Neuro-sequential model: sequential and hierarchical

Complexity  Plasticity  dyadic relationship  ‘stress’
Key brain structures, roles, connections

- **Prefrontal cortex**
- **Hypothalamus**
- **Amygdala**
- **Hippocampus**

**Frontal lobe**
- movement
- intelligence
- reasoning
- behavior
- memory
- personality

**Temporal lobe**
- speech
- behavior
- memory
- hearing
- vision
- emotions

**Parietal lobe**
- intelligence
- reasoning
- telling right from left
- language
- sensation
- reading

**Occipital lobe**
- vision

**Cerebellum**
- balance
- coordination
- fine muscle control

**Brain stem**
- breathing
- blood pressure
- heartbeat
- swallowing
Vestibular system

Central connections of the vestibular system

To cerebral cortex

Oculomotor nucleus

Thalamus (VPM nucleus)

Trochlear nucleus

Abducens nucleus

Medial lemniscus

To cerebellum (through its inferior peduncle)

Medial longitudinal fasciculus

Ascending component

Descending component

VESITIBULAR NUCLEI

Vestibulospinal tract

Lopex, (2013); Mast et al (2014); Edoctoronline.com,
Spatial cognition, body representation and affective processes: the role of vestibular information beyond ocular reflexes and control of posture

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What do we see?

Effect of Trauma— psychological / physical
- Posture
- Breathing pattern dysfunctions
- Physical injuries, dysfunctions, limitations

Neurological soft signs and sensorimotor dysfunction
- Developmental dysfunctions and retained reflexes
- Abnormalities of tone, movement
- Balance
Neurological soft signs & motor dysfunction

Excess of NSS in 1st episode psychosis
  - Motor coordination/sequencing
  - Sensory integration
  - Developmental reflexes

Study NSS prevalence 20-97.1% 1st episode psychosis

NSS presence in general population ↑ likelihood of adult onset schizophrenia or affective psychotic disorders
Current paradigms

In addition to pharmacologic/ metabolic/ genetic/ nutritional/ psychosocial factors, research in the last 25 years appears to support underlying neurobiological contributing factors:

- Trauma
- Neurodevelopmental
- Neural Connectivity
Neurobiological Paradigms informing therapy interventions

Neuroplasticity and neurogenesis

Bi-directional connection and influence between body and brain

Sense of ‘safety’ - ‘Window of tolerance’

Interoception is the basis of emotion

The ‘state’ of the body affects personal resource
Shaping the mind: ‘Safety first’

Calming the ‘smoke detector’
- Oxytocin - neurotransmitter of connection
  - social engagement,
  - ‘Good’ touch, warmth, pleasant activities, Support/positioning

- Autonomy and predictability

- Removing limitations, restoring function
  - pain
  - Joint restriction
Shaping the mind: Regulating Neurophysiology

Autonomic nervous system
  ◦ Muscle tension release
  ◦ Breathing pattern dysfunction

Interoception
  ◦ Mindful attention to sensory/body/movement
Shaping the mind: integration

Afferent and efferent systems - Sensorimotor processing
◦ vestibular system
◦ muscle activation
◦ posture
◦ ‘tone’

Synchrony and attunement – rhythmic movements
Physical activity...!
Not Psychotherapy .... but psychotherapeutic

Sense of Safety – regulation of survival ’state’

Increase capacity by reducing dysfunction, inefficiency and effort:

Work with the body, retrain the brain and central nervous system

Increase capacity and resource for self, for connection, for life
Conclusion

Clinical presentation indicative of underlying neurobiological dysfunction

Physiotherapy interventions enhance neurobiological integration
...to increase capacity and resource
....for self, for connection, for life
References


Catts et al. (2013). Rethinking schizophrenia in the context of normal neurodevelopment Frontiers in Cellular Neuroscience. Volume 7 | Article 60


References


**Te Tinana – the body**

Systems to support life
- 11 major organ systems – include Circulatory, respiratory, excretory, digestive, nervous, endocrine, immune, integumentary (skin) reproductive, and musculoskeletal ...
- Maintaining balance - *homeostasis*
- adjusting to demands - *allostasis*

Vehicle for ‘self’
- inner sensations, perceptions, desires, fears...
- Outer world...

connection with others
- non verbal language is up to 90 % of all communication
- Posture, movement and physiology