

Intensive Neurophysiological Rehabilitation System The Kozijavkin Method

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It is well understood that Cerebral Palsy is caused by many different noxious factors applied to the developing brain. Nowadays, more than 400 different causes are known, which determine very different clinical signs in each child affected. Each patient is a peculiar individual, and therefore one universal way of treatment cannot be applied to all patients.

Unfortunately, the use of only traditional methods of physical therapy and rehabilitation fail to bring the desired results in many cases. The therapy should not have a single focus. Only an individualized combination of different treatment modalities can achieve the desired results.

One such multimodal approach to the rehabilitation of patients with CP is the Intensive Neurophysiological Rehabilitation System (INRS), also known by the name of its author – the Kozijavkin Method.

Stimulating compensatory possibilities and brain plasticity, this method creates a new functional state which opens the possibility for faster motor and mental development of the child.

Different rehabilitation modalities of this system complement and intensify each other, and are aimed at the main task of rehabilitation: improvement in the quality of the patient's life.

It is important to stress that the Kozijavkin Method is not an alternative to existing rehabilitation approaches. It complements and significantly increases the efficiency of many other existing rehabilitation systems. The new functional state, created by the INRS, along with muscle tone normalization, joint mobility restoration, improvements of tissue trophicity and blood circulation, opens new wide possibilities for the development of the child and enhances the results of other rehabilitation treatments.

The Kozijavkin Method was created 15 years ago in the Ukraine and thus far, more than 15,000 patients have been treated by this method, including about 7,000 from Germany, Austria, Switzerland, and France.



Fig 1. Geography of our patients

More than 40 families from the United States have also traveled to the Ukraine to experience this treatment.

Already in 1993, the rehabilitation system has been officially recognized by the Ukrainian government. Due to the high level of success with the Kozijavkin Method, it has received international approval and has been included in the encyclopedic edition of child orthopedics by the well-known German professor, Frits Niethard (1998), as one of the four most effective approaches to the rehabilitation of Cerebral Palsy.

Statistical analysis of the medical records of a group of 12,256 patients treated by the Kozijavkin Method confirmed the high efficiency of this rehabilitation system.

Muscle tone normalization was noted in 94% of patients, improvement of head control in supine position was noted in 75% of patients, 62% of the patients who were unable to sit before the treatment have learned to sit, 19% of patients began to walk without assistance, and 87% of patients after the treatment were able to open their spastically fistened hand*.

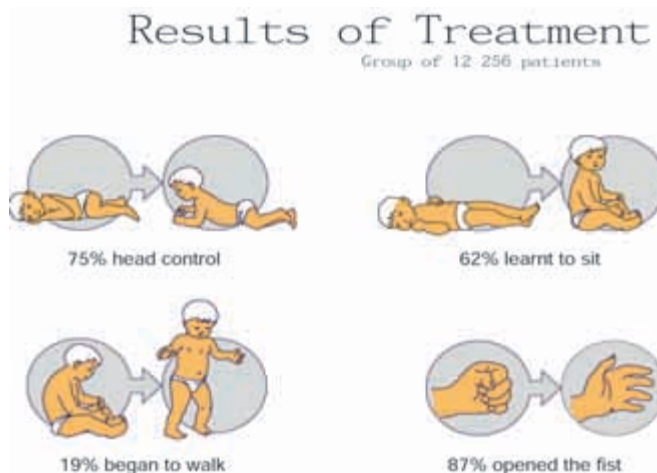


Fig 2. Results of the rehabilitation by the Kozijavkin Method

Over the past few years, the interest in our rehabilitation system has grown in the USA. Beginning in 1999, our doctors have made presentations of the Kozijavkin Method in the USA and this information was accepted with great interest at the University of Illinois in Chicago (1999), the Cleveland Clinic (2000), the conferences of the American Academy of Physical Medicine and Rehabilitation (2000), and at the American Congress of Rehabilitation Medicine (2001). Several special conferences and workshops have been conducted in New York, Ohio, Florida, California and Washington.

This article about the basics of our rehabilitation system will provide a clear explanation of the Intensive Neurophysiological Rehabilitation System for health professionals, patients and parents.

History of the Kozijavkin Method

In the process of its rise and development, the Kozijavkin Method, Intensive Neurophysiological Rehabilitation System went through several evolutionary stages, constantly improving and adjusting. The basis of the rehabilitation system – the method of the biomechanical correction of the spine was worked out already in the late 1980's. The author of the method, Prof Kozijavkin, while treating patients with diseases of the nervous system and spine, had utilized the methods of manual therapy. With long-term experience, he discovered that the use of certain spine mobilization techniques resulted in normalization of muscle tone.

This practical experience encouraged the successful use of the spine mobilization techniques for the reduction of muscle spasticity in children with Cerebral Palsy.

However, the anatomical and physiological peculiarities of the child's spine required an adaptation of the classical methods of the manual therapy. Therefore, V Kozijavkin developed the original technique of the polysegmental biomechanical correction of the spine specific to the child.

For the first time a report about the new method of rehabilitation was delivered at the All-Union Research Conference on child neurology and psychiatry in Vilnius in 1989.

The new rehabilitation system awakened interest among doctors and researchers of the Soviet Union. In the same year, a commission of experts headed by the leading Soviet neurologist, Prof K. Semenova, confirmed the effectiveness of the new rehabilitation system.

In 1990 to enable wider implementation of the new rehabilitation system in Lviv (Ukraine), a new contemporary Rehabilitation Center was founded. This center began treating patients from the Ukraine and Russia. However, as information about the new rehabilitation system spread to Europe, the first group of patients from Germany arrived in the Ukraine for treatment in 1991. Positive treatment results have since led to an increase in the number of patients. Since 1993, a group of patients arrive for the treatment in the Ukraine routinely, twice a month, by a special flight from Frankfurt (Germany). In 1993 by the resolution of the Ukrainian government, this method has been officially recognized and recommended for the wide application in the medical practice.

In order to broaden the range of the research work and further refine the rehabilitation approach, a new Institute for Medical Rehabilitation was established. The main direction of its work was the further research in the medical rehabilitation of patients with diseases of the nervous system and spine. Employees of the Institute collaborate with Lviv Medical University, Ukrainian Research Institute of Neurology and Psychiatry, Kiev Medical Academy of Postgraduate Education, German Academy for Rehabilitation and Development, Munich Child Center, and many other scientific and practical institutions.

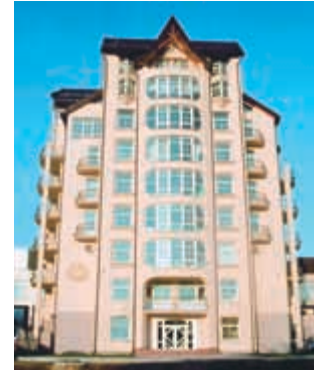


Fig 3. Institute for Medical Rehabilitation was established in 1996

Good results and the high efficacy of the new rehabilitation technology assisted in its recognition not only in the Ukraine, but also far abroad. Well-known German professor Frits Niethard in his encyclopedic edition of child orthopedics (1998) includes the Kozijavkin Method in the four most effective approaches to rehabilitation of Cerebral Palsy.



Fig 4. The encyclopedic edition in child orthopedics included the Kozijavkin Method in a list of the four most effective rehabilitation systems for patients with CP

For major achievements in rehabilitation research, a group of physicians headed by Prof Kozijavkin received the State Prize of Ukraine in the Field of Science and Technology in 1999.

To spread the advanced experience in the field of rehabilitation, our Institute in close cooperation with the department of physical therapy and rehabilitation of Kiev Medical Academy of Postgraduate Education has established educational postgraduate courses.

Since 1999, over 750 physicians of different specialties have become acquainted with the basics of the Intensive Neurophysiological Rehabilitation System during the advanced training courses.

In order to provide high-level accommodations for an increasing number of patients, and permit continued improvements and expansion in the rehabilitation system, a new contemporary International Clinic of Rehabilitation was put into service in the summer of 2003 in the ecologically clean area, in the health resort Truskavets.

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Pathophysiological basis of the rehabilitation system

The damage of the central nervous system in Cerebral Palsy is accompanied by the secondary changes of the musculoskeletal system and other systems of the body.

High muscle tone, pathological reflexes, improper body position, and pathological movement patterns cause changes of the joints, shortening of the spastic muscles, tendons and ligaments, and abnormalities of blood circulation and metabolism.

Those pathological changes are accompanied by restriction of joint movement and development of functional blockages.

As is evident in literature, functional blockages by themselves augment disturbances in trophicity, circulation, and autonomic functions resulting in further slowing and distortion of motor development in the child. A pathological vicious circle is formed.

In Cerebral Palsy, functional blockages develop in the majority of the joints. In the study of this phenomenon, most authors have addressed joints in the extremities, but there is little discussion of the more than 100 joints of the human spine in which functional blockages are also developing.

Our studies, which began in the mid eighties, showed the important role of the spine in the pathogenesis of Cerebral Palsy. The functional blockages are not limited to a single joint of the spine, but rather the blockages occur in several adjacent vertebrae resulting in polysegmental spinal blockages.

These spinal blockages influence all the organs of the human body which are innervated by the corresponding segments of the spinal cord.

The segmental interactions are disturbed (both with respect to innervation of the organs and systems innervated by the same segment of the spinal cord), as well as those innervated by vertical connections of the segment with the higher centers of the nervous system (connections with brain stem, basal ganglia and cortex).

Proprioception may also be affected in CP. In the joints, tendons and muscles there are receptors that relay information about body position, equilibrium and movements. There are muscle spindles in the muscles, Golgi tendon organs in the tendons, and joint kinesthetic receptors in the joints.

Information from those receptors is essential, not only for the performance of all movements, but also for motor training and learning new movements.

Recent studies have shown that functional spinal blockages are blocking and distorting the flow of proprioceptive information from the musculoskeletal system through the central nervous system, which further complicates the motor development of the CP patient. In an attempt to correct the above-mentioned pathological signs, the method of biomechanical correction of the spine and large joints has been developed. This method became the basis of the Intensive Neurophysiological Rehabilitation System.

The technique of the biomechanical correction releases functional blockages of the spine, restores joint mobility and opens the "gate" for the flow of the proprioceptive information to the central nervous system.

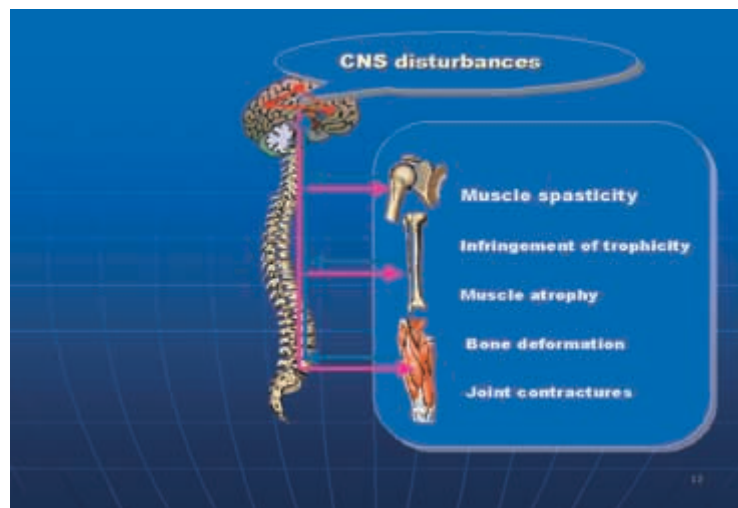


Fig 5. Releasing of functional spinal blockages opens the flow of the proprioceptive information to the central nervous system and creates a new functional state in the individual.

The results of this technique are not limited to the changes in joint mobility, but are accompanied by complex changes in the body – the so-called new functional state is created. The muscle tone is normalized, and tissue trophicity, blood circulation, and metabolism are improved. The new functional state significantly enhances the possibility for faster motor and mental development.

However, isolated use of the biomechanical correction of the spine is not sufficient. It only creates the basis for the possible future development of the child.

This rehabilitation approach assumes that the human body is a complex self-organizing system, made up of many subsystems which can exist and develop normally only if their interconnections are ordered and harmonious.

The damage or malfunction of one subsystem disturbs the function of the entire organism as is the case in CP. When self-regulation is not sufficient, the dysfunction of the whole body occurs.

Influencing the different chains of the pathological process with different modalities, our task is to break the pathological vicious cycle, create a new functional state in the body, and open up the possibilities for faster motor development.

Hence, the Intensive Neurophysiological Rehabilitation System was created. It combines different treatment modalities that complement and reinforce each other. The method of biomechanical correction of the spine, combined with other treatment methods, is used to prepare the child for the correction, sustain the achieved results, create correct movement patterns, and accelerate motor and mental development.

The pathophysiological mechanism presented above is only one of several hypotheses regarding the effects of this treatment method. Other hypotheses of the therapeutic influence of the Kozijavkin Method are now in the process of development.

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Principle of the Star in Rehabilitation

Some rules of the medical rehabilitation by the Kozijavkin Method could be illustrated using the principle of a pentagon star.

A man could be represented as a star and the points of which correspond to the hands, legs and head. All the points are joined around the center and the axis of the body – around the spine and spinal cord. Each point includes main structures – muscles, bones, joints, vessels, and nerves. The proximal large joints, big muscle groups, large vessels and nerves are situated near the center of the star. Distal small joints and muscles, tiny vessels and nerves are on the ends of the star points. Phylogenetically older structures of the brain stem occupy the most proximal areas of the point representing the head, followed by younger structures (basal ganglia), and distally the youngest structures, which determine higher functions – the brain cortex.

Tight interconnections of all the structures are necessary for the normal development of the body achieved by the efferent (from center to periphery) and afferent (from periphery to center) informational flow. Functional blockages of the spine in cases of CP patients disturb this interconnection, and block the flow of proprioceptive information. This could be presented as a disturbed interrelation of the star points. Restitution of normal interconnection among the points to achieve harmony of the star in the Kozijavkin Method is achieved using the principle from the “center to the periphery”.

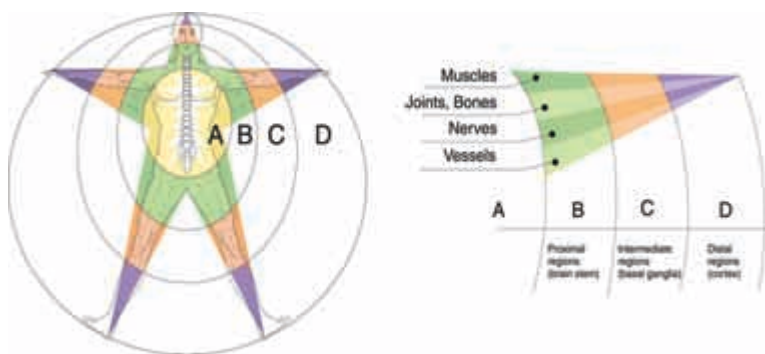


Fig 6. Principle of the Star in the Rehabilitation. The therapeutic influence starts on the central structures (circle A), then gradually added the influence on the proximal -B, middle-C, and distal-D structures of the body

In the early sessions the therapy is applied primarily on the central structure, the spine (circle A on the picture).

The purpose of this method is to release the functional spinal blockages, normalize muscle tone, tissue trophicity and blood circulation, and create a new functional state in the organism.

In the central nervous system this new functional state is manifested by the mental arousal of the patients, a psychological “awakening”, opening possibilities for the motor and mental development of the child and enhanced effectiveness of other treatment modalities.

The next step is meant to influence the proximal structures. The large joints of the shoulder and pelvic girdle are influenced utilizing the mobilization techniques of physical therapy and massage (circle B). Gradually the methods aimed at activation of the medium sized joints (circle C) are added, and finally the small distal structures are treated (circle D).

Creation of the higher and more “distal” fine motor functions of the hand, development of balance, and improvement of speech is possible only after the development of the previous, more “proximal” functions. The correction begins with the “central” structures, which affect phylogenetically older and more simple functions. Then the influence on the “proximal” and “middle” structures is added, and ultimately, the treatment of the “distal” structures, which fulfill a new and higher function merged.

Short Description of the Kozijavkin Method

The Kozijavkin Method or INRS consists of two subsystems – The Intensive Correction Subsystem and The Stabilization and Effects Potentiation Subsystem. The Intensive Correction is performed in the Rehabilitation Center and lasts for two weeks. In the period of Stabilization and Effect Potentiation, treatment is continued at home according to the recommendations given to the patient at the center. This period usually lasts from 6 to 8 months, at which point the patient is admitted to the center again for the next course of Intensive Correction.

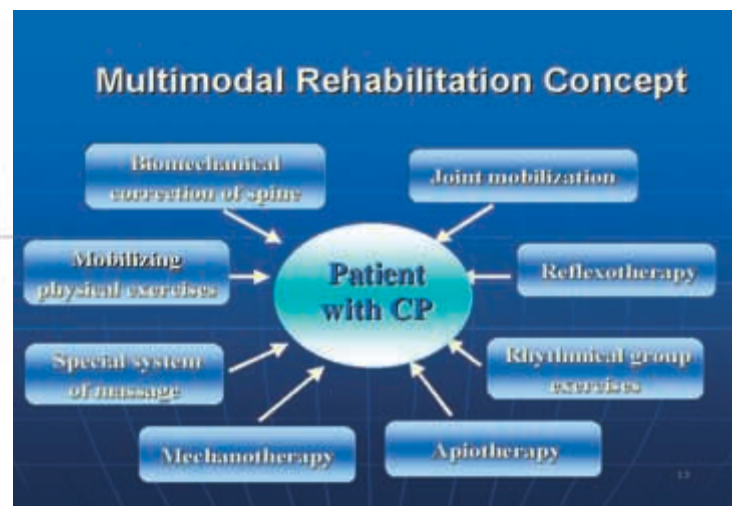


Fig 7. The Kozijavkin Method is a multimodal rehabilitation system

INRS is a multimodal rehabilitation system in which the influence of one component is complemented and intensified by the others. The main treatment programs include biomechanical correction of the spine, extremity joint mobilization, reflexotherapy, mobilizing physical exercises, special massage system, rhythmical group exercises, mechanotherapy and apitherapy which are described in the next section.

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Biomechanical Correction of the Spine

The basis of the rehabilitation system is the polysegmental biomechanical correction of the spine created by Prof. V. Kozijavkin MD. It is aimed at releasing the functional blockages of the spinal segments and resumption of normal mobility of the joints of the spine.



Fig. 8. Biomechanical correction of the spine is an important part of the treatment

Biomechanical correction of the spine is carried out consecutively in lumbar, thoracic and cervical regions. Lumbar spine correction includes simultaneous mobilization of all blocked movement segments using our method of “backward rotation”. Correction of the thoracic blockages is performed starting from the upper regions to lower using special impulse techniques. Corrections of the cervical spine are performed using movement with complex trajectory to simultaneously influence all blocked segments.

Extremity Joint Mobilization

Extremity joint mobilization is used for the improvement in mobility of the joints, stretching and improving muscle elasticity, stimulating blood circulation, and for prevention of joint contractures. Mobilization starts with the treatment of the large joints (hip, knee, shoulder) and then gradual involvement of the small joints. In our work we use classical principles and also newly created techniques. The joints in our rehabilitation system are brought out of the passive range of motion using a certain limited force. Gentle tactile traction methods are used in combination with vibrating movements, as well as an impulse technique of tapping along the joint cleft. During the treatment course the intensity of the mobilization increases gradually. Mobilization of the mandibular joints with the facial massage is used for improvement of articulation and chewing movements.

Reflexotherapy

The method of reflexotherapy serves to intensify the achieved spasticity reduction, eliminate trigger points in the muscles and correct autonomic disturbances. The biologically active points are influenced by means of a portable electric low voltage stimulator, which is applied to the points of classical meridians, as well as specific points. Influence on the trigger points is performed simultaneously with the post-isometric and post-isotonic muscle relaxation. Reflexotherapy is performed through intact skin and is painless.

Mobilizing Physical Exercises

Physical therapy is an essential part of the rehabilitation system. In our program we use mobilizing physical exercises that are aimed at the improvement of mobility of the joints of both the spine and extremities, creation of new motor patterns, and acquisition of the necessary mobility for daily life skills. The exercises are performed following the rule “from center to periphery”, so that the main influence is on trunk movement and proximal joints with gradual involvement of movement in distal small joints. New motor acts are taught first through passive movement, then through passive- active movement, and finally through active movement. Simple movements are undertaken first, followed by more complex movements. Daily sessions include breathing exercises, exercises for joint mobilization, as well as strengthening exercises.



Fig 9. Physical therapy is an essential part of the rehabilitation system

Special Massage System

In our rehabilitation program the special massage system is used to prepare for the biomechanical correction of the spine, muscle relaxation and reflexotherapy. It includes techniques of classical, segmental, and periosteal massage in combination with post- isometric and post-isotonic relaxation. In order for the biomechanical correction of the spine to be effective, the appropriate preparation of the musculoskeletal system is essential. Such preparation is provided by means of relaxation massage techniques. Elements of joint mobilization and acupressure are also included in the massage system. Techniques of stimulating massage are used for activation of hypotonic, weak muscles.

Rhythmical Group Exercises

Rhythmical group exercises are used to encourage emotional development and social integration of the child. Group exercises are performed with the elements of play therapy using music and dance. The patients are grouped by age and the level of motor ability and parents are also involved in these sessions. A positive emotional attitude assists in the stimulation of the patient’s motivation for recovery and strengthens their belief in their own power and potential.

Apitherapy

The method of apitherapy (treatment with bee’s products) in our rehabilitation system includes beeswax wraps and the application of bee venom. Apitherapy is used for the improvement of local blood circulation, metabolism and tissue trophicity. Allergy testing is performed prior to this treatment. In the technique of beeswax wraps,

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the warm packages of beeswax mixed with paraffin, honey and propolis are applied to selected joints or muscle groups. Along with the thermal influence, the diffusion of biologically active substances through the skin is important for muscle growth.

Mechanotherapy

Several methods of mechanotherapy are used to strengthen muscles, improve coordination and correct movement patterns. Lower extremity training is done using lever devices. The optimal training regime is set by adjusting levers, weights and the number of repetitions. Treadmill and cycling devices are used for the correction of lower extremity movement patterns. For the upper extremities we use primarily block devices. Devices such as the “Vibroextensor”, which combines heat, vibration and mechanical massage of the para-vertebral regions are also used.



Fig 10. Methods of mechanotherapy are used to strengthen muscles, improve coordination and correct movement patterns

Indications and Contraindications

Main Indications

- Cerebral Palsy (all forms)
- Gross and fine motor delay
- Post traumatic brain injury, stroke and neuroinfections at least 6 months after the event
- Vertebral pathology with low back pain
- Impairments of the autonomic nervous system, e.g. functional cardiac and respiratory complaints
- Headaches and Migraine

Contraindications

- Congenital anomalies of the vertebral column and of the central nervous system
- Expressed spine instability – spondylolisthesis, and osteoporosis
- Acute inflammatory and infectious diseases of the central nervous system
- Acute period after brain trauma and stroke
- Severe brain damage
- Decompensated Hydrocephalus
- Severe epilepsy and convulsions with frequent seizures
- Tumors of the spine, spinal cord and brain
- Inflammatory diseases of the spine
- Prior spine surgery
- Fragile medical condition
- Pronounced psychiatric disorders

In doubtful cases, the decision is made individually after extended examination and review of medical records.

Treatment results

The primary goal of the outcome studies of the Intensive Neurophysiological Rehabilitation System is the assessment of those functions which influence the quality of life, the main aim of our rehabilitation treatment. Therefore, the studies evaluate gross motor function, fine motor function of the hand, and mental development.

A four-level diagnostic algorithm has been worked out for the complex patient evaluation. It includes the preliminary selection of patients for treatment, obtaining data necessary for the development of individual rehabilitation programs, observation of the changes in the patient's conditions during the treatment and preparation of the home program for the patient.

In 2002, the extended analysis of the medical data of 12,256 patients treated with Intensive Neurophysiological Rehabilitation System was reported.¹

In this group, 89% of the patients were children with different forms of Cerebral Palsy, 6% - with disorders of the spine, 3% with residual conditions after damage of the central nervous system (stroke, brain trauma), and 2% with other conditions.

Among the CP patients, 73% had spastic quadriplegia, 16% spastic diplegia, 7% hemiplegia, 2% had hypotonic form and 2% - hyperkinetic.

The largest age group consisted of patients from 7 to 14 years – 36% (Fig 11). Unfortunately, only 3% of the patients began treatment below 4 years of age.

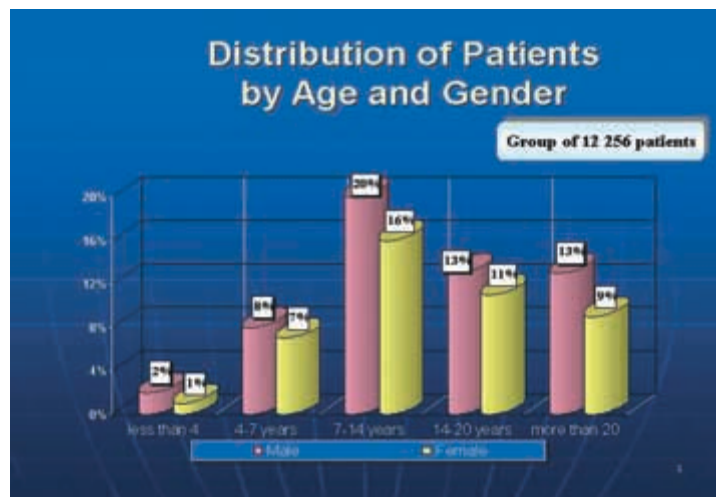


Fig 11. Distribution of Patients by Age and Gender

Before treatment in our clinic, patients have tried other rehabilitation methods: 73 % neurodevelopmental therapy (Bobath), 59% rehabilitation by Vojta, 18% Conductive Education by Petö, and 22% tried other treatment methods (Fig 12).

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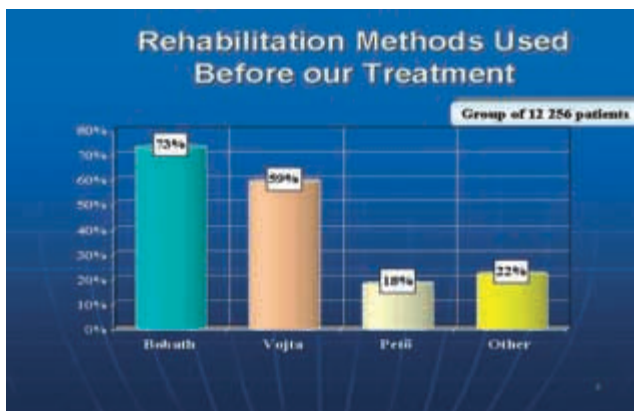


Fig 12. Rehabilitation Methods Used Before our Treatment

37% of patients were treated in the Clinic for the first time. 26% came for the second treatment, 14% of patients for the third visit, 9% for the fourth visit, and 14% for five or more times.

One of the important clinical signs of the CP patient is the alteration of muscle tone.

The Ashworth Scale was used for the assessment of muscle tone. Among the group of 10,793 patients with spastic forms of Cerebral Palsy, 93% of patients experienced a reduction in muscle tone. (Fig 13). In 7% of the cases, the muscle tone remained unchanged.

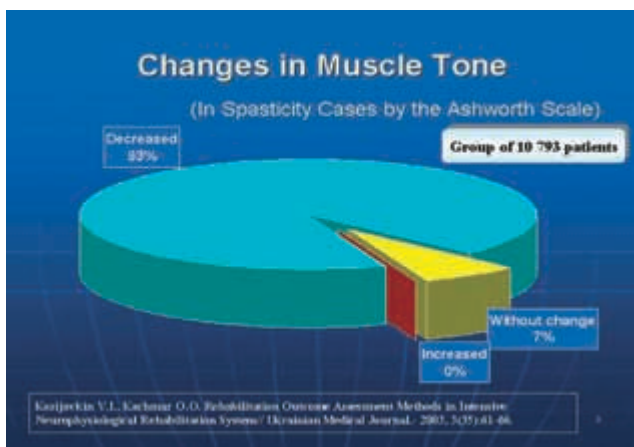


Fig 13. Changes in Muscle Tone

Range of passive and active joint movements is one of the important rehabilitation goals. Our results presents the changes of active and passive range of motion in large joints in a group of 10,793 patients with a movement limitation before the treatment.

After the treatment, the range of passive movement increased in 91% of the cases. The volume of active movements increased in 84%. Passive and active movements remain unchanged in 8 and 15% of cases respectively, and there was some reduction of the movements' volume in only 1%.

We have developed a scale of gross motor function, which was used to evaluate a group of 12,256 patients following treatment. 75% of patients without prior head control in the supine position

had learned to control their head. 62% of patients who were unable to sit, had learned to sit, 28% of patients had learned to crawl, 41% of patients who earlier were unable to stand, had learned to stand, and 19% of patients began to walk without assistance.

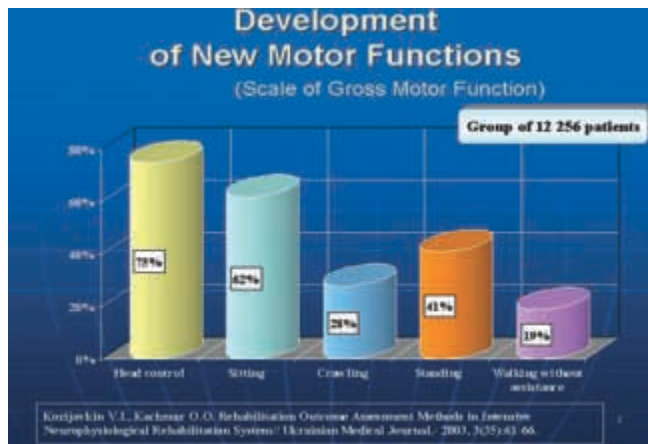


Fig 14. Development of New Motor Functions

The ability of the hand to grasp an object and release it are both important functions for independent life and both components are often disturbed in CP. The Sollerman Hand Test (1995) was used to evaluate the grasp function. Improvement of fine motor skills was noted in 87% of the patients that had problems with grasp before the treatment. Hand function was unchanged in 13% and there was no deterioration in any case.

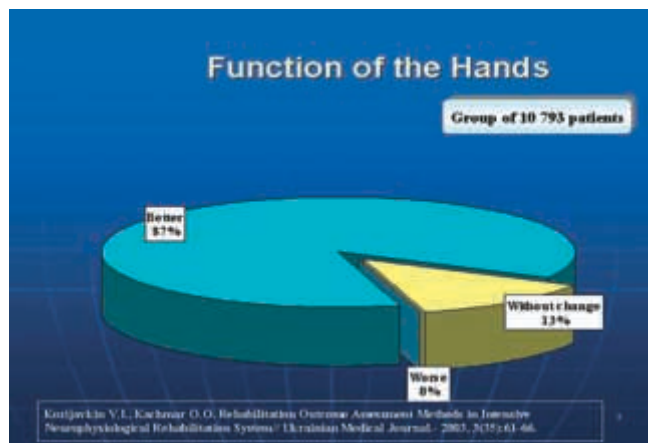


Fig 15. Function of the Hands

Once the child with CP returned home, further improvement of motor function was noted in 45% of cases if therapy was continued at home. In 47%, the achieved results remained at the same level and the results were deteriorated in only 8%, mostly after infection, diseases, or surgery.

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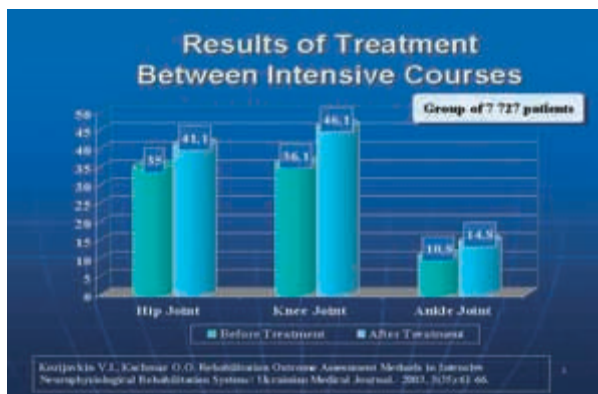


Fig 16. Results of Treatment between Intensive Courses

It was noted that the Kozijavkin Method of rehabilitation resulted in improvement not only of movement and posture, but also in the development of the psychological and mental function of the CP patient. 300 patients with CP were evaluated together with the Ukrainian Research Institute of Neurology and Psychiatry². Using the British Picture Vocabulary Scale, a significant increase of the intelligent quotient after the treatment was noted. In the case of the patients with spastic quadriplegia, the scores increased from 76 to 89 points.

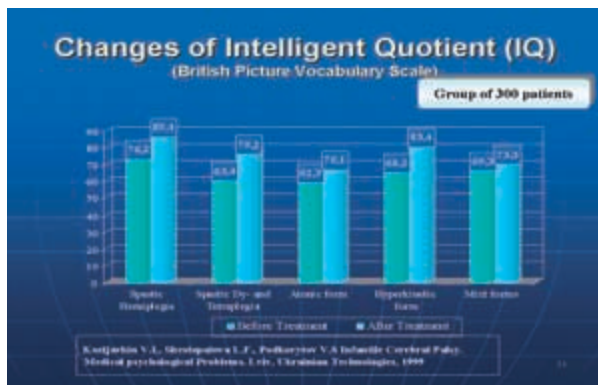


Fig 17. Changes of Intelligent Quotient (IQ)

Novelties in the Kozijavkin Method

Through activation of both internal compensatory potential and plasticity of the nervous system, the effect of Intensive Neurorehabilitation is the new functional state of the child's body. The next important step after the normalization of muscle tone and increase in range of passive and active movements during a rehabilitation course is to eliminate previous pathological movement patterns and to develop new, correct movements.

To solve the above problem, we created a new component and it was added to the program, which is based on the principles of dynamic proprioceptive correction.

All exercises of this program are carried out with the use of a biodynamical correction "Spiral" suit, which applies additional exertion to certain joints. This creates forces for the dynamic

correction of movements and posture of the patient, and assists in acquiring new movement patterns. While strengthening relatively weak muscle groups, especially the extremity extensors, this program promotes vertical positioning of the child.



Fig 18. Biodynamical Correction Suit "Spiral" with elastic straps to provide the necessary corrective force

The suit consists of a system of elastic straps which are wrapped in a spiral across the body and extremities. Imitating the positions of main muscle groups, they provide the necessary corrective force.

The straps can be attached to the supportive elements on the trunk and extremities (vest, shorts, knee, elbow, foot and wrist pieces). Velcro attachments on the straps allow for various adjustments to be made optimizing the corrective action desired.

The development of a new movement pattern and the correction of the posture of the patient is attained through the sum of forces applied by the appropriate placement of the elastic straps. Attention is paid to the peculiarities of a patient's musculoskeletal system and the goals of treatment.



Fig 19. Training in Biodynamical Correction "Spiral" Suit enhances physical therapy

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The biodynamical correction suit is used to enhance remedial gymnastic exercises, mechanotherapy, treadmill training, training with play therapy devices, and plain movement activity of the child.

For the relaxation of muscles and joint mobilization a “Dolphin-Imitator” is used. This device causes wavy movements of the ankles, which are propagated along the body. Those movements are much like the movements of a dolphin in the water.



Fig 20. Wavy movements of the ankles spreading along the body assists in spinal joints mobilization, relax spastic and overstrained muscle groups

An individual selection of frequency and amplitude provides movement waves, which pass along the whole spine and body assisting in spinal joint mobilization, relaxation of spastic and overstrained muscle groups, and improvement in blood supply and trophicity of the musculoskeletal system. This effect can be enhanced by comfortably positioning the patient, and by adding acoustic or visual stimulation during the treatment.

American psychologist, O’Gorman (1975) has mentioned that: “Motivation of the patient is the most important, yet the most difficult part of the work of the therapeutic professions”. Keeping this in mind, we have developed a series of special game- training devices aimed at the improvement of different movements and the activation of the patient’s motivation for training sessions. One of these is a hand-training device, which requires the patient to perform a specific exercise in order to successfully play a computer game. This stimulates the development of movement speed, increases movement amplitude, shortens reaction time and improves eye-hand coordination.

Specially developed existing computer games turn physical training into an effective, and most important, an interesting treatment procedure. Simultaneously, game software measures movement parameters – volume, speed, frequency, and all the data of each training session is stored, and can be used to analyze the patient’s progress.



Fig 21. Hand training device improves hand function in the game

Another device is a training chair in which a game is played with trunk movements. The training chair provides a method for developing body movement coordination and improvement of postural control. The chair is equipped with a special system of sensors, which determine position and movement of the body in three dimensions. The information is transmitted to a computer that operates a computer game. While taking part in the game, the patient directs a virtual object by bending forward and back, tilting to the side and rotating the trunk. To enhance emotional involvement of the patients, in some cases, virtual reality may be used.



Fig 22. Training chair. By bending forward and back, tilting to the side and rotating his trunk, a child plays a computer game.

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International Clinic of Rehabilitation

Increasing number of patients, constant development and expansion of our rehabilitation system, and the need of the patients for comfortable accommodations forced the creation of a new rehabilitation facility.

In the summer of 2003 in the ecologically clean area near the mountains, in the health resort Truskavets, a new 14 thousand sq. m International Clinic of Rehabilitation was opened. The new building, situated near a lake, is created in the Secession architectural style, distinguished by the escape and release from the old traditions and dogmas.



Fig 23. International Clinic of Rehabilitation

All the lobbies of the clinic are ornamented with flower decorative patterns made with stained glass with internal lighting. Stylized snowdrops and violets symbolize spring and revival of nature. Decorative patterns and ornaments are part of the art-therapy aimed at stimulating the patient's motivation for recovery and freedom from disease. Internal decorations, parquet and furniture were made with birch, a tree, known for its healing influence.



Fig 24. Lobbies of the clinic are ornamented with flower decorative patterns made with stained glass with internal lighting

The medical departments of the clinic are situated on the first and ground floor of the clinic and in the tower. Diagnostic departments were planned bearing in mind the main task of the diagnostics in the Intensive Neurophysiological Rehabilitation System – assessment

of the functional condition of the child, his adaptation and compensatory possibilities.

Contemporary diagnostic equipment makes a wide range of Neurophysiological examinations possible including tests of respiratory and cardiovascular systems, extensive study of gross motor functions, gait analysis, and hand functions.



Fig 25. Diagnostic equipment makes possible a wide range of examinations

Spacious rooms in the rehabilitation department with comfortable furniture and modern rehabilitation equipment ensure that training sessions may be carried out effectively and provide for the comfort of the patients and the medical personnel

Special rooms for mechanotherapy and physical therapy are equipped with the gear for strength training, improvement of movement coordination, gait training, and gradual body adaptation to its new functional state.



Fig 26. Rooms for mechanotherapy are equipped with all the necessary gear

Several rooms are specially equipped for training in the biodynamical movement correction program and for sessions of computer game training.

Computer network and specially developed software automate storing and analysis of all the medical data.

The Clinic also includes 100 living quarters, which provide all the necessary comfort for the patients and accompanying persons during the entire rehabilitation course. Modern interior design, nice furniture, and comfortable beds make the stay in the clinic suitable and cozy.

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TREATMENT METHOD

Spacious one, two or three-room suites with the living space of over 24 sq. m, are equipped with phone, refrigerator, TV, and Internet connection. Roomy bathrooms with the space of 6 sq. m are accommodated to the special needs of the residents.

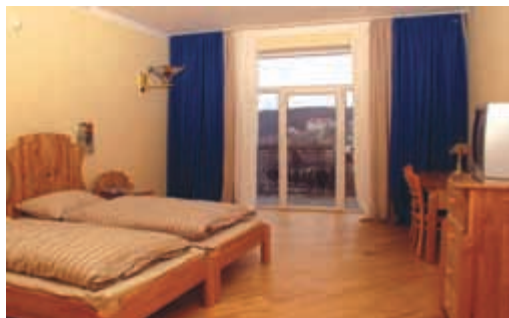


Fig 27. The Clinic includes 100 living quarters accommodated to the special needs of the residents

Standard services – laundry, ironing, clothes repair, etc are available for guest use. Room security is provided by electronic locks and a reliable access control system. Most technological processes of the clinic are automated according to the technology of “Clever House”. A comfortable restaurant, which seats up to 180 people is situated on the second floor of the clinic. Self-serving tables adapted for people with disabilities feature a large assortment of meat, fish and vegetable dishes, different juices, fruits, and confectionaries.



Fig 28. A comfortable restaurant is situated on the second floor

Patients, parents and accompanying persons may spend free time in a bar located on the first floor of the clinic. Different drinks, snacks, and confectionaries are served here in a cozy setting.

* More data is presented in the chapter treatment results

¹ Kozijavkin V., Kachmar O. *Outcome Evaluation of the Medical Rehabilitation in the Intensive Neurophysiological Rehabilitation System/ Ukrainskij medychnyi chasopys*, 2003; 3(35):61-66.

² Kozijavkin V, Shestopalova T, Podkorytov V. *Infantile Cerebral Palsy. Medical psychological problems*. Lviv. Ukrainski Technologij, 1999

Professor, MD, PhD, Specialist in Neurology and Manual therapy. Director of the International Clinic for Rehabilitation, Institute for Medical Rehabilitation and Rehabilitation Center “Elita”



Volodymyr Kozijavkin is a well-known specialist in neurology and medical rehabilitation and the author of a fundamentally new rehabilitation technology—Intensive Neurophysiological Rehabilitation System, known also under the name of its author – the Kozijavkin Method.

Volodymyr Kozijavkin was born on June 9, 1947 in Ukraine. In 1971, he graduated from the medical department of Grodno Medical Institute.

In 1990, he established the Rehabilitation Center “Elita” in Lviv. In 1996 he founded the Institute for Medical Rehabilitation, and in 2003 the International Clinic of Rehabilitation in Truskavets.

V. Kozijavkin makes an important contribution not only as a practical medical doctor. He is also a well-known scientist, the author of more than 100 research publications and 2 scientific monographs.

In 1992, he completed his postgraduate work: “Manual Therapy for the Rehabilitation of Patients with Cerebral Palsy”.

His practical, research, and public work were highly regarded by the Ukrainian government and in 1994 he was awarded the title of “Honored Scientist and Technician of Ukraine.”

In 1996 he completed his doctoral thesis: “Structural and Functional Pathology of the Spinal and Cerebral Structures in Patients with Cerebral Palsy and Rehabilitation System for such Patients”.

In 1996, he headed the newly established Institute for Medical Rehabilitation.

In 1997 he was awarded the Presidential Distinction and Honorable Order “For Great Services”.

In 1999, V. Kozijavkin became a professor in the department of medical rehabilitation and resort science of Kyiv Medical Academy of Postgraduate Education, and the Institute for Medical Rehabilitation became the research branch of this department.

In the same year, he became a winner of the State Prize of Ukraine in the Field of Science and Technology for the scientific proceeding, “Organic lesions of the nervous system in children, development and application of new methods of diagnostics, treatment, prophylactic, medical rehabilitation and social adaptation”

In June 2001, V. Kozijavkin was awarded the Bavarian (Germany) Medal “For efforts in helping children with special needs”.

In July 2003, the International Clinic of Rehabilitation was established in Truskavets and headed by Prof. Kozijavkin.

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TREATMENT METHOD

The Kozijavkin Method - A Parent's Perspective

By Regina Spinazzola-Kinney, MD

As a parent, I naturally have high hopes for my daughter, Laura, a bright 8-year-old with cerebral palsy, and have searched out many forms of treatment ranging from conventional physical therapy to Conductive Education. As a physician, I have evaluated many treatments that might benefit my patients as well. Some of my friends and former patients had visited the Institute for Medical Rehabilitation with impressive results, so in the summer of 2002, my then 6 year old daughter and I made our first trip to the Ukraine for treatment at the center.



I did not know what changes to expect, but was open to learn, observe, and help Laura get the most out of our visit. After the very first session of biomechanical correction of the spine with Prof. Kozijavkin, I was able to feel a marked decrease in her spastic muscle tone. The treatments began slowly, but new therapies such as massage, bees wax applications, mechanotherapy and vigorous physical therapy were added to the schedule every few days so that by the end of the 2 week session, Laura was quite busy. Once her muscle tone improved, she was able to perform many of the therapy activities more easily. She could learn new patterns of movement that had not been open to her before. In the evenings, there was time for relaxation and games of "floor hockey" and ice cream snacks with new-found friends from around the world. All of the staff at the Institute were extremely dedicated and worked hard to ensure that she put forth her best effort and made the most progress possible.

By the end of her 2 week session, Laura had better head and trunk control, was able to stand with less support and able to open her hands more easily. She and all the other children participated in "Olympic games" at the close of the treatment period. For the children, this was not only a fun-filled activity, but a culmination of all their hard work. Many proudly demonstrated newly acquired skills while their parents looked on with tears in their eyes.

When we returned home, family and friends were amazed at how much she had improved in such a short time. We have since made another trip to the newly opened, beautifully decorated treatment center, and again with very positive results. The combination of Prof. Kozijavkin's technique with many different modalities all under one roof is a truly impressive regimen, and we are planning to take advantage of this program often in the future.

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By Mrs. Linda Mograbi, Lawrence, New York

For the past three summers, my 12-year-old son, Sammy and I have traveled from New York to the Ukraine so that he can participate in the INRS treatment program at the International Clinic of Rehabilitation in Truskavets. Sammy has cerebral palsy in the form of spastic quadriplegia, athetosis and a stubborn ATNR (asymmetrical tonic neck reflex) that prevents him from bringing his hands to midline for functional movements. He can use a manual wheelchair and a walker with minimal assistance.

After each session Sammy has shown a notable, overall reduction in muscle tone, a greater range of motion in his joints, improvement in articulation and cognitive function and a reduction in his ATNR. He continued to show functional improvements for several months following the trip. Each year, I schedule a visit to our neurologist shortly after our return and these changes have been documented. Sammy has been able to maintain most of his gains and improve upon some by following the home therapy/activity recommendations made by Dr. Kozijavkin. Because of Sammy's extraordinary results, we plan to continue a yearly visit to the Clinic as part of his rehabilitation and to share our experiences with parents and professionals.

The accommodations are excellent, the staff is skilled, kind and professional, the food is healthful, the trip is long but manageable, the cost is reasonable and the results are remarkable. An itemized daily treatment plan/receipt is issued with American insurance codes. Since the majority of patients are European, it is advisable to plan your trip when other Americans will be attending to provide optimal socialization opportunities for parent and child.

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