

Dear readers,

We bring to your attention the next issue of our journal that is thematic and focuses on various issues of joint replacement.

The journal opens with the work of the authors from Novosibirsk (Aleksandrov et al.), who studied the survival rate of unconstrained ceramic wrist joint implants in 83 patients. Having analyzed the results, the authors state that the intermediate outcomes of total arthroplasty with an unconstrained ceramic endoprosthesis of the wrist joint are encouraging in terms of a lasting positive effect in achieving mobility of the wrist joint that is lost due to the degenerative process. An eleven-year follow-up demonstrates that the survival rate of an unconstrained ceramic wrist replacement is 88 %.

Kotelnikov et al. (Samara) analyzed the biomechanics of the proximal interphalangeal joint after its replacement in 42 patients. Using 3D modeling, a digital model of the endoprosthesis was created. The finite element method was applied to study the critical states of the developed digital model simulating stereotypical movements in the joint, and objective results were obtained and used in clinical practice. Based on the data obtained, the authors concluded that the load of up to 5 kg in the early postoperative period is optimal

for the patient, while the range of flexion should not exceed 90°. The load in the range from 5 to 20 kg is possible, but the angle of flexion in the proximal interphalangeal joint should not exceed 30°. The load of 20 kg and the flexion angle of more than 30° may result in the dislocation of the endoprosthesis components; flexion angle of more than 60° may cause a periprosthetic fracture.

The first experience in robot-assisted knee arthroplasty in 10 patients was shared by authors from St. Petersburg (Airapetov et al.). Despite the high cost and the need for additional consumables, this technique has a number of advantages over the classical manual technique. Such advantages include accurate restoration of the limb axis even in extra-articular deformities, correct position of endoprosthetic components, reduction of intra-operative blood loss due to closed bone marrow canals, and safety for patients.

Authors from Kurgan (Teplenky et al.) assessed the impact of previous surgical treatment on the results of total hip replacement in young patients with dysplastic coxarthrosis. The paper presents a retrospective analysis of the outcomes of surgical treatment of 78 patients aged 14-30 years. Based on the results obtained, the authors came to the conclusion that prior reconstructive interventions in the hip joint increase the technical complexity and aggressiveness of subsequent total arthroplasty, contribute to an increased risk of late complications, but do not have a significant impact on the results of treatment.

Mitroshin et al. (Penza) compared the strength characteristics of a carbon-based friction pair of a hip joint endoprosthesis, including components made of monolithic or non-monolithic pyrolytic carbon. Based on the data obtained, the authors conclude that the designs of the head and liner of the hip joint endoprosthesis with a friction pair made of carbon material provide high reliability in the conditions of hip joint functioning at maximum loads. Mitroshin et al (Penza) compared the strength characteristics of a carbon-based friction pair of a hip joint endoprosthesis, including components made of monolithic or non-monolithic pyrolytic carbon. Based on the data obtained, the authors conclude that the designs of the head and liner of the hip joint endoprosthesis with a friction pair made of carbon material provide high reliability in the conditions of hip joint functioning at maximum loads.

Prevention of pain after arthroplasty in patients with fractures of the proximal femur is the topic of the publication by Han et al. (Kazan, Tashkent). The authors performed a comparative study of 60 clinical cases using the VAS pain scale in terms of assessing the effectiveness of postoperative multimodal pain relief using the author's method. Positive dynamics of pain disappearance were noted in patients with increased BMI of any grade, including those with BMI ≥ 40 .

A comparative analysis of the results of using various surgical techniques in 94 patients with closed injuries to the sciatic nerve after total hip replacement was carried out by authors from Saratov (Bazhanov et al.). According to the authors, the most effective method of surgical treatment for this pathology is microsurgical neurolysis in combination with two-level electrical stimulation, which is characterized by a faster rate of pain regression as well as by positive dynamics of clinical and electrophysiological parameters in the affected lower limb.

The issues of diagnosis are discussed in two publications. Hematological markers of periprosthetic infection during revision hip arthroplasty were studied by authors from Kurgan (Matveeva et al). Patients with acute and chronic types of periprosthetic infection were screened for hematological parameters upon admission and during treatment in order to monitor the course of the purulent inflammatory process. It was observed that patients with acute PJI do not need additional clinical and laboratory examination; it is necessary to use integral laboratory indicators that allow a more accurate assessment of the inflammation in a purulent wound.

Aranovich et al (Kurgan, Yoshkar-Ola, Perm) studied the relationship between serotonin levels in the blood of children and adolescents with unstable flat and valgus foot deformity and confirmed the relationship between the level of serum serotonin and this type of deformity, which, according to the authors, confirms the involvement of the serotonergic system in the formation and progression of foot pathology.

Experimental studies are presented in two publications. Stogov et al (Kurgan, Yekaterinburg) conducted a comparative assessment of the osseointegration of new percutaneous implants made of ultrafine-grained Ti Grade 4 alloy in an experiment on 12 rabbits. Analysis of the results showed that the osseointegration of the percutaneous implant with a mixed nanocrystalline and ultrafine-grained structure was more effective relative to the comparison product. The authors conclude that the use of such implants promising for solving clinical problems in prosthetics.

Tsiskarashvili et al. (Moscow) also studied the effectiveness of polymer hydrogels impregnated with an antibacterial drug in chronic osteomyelitis in experiments on rabbits. A comparative analysis of the results showed that the hydrogel, unlike polymethyl methacrylate (PMMA), reliably relieves chronic osteomyelitis without additional systemic antibiotic therapy and does not cause material-associated bone resorption. At the same time, the clinical and laboratory picture fully corresponds to the data of microbiology, radiology and histomorphometry.

Three case reports of this journal issue describe examples of the use of an individual implant during revision hip arthroplasty in a 72-year-old patient with a Paprosky type IV bone defect (Kovaldov et al, Nizhny Novgorod), the combined use of elastic intramedullary reinforcement and Ilizarov apparatus in the treatment of pseudarthrosis of the hip and shoulder in a girl with osteogenesis imperfecta (Mingazov et al.; Kurgan; Leeds, UK) and a rare case of periprosthetic infection after total hip arthroplasty caused by Mycobacterium abscessus (Kasimova et al., St. Petersburg).

The literature review that finalizes this issue is devoted to the analysis of domestic and foreign publications on the undesirable phenomenon during hip replacement, “ceramic noise”, in the friction pair of the endoprosthesis. The authors note that the noise can be a predictor of problems in the endoprosthesis functioning. The accumulation of a database will lead to a deeper understanding of the noise, methods for its correction and timely prevention of the risk of ceramic cracking.

We hope that this thematic issue will be interesting and useful to specialists and will expand their knowledge in this orthopaedic field.

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Chief Editor of Genij Ortopedii