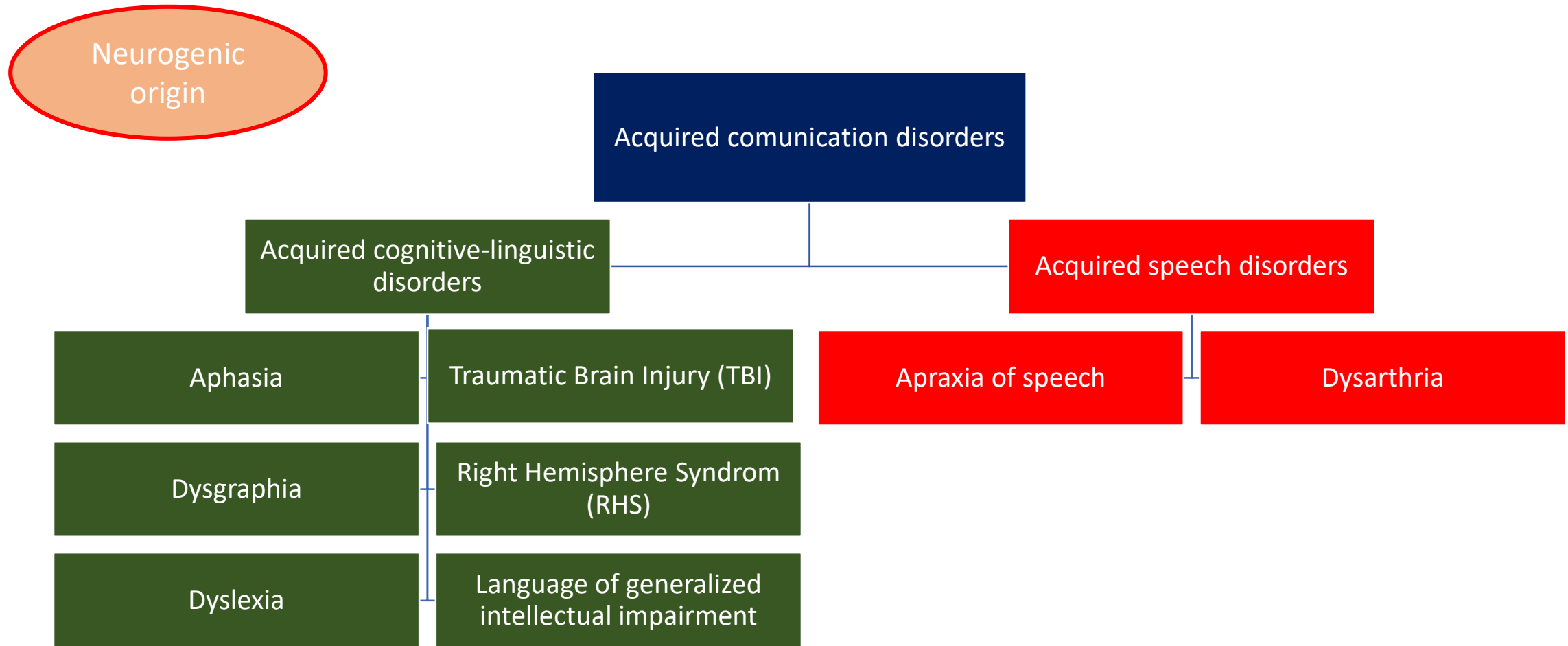
# Types of acquired neurogenic communication disorders

Assoc. Prof. Dr. Baiba Trinite

# A linguistic model of language & its breakdown (adapted by C.Code, 2018)



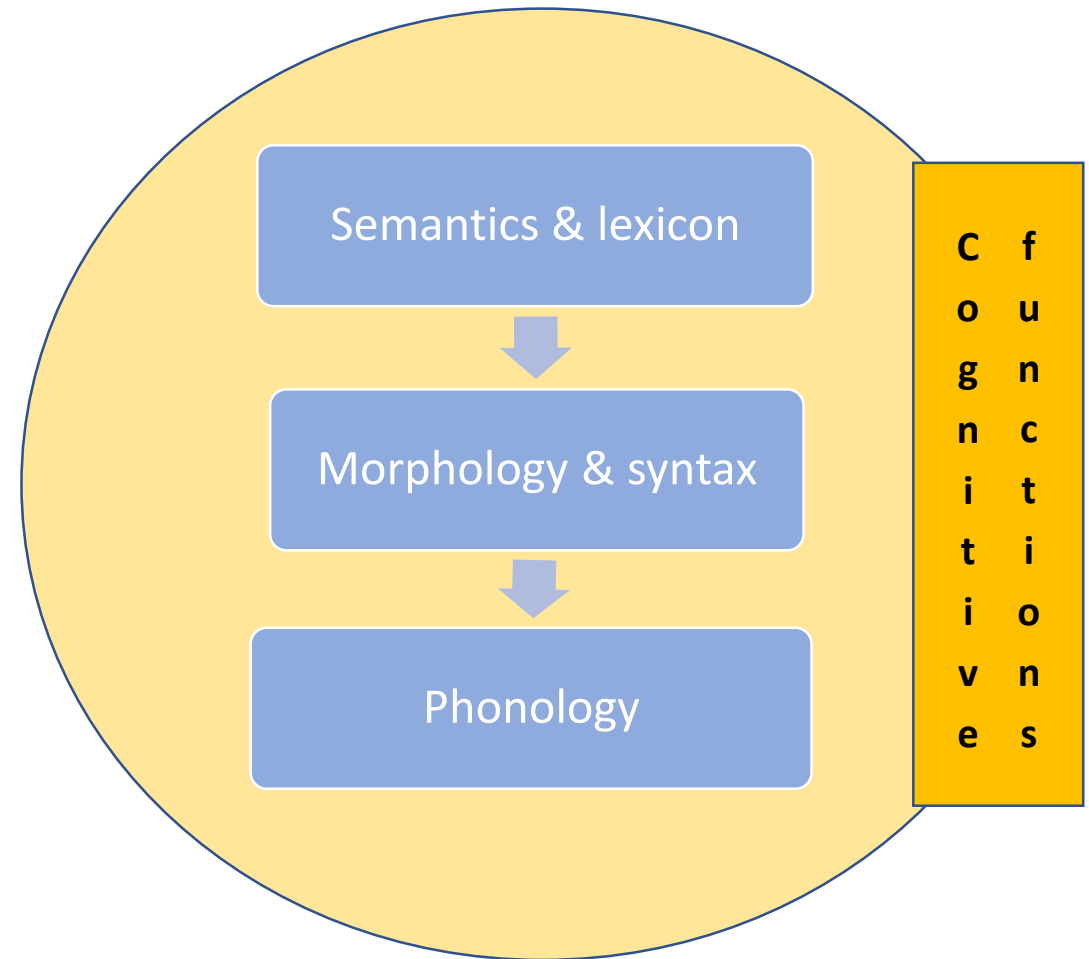
# Acquired communication disorders



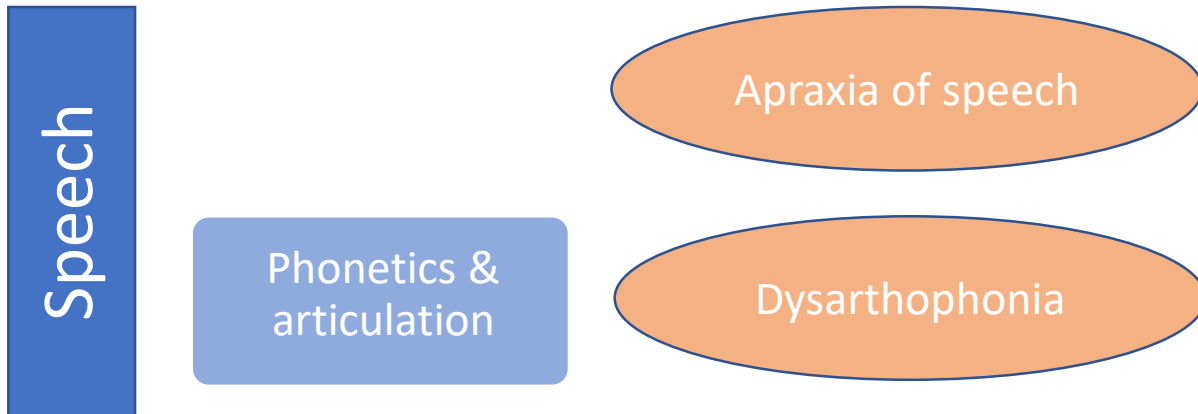
Hallowell, 2017

# Aphasia: language or cognitive linguistic disorder? (C.Code, 2018)

- Language cannot function without the support of cognitive functions
  - Memory – long-term, short-term, working memory
  - Praxis – ability to control the movement planning, programming and initiation the movement
  - Attention: concentration, stability, switching
  - Executive functions – delay, monitoring, planning, etc.
  - Perception – analysis and interpretation of sensory information (visual, acoustic, tactile, etc.)

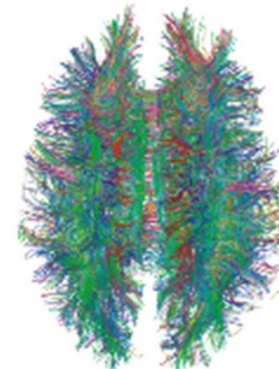
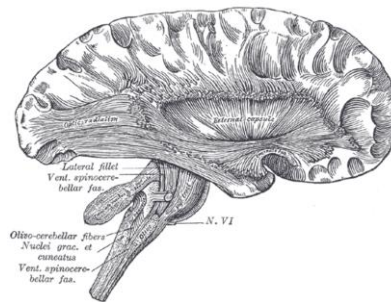
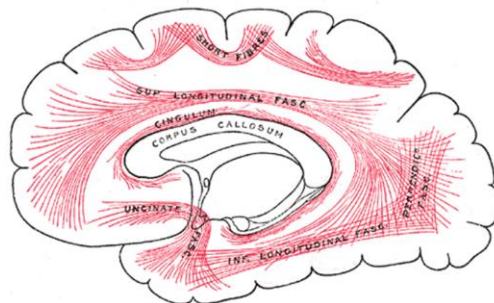
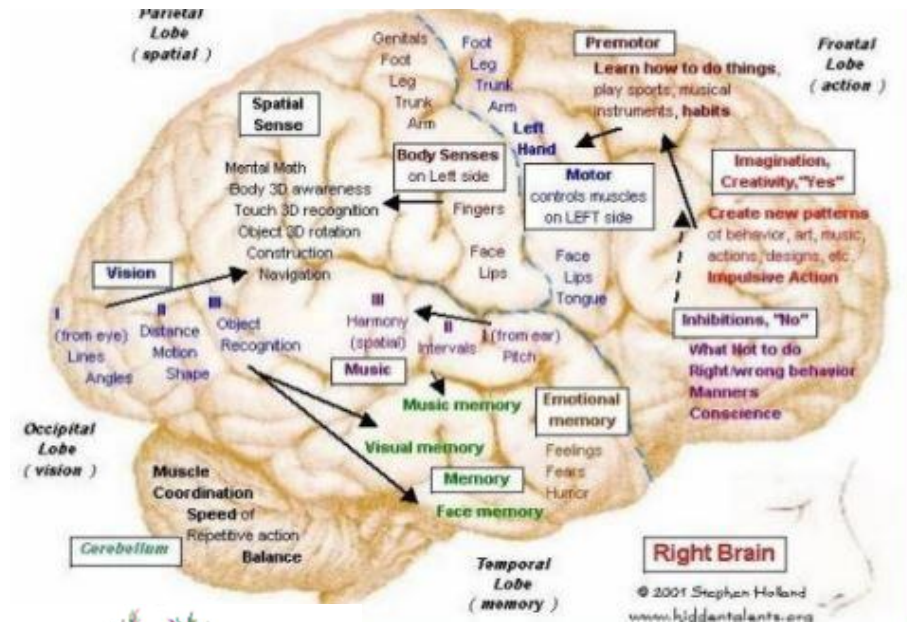
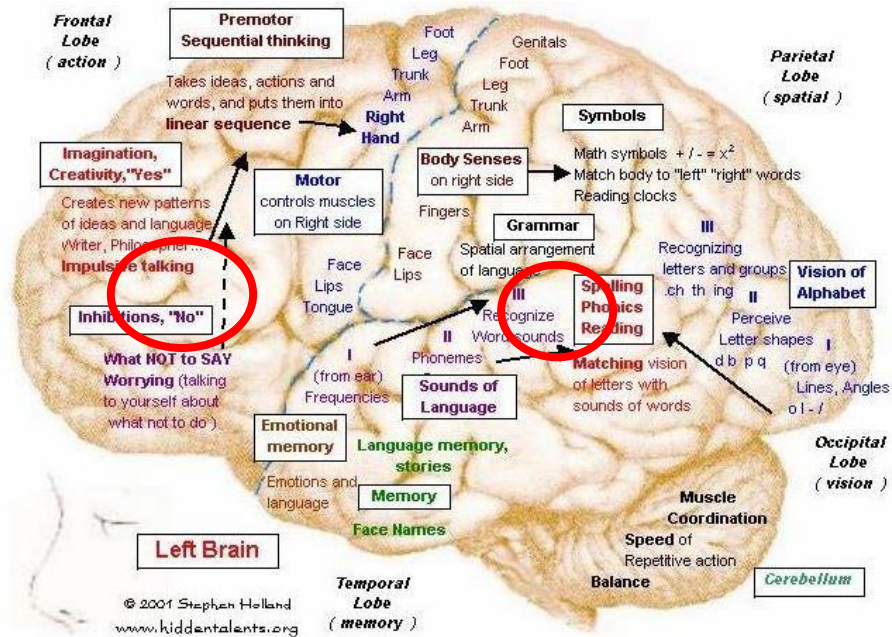


# Acquired speech disorders



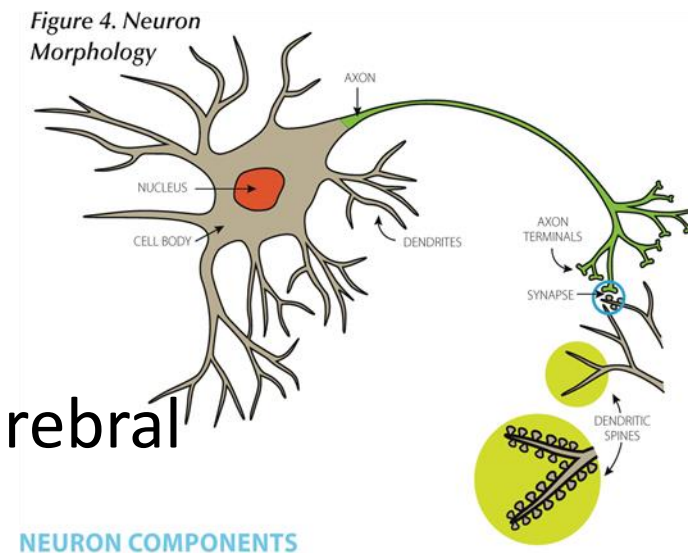
- Apraxia of speech: an impairment in **motor programming and sequencing of movements** of the articulators for intentional or volitional speech
- Dysarthria: sound pronunciation disorders of neurologic origin that has occurred in the result of speech muscle innervation disorders

# Specialization of cortex



# Neuroplasticity

- Neuroplasticity – the ability of the nervous system to react to external and internal stimuli reorganizing their structure, functions and connections
- Use of neuroplasticity potential
  - speech, language, cognitive functions trainings,
  - brain stimulation
  - neuropharmacology
- Challenge: how to measure the activity of specific cerebral regions at specific stimulations in real time



Reyst H,  
Rainbow Rehabilitation Centers

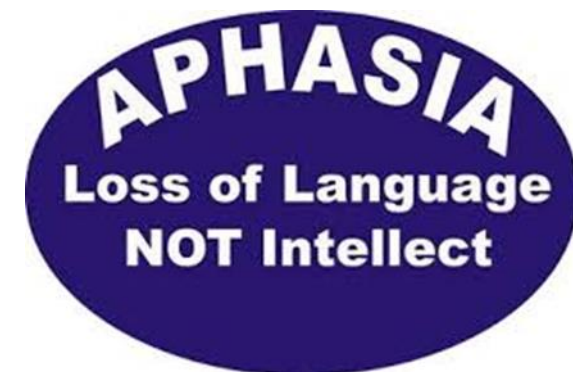


# Aphasia: Aetiology, syndromes and subtypes

Assoc. Prof. Dr. Baiba Trinite

# Definition of aphasia

- An acquired language disorder, caused by brain injury affecting all modalities of language; it is not the result of an intellectual, sensory, motor, or psychiatric problem (Hallowell & Chapey, 2008)
  - Acquired
  - Neurologic origin
  - Affect speaking, listening, reading, writing, and communication
  - It is not a sensory, motor, psychiatric, or intellectual disorder
- Aphasia can be observed at any age. An important criterion is the presence of language before brain injury.



# Aphasia

- Communication disorders: mild, moderate, severe, total
- Aphasia affects all language modalities
  - In case of motor aphasia, there can be language comprehension problems *vice versa* in case of sensor aphasia
  - In case of mild forms of aphasia, there are difficulties to create complex grammatic constructions

## Structural elements of communication

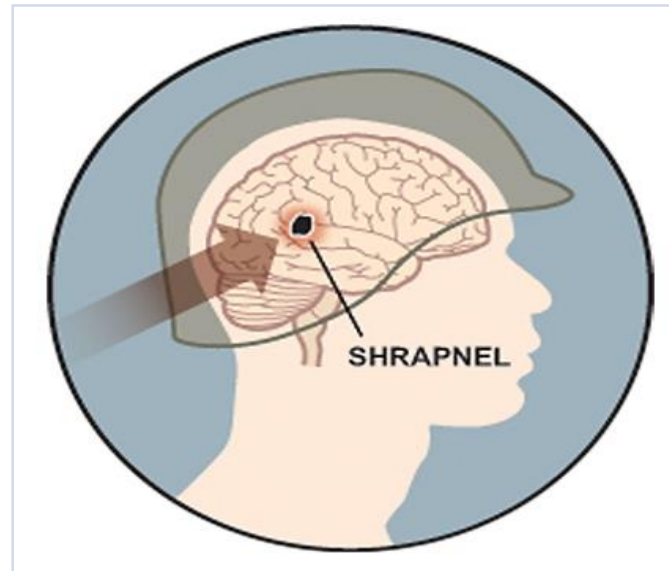
- Language (vocabulary, grammar, phonology)
- Speech (motor movements)
- Cognitive functions (memory, attention, problem-solving)

# Causes of aphasia

## Stroke

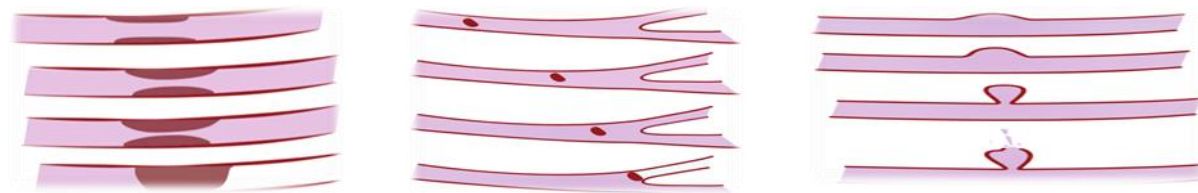
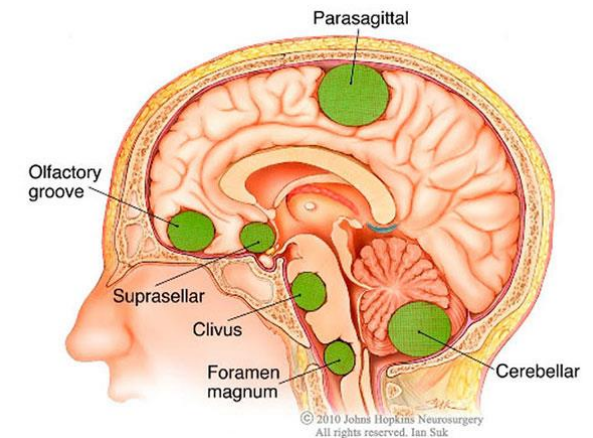
- Ischemic
  - thrombotic
  - embolic
- Haemorrhagic
  - intracerebral
  - subarachnoid
  - subdural

## Brain trauma/injury



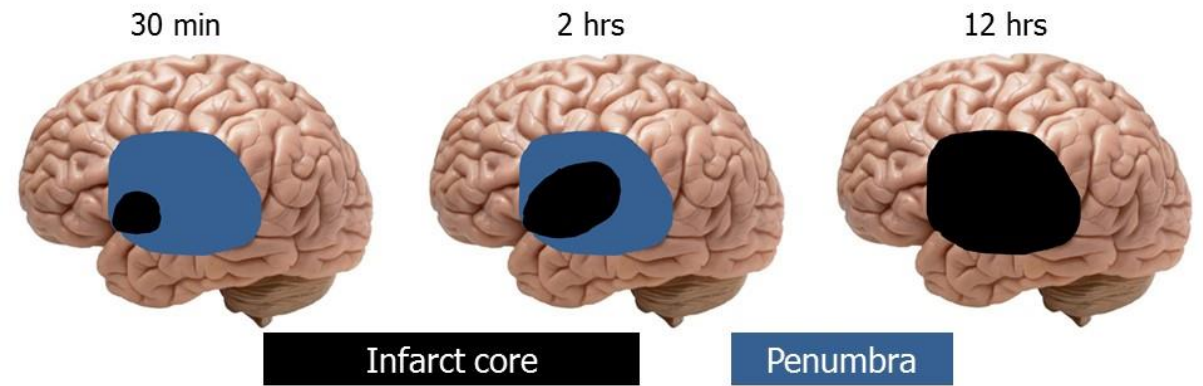
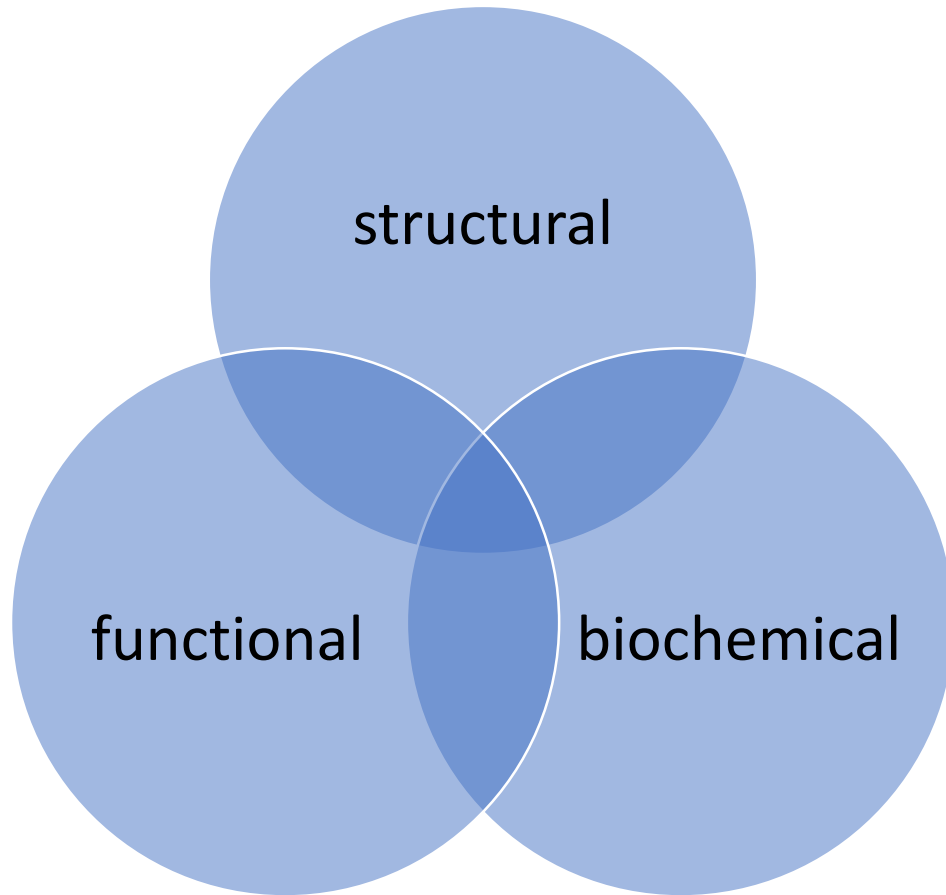
## Tumour

- benign
- malignant



**The injury of left hemisphere**

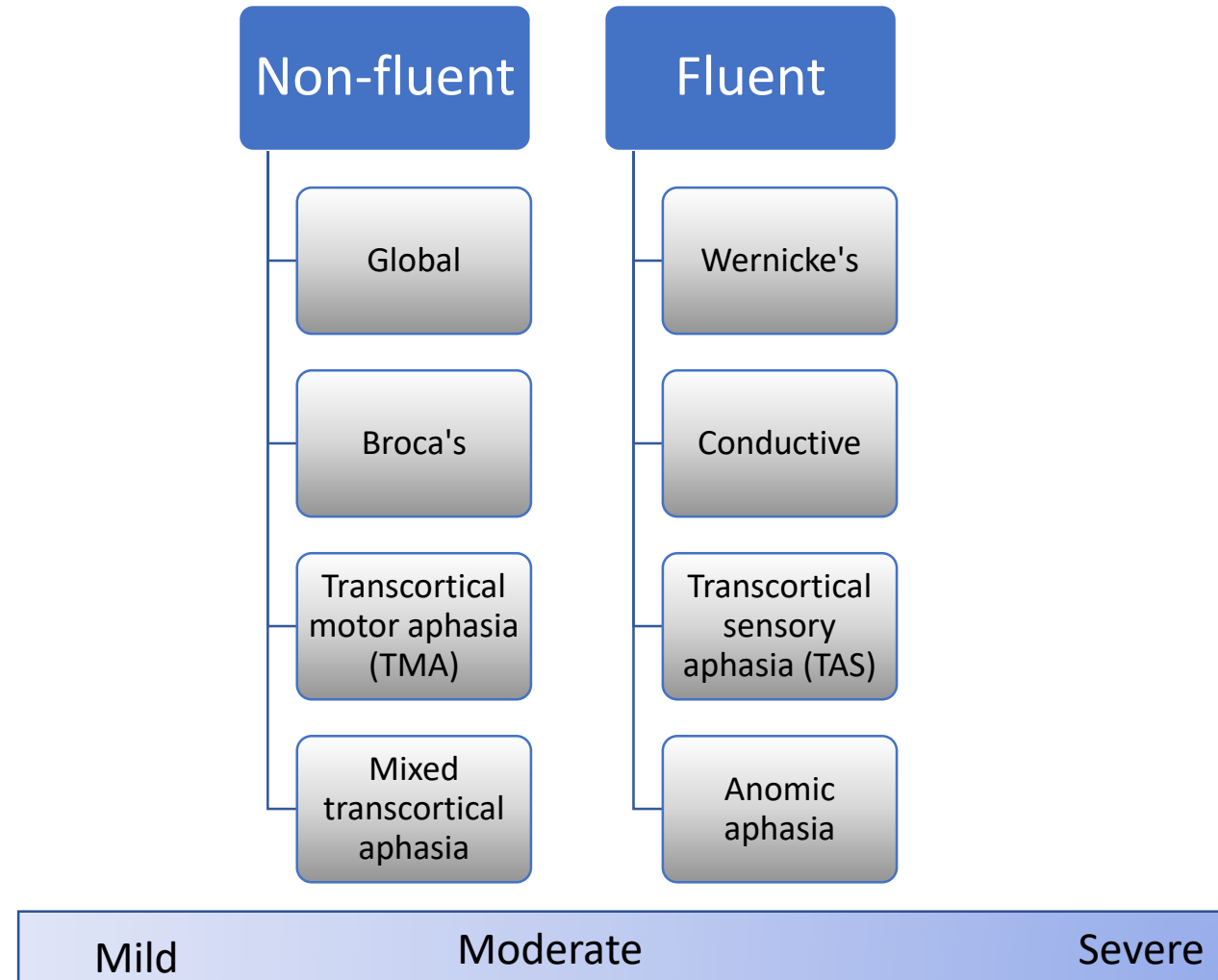
# Physiological effects of stroke



# Division of aphasia

- Impaired functions in case of aphasia:
  - Speech fluency
  - Language comprehension
  - Repeating
  - Naming
- Dichotomic division: conditionally maintained ability (function) vs conditionally disturbed ability (function)
- Writing and reading are always impaired

# Classification of aphasia (Aphasia syndrums), The Boston group classification (Benson, 1979)



# Aphasia in bio-psycho-social context

- International Classification of Functioning ICF
  - Body structures (brain injury) and functions
  - Activity and participation
    - How efficiently the language is used as a means of communication?
    - Is the language functional?
    - Restrictions due to language disorders
  - Quality of life
    - How significant are the changes?
- Social context
  - Aphasia is a condition that affects the everyday life all life long
  - Compensation and adaptation possibilities
  - *Life Participation Approach to Aphasia, LPPA. Social model (Full life participation)*

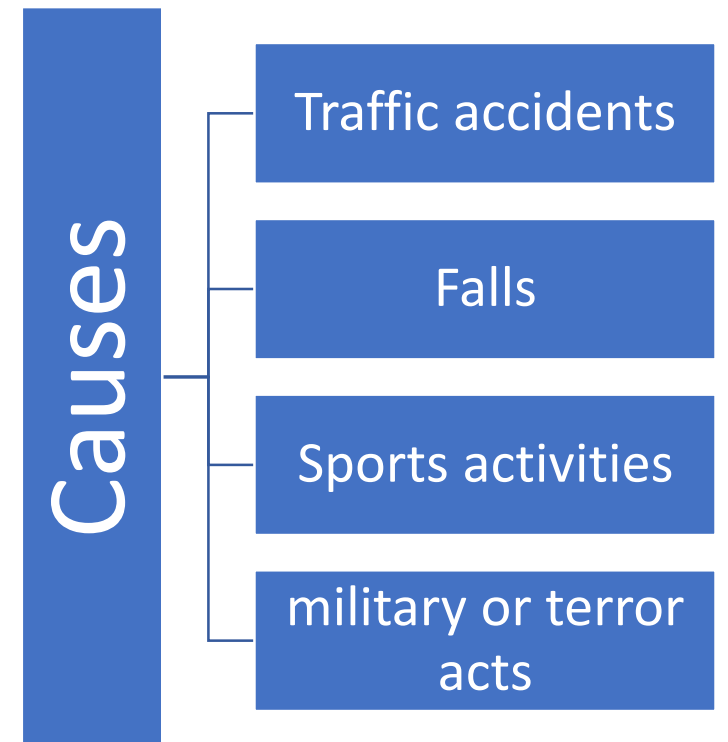


# Cognitive-Communicative disorders associated with Traumatic Brain Injury

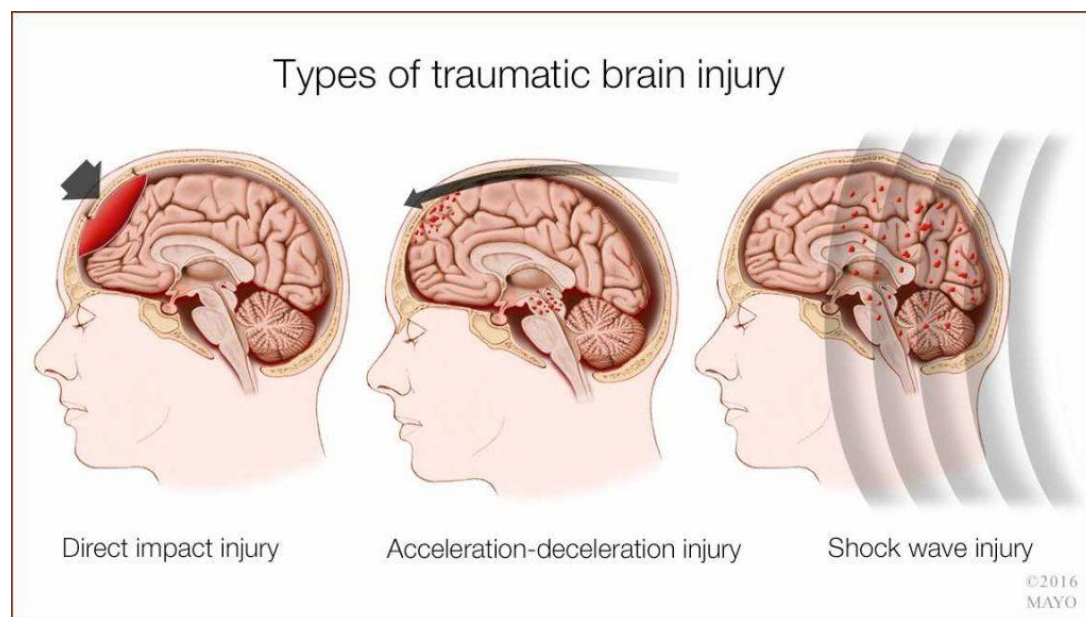
Assoc. Prof. Dr. Baiba Trinite

# Epidemiology of traumatic brain injury (TBI)

- TBIs are incident in heterogenous population: different age, nationalities, races, cultures, social-economical status, education
- TSB incidence
  - 262/100 000 (Europa)
  - Groups of a high risk
    - Children to the age of 4
    - Adolescents aged 15-19
    - Adults 65+
  - 2x as often in men than in women
- TBI severity is variable
  - Slightly noticeable symptoms
  - Complete loss of functional skills in all areas of everyday life
  - Vegetative / loss of consciousness
  - Coma



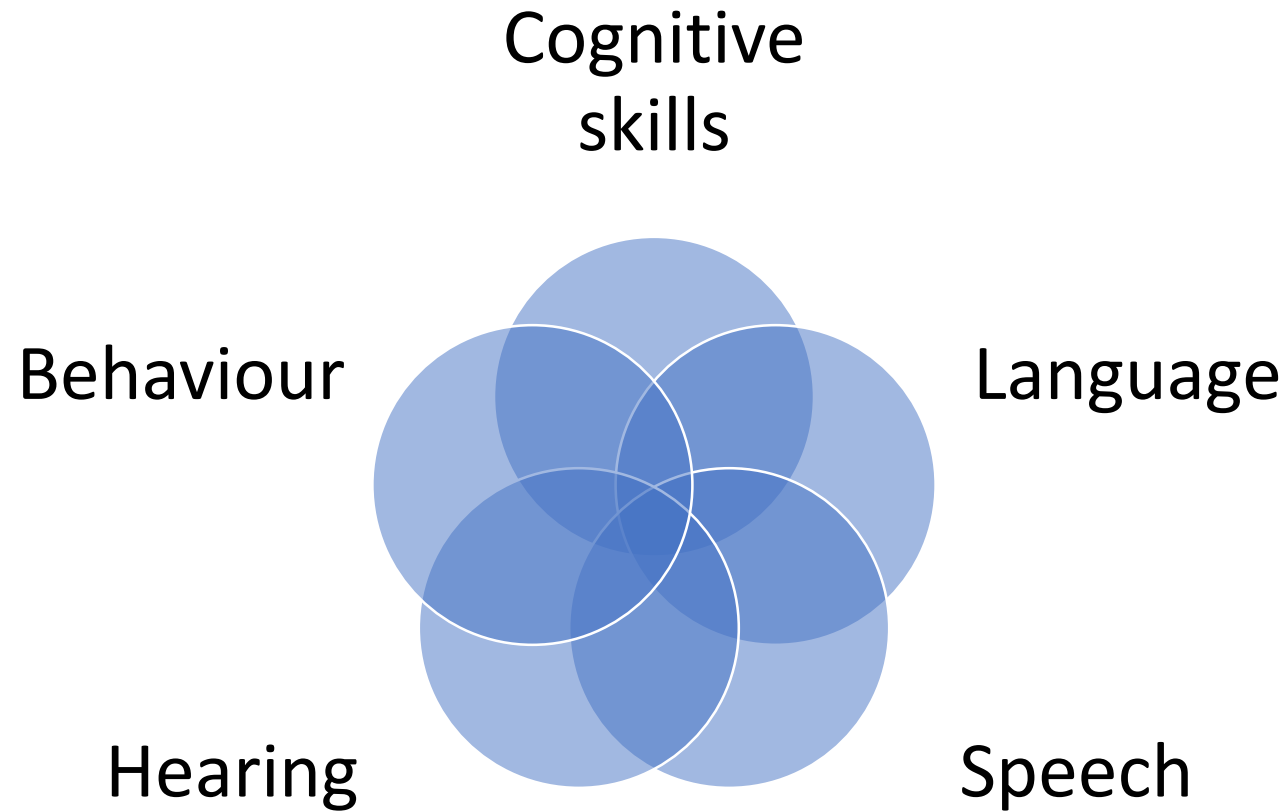
# Pathophysiology of communication disorders in case of TBI



Mayo Clinic, 2016

- Bilateral frontal lobe and limbic system damage
- disorders of prefrontal area and limbic structures axon junctures
- Frontal lobe syndrome
  - Disorders of executive functions
  - Pragmatics disorders

# Groups of TBI symptoms



# Cognitive skills

- Impaired verbal and nonverbal memory
- Sensory integration disorders
- Reduced attention
- Disorders of executive functions
- Impaired reasoning

# Language disorders

- Word-finding difficulties
- Difficulties with comprehension and production of abstract ideas/language
- Disturbed verbal reasoning
- Verbal learning disorders
- Dyslexia
- Dysgraphia
- Paraphasias
- Impaired pragmatic abilities

# Characteristics of speech and hearing

- Speech disorders
  - Slowed speech
  - Slurred speech
  - Inappropriate intonation
- Hearing disorders
  - Conductive and sensorineural hearing loss
  - Speech discrimination disorders
  - Central auditory processing disorders

# Characteristics of behaviour

- Personality changes
- Sudden change of mood
- Anxiety, frustration
- Depression
- Low self-confidence and self-respect
- Hyperactivity
- Concentration difficulties
- Impulsivity
- Egocentricity
- Emotional lability
- Hypersexuality
- Self-control difficulties
- Lack of motivation
- Inability to control emotions
- Lack of insight
- Denial of physical and mental restrictions
- Confusion
- Confabulation
- Perseverations
- Stimulus boundedness
- Decreased or lack of initiative
- Impaired visual processing skills
- Fatigue
- General mental slowing
- Low tolerance of external visual and acoustic signals
- Motor control disorders



# Principles of speech-therapeutic influence

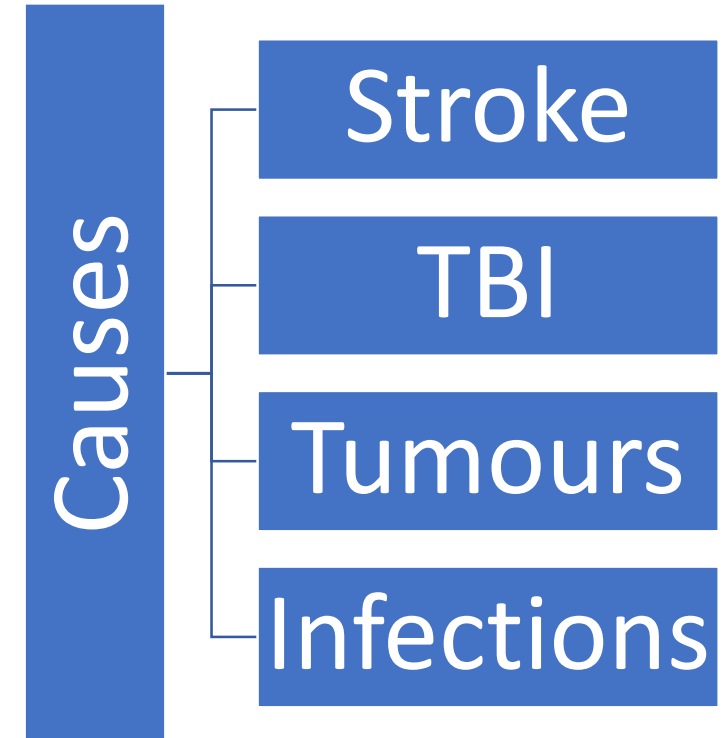
- Interdisciplinary teamwork
- Knowledge not only about the language disorders, but also on assessment and restoration of cognitive functions
  - Self-assessment of professional knowledge and skills
  - Clinical psychologist
  - RehaCom <https://www.rehacom.com/what-is-rehacom.html>
- Possible problems
  - Communication and cognitive problems can be hidden
    - Distorted limbs are noticed first in accident victims
    - Simple communication is possible, but deeper communication layers are impaired
  - The patients don't admit the problems, they are not motivated to continue rehabilitation
    - Cerebral damage symptom
    - Social stigma
  - The lack of information about rehabilitation of cognitive functions
  - Lack of specialized assessment tools

# Cognitive-Communicative disorders associated with Right Hemisphere Syndrom

Assoc. Prof. Dr. Baiba Trinite

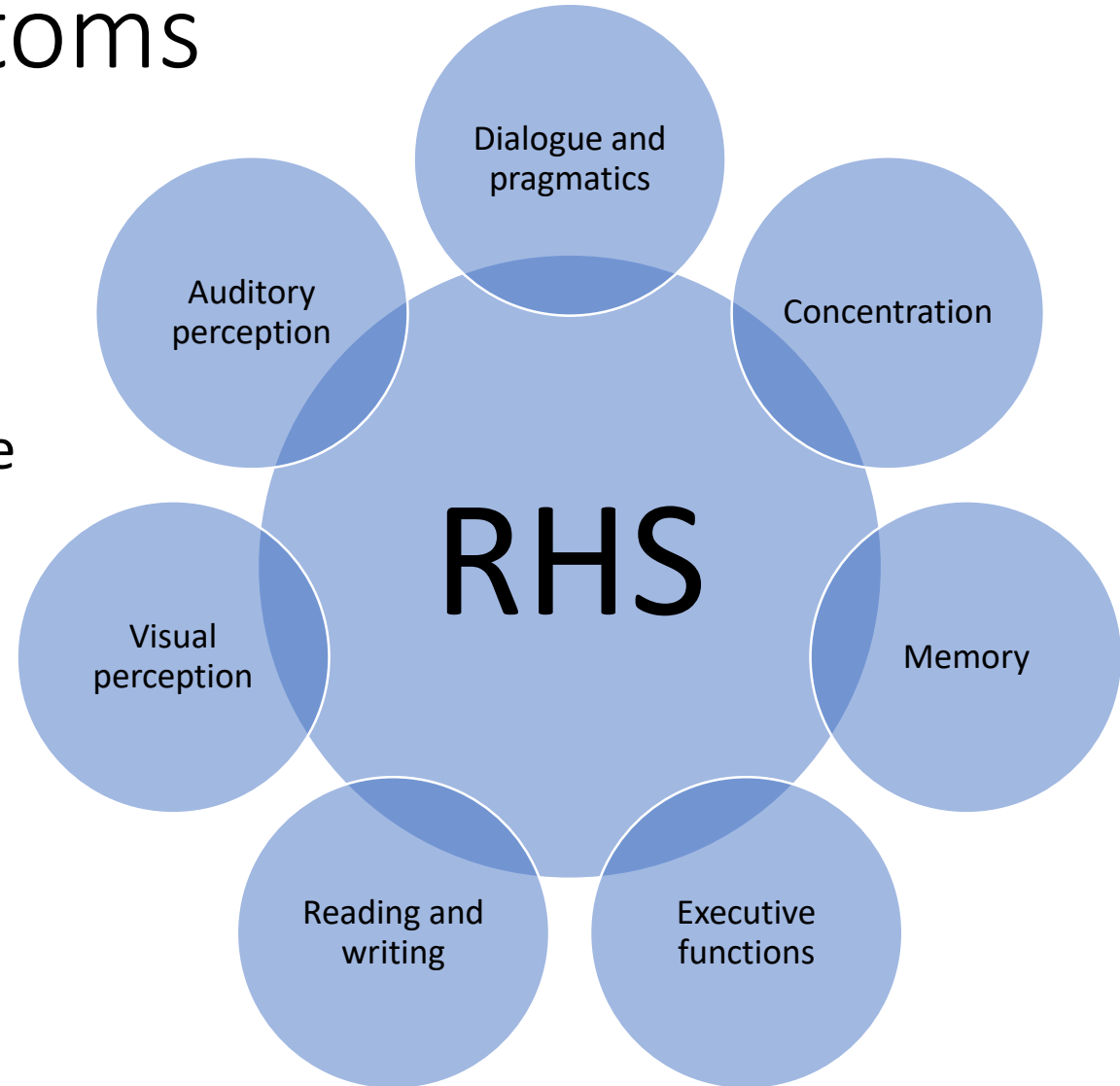
# Right hemisphere syndrome (RHS)

- Right hemisphere syndrome is a constellation of symptoms associated with right hemisphere damage.
- In case of RHS, there can be bilateral brain damage
  - Right hemisphere symptoms + left hemisphere symptoms
- RH ensures
  - Concentration, memory, judgment and problem solving ability
- In case of RHS, there can be no communication disorders, or they can be mild
  - Reduction of life quality
- Patients with RHS frequently ignore the problems caused by the disorder



# Groups of RHS symptoms

- Symptoms vary by their form of manifestation and degree of expression
- The manifestation of symptoms can be determined in social environment



# Communication & pragmatics

## **Receptive difficulties:**

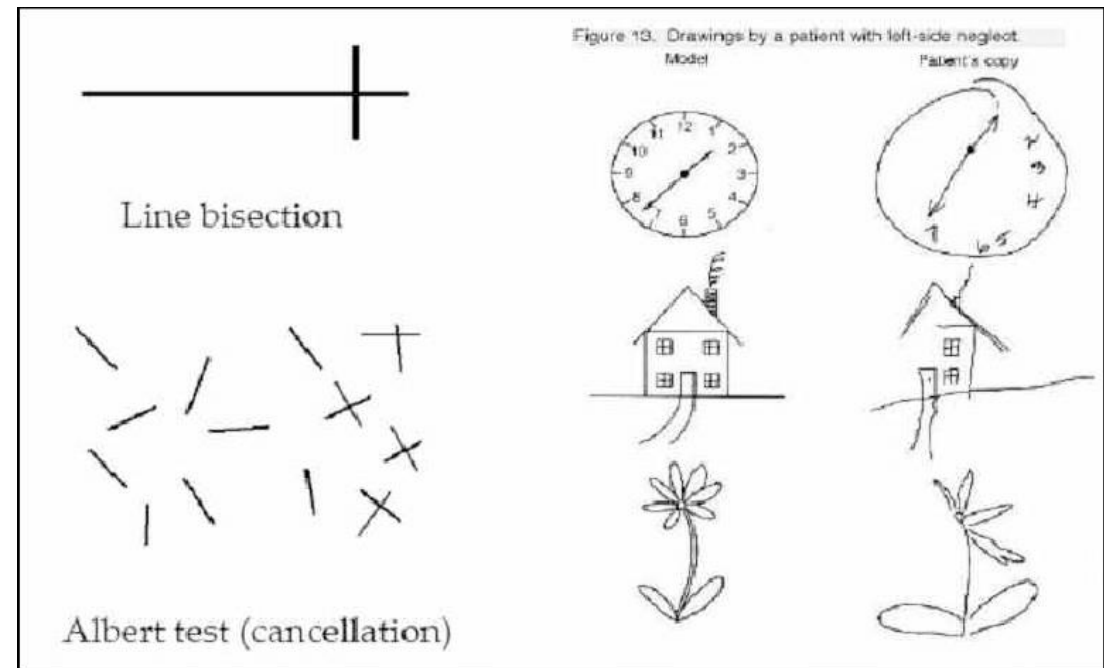
- Understand and interpret specific topics, grasp the main idea
- Draw conclusions
- Understand the idioms, indirect messages and sarcasm
- Switch from one topic to another one
- Interpret the facial expression
- Interpreting humour and jokes
- Receptive aprosodia

## **Expressive difficulties :**

- Poor topic maintenance
- Form structured narration
- Draws intensified attention to details, difficulties to generalize (tangential narration)
- Disprosodia or expressive aprosodia (monotonous speech)
- Limited ability to start conversation  
Confabulation
- Hypo- or hyperactivity

# Attention problems

- Anosognosia
  - a lack of awareness of an illness or deficit
- Hemispatial (left side) neglect
  - Inattention to or lack of conscious awareness of sensory information that is not due to a sensory deficit
- Difficulties
  - to follow what is happening (be alert),
  - to orientate
  - maintain, focus or switch attention



# Memory & performance functions

- Memory disorders (**working**, short-term, long-term memory )
  - Formation of long and complex sentences
  - Remembering and performing of instructions
  - Remembering of specific routine activities (e.g., take pills)
- Disorders of executive functions
  - Reasoning, decision-making, planning, goal setting, sequencing, problem solving, self-control

# Visual and hearing perception disorders

## **Visual-perceptual disorders**

- Visual memory disorders
- Prosopagnosia (facial agnosia)
- Visuospatial disorientation
- Topographical disorientation

## **Auditory-perceptual disorders**

- Amusia
- Auditory agnosia
- Sound localization disorders
- Tone perception disorders



# Reading and writing disorders

- Visuospatial difficulties to read and write letters, words, symbols
- Difficulties interpreting content
- Difficulties to write sentences, text without assistance

# Challenges in rehabilitation

- Hypodiagnosics
  - The reason for underdiagnosis and underreporting is not that the incidence in right versus left strokes is different but that medical professionals, family members, and patients themselves are less likely to notice or complain about the symptoms associated with RHS (Foerch, 2005)
- Anosognosia
  - Lack of motivation to commence and fit into the rehabilitation process

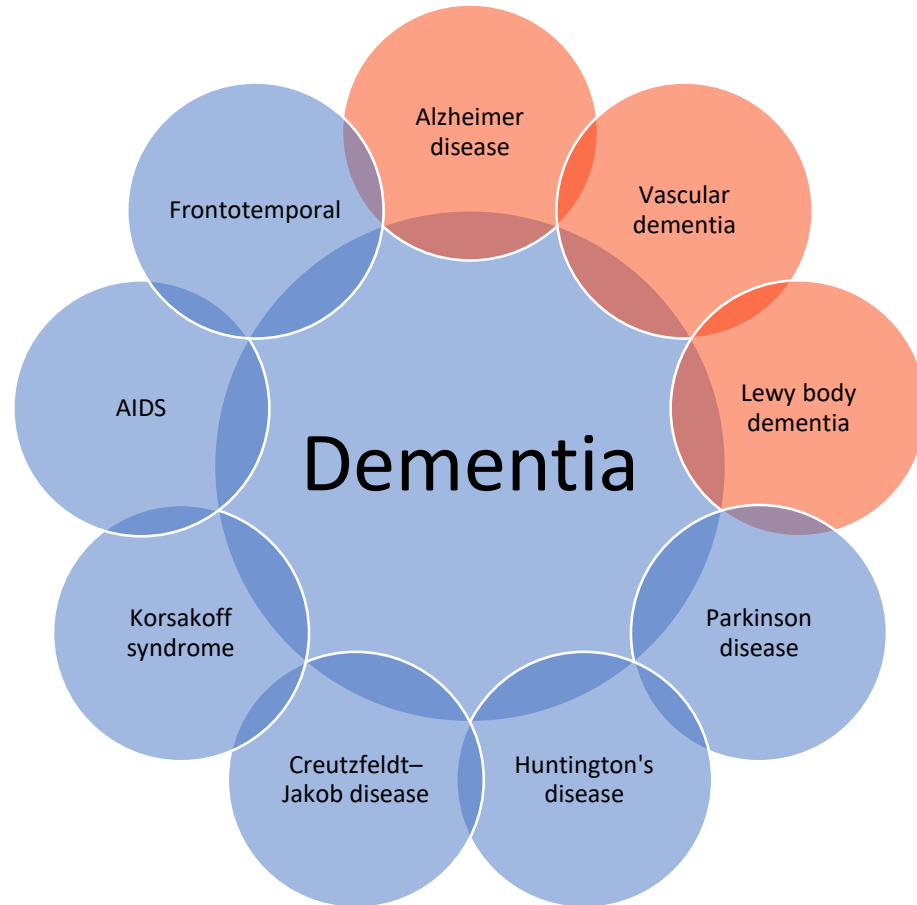
# Cognitive-Communicative disorders associated with dementia

Assoc. Prof. Dr. Baiba Trinite

# Neurodegenerative disease

- A neurodegenerative disease is characterized by **progressive changes** in the brain which are characteristic of diverse disorders of highest functions of cortex (memory, thinking, orientation, comprehension, calculation, ability to learn, language and judgement abilities).
- Primary neurodegenerative conditions
  - Mild cognitive impairment
    - A condition of cognitive decline that is not consistent with normal aging
  - Dementia
    - A constellation of symptoms that comprise
      - **Memory disorders**
      - One or more cognitive and/or linguistic impairments
  - Primary progressive aphasia (PPA)

# Formes of dementia



- Language problems in people with dementia are called **cognitive communication disorders**
- Dementia must be separated from other dementia-like conditions:
  - Depression
  - Vitamin deficit
  - Drug effect
  - Post-surgery conditions

# Cognitive-Communicative disorders

## Cognitive disorders

- Memory disorders
  - Working vs short-term vs long-term memory
  - Anterograde and retrograde amnesia
- Attention disorders
  - Divided attention
  - Switching of attention
  - Vision neglect
  - Focused and sustained attention
- Disorders of executive functions
  - Verbal and task perseveration
  - Inability to adapt to changes/ inflexibility
  - Impaired Judgment
  - problems of codeswitching and social appropriateness
- Perceptual disorders
  - Visuospatial discrimination
  - Prosopagnosia
  - Achromatopsia

## Communication disorders (defined by memory disorders)

- Word-finding difficulties
  - Speech fluency, naming
- Semantic confusions in word usage
- Inability to speak about recent events in contrast to the ability to talk about past events

# Progress of cognitive communication disorders in case of dementia

## Mild stage

- Uses humour to distract the attention or to hide symptoms of disease
- Isolates
- Circumlocution (to hide words finding difficulties)
- Can talk about particular things, difficulties to speak about «abstract» topics

## Moderate stage

- The pragmatics and performance functions get worse
- Word-finding difficulties, but the overall speech and writing skills are relatively good

## Moderately severe stage

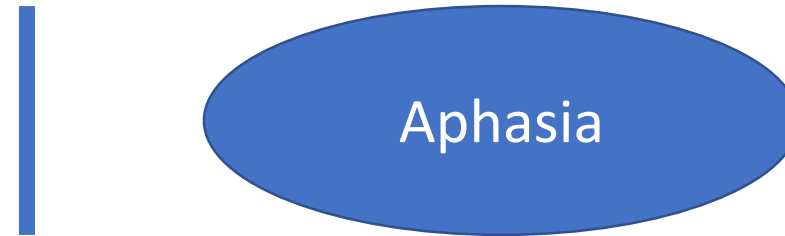
- Syntax and phonology problems
- With slowly progressing dementia can talk relatively good about daily things or past events
- Pragmatic problems (maintaining a topic for a cohesive conversation, cannot express logically one's ideas, doesn't adhere to social etiquette, egocentrism)
- Cannot control the social norms of language use (racism, sexual topics)

## Severe stage

- Doesn't talk
- Echolalia, stereotypic phrases

# Primary progressive aphasia (PPA)

- PPA is the ongoing loss of language abilities in the face of relatively preserved cognitive abilities
  - Gradual onset
  - Neurodegenerative origin
  - Progressing symptoms
- The first symptoms are related with difficulties to find words (clearly noticeable in persons who didn't have such problems previously)
  - Degenerative processes start in the brain language areas
- At late stage, mild cognitive disorders or dementia develop
- At the age of 50 or 60 years
  - Diagnostics problems, hypodiagnosics





# Speech-therapeutic aid to persons with dementia

- Assess the strong and weak sides of communication, and to explain then to the relatives and rehabilitation team
- Direct speech-therapeutic influence
  - Memory book and cards
  - Word memory trainings
  - Montessori therapy
- Teaching the relatives and caring staff about efficient communication strategies



# Assessment: basic principles, screening instruments

Speech language therapist, Liene Gutmane, MSc

# The aim and benefits of assessment of acquired communication disorders

**Aim: identify and describe the basic problem**

**When performing the assessment, one identifies:**

- Strong sides;
- Weak sides;
- Degree and manifestations of communication disorders.

**of the patient with communication disorders**

**Benefits:**

- Diagnosis of language disorders;
- Assessment of language disorders.

# Assessment

## **Assessment of acquired communication disorders includes:**

1. Collecting of anamnesis;
2. Orofacial examination (oral apraxia, dysarthria);
3. Apraxia of speech, dysarthria;
4. Examination of expressive and receptive language;
5. Reading and writing;
6. Apraxia;
7. Agnosia;
8. Neglect;
9. Cognitive linguistic assessment;
10. RehaCom.

# Anamnesis

1. Primary diagnosis of a patient;
2. Localization of damage;
3. Age;
4. Previous diseases;
5. Education;
6. Profession;
7. Social-economic condition;

# Orofacial examination (oral apraxia, dysarthria)

Aim: examination of mimics muscles and innervation of articulation apparatus.

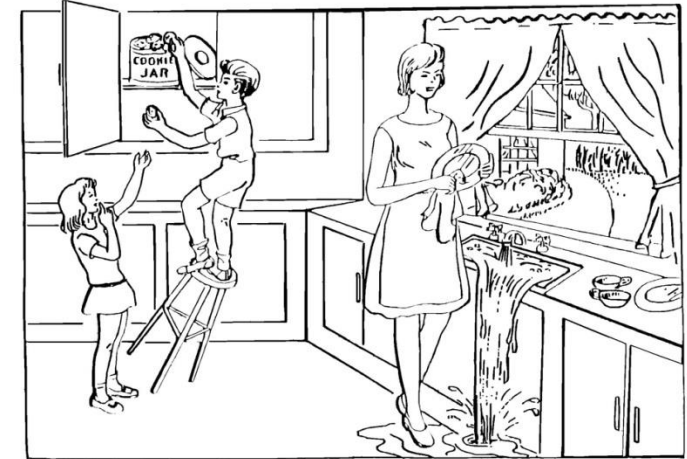
- Mimics muscles;
- Articulation apparatus :
  1. Lips;
  2. Tongue;
  3. Soft palate.

# Speech apraxia and dysarthria

- Speech apraxia:
  1. Repeating of phonemes;
  2. Repeating of syllables (pa – pa – pa, ta – ta – ta, ka – ka – ka);
  3. Repeating of words
- Dysarthria:
  1. Repeating of syllables ( pa – ta – ka).

# Examination of expressive and receptive language

- Expressive language:
  1. Spontaneous speech;
  2. Naming;
  3. Repeating.
- Receptive language
  1. Understanding of instruction / questions;



## Reading and writing (neglect)

### Reading:

1. Letters;
  2. Syllables;
  3. Words (words with complicated structure);
  4. Word combinations, sentences, text;
  5. Understanding of the read text.
- Writing:
    1. Letters;
    2. Syllables;
    3. Words, words with complicated structure;
    4. Sentences.





# Apraxia; Agnosia; Neglect

## 1. Neglect:

- Methods to assess neglect.

## 2. Apraxia:

- Methods to assess apraxia at specific type of apraxia.

## 3. Agnosia:

- Methods to assess agnosia at specific type of agnosia.

# Cognitively linguistic assessment and RehaCom

1. What is a cognitively linguistic assessment;
2. What and by means of what methods is assessed.
3. What is RehaCom;
4. What and how is assessed by means of RehaCom.

# General treatment approaches

Speech language therapist, Liene Gutmane, MSc

# In the therapy of acquired communication disorders:

The existing language skills are restored/improved

The loss of existing language is compensated

~~Language skill development is not developed/facilitated~~

# Aims of the therapy of acquired communication disorders

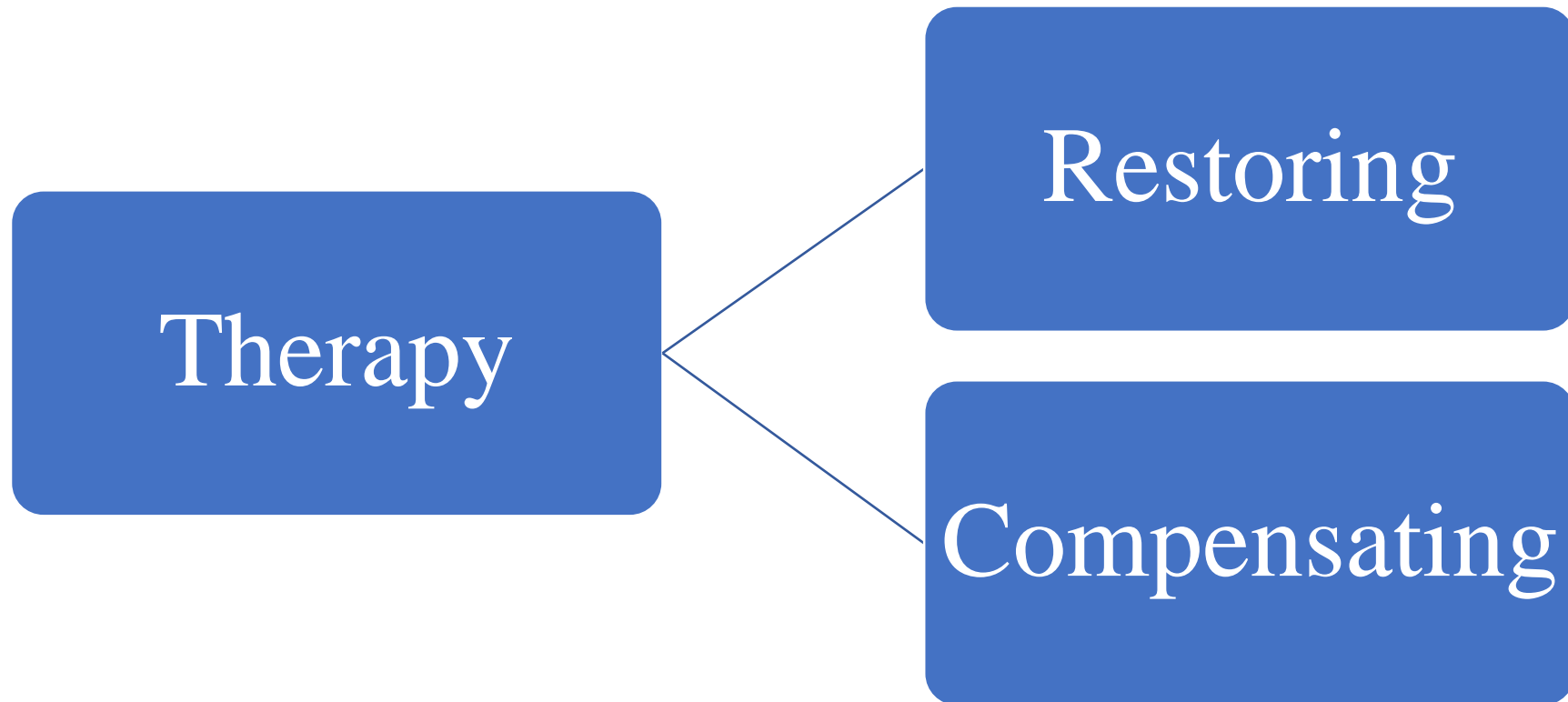
1. improve the acquired communication disorders;

=

Improve the  
quality of life

2. Compensate the acquired communication disorders.

# Therapy and selection of therapy



# Therapy and selection of therapy (1)

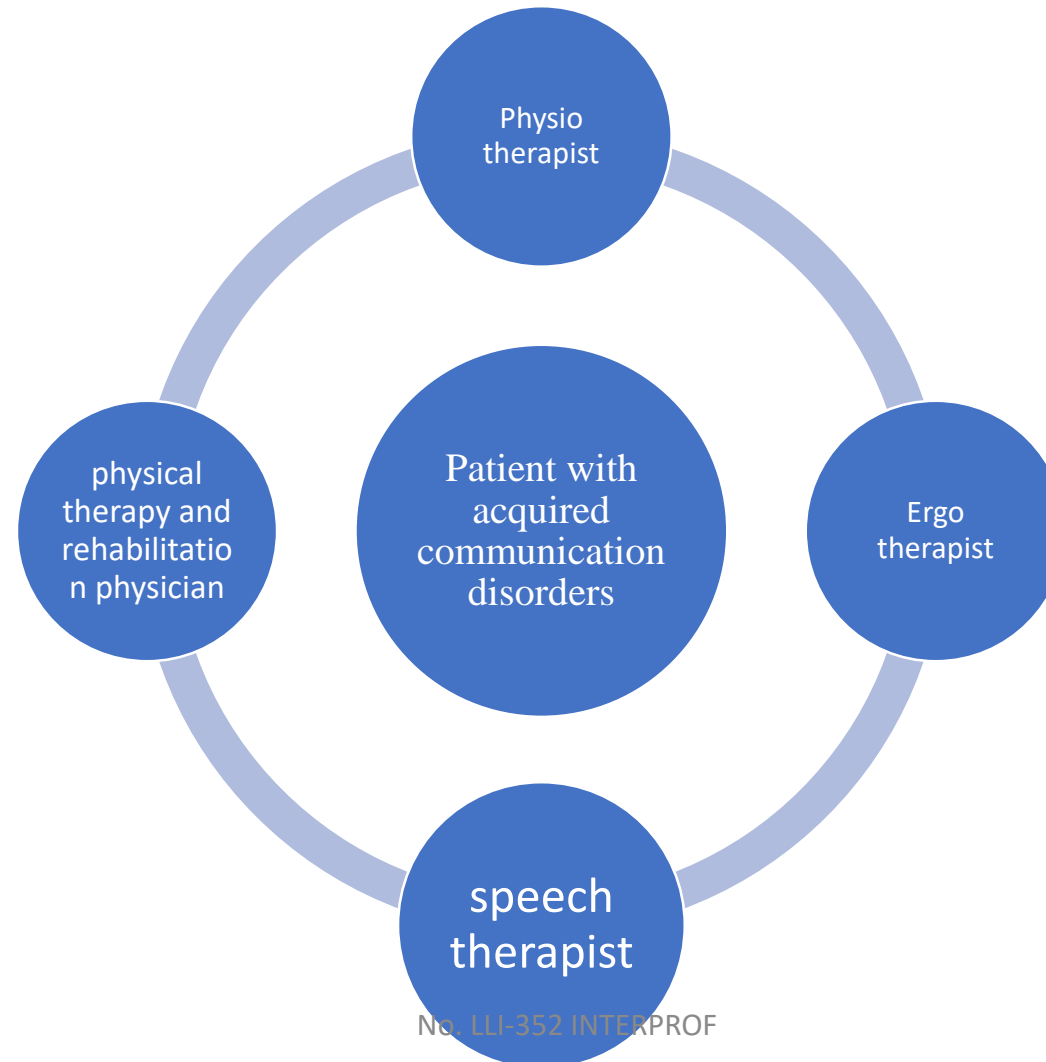
- When starting the therapy process, the aims of therapy and work tasks must be clearly set;
- Aims of therapy are set, considering patient's strong and weak sides.

Selection of therapy is different and depend on:

1. The form of patient's disorder;
2. Severity of disorder;
3. Patient's wishes and needs.

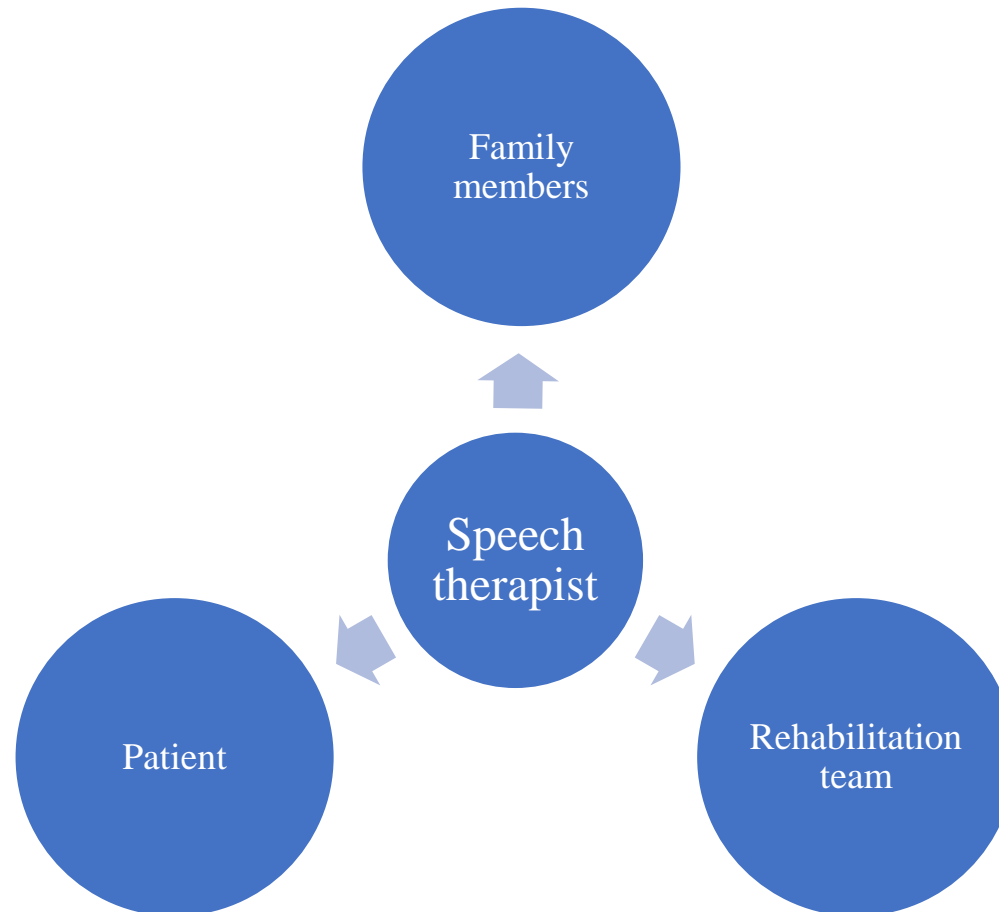
Form of therapy can change during the rehabilitation process.

# All experts of multidisciplinary team have important role in the therapy process





# Therapy process is not based only on the patient with acquired communication disorders



# Case I (patient with conductive aphasia)

## **Anamnesis data**

- Female, born on 15.04.1962

## **Primary diagnosis:**

- condition after acute ischemic stroke in ACM sin area

## **Functional disorders caused by the disease:**

- hemiparesis of right side;
- language production disorders;
- apraxia.

# Case I (patient with conductive aphasia) (cont.)

- Contact with the patient is good. Patient readily communicates, establishes eye contact. Orientates in the place, time, space and her person.
- Disturbed spontaneous speech. Disturbed naming (needs repeated naming). Disturbed repeating (repeating of complicated structures);
- Language comprehension is preserved (performs instructions);
- Reading preserved;
- Writing preserved (right hand paresis causes difficulties).
- Purposeful use of subjects is disturbed.

# Case I (patient with conductive aphasia) (cont. I)

- Audio record



- Applied methods of audio speech therapeutic rehabilitation.
- Further life quality and future perspectives.

# Case II (patient with right hemisphere syndrome)

## **Anamnesis data**

- Female, born on 20.08.1941

## **Primary diagnosis:**

- Acute ischemic infarction in ACP dxt with haemorrhagic component.

## **Functional disorders caused by the disease:**

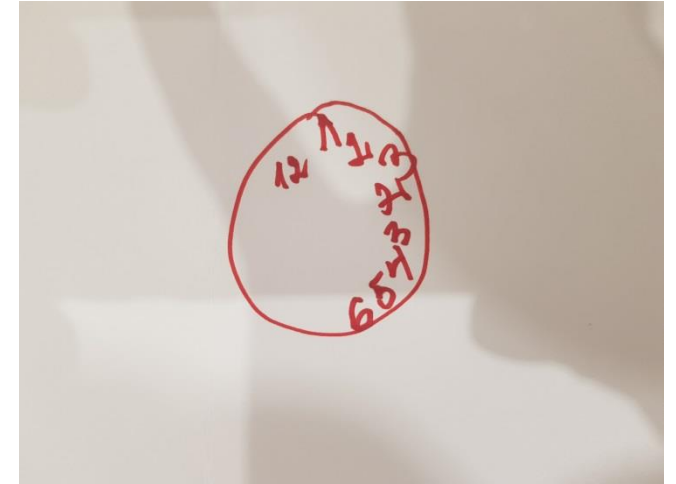
- left side hemiparesis;
- Hemispacial neglect.

# Case II (patient with right hemisphere syndrome) (cont.)

- Contact with the patient is good. Patient readily communicates, establishes eye contact. Disturbed orientation in space, time. Disturbed orientation in body scheme.
- Spontaneous speech preserved.
- Understanding of language preserved.
- Reading disturbed (ignores the left side, omits words, skips rows. So, the understanding of what is read is disturbed);
- Writing preserved.
- Cognitively linguistic assessment (disorders not detected).

# Case II (patient with right hemisphere syndrome) (cont. I)

- Audio record



- Applied methods of audio speech therapeutic rehabilitation.
- Further life quality and future perspectives.

# Case III (patient with neurodegenerative disease)

## **Anamnesis data**

- Male, born on 09.09.1945

## **Primary diagnosis :**

- Parkinson disease

## **Functional disorders caused by the disease:**

- impaired movement (body posture);
- dysarthria, dysphagia (mild);
- cognitive disorders.



# Case III (patient with neurogenerative disease) (cont.)

- Contact with the patient is good. Patient readily communicates, establishes eye contact.
- Discoordination of articulatory organs.
- Narrowed voice range.
- Spontaneous speech preserved.
- Understanding of language preserved.
- Reading preserved.
- Writing preserved.
- Cognitive disorders.

# Case III (patient with neurogenerative disease) (cont. I)

- RehaCom results
- Applied methods of audio speech therapeutic rehabilitation.
- Further life quality and future perspectives.

# Alternative and augmentative communication

Speech language therapist, Liene Gutmane, MSc

# Acquired communication disorders – alternative and augmentative communication

- Alternative and augmentative communication is used for patients with severe communication disorders where the language skills are insufficient to communicate verbally or where verbal communication is impossible.

Alternative  
communication  
(substituting)

- Used if the patient used has severe disorders (there is practically no verbal communication)

Augmentative  
communication  
(supporting)

- Is used in case the communication is possible, but is not sufficient (verbal communication is limited)

# Aims when using the methods of alternative and augmentative communication

1. Extend the active and passive vocabulary;
2. Integrate the alternative and augmentative communication techniques.

# Before selecting communication auxiliary aids, the following must be clarified :

- Form of the acquired communication disorders, severity, manifestations;
- Presence of cognitive disorders;
- What are the physical abilities of the patient;
- What are the communication needs of the patient;
- Which of the alternative communication aids would be most suitable for the patient.

# Forms and devices of alternative and augmentative communication auxiliary

- Gesture, body language;
- Subjects;
- Photos, images;
- Pictograms, Bliss symbols, PECS;
- Communication books
- etc.

- Speech boards;
- Signal buttons;
- Touchscreens;
- Eye-controlled devices;
- Keyboard communicators;
- etc.



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