ABSTRACT

We examined the effect of a neurocognitive rehabilitation method in a young patient with upper limb impairment after cerebral hemorrhage. The "Perfetti" Neurocognitive Rehabilitation considers rehabilitation as a process of relearning, so every moment is necessary to use the parameters of the movement (spatiality, temporality) that do not fall into the so-called neuromotor methods. It proposes the learning of movements, through cognitive exercises. In the context of therapeutic exercise, the patient is encouraged to solve the "problem" related to movement through the use of "perceptive hypothesis". The method is based on the recovery of learning, on the conception of the body as a receptorial surface and the idea that the movement represents a phenomenon of knowledge. The patient made neurocognitive therapeutic exercise associated with high intensity focused acoustic waves to optimize muscle tone and hydrokinesitherapy at the frequency of 3 sessions per week for 6 months.

The assessment was performed at the beginning (T0), mid (T1) and the end (T2) of the rehabilitation program, through: Multi Joint System; R.O.M. goniometric examination of the upper limb; Myometry; Fugl-Meyer Scale for the functional evaluation of the hemiplegic upper limb; Ashworth scale for spasticity. At the end of the rehabilitation program, we found improvement in upper limb proprioception; decrease in muscle tone at myometry in the upper limb flexors; increase in passive ROM of the shoulder; increase in the The Fugl-Meyer score; decrease in the Ashworth scale score. The proposed rehabilitation program is effective in improving the functional ability of the person with severe spasticity of the upper limb and functional deficit in the outcome of cerebral hemorrhage. The integration of functional neurocognitive rehabilitation in the treatment program is able to promote not only the recovery of the movement, understood as recovery of the articular range, but also the cognitive processes, perception, attention and the ability to solve problems through the stimulation of neuroplasticity.

INTRODUCTION: AVMs (arteriovenous malformations) are vascular abnormalities characterized by a pathological direct communication between arteries and veins, resulting from an abnormality in development where, due to an error embryogenetic, in a vascular district is missing the system of capillaries for which the arteries convey arterial blood (high flow and high pressure) directly into the veins along vascular channels abnormal, dilated and tortuous. These form a sort of ball called nidus. Although the lesion is present since birth, symptoms usually occur between 10 and 30 years. Symptoms may consist of: epilepsy; headache; cerebral hemorrhage; this last causes the compression of adjacent structures through hematoma with neuronal necrosis, and subsequent motor and sensory neurological deficits. Considering the age of onset of symptoms is easy to understand how motor deficits seriously compromise daily activities and social reintegration. The upper limb recovery, and in particular that of the fine movements of fingers, represents one of the most difficult challenges in the management of the hemiplegic patient. It is an important objective in the medium and short-term rehabilitation project and it is always useful to be groped in the first three months thus optimizing the full potential of neuroplasticity. Movement therapy in any case can not be limited to the construction and reconstruction of sensorimotor patterns or limited to a progression of motor functions, without considering intentionality and consciousness of the gesture. We define as cognitive a theory which considers that the quality of recovery, both spontaneous and driven by rehabilitation, is determined by the kind of the activated cognitive processes and the specific mode of their activation. The "Perfetti" Neurocognitive Rehabilitation considers rehabilitation as a process of relearning, so every moment is necessary to use the parameters of the movement (spatiality, temporality) that do not fall into the so-called neuromotor methods. It proposes the learning of movements, through cognitive exercises. In the context of therapeutic exercise, the patient is encouraged to solve the "problem" related to movement through the use of "perceptive hypothesis". The method is based on the recovery of learning, on the conception of the body as a receptorial surface and the idea that the movement represents a phenomenon of knowledge. For the re-acquisition of the ability to control the movement, are very important those afferences which may reach consciousness. A tactile stimulation on the palm of the hemiplegic hand determines, most times, a reflection of closure, whereas if the same stimulation is administered while the patient is required to pay attention on the extent of the stimulus, the patient will, in this way, relax the upper limb muscles. It is important to know accurately the dysfunctional motor pattern to correct all the elements which make it difficult relearning such as: abnormal response to stretching, irradiation, basic schemas, the deficit of muscle recruitment. The abnormal reaction to stretch can improve if we ask the patient to close...
his eyes and become aware of the movement (it is important to consciously control this response); irradiation in the hemiplegic
is activated at very low thresholds, thus preventing the learning of motor patterns due to the non-selection of necessary muscles
by the central nervous system; it is preferable to use evolved patterns instead of those basic (used in other functional
rehabilitation methods) as they allow to stimulate the adaptability and variability of the movement; the recruitment deficit is
considered both qualitatively and quantitatively. It is important to assess the learning mode, motion, interaction, attention and
imagination of the patient in the form of both cognitive and phenomenological consciousness.

METHODS: The clinical case is that of a female patient aged 28 years suffering from right hemiplegia cerebral hemorrhage
by rupture of the M1V, with severe deficit of active movement of the upper limb and severe spasticity. The patient made
neurocognitive therapeutic exercise associated with high intensity focused acoustic waves to optimize muscle tone and
hydrokinesitherapy at the frequency of 3 sessions per week for 6 months. The assessment was performed at the beginning
(T0), mid (T1) and the end (T2) of the rehabilitation program, to monitor the effectiveness of therapy and the trend of
recovery through: Multi Joint System; R.O.M. goniometric examination of the upper limb; Myometry; Fugl-Meyer Scale for
the functional evaluation of the hemiplegic upper limb; Ashworth scale for spasticity. The Multi Joint System is a system
with an anthropomorphic arm positioned parallel to the upper limb that is driven directly by the patient in all directions of
space, connected to a computer where it is shown and tracked paths to follow and allows to evaluate: proprioception and joint
range of active shoulder. The Myoton is a device able to measure the rheological properties or muscle: tone, elasticity and
stiffness in a noninvasive way.
The treatment, as described by Perfetti-Salvini, consisted of:
1) initial interview to understand what motivates the subject, talking with the patient and his family, as well as to take into
account the interests, acquisitions and the socio-cultural background of the environment
2) relaxation and adaptation by prohibition of the movement and description of some objects made to observe the patient; In
this way we obtain a reduction or disappearance of hypertonia and hyperreflexia.
3) passive mobilization: used to reconstruct the correct movement through special arrangements: shapes, very similar to each
other, are grouped together on a billboard, the patient sees them and than the therapist explains the differences; then the
patient with closed eyes is driven passively along the contours of one of these forms reproduced in relief, first with the index
finger, then the middle and ring fingers; when he opens his eyes on the billboard must be able to recognize the form that he
perceived by touch. The forms may be the most diverse, such as letters, common objects etc ...
4) active motility: exercises with gradual voluntary participation.
The treatment involves the increase and improvement in the control of: Abnormal Response to Stretch in the first phase;
control of irradiation in the second; recovery and monitoring of elementary schemes, by simultaneous recruitment of motor
units, optimization of motion trajectories in the third.

RESULTS: The mid-term result (T1) showed a percentage increase in muscle tone of the upper limb flexor muscles of the
upper limb estimated at 52% of biceps brachii, with simultaneous increase of the tone of the extensor muscles on load equal
to +17% and +60% on the triceps brachii on the extensor carpi; muscle tone of flexor carpi was reduced by 20%. At the
same time there has been an increase in the elasticity parameters (+28% on the biceps, flexor carpi about +8%) and stiffness
(+12.5% on the biceps, flexor carpi about +11.5%).
At the end of the rehabilitation program, we found a reduction of 23% of the error degree in the Multi Joint System trial,
indicator of improvement in upper limb proprioception; decrease in muscle tone at myometry in the upper limb flexors equal
to -16% on the biceps and -11% on flexor carpi; concomitant decrease of elasticity (15% and 7% respectively) and stiffness
(31% and 11.5% respectively). Increase in passive ROM of the shoulder of 34% in abduction and 31% in flexion, increase of
25% in elbow extension and 27% in wrist extension. The Fugl-Meyer score increased from 42 (T0) to 56 (T2); the Ashworth
scale score decreased from 3 to 2 at the level of the superficial and deep flexors of fingers and biceps.

CONSIDERATION: The proposed rehabilitation program is effective in improving the functional ability of the person with
severe spasticity of the upper limb and functional deficit in the outcome of cerebral hemorrhage. The evaluation of the
rheological parameters muscular showed a different trend in the first 3 months of treatment compared to the final evaluation
after 6 months, with a significant decrease in muscle tone of the flexor muscles at the end of the entire treatment period; this
is likely to be related even to the impact of the psychophysical state of the subject in the first period of treatment and the need
for adaptation by the establishment and consolidation of subjective motivation, the relationship with the therapist and the
gradual reduction of the emotional impact of disability. The decrease in muscle tone is accompanied by a simultaneous
reduction of the elasticity both in the extensor muscles and in the flexor muscles, probably due to the effort exerted by each
muscle to overcome the force exerted by his antagonist. The integration of functional neurocognitive rehabilitation in the
treatment program is able to promote not only the recovery of the movement, understood as recovery of the articular range,
but also the cognitive processes, perception, attention and the ability to solve problems through the stimulation of
neuroplasticity.