DOI 10.18019/1028-4427-2018-24-3-404-410

Analytical review of scientific theses defended in 2016-2017 with the dissertation board D 999.063.03 at the Russian Ilizarov Scientific Center for Restorative Traumatology and Orthopaedics of the Ministry of Health of Russia, FSBEI of higher education "South Ural State Medical University" of the Ministry of Health of Russia and FSBEI of higher education "Tyumen State Medical University" of the Ministry of Health of Russia

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According to the order of the Ministry of Education and Science of the Russian Federation No. 53n/k of January 16, 2016, the dissertation board D 999.063.03 has the right to accept and assess dissertations for candidate of medical sciences and doctoral degrees in specialties 14.01.15 (traumatology and orthopaedics) and 14.03.02 (pathological anatomy).

In the second half of 2016 and in 2017, 12 dissertations were accepted and defended at the Board, including one doctoral and 10 for a candidate of medical sciences degree in specialty 14.01.15 (traumatology and orthopaedics) and one for a candidate of sciences degree in specialty 14.03.02 (pathological anatomy).

Kobyzev Andrey Evgenievich from the Russian Ilizarov Scientific Center for Restorative Traumatology and Orthopaedics of the Ministry of Health of Russia (Kurgan) presented and defended his doctoral dissertation on the topic ***"Experimental and clinical substantiation of the prognosis of idiopathic scoliosis in children"*** in specialty 14.01.15 (traumatology and orthopaedics). His scientific supervisor was Gubin Alexander Vadimovich, doctor of medical sciences, associate professor.

To create a system for predicting the course of scoliotic disease based on new data on the pathogenesis of spinal column deformity progression and treat patients with idiopathic scoliosis, a model of scoliosis was developed in an experiment on growing dogs using the method of controlled growth of vertebral bodies that provides temporary arrest of nutrition supply to a part of the growth zones of vertebrae.

The author of the dissertation studied pathohistological changes in the spinal cord and its roots, intervertebral disks and skin by scoliotic deformity of the spine. A working hypothesis of the pathogenesis of idiopathic scoliosis progression was proposed. The effect of the partial arrest of the enchondral nutrition of the vertebral growth zones on the organizational bone tissue remodeling of the bodies of the fixed vertebrae was studied.

For the first time, the use of temporal fixation of the functional spinal segment with a U-shaped bracket made of titanium nickelide with a partial block of nutrition of the vertebral growth zones from the convex side within the scoliotic curve was substantiated by a comprehensive study (experimental, morphological, clinical, and physiological) to prevent the development of severe deformities of the spine in patients with progressive idiopathic scoliosis

Theoretically, the importance of the study implies the proposed method for controlling the growth of vertebral bodies, substantiated in the experiment, which is the basis for creating a new surgical treatment system for patients with progressive idiopathic scoliosis. Based on the revealed radiological, morphological and functional signs that influence the rate of scoliotic deformity progression, a system for predicting the course of idiopathic scoliosis in children in the process of growth was proposed.

The use of diagnostic criteria for detecting the progression of idiopathic scoliosis, as well as rational schemes of administrative interaction between health care institutions, will enable, in the author's opinion, to identify patients at early stages of scoliosis development and to timely conduct the treatment aimed at preventing severe deformities.

In practical terms, the radiographic and morphometric data on the structure of the canine lumbar spine could be used to create experimental models of pathological processes of the spinal column during the growth of animals, as well as to arrest stenosis of the spinal canal

Diachkov A.N., Soldatov Yu.P. Analytical review of scientific theses defended in 2016-2017 with the dissertation board D 999.063.03 at the Russian Ilizarov Scientific Center for Restorative Traumatology and Orthopedics of the Ministry of Health of Russia, FSBEI of higher education "South Ural State Medical University" of the Ministry of Health of Russia and FSBEI of higher education "Tyumen State Medical University" of the Ministry of Health of Russia. *Genij Ortopedii*. 2018. T. 24. No 3. pp. 404-410.DOI 10.18019/1028-4427-2018-24-3-404-410. (In Russian)

in veterinary practice. To predict the course of idiopathic scoliosis, it is necessary to adhere to the algorithm of dynamic examinations proposed by the author and take into account the signs of deformity progression, which will allow choosing the right tactics and time of treatment. The use of the method for controlling the growth of vertebral bodies with U-shaped brackets made of titanium nickelide with partial disruption of the nutrient supply to vertebrae with the metal plate in patients with a high growth potential will stop the progression of scoliotic deformity of the spine. The use of the treatment protocol and registry of patients with idiopathic scoliosis in practice will eliminate the duplication of doctors' work, optimize the use of resources, and create an effective model for provision of specialized and high-tech medical care to patients with idiopathic scoliosis.

The dissertation holder proposed a new administrative organizational cooperation between medical institutions using patients' registry.

Ababkov Yuri Vladimirovich, also from the Russian Ilizarov Scientific Center for Restorative Traumatology and Orthopaedics of the Ministry of Health of Russia (Kurgan), presented and defended a thesis for the degree of a candidate of medical sciences on the topic ***"Differentiated approach to the treatment of patients with periprosthetic infection of the knee joint"*** on specialty 14.01.15 (traumatology and orthopaedics) with clinical substantiation of the effectiveness of a differentiated use of various surgical and fixation techniques for treatment of patients with periprosthetic infection, depending on the condition of the tissues of the knee joint. His scientific supervisor was Nikolay Klyushin, doctor of medical sciences.

The thesis deals with the issues of one of the most difficult and challenging problems of the locomotor system at present.

The author proved the clinical effectiveness of a differentiated, depending on the state of the tissues of the limb, use of various treatment methods for managing periprosthetic infection and the use of fixation on a large clinical material. The possibility of decreasing the amount and duration of antibiotic therapy to a single mandatory course was shown, which includes simultaneous administration of two enhancing each other antibiotics, regardless of the purulent inflammatory process grade. Indications for the use and an algorithm proposed for each of the techniques, as well as the technology of installation and dismantling of fixation devices were developed.

The author proved that the differentiated, depending on the condition of the knee joint tissues, use of different treatment methods and the corresponding fixation techniques decreased the number of purulent recurrences, ensuring limb weight-bearing during the entire period of osteosynthesis and subsequent rehabilitation, which creates optimal conditions for reparative process and has a positive effect on the emotional status of patients. Sufficient simplicity of the osteosynthesis techniques makes them accessible to a wide range of surgeons from various specialized departments of medical institutions.

Davydov Denis Albertovich, from Novosibirsk NIITO, defended his thesis for a candidate of medical sciences degree in specialty 14.03.02 (pathological anatomy) on the topic ***"Features of the femoral head tissue in dysplastic, post-ischemic, and post-traumatic coxarthrosis"***. His scientific supervisor was Avdalyan Ashot Meruzhanovich, doctor of medical sciences.

Morphological changes in the femoral head tissues that are characteristic of dysplastic, post-ischemic and post-traumatic coxarthrosis were described. It was established that fibrotic changes in the articular surface are most pronounced in post-traumatic coxarthrosis, while fibrosis of the bone tissue of the subchondral part of the femoral head is predominant in the dysplastic one. A characteristic feature of post-ischemic coxarthrosis is minimal fibrous changes in the joint surface and its maximum thickness. It was shown that the largest size of bone trabeculae was detected in dysplastic coxarthrosis, and with post-ischemic and post-traumatic coxarthrosis this indicator was of minimal importance. Moreover, in posttraumatic coxarthrosis, the bone trabeculae in the subchondral part of the head were closer to each other than in the pathological process of post-ischemic origin.

For the first time, taking into account the etiological type, such a compensatory adaptive mechanism to hypoxia as expression of VEGF by bone cells that develops in the femoral head in coxarthrosis was described. It was shown that in dysplastic coxarthrosis this mechanism is realized mainly by osteoblasts while in the post-ischemic one by osteoclasts. In coxarthrosis of post-traumatic etiology, osteoclasts and osteoblasts are equally involved in the implementation of this mechanism. Among the three etiologic types of coxarthrosis investigated, the least contribution to the realization of the compensatory adaptive mechanism to hypoxia is made by osteocytes. The assessment of the area of the vessels of the microcirculatory bed of the bone tissue of the femoral head showed that the vessels were much larger in post-ischemic coxarthrosis than in coxarthrosis of post-traumatic and dysplastic etiology.

By determining the level of TRAcP expression by osteoclasts and counting their number, it was found that the most intensive resorption occurs in the bone tissue of the femoral head in post-ischemic coxarthrosis. Differences in resorption between coxarthrosis of post-traumatic and dysplastic etiology are in fewer osteoclasts in the latter.

Proliferative activity and apoptosis of bone cells of the femoral head in coxarthrosis of various etiologies was described in detail. There was a statistically significant difference in the proliferative activity of osteoblasts in post-traumatic, post-ischemic and

dysplastic coxarthrosis. It was found that the expression of bcl-2 protein was carried out by both osteoblasts and osteocytes. The nature of this expression has its own peculiarities in etiologic types of coxarthrosis. Expression of p53 protein is carried out exclusively by osteocytes in a very small amount and does not have statistically significant differences in etiologic types of coxarthrosis.

For the first time, a correlation analysis of the expression of proliferation markers by the cells of the femoral head bone tissue and apoptosis identified the characteristic features of coxarthrosis of various etiologies. In dysplastic coxarthrosis, the inverse relationship between the expression of proteins p53 and bcl-2 by osteocytes and a direct correlation between the expression of bcl-2 protein by osteocytes and osteoblasts were found. A similar pattern was observed between the expression of bcl-2 protein by osteocytes and osteoblasts in the bone tissue of the femoral head in post-traumatic coxarthrosis. In post-ischemic coxarthrosis, the level of proliferative activity of osteoblasts directly correlates with the level of expression of bcl-2 and p53 proteins by osteocytes, as well as with bcl-2 by osteoblasts.

The features of the femoral head bone tissue that were revealed will help in determining a more targeted and effective correction, will assist in assessing the quality of conservative therapy and surgical treatment in both health care settings and in experimental studies.

Uskov Sergey Anatolyevich from the Chita State Medical Academy of the Ministry of Health of the Russian Federation defended his thesis for a candidate of medical sciences degree in specialty 14.01.15 (traumatology and orthopaedics) on the topic ***"Optimization of diagnosis and prevention of delayed consolidation in patients with fractures of long limb bones in the postoperative period"*** with the aim of improving the diagnosis and prevention of delayed consolidation in patients with traumatic destruction of long bones in postoperative period. The scientific adviser was doctor of medical sciences, senior lecturer Mironov Alexander Mikhailovich.

The investigator made a comparative analysis of clinical, laboratory and instrumental indicators on a large clinical material and evaluated their interrelation within the period of 90 days after long bones fractures in patients with favorable course of traumatic disease (group 1) and delayed consolidation (group 2). The effect of SNP genes TNFα (G308A), IL4 (C589T), IL10 (C592A), IL10 (C819T), IL10 (G1082A, TGFβ1 (Arg25Pro), VEGFR (A2073T) on the course of reparative regeneration in the postoperative period was investigated. A personalized algorithm for diagnosis and preventive treatment of delayed consolidation in patients with long bone fractures was developed. It was shown that the developed algorithm helps in diagnosis of reparative process that runs in bone tissue in patients with fractures of long bones from the first day of injury and in individual prophylaxis of delayed consolidation.

The practical significance of the results obtained in the study is that the systemic evaluation of the phase picture of reparative bone tissue regeneration based on the determination of bone resorption markers, microvessel parameters, biologically active molecules and genes influencing their synthesis, clinical and radiation methods of investigation makes it possible to objectively assess and dynamically observe patients' conditions after long bone fractures. The developed algorithm of individual diagnosis and preventive therapy of delayed consolidation will improve treatment results.

The approach to the diagnosis and prevention of delayed consolidation proposed is applicable for a wide use at specialized trauma and orthopedic clinics and departments.

Korobeinikov Anatoly Anatolyevich from the RISC for Restorative Traumatology and Orthopaedics (Kurgan) presented and defended his thesis for a candidate of medical sciences degree in specialty 14.01.15 (traumatology and orthopaedics) on the topic ***"Treatment of diaphyseal fractures of the forearm bones in children by the method of elastic stable intramedullary osteosynthesis"***. The scientific supervisor was Popkov Dmitry Arnoldovich, doctor of medical sciences.

The study was carried out to develop and perfect the methods of elastic stable intramedullary osteosynthesis in the treatment of diaphyseal fractures in children with the aim of improving the anatomical and functional results, reduce the duration of inpatient stay and achieve rapid social recovery of children.

The scientific novelty of the thesis is that the optimal surgical treatment tactics were determined depending on the nature and time relapsed since the injury and was based on the treatment results of 55 children with diaphyseal fractures of the forearm bones.

For the first time, the use of the method of elastic stable intramedullary osteosynthesis (ESIO) for closed fractures of the forearm bones was substantiated. The techniques were suggested that expand the indications to the use of ESIO in open, neglected fractures with a pronounced displacement of the fragments along the length and in combination with soft tissue retraction. The methods proposed by the thesis are characterized by all the positive features of the ESIO: low invasiveness, extrafocal nature, stability, possibility of early and full mobilization of the elbow and wrist joints and preservation of pronation and supination. They are perfectly adapted to the anatomical features of the child's body.

It was shown that the discharge of the child from the hospital is possible 5-8 days after the operation if the principles of the ESIO are strictly followed. By this time, the greater range of movements in the wrist and forearm restores and the child is able to self-service.

Biomechanical bench tests that were conducted to study the relationship between the elastic nail bending angle and stability of osteosynthesis showed that when

intramedullary nails are bent to 60° the resistance to angular shift increases significantly in the plane of the nail bending. With the bending angle of 90°, the displacement of the fragments is significantly less than in the standard recommended bending (40°), regardless of the plane of the applied forces.

The influence of the method used to perforate a hole for introducing fixation nails on the stability of an ESIO was proven. According to the data obtained, the nails installed through the holes formed by a drill tip the diameter of which coincides with the diameter of the titanium nail have greater stability to angular loading at an angle of 45° in the plane that coincides with the bending plane of the nails.

The ESIO technique for treatment of diaphyseal fractures of the forearm bones in children is highly effective which was proven by both clinical and radiographic studies. It achieves anatomical and early functional restoration of the injured segment.

Sequential application of transosseous osteosynthesis and ESIO in open fractures, reduction by distraction device and ESIO in fractures with pronounced displacement along the length and retraction of soft tissues, especially in fractures with a post-injury duration of 3 or more days, enables to avoid functional limitations and complications associated with prolonged use of external fixation and maintain all the advantages of ESIO in the types of fractures studied.

The parameters of the nail shape were determined to successfully perform osteosynthesis of bones with a narrow (in some parts) bone marrow canal without any loss of fixation stability.

Systemic and methodologically correct application of the method of elastic stable intramedullary osteosynthesis ensures a prompt social reintegration of the child.

Ochirova Polina Vyacheslavovna from the Russian Ilizarov Scientific Center for Restorative Traumatology and Orthopaedics of the Ministry of Health of Russia (Kurgan) defended her thesis ***"Surgical treatment of patients with vertebral syndromes due to genetic diseases"*** in specialty 14.01.15 (traumatology and orthopaedics). The supervisor of studies was Gubin Alexander Vadimovich, doctor of medical sciences, associate professor.

The basis for the dissertation was the studies of domestic and foreign authors in the field of operative vertebrology in patients with genetic diseases. Most of the works reviewed were separate clinical observations. Some of them were descriptive. Organizational aspects of surgical vertebrological aid in this group of patients were not described in the literature.

The thesis was aimed to improve the results of treatment of patients with genetic diseases due to timely detection and surgical correction of vertebral syndromes.

The specificity of vertebral disorders in patients with different genetic diseases was studied by the author. Much attention was paid to modern diagnosis means using MRI, CT, neurophysiological methods with the practical purpose of determining the priority and scope of surgical interventions and preoperative planning.

The pathology of the spine in genetic diseases was assessed from the point of a systemic multidisciplinary approach; highlighting the leading vertebral syndrome; role of surgical vertebrological treatment.

For the first time in the domestic literature, the author described in detail the course of vertebral syndromes and the management for surgical correction of the spine pathology in patients with mucopolysaccharidosis, Oilles and Larsen's disease, Goldenhar syndrome. For the first time in Russia, the techniques of implantation of screws at all levels and osteotomy from the posterior access by fixing and correcting spinal deformities in patients with genetic diseases were widely used. The unified key principles for provision of surgical vertebrological care in patients with genetic diseases of different ages were defined.

The author proves that approaches proposed for management of patients with vertebral syndromes due to genetic diseases enable to reduce the lethality and improve the quality of patients' life. The described diagnostic algorithms are applicable in an outpatient setting with the purpose of timely selection of patients for vertebrological interventions. The principles of multidisciplinarity and the unity of surgical decisions can become the basis for qualitative care in severe vertebral pathology both in patients with genetic diseases and in other groups of patients.

The findings obtained can be used by health care organizers to amend the orders and to more accurately calculate the economic costs of treating this complex group of patients.

The work of ***Savin Dmitry Mikhailovich*** entitled ***"Surgical treatment of patients with spine deformity due to spinal dysraphia***" in specialty 14.01.15 (traumatology and orthopaedics, supervisor – Sergey Ryabykh, doctor of medical sciences) from the Russian Ilizarov Scientific Center for Restorative Traumatology and Orthopaedics of the Ministry of Health of Russia (Kurgan) was aimed at determining the regularities of vertebral syndrome development with an algorithm for surgical treatment in patients with spinal deformities due to severe spinal dysraphia.

The necessity of early operative orthopedic treatment of patients with deformities of the spine due to dysraphia was substantiated in the thesis, taking into account the pro-gradient course of neurologic and somatic pathology as well as stato-dynamic imbalance. Individual approaches to surgical treatment of patients with severe spinal pathology were developed depending on the characteristics of vertebral syndrome: type, location and magnitude of deformity, presence of intracanal formations, stenosis of the spinal canal and involvement of the spinal cord.

New surgical techniques were developed for treatment of congenital and acquired spinal deformity due to spinal dysraphia syndrome, as well as deformities complicated by neurologic deficits, severe somatic pathology and static-dynamic imbalance.

Significant for science and practice are the principles of the syndromic analysis of the pathology and differential determination of indications and methods of surgical treatment of patients with spinal deformities due to spinal dysraphia that were proposed by the author.

The data obtained in the course of the study enlarge the knowledge about clinical and radiographic manifestations of spinal deformities due to spinal dysraphia, objectify the evaluation of pathology and assist in choosing the optimal method of surgical treatment aimed at improving the patient's condition and facilitating the care.

Based on the clinical research conducted by the author, the tactics of surgical treatment for patients of different age with spinal deformity due to spinal dysraphia was developed, and its effectiveness was proven, recommendations for early detection and prevention of possible complications of surgical interventions were given.

Anatoly Sergeevich Sudnitsyn, also from the Russian Ilizarov Scientific Center for Restorative Traumatology and Orthopaedics of the Ministry of Health of Russia (Kurgan) presented the work "***Ilizarov method in the treatment of patients with multi-component foot deformities due to neurogenic etiology complicated by chronic osteomyelitis"*** for a candidate of medical sciences degree in specialty 14.01.15 (traumatology and orthopaedics). The scientific adviser was Nikolay Mikhailovich Klyushin, doctor of medical sciences.

The author of the thesis found that the number of cases of infection process exacerbation increased, which is the reason for the disease recurrence. This raises the need to clarify the algorithm for performing the necessary manipulations during the treatment, their sequence and stages, as well as the techniques of performing osteosynthesis and the features of managing the osteomyelitic focus. In this regard, the goal is to optimize the algorithm for surgical treatment of patients with multi-component foot deformities of a neurologic genesis complicated by chronic osteomyelitis, increasing its effectiveness by reducing the number of postoperative complications and disease recurrence.

An improved algorithm for performing the technology for treatment of patients with multi-component foot deformities of neurogenic etiology complicated by chronic osteomyelitis was substantiated. Sequence of osteosynthesis and features of osteomyelitis treatment, providing an improvement in the hemodynamics of the affected segment at the initial stage of fixation and preventing the development of osteomyelitis process in the course of subsequent implementation of necessary manipulations was proposed. For the first time, the relationship between a neurologic disorder as well as a decrease in bone density and the development of the osteomyelitis process was revealed. Based on the analysis of the results of practical application of the improved method of treatment and a complex of instrumental methods of research, the effectiveness was proven.

It was shown that the approach proposed to the treatment of patients with multi-component foot deformities of neurogenic etiology complicated by chronic osteomyelitis provides the arrest of infection in 91.9 % of cases and in 100 % of observations improves the anatomical shape of the foot and the ability to bear weight on the affected limb. The complex of treatment offered is distinguished by high technological efficiency and reproducibility of the methods used, which makes it suitable for a wide application by specialists who were trained in the Ilizarov method at orthopedic clinics and departments.

Kolchin Sergey Nikolaevich from the Russian Ilizarov Scientific Center for Restorative Traumatology and Orthopaedics (Kurgan) presented and defended a thesis on the topic ***"Combined transosseous and locked intramedullary osteosynthesis in the rehabilitation of patients with pseudoarthrosis of the femural diaphysis"*** in specialty 14.01.15 (traumatology and orthopaedics). The scientific supervisor was Borzunov Dmitry Yurievich, doctor of medical sciences, associate professor.

The author aimed to evaluate the effectiveness of surgical and rehabilitation measures by combined use of transosseous and locked intramedullary osteosynthesis in patients with pseudoarthrosis of the femoral diaphysis.

In the course of the work, the known techniques of combined transosseous and locked intramedullary osteosynthesis in the treatment of patients with pseudoarthrosis of the femoral diaphysis were systematized and improved, and indications for their use were determined. A comparative analysis of combined techniques and transosseous osteosynthesis was performed, showing a significant reduction in the duration of external fixation in a combined use of transosseous osteosynthesis and LIOS with no significant differences in the results of treatment.

It was revealed that compensatory support reactions of the feet in patients did not have a specific diagnostic value and were manifested to varying degrees in locomotor stereotypes, depending on the individual characteristics of patients. At the same time, the dynamics of the compensatory elements illustrated positive changes in locomotor stereotypes in the patients after surgical treatment.

It was shown that the proposed methods of surgical interventions with the use of transosseous and intramedullary osteosynthesis are effective and expedient in the treatment of patients with pseudoarthrosis of the

femoral diaphysis, provide anatomical and functional integrity of the femur and reduce the period of external fixation.

It was found that correction of diaphyseal deformities at the apex of pseudoarthrosis aligns the anatomical and mechanical axis of the segment. Transition to intramedullary fixation with a locked nail assists in maintaining the alignment achieved. In pseudoarthrosis of the femural diaphysis associated with shortening, the use of combined osteosynthesis allows achieving equalization of the length of the lower extremities and bone union in one stage of treatment. The use of locked intramedullary nails eliminates the need for additional plaster immobilization after dismantling the Ilizarov apparatus and reduces the risks of secondary deformity and nonunion recurrence.

The effectiveness of combined osteosynthesis in the treatment of patients with pseudoarthrosis of the femoral diaphysis proves that it can be recommended for use in clinical practice at specialized departments of regional hospitals, as well as at research institutes of orthopedic and traumatological profile.

The analysis of errors and complications in the treatment of patients with pseudoarthrosis of the femoral diaphysis found no statistically significant differences in the incidence of their occurrence between the main group and the comparison group. Methods for their elimination and prevention were developed.

Tarkhokov Vyacheslav Timofeevich from the Russian Ilizarov Scientific Center for Restorative Traumatology and Orthopaedics (Kurgan) defended his thesis entitled ***"Treatment of closed fractures of the humeral diaphysis, complicated and not complicated by neuropathy of the radial nerve, with the method of Ilizarov transosseous osteosynthesis"*** in specialty 14.01.15 (traumatology and orthopaedics). The scientific adviser was Dyachkov Alexander Nikolaevich, doctor of medical sciences, professor.

The study was aimed at improvement of the results in management of patients with fractures of the humeral diaphysis, complicated and not complicated by radial nerve neuropathy, and at optimization of the Ilizarov transosseous osteosynthesis and rehabilitation process.

It was proven that the method of transosseous osteosynthesis is effective, provides fracture consolidation both in complicated and non-complicated by radial nerve neuropathy cases, and possibility to apply a complex of rehabilitative measures to recover the conductivity of the radial nerve without any additional surgical interventions.

Statistically significant factors determining the period of consolidation of the fracture of the humerus when it is treated with the method of transosseous osteosynthesis were established. The more distal is the fracture on the humerus diaphysis, the shorter is the period of consolidation of the fragments. This regularity is valid for diaphyseal fractures of the humerus that are distant in the range from 11 to 72 percent from the proximal end of the humerus. It is established that the extent of the primary injury of the humerus as a segment causes an increase in the consolidation time. A standard system for evaluating the results within the framework of the international classification of functions (ICF) in patients with mononeuropathies was developed.

For practical medicine, the quantitative characteristics of diaphyseal fractures of the humerus were suggested, and namely, the distance of the fracture zone from the proximal metaphysis of the humerus, the extent of the fracture site, the primary displacement of the fragments, and the post-reduction displacement of the fragments that are used to assess fracture complexity and predict the course of the postoperative period.

A method for visual assessment of the intensity of pain was developed, which makes it possible to detect the peaks of its maximal manifestations, which facilitates analgesic therapy and, finally, makes it more targeted to prevent the intensification of pain sensations. This approach to assessing the daily dynamics of pain sensations enables to correct the time of taking painkillers, optimize the parameters of the electrostimulation regime, and contribute to an increase in the effectiveness of analgesic therapy.

Assemblies of the Ilizarov apparatus for humeral fractures at various levels of the diaphysis were optimized to improve the quality of life of patients and exclude the negative biomechanical moment in the system of the humerus and apparatus.

Candidate dissertation on the topic ***"Combined surgical treatment of patients with posttraumatic intraarticular deformities and pseudoarthrosis of the humeral condyles"***, specialty 14.01.15 (traumatology and orthopaedics) was defended by ***Georgy Merabovich Chibirov*** from the Russian Ilizarov Scientific Center for Restorative Traumatology and Orthopaedics (Kurgan). The scientific adviser was Yuri Petrovich Soldatov, doctor of medical sciences, professor.

The investigator developed a set of methodological approaches that assist in solving a number of therapeutic and research tasks for treatment of patients with posttraumatic intraarticular deformities and pseudoarthrosis of the humeral condyles. The effectiveness of differentiated application of treatment methods in patients with posttraumatic intraarticular deformities and pseudoarthrosis of the humeral condyle depending on anatomical and functional changes in the joint were substantiated and proven; the necessity of adding additional physical theraty to the protocols of measures of the treatment and rehabilitation process in patients with posttraumatic intraarticular deformities and pseudoarthrosis of the humeral condyle was substantiated.

In the experiment, the effect of terahertz waves in the absorption spectrum and nitrogen oxide emission on elbow

joint tissues under the conditions of its immobilization in modeling osteoarthritis was studied; new methods of treating patients with posttraumatic intraarticular deformities and pseudoarthrosis of the humeral condyle were proposed and their effectiveness was proven; efficiency of various variants of reconstructive surgical interventions on the elbow joint was revealed and differentiated indications for treatment were developed on its basis.

The significance of the results of the study for practice is confirmed by the fact that:

– the new methods of treatment of patients were introduced into the practice of medical departments, protected by Russian patents and acts of their introduction into clinical practice;

– indications for performing operations were defined that are differentiated depending on clinical and radiological features;

– practical recommendations were worked out.

The thesis ***"Optimization of the regenerative process in patients with nonunion and bone defects in the conditions of impaired osteogenesis (clinical and experimental research)"*** for a candidate of medical sciences degree in specialty 14.01.15 (traumatology and orthopaedics), performed at the Russian Ilizarov Scientific Center for Restorative Traumatology and Orthopaedics of the Ministry of Health of Russia (Kurgan), was presented and defended by ***Shastov Alexander Leonidovich***. The scientific supervisor was Borzunov Dmitry Yurievich, doctor of medical sciences, associate professor.

The complexity, multifactorial character and medical relevance of the problem, the lack of a unified approach to rehabilitation of patients with impaired bone regeneration motivated the author to perform the thesis aimed at improving the results of treatment using new methods of stimulating tissue regeneration in patients with long bone nonunion and defects due to failure of previous treatment.

The author systematized and improved the known methods of tissue regeneration stimulation in patients with bone nonunion and defects of long bones of various etiologies. The effectiveness of differentiated application of additional methods in patients with heterogeneous nonunion and defects of long bones with incompleteness of the regeneration process under the conditions of transosseous osteosynthesis was substantiated and proven. Indications were determined and an algorithm of actions was developed for management of incomplete or failed tissue regeneration in patients with defects and nonunion at the stages of transosseous osteosynthesis.

The effectiveness of mechanical methods of intraoperative effect of both directly in the zone of impaired regeneration (nonunion) and at the stages of transosseous osteosynthesis in the case of distraction osteogenesis and "ischemic" regeneration was revealed.

The analysis of the clinical material showed that compaction of the regenerate in combination with additional osteotomy of the elongated fragment or without it is an effective method of stimulating "ischemic" distraction regeneration in patients with defects and nonunion of long bones. Intramedullary fixation of the zone of impaired bone regeneration provides stimulation of bone formation and strengthening of segment due to local reinforcement of fragments.

The influence and the effect on the distraction regenerate of terahertz waves in the absorption spectrum and the release of nitric oxide was studied in experimental conditions by modeling of bone defect management by elongation of a fragment.

It was shown that it is possible to solve the clinical problems such as anatomical and functional restoration of limb integrity using additional stimulation methods without changing the technology of osteosynthesis in impaired tissue regeneration process in patients with defects and nonunion of long bones in the conditions of transosseous osteosynthesis.

Systematization of the material and analysis of the treatment outcomes in patients with defects and nonunion resulted in defining the indications and an algorithm for application of additional effects for tissue regeneration process stimulation at the stages of transosseous osteosynthesis.

The suggested variants of mechanical and physiotherapeutic effects enable to solve the earlier posed clinical problems to obtain anatomical and functional restoration of the integrity of the limb in case of failed regeneration process within the framework of one method of osteosynthesis in one stage of treatment and rehabilitation measures.

The results of the experimental section of the work suggest about the prospect of the developed methods of additional impact on the centers of inactive tissue regeneration for clinical application. Methods of stimulation of tissue regeneration in patients with nonunion and defects of long bones can be recommended for use in specialized departments of medical and preventive institutions due to their simplicity of execution and availability of technical equipment with proven effectiveness.

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