Ultrasound Multidisciplinary Approach in Psychoneurorehabilitation: Ultrasound Evidence-based Medicine and Instrumental Monitoring in Treatment and Rehabilitation Practice of Acute Patients for Successful Outcome – Recovery and Socialization

Authors:

Ulyana Lushchyk, Viktor Novytskyy, Nadiya Lushchyk, Igor Babii, Viktor Vi. Novytskyy, Ivanna Legka

Veritas Research Center (Kyiv, Ukraine)
Veritas ITMEd Center for Medical Technology Transfer (Kyiv, Ukraine)
Clinic of Vascular Innovations (Kyiv, Ukraine)
Ukrainian Medical Innovations Medical Center (Ternopil, Ukraine)

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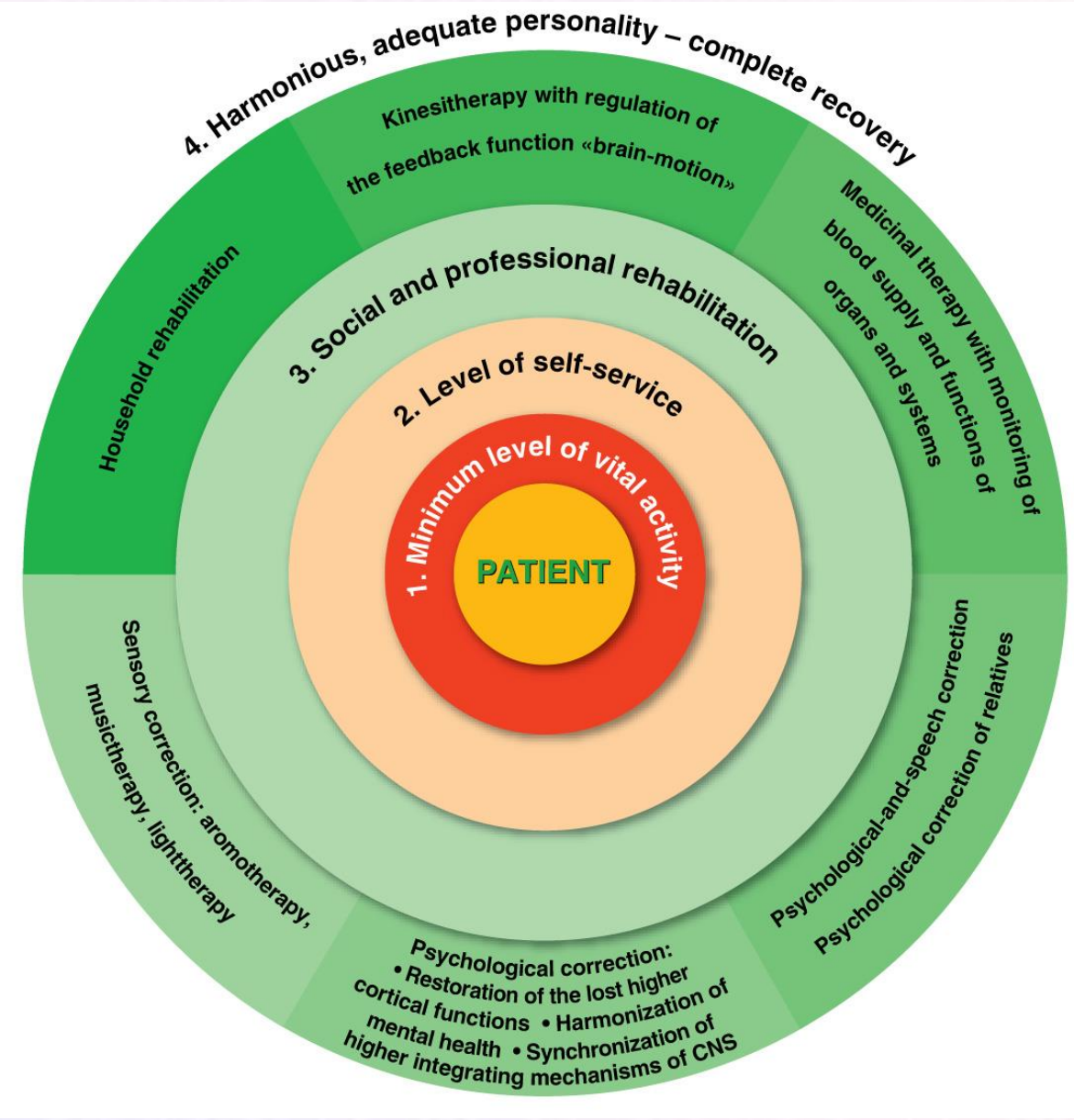
Aim

The use of complex ultrasound of organs and systems in psychoneurorehabilitation practice as a method of evidence-based medicine in the objectification of the patient's condition and risk management during **whole circle of long term** Neurorehabilitation.

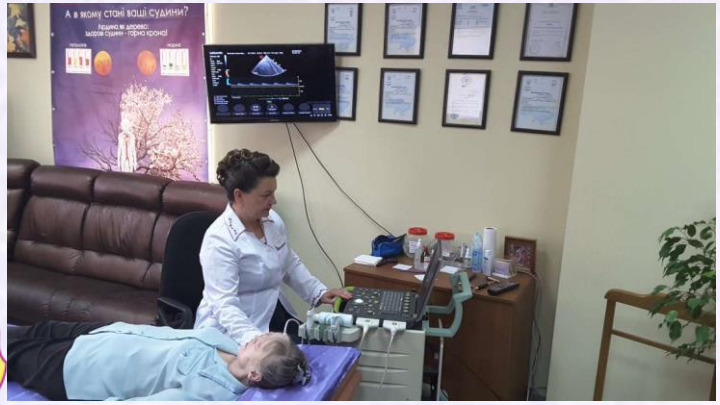
Recovery from coma to self-care level

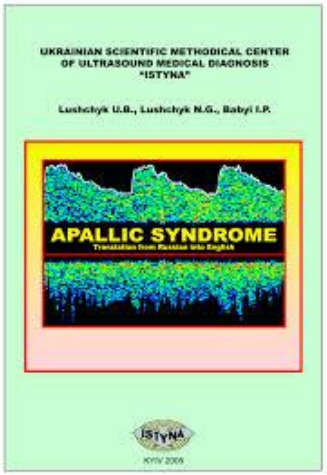


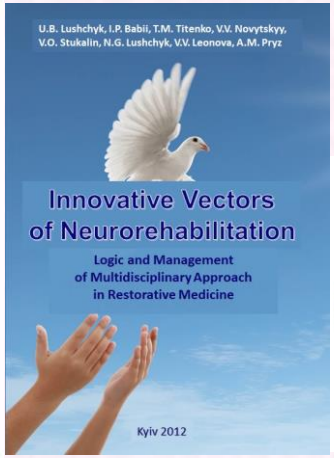
Methods

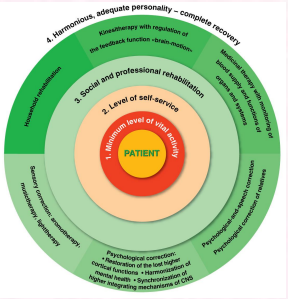
Ultrasound scanning and triplex angioscanning with the use of modern technologies of dopplerography, harmonics in the study of problem organs, zones and systems:

- ✓ **Neurosonography**
- ✓ **Transcranial Blood supply**
- ✓ **Echocardiography**
- ✓ **Neuromuscular and articulago-vertebral**
- ✓ **Abdominal and pelvic USD**





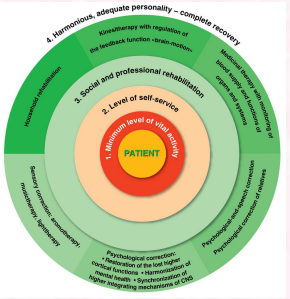




Triplex ultrasound is important in neurorehabilitation

Despite the pathogenesis of a disease, the following ultrasound examinations should be performed upon admission to neurorehabilitation:

1. **Neurosonography** - through a trepanation hole to determine the dynamics of ventriculodilatation of the lateral ventricles, ICH, the condition of cerebral angioarchitectonics, the level of arterial blood supply and the presence of venous brain pathology.



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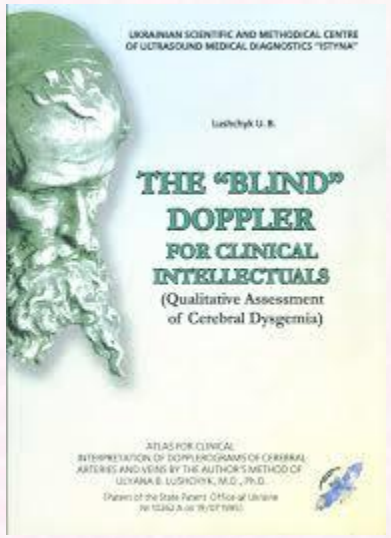
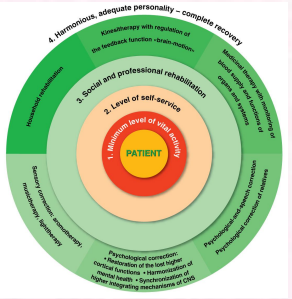
2. Transcranial Blood supply – pumping function of the myocardium, arteriovenous cerebral balance, abnormalities of the structure and function of the arteries and veins of the neck and head, diorder of the elastic-tonic characteristics of the vascular wall, intracranial hydrohemodynamic conflict.



Blood supply to the brain can reflect the readiness of brain structures for neurorehabilitation and determine the stage of neurorehabilitation (saving life, forming minimal self-care skills, restoring consciousness, restoring speech, readiness for verticalization and restoration of gait, etc.)



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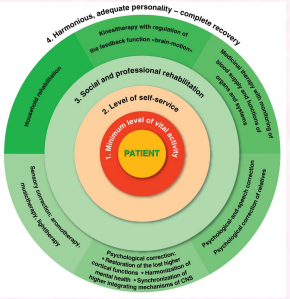
3.Echcardiography

The study of the structure of the heart cavities, valvular apparatus, ejection fraction is important for the formation of a plan for rehabilitation measures and control of physical load during neurorehabilitation.

Echocardiography should rule out the presence of postresuscitation defects - torn chordae, functional insufficiency of the aortic and mitral valves, the presence of thrombotic masses in the heart cavities, low ejection fraction, etc., in order to prevent possible critical conditions during neurorehabilitation.

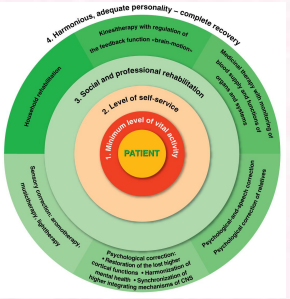


Triplex ultrasound is important in neurorehabilitation

4. **Neuromuscular and articularo-vertebral USD**

It is important to check the condition of the muscles of the back and limbs for possible tears (after injuries), myospasms, degenerative changes in the muscles, joints and spine after injuries, the severity of contractures.

Particular attention should be paid to the places of known fractures and check all joints and bones of the limbs for undiagnosed fractures, pathological growth of undiagnosed fractures.
If you do not do this, you can get a repeat fracture during neurorehabilitation.



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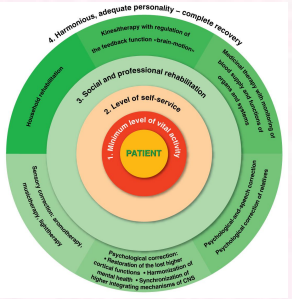
5. Abdominal and pelvic USD –

Hepatomegaly, uric acid diathesis up to urolithiasis, bladder dysfunction and bladder stones, coprostasis, decreased peristalsis, etc. - mandatory things to control before the start of neurorehabilitation after a long-term lying position of the patient.

Especially in those cases when the patient is in minimal consciousness or with aphasia.

The condition of the abdominal cavity and small pelvis that directly affects work capacity during neurorehabilitation.

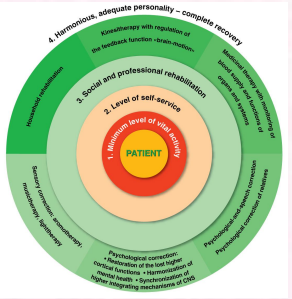


Triplex ultrasound is important in neurorehabilitation

6. **Ultrasound of the limbs:** blood supply to the upper and lower limbs, the permeability of the deep veins, the condition of the valvular apparatus of the deep veins.

Varicose veins, deep vein thrombosis are mandatory for control before starting neurorehabilitation.

The risk of thromboembolism should be excluded.



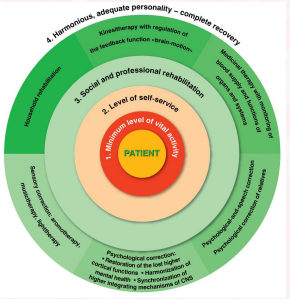
Results

Ultrasound support of psychoneurorehabilitation of patients

is a relatively young field in restorative medicine

and acute patients (often incurable conditions),

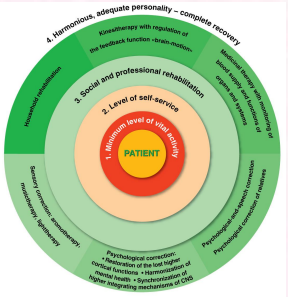
which aims to help the patient recover after the acute phase of the disease or exacerbation of a chronic disease.



Results

The logic of modern algorithms of the neurorehabilitation process involves

- assessment of the functional and structural state of a particular joint, the condition of the muscles of the musculoskeletal system during verticalization,
- the readiness of the cerebral blood supply and the level of consciousness for verticalization,
- the readiness of the corresponding brain areas to work on psychological, speech, and motor disorders after structural lesions of the brain and the need to monitor the degree of recovery of brain tissue and cerebral blood supply.

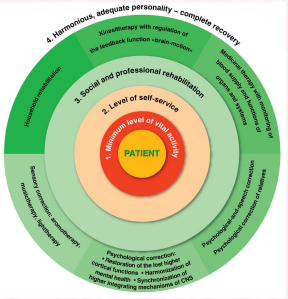


Results

- The lack of verification of such pathology in rehabilitation practice can lead to repeated fractures in case of contractures (without ultrasound of the joints and the state of the acoustic density of the bones, degenerative changes in the spine and joints)

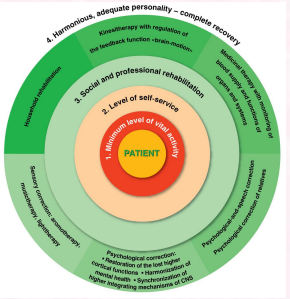
Or

- undiagnosed and pathologically fused fractures of the limbs after severe polytraumas and road accidents in patients after comatose conditions during verticalization and formation of walking skills,
- thromboembolism in patients with a minimal level of consciousness during uncontrolled (without ultrasound monitoring of the level of cerebral blood flow) use of the verticalizer.



Results

- Our experience has shown that ultrasound monitoring every 10-14 days is optimal for monitoring when the patient is slightly undergoing rehabilitation programs.
- In critical cases, ultrasound monitoring can take place daily in the first days of rehabilitation in order to control the adequacy of the load and reserve capabilities of the body until the formation of stabilization of hemodynamic indicators at the level of both systemic and risk regional hemodynamic indicators.



Conclusions

Ultrasound screening of organs and systems is extremely important

for the management of patients in psychoneurorehabilitation practice

in order to minimize the risks of complications and critical conditions

in the process of recovery of patients after serious diseases of various genesis both at the level of background diagnostics and in the mode of monitoring sanogenic changes in the body.

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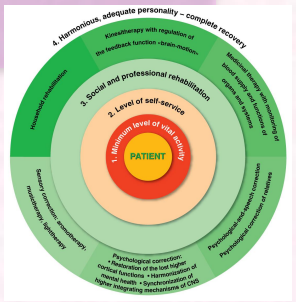

Thank you for your attention!

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+38 (093) 135 61 87
(WhatsApp, Viber, Telegram)
Veritasangio@gmail.com