# Neuropsychological Rehabilitation

## Prof. Alessandra Maietti

***COURSE AIMS AND INTENDED LEARNING OUTCOMES***

The course aims to provide students with the basics of neuropsychological rehabilitation of cognitive and behavioural disorders following injury or dysfunction of the central nervous system. In particular, the course aims to: a) present the most frequent cognitive and behavioural disorders resulting from acquired brain injury in the adult subject; b) illustrate the main and most recent rehabilitation methods and their applications in various disorders, with relative analyses of supporting clinical cases.

*Intended learning outcomes*

*Knowledge and understanding:*

At the end of the course, students will be able to relate the neuropsychological clinical signs of an acquired brain injury to the most appropriate diagnostic and rehabilitative process. In particular, they will be able to:

– identify the elements needed to implement a neuropsychological rehabilitation programme;

– know the elements needed to define the objectives of neuropsychological rehabilitation;

* know the differences between and applicability of various rehabilitative approaches, distinguishing the strengths and weaknesses of each strategy.

*Applying knowledge and understanding:*

At the end of the course, students will be able to develop intervention projects for neuropsychological diagnosis and rehabilitation.

*Autonomous judging skills:*

At the end of the course, students will be able to correctly integrate the knowledge acquired to develop autonomous skills in identifying the most appropriate methods of cognitive-behavioural rehabilitation following acquired brain injury.

*Communication skills:*

At the end of the course, students will be able to communicate the scientific knowledge acquired in a clear and unambiguous way, using appropriate technical language.

***COURSE CONTENT***

The course considers the theories and techniques of neuropsychological rehabilitation of the most frequent cognitive and behavioural disorders following lesions or dysfunctions of the central nervous system.

Below is the course syllabus.

**Unit 0: Introduction**

* 1. **Premises**

Definition of neuropsychology

Definition of the neuropsychological assessment, objectives and fields of application

Definition of neuropsychological rehabilitation

Evolution of the concept of neuropsychological rehabilitation

Neuropsychological rehabilitation theories and models

* 1. **Brain injuries and possible consequences**

Neural substrates of cognitive-behavioural disorders

Stages of neuropsychological rehabilitation

Cognitive and behavioural disorders in focal and diffuse brain lesions

* 1. **Neuropsychological rehabilitation**

Definition of objectives

The rehabilitation team

Recommendations and guidelines

Use of technology

* 1. **The neurological bases of recovery**

Compensation, replacement and recovery

Plasticity and functional reorganisation

* 1. **General methodology of the neuropsychological rehabilitation intervention**

Assessment

Operating procedures

**Unit 1: Rehabilitation of attention disorders**

* 1. **Attention models**
  2. **Components of attention**

Intensive components

Selective components

* 1. **Disturbances in attention and neuropsychological syndromes**

Focal and diffuse brain injuries

* 1. **Clinical assessment of attention disorders**
  2. **Rehabilitation of attention disorders**

Environmental changes

Compensatory skills

Restorative exercises

INCOG recommendations

Evidence Based Machine and literature reviews

Pencil and paper and computerised exercises

**Unit 2: Rehabilitation of Unilateral Neglect**

* 1. **Unilateral Neglect (UN)**

UN syndrome

UN phenomenology

Frequency and course of UN

* 1. **Assessment of the UN**

personal space

Extra-personal space

Imaginative space

Disease awareness

Ecological fallout

* 1. **Rehabilitation of UN**

Goals of rehabilitation treatment

Visual-exploratory methods

Sensory and motor stimulation

Modulation of intracerebral inhibitory processes

Improvement of sustained attention

Evidence Based Machine and literature reviews

* 1. **Clinical cases**

**Unit 3: Rehabilitation of executive functions**

**3.1. Introduction**

**3.2 Anatomical and functional structure of the frontal lobes**

**3.3 Clinical model**

**3.4 Frontal lobe syndromes**

Lateral convexity syndrome

Mesial frontal lobe syndrome

* Alien hand syndrome
* utilisation behaviour
* clinical case

Orbitobasal syndrome

* the case of Phineas Gage
* behavioural disorders
* social cognition
* clinical case

**3.4 Assessment of executive functions**

* tests and questionnaires

**3.5 Rehabilitation of executive functions**

INCOG recommendations

Metacognitive strategies

Problem-solving

Executive functions and activities of daily living

Organisation of the environment

Pencil and paper and computerised exercises

Clinical case

**Unit 4: Rehabilitation of memory disorders**

**4.1 Short-term memory and long-term memory**

Multi-component models

Short-term memory

Working memory

Episodic memory

Autobiographical memory

Prospective memory

Non-declarative memory

**4.2 Encoding, storage and retrieval processes**

**4.3 Memory disorders**

Anterograde amnesia

Retrograde amnesia

Global amnesia

Frontal amnesia

Temporal amnesia

Diencephalic amnesia

**4.4 Memory assessment**

Batteries

Long-term memory tests

Short-term memory tests

Autobiographical memory tests

**4.5 Rehabilitation of memory disorders**

Preliminary considerations

Compensatory strategies

* environmental modifications
* training in the use of external and active mnemonic aids

Instructional techniques

* mnemotechnics
* computerised methods

Reorganisation techniques

* cognitive methods

Behavioural compensation techniques

Efficacy of memory rehabilitation treatments

INCOG recommendations

Clinical case

**Unit 5: Rehabilitation of language and communication disorders**

**5.1 Aphasias**

Clinical models of aphasias

Fluent aphasias

Non-fluent aphasias

Speech disorders

Communication disorders

**5.2 Language assessment**

Batteries

Tests

Questionnaires

**5.3 The rehabilitation of language**

The treatment of communication disorders in the adult brain injury

Functional treatments

Use of alternative systems

Pragmatic approach

Conversationally oriented therapies

Treatment of phonological deficits

Treatment of semantic-lexical deficits

Treatment of morphosyntactic deficits

Conversationally oriented partner-centred therapies

Rehabilitation of social communication disorders

Communication aids

The INCOG recommendations

Treatment of severe aphasic disorders

Clinical case

**Unit 6: Rehabilitation of behavioural disorders resulting from acquired brain injuries**

**6.1 Premises**

The comprehensive-holistic approaches (Ben-Yishay 2008)

**6.2 Clinical classification of behavioural disorders**

Externalising symptoms

Internalising symptoms

Emotional and mood disorders

The bio-psycho-social approach

Behavioural disorders assessment tools

**6.3 Rehabilitation interventions**

INCOG recommendations

Environmental approach

Behavioural therapy

Cognitive-behavioural therapy

Comprehensive-holistic approaches

Rehabilitation of activation and motivation disorders

Rehabilitation of inhibition and self-regulation disorders

Clinical cases

***READING LIST***

**Reading list for the path based on the lecture contents**

Students will prepare by studying:

* the lecture notes and slides;
* additional materials posted on the Blackboard platform*;*
* a number of chapters (chapter 6 “Terapia dei disturbi della comunicazione nel cerebroleso adulto”; chapter 9 “Riabilitazione dei disturbi dell’attenzione”; chapter 10 “Riabilitazione dei disturbi di memoria”; chapter 13 “Riabilitazione dell’eminattenzione”; chapter 14 “Riabilitazione dei disturbi del comportamento conseguenti a lesioni cerebrali”; chapter 15 “Riabilitazione neuropsicologica dei traumatizzati cranici e di altre gravi cerebrolesioni”; chapter 17 “Lobi frontali, capacità esecutive e loro riabilitazione”; chapter 19 “Apporto della terapia occupazionale nel percorso riabilitativo cognitivo-comportamentale”) of the following textbook: Mazzucchi (edited by), La riabilitazione neuropsicologica: premesse teoriche e applicazioni cliniche, QUARTA EDIZIONE, Edra Edizioni, Milano, 2020.
* the following chapters:
* Di Pellegrino G. (2012). Meccanismi di plasticità neurale dopo lesione cerebrale. In Ladavas E. (Ed.) La riabilitazione neuropsicologica. Bologna: Il Mulino.
* Serino A. (2012). Programmare e valutare l’efficacia di un trattamento riabilitativo. In Ladavas E. (Ed.) La riabilitazione neuropsicologica. Bologna: Il Mulino.

**Reading list for the text-based path**

Students will prepare by studying the following compulsory texts:

Mazzucchi (Ed.), La riabilitazione neuropsicologica: premesse teoriche e applicazioni cliniche, FOURTH EDITION, Edra Edizioni, Milan, 2020.

Vallar, G., Cantagallo, A., Cappa, S.F., & Zoccolotti, P. (Eds.). (2012). La riabilitazione neuropsicologica. Un'analisi basata sul metodo evidence-based medicine. Milan: Springer.

Students will also prepare by studying the following compulsory articles and chapters (upon request, the lecturer will send them to the student):

- Di Pellegrino G. (2012). Meccanismi di plasticità neurale dopo lesione cerebrale. In Ladavas E. (Ed.) La riabilitazione neuropsicologica. Bologna: Il Mulino.

- Serino A. (2012). Programmare e valutare l’efficacia di un trattamento riabilitativo. In Ladavas E. (Ed.) La riabilitazione neuropsicologica. Bologna: Il Mulino.

- Wilson, B.A. (2008). Neuropsychological Rehabilitation. Annu. Rev. Clin. Psychol., 4, 141-162.

- Caprì, T., Fabio, R.A., Towey, G.E., & Antonietti, A. (2019) Current Theory. In Caprì, T., Fabio, R.A., Towey, G.E., & Antonietti, A. (Eds.) Attention Today. New York: Nova Science Publishers, Inc.

- Ponsford, J., Bayley, M., Wiseman-Hakes, C., Togher, L., Velikonja, D., McIntyre, A., ... & Tate, R. (2014). INCOG recommendations for management of cognition following traumatic brain injury, part II: attention and information processing speed. The Journal of Head Trauma Rehabilitation, 29 (4), 321-337.

- Tate, R., Kennedy, M., Ponsford, J., Douglas, J., Velikonja, D., Bayley, M., & Stergiou-Kita, M. (2014). INCOG recommendations for management of cognition following traumatic brain injury, part III: executive function and self-awareness. The Journal of Head Trauma Rehabilitation, 29 (4), 338-352.

- Togher, L., Wiseman-Hakes, C., Douglas, J., Stergiou-Kita, M., Ponsford, J., Teasell, R., ... & Turkstra, L.S. (2014). INCOG recommendations for management of cognition following traumatic brain injury, part IV: Cognitive communication. The Journal of Head Trauma Rehabilitation, 29 (4), 353-368.

- Ponsford, J., Janzen, S., McIntyre, A., Bayley, M., Velikonja, D., & Tate, R. (2014). INCOG recommendations for management of cognition following traumatic brain injury, part I: posttraumatic amnesia/delirium. The Journal of Head Trauma Rehabilitation, 29 (4), 307-320.

- Prigatano, G.P., Borgaro, S., & Caples, H. (2003). Non-pharmacological management of psychiatric disturbances after traumatic brain injury. International Review of Psychiatry, 15 (4), 371-379.

- Cattelani, R., Zettin, M., & Zoccolotti, P. (2010). Rehabilitation treatments for adults with behavioral and psychosocial disorders following acquired brain injury: A systematic review. Neuropsychology Review, 20 (1), 52-85.

***TEACHING METHOD***

The course includes classroom lectures, supplemented by multimedia presentations and material made available online, as well as by presentations of clinical cases with the aid of audio-visual materials aimed at developing the ability to analyse specific application situations and plan rehabilitative interventions. Attendance of lectures is therefore highly recommended.

***ASSESSMENT METHOD AND CRITERIA***

An oral exam aimed at assessing the student's understanding of the topics covered as well as their knowledge of the theory and methodologies presented. Students will be asked questions on the notions learnt, their understanding of concepts, and their personal re-elaboration skills (e.g. their ability to critically assess course contents, find links between topics, and apply their knowledge to concrete cases). Assessment will focus on relevance of students' answers, their appropriate use of specific terminology, reasoned and coherent structuring of argumentation, and their ability to identify conceptual links and open questions. In particular, the assessment requires the presentation of a chosen topic, the answering of a theoretical question, and the elaboration of a diagnosis and rehabilitation project related to the programme contents.

The result will be expressed out of thirty. A top mark will be awarded if the student is able to develop an adequate diagnosis and rehabilitation project from a formally correct theoretical and applicative point of view (with particular attention to the use of specific language). Based on the correctness and completeness of the exam, the mark will lie anywhere from 30 to 18.

***NOTES AND PREREQUISITES***

*It is useful*for students to have a basic knowledge of the concepts of clinical neuropsychology. Furthermore, a degree of intellectual interest in and curiosity towards neuropsychology and neuropsychological rehabilitation is assumed. Attendance is recommended for students of the second-year Graduate programme

Should the current Covid-19 health emergency not allow face-to-face teaching, remote teaching in synchronous or asynchronous mode will be guaranteed; this will be communicated in good time to students.

Further information can be found on the lecturer’s webpage at http://docenti.unicatt.it/web/searchByName.do?language=ENG or on the Faculty notice board.