

- Dedicated team: stroke physician, trained nurses, physical therapy, speech therapy and occupational therapy.
- Immediate imaging 24 hours (CT or MRI), if not performed at the Emergency Room. It is realized that this criterion may not be met in all stroke units in all countries due to economic constraints.
- Written protocols and pathways for diagnostic procedures, acute treatment, monitoring to prevent complications, and for secondary prevention.
- Availability of neurosurgery, vascular surgery, interventional neuroradiology and cardiology is a part of a comprehensive stroke unit, but not required for a primary stroke unit.
- Immediate start of mobilization after the patient has stabilized and access to early rehabilitation.
- Weekly multidisciplinary team meetings with patient involvement are part of stroke unit care.
- Continuing staff education.
- Continuing education of patients/families/carers.

All stroke patients should have their rehabilitation needs assessed by a multidisciplinary stroke rehabilitation team with medical, nursing, physiotherapy, occupational therapy and speech therapy skills as well as with psychological expertise, when needed. Rehabilitation should be started during the first few days in a stroke unit or on a ward with dedicated stroke beds.

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Post-stroke depression

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Depression is a relatively common psychopathological comorbidity in stroke sufferers – the mean prevalence rate of post-stroke depression, in all stroke victims, ranges from 30 to 50%.

The occurrence of post-stroke depression (both major and minor) increases from 3 months to half a year after the incident. The most encountered types of mood disturbances after stroke are both major and minor depression with the clinical manifestations resembling those of idiosyncratic late-onset depression, with psychomotor retardation more frequently expressed.

Lately, a different form of mood disturbances in CVD had been postulated, i.e. vascular depression, that could be late-onset depressive disorder, found in patients with the overt or silent stroke or subcortical white matter ischemic disease. The symptoms of the disease should consist of: mood abnormalities, neuropsychological disturbances with – especially – executive functions impairment, tendency to psychomotor retardation, poor insight and impaired activities of daily living. It seems that many biological factors might be associated with the presence and characteristics of post-stroke depression (e.g. the stroke focus side, the size of the ventricles), however no firm conclusions can be established by now. Post-stroke depression has undoubtedly negative impact on the recovery of cognitive function and on the activities of daily living; what is more – it increases patients' mortality risk. It is strongly suggested that depression and stroke have bidirectional relationship and influence which means that patients with depression (especially the major one) have 2-fold greater risk of developing a stroke, even after controlling for other risk factors. The post-stroke depression should be treated with such antidepressive drugs as SSRI and tricyclic antidepressants of which fluoxetine and nortriptyline, respectively, have been found to be most effective.

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Evidence based motor rehabilitation after stroke

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Stroke is a leading cause of serious long-term disability in adults. Restoration of walking ability and gait rehabilitation as well as motor rehabilitation of upper extremity functions is therefore highly relevant for stroke patients and their relatives. To restore motor functions, modern concepts of rehabilitation favour a task-specific repetitive approach. In recent years it has also been shown that higher intensities of walking and grasping practice (resulting in more repetitions trained)

result in better outcomes for patients. Systematic MEDLINE search, search of the Cochrane database and of informal sources was performed for the motor rehabilitation of the upper and lower extremity function. For the upper extremity 40 references were identified that evaluate training therapy or neuromuscular electrical stimulation for arm paresis after stroke and describe either a systematic review, meta-analysis, randomized controlled trial or controlled cohort study. The evidence was grouped into three areas of interest: comparison of physiotherapy schools, effects of intensity of training and efficacy of specific arm rehabilitation techniques. The only physiotherapy school with evidence of superior efficacy was the task-oriented “motor relearning program”. Higher intensities of motor rehabilitation can accelerate motor recovery. Various training techniques with demonstrated efficacy were available for specific patient subgroups: arm ability training, constrained induced movement therapy (Taub), repetitive sensorimotor training techniques, robot-assisted training with several different mechanical devices, emg-biofeedback and functional electrical stimulation.

A similar approach was done for the lower extremity and for gait rehabilitation. In addition the EMBASE, PEDro (Physiotherapy Evidence Database) and COMPENDEX (engineering databases) were searched. Treadmill training, and training with electromechanical devices (i.e. “gait trainer”, LOCOMAT) were found to improve walking abilities. Music biofeedback was also shown to restore function. The application of antispastic medication or injection of botulinum toxin as well as orthotic devices were another interesting field of evidence based motor rehabilitation of the lower extremity.

This spectrum of efficient motor strategies available today in rehabilitation will be presented.

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Enhancement of stroke recovery

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THE ROLE OF MUSIC THERAPY IN THE RECOVERY AFTER STROKE

During the past decades a great achievements were done in the field of the stroke therapy, but still the greatest role in the battle against this disease lies on prevention and rehabilitation after the illness occurred. Early start and consistent physical rehabilitation is the absolute need for successful recovery of the patient’s motor skills as well as his/her psychological wellbeing. Many novelties are introduced in the physical therapy methods, among others the role of music is researched more than ever and very significant and optimistic results were established.

In the ancient times great scientists and philosophers explored and noticed the connection between music, human body and health. Pythagoras assumed that harmony of the music influences the harmony of the biological processes in the human body. Several thousands year after, modern technologies enabled almost direct view into the human brain and its functions, among others fMRI studies showed how music activates specific brain areas so today scientists have evidences of influence of music on healthy as well as on damaged brain. These studies have discovered that during listening to the music some areas of motor cortex are activated although the person is completely still. The similar situation occurs while person imagine some tune or rhythm. It is considered that music has complex influence on human brain, motor and sensory areas, what could be an explanation why music is a drive for dancing, singing or expressing of emotions by mimic and gesticulation.

The influence of music on healing processes was investigated by many scientists –medical and musical experts and the clear connection based on clinical studies between music and better recovery after stroke is shown. Particular benefit was shown in muscle and movement control, speech recovery, cognition and mood. Music with its rhythm especially helps recovery of walking, what was presented by researches at Colorado State University who stimulated stroke patients with rhythmic melody and after three weeks they were able to walk more steadily and had better balance than the patients without rhythmic stimulation. Since the area for singing is mostly speared in stroke patients with dysphasia, singing is of the great help in regaining speech abilities. Patients with stroke who have listened to the music during physical therapy had better results than the group without musical background during rehabilitation. Also, they suffered of depression in a less degree and they were emotionally more stable and more communicative than control subjects. Music therapy doesn’t consist only in listening to the music. Playing the instrument uses many aspects of the brain and body, it stimulates and synchronizes motor skills.

The incredible therapeutic power of music is not limited. Further studies should discover more methods of music therapy and more fields where it can be implemented.