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Laser Doppler flowmetry as a method to assess blood supply to the lower limb joints in children with Legg-Calve-Perthes disease.

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Legg-Calve-Perthes disease is a common pediatric orthopedic pathology of the hip joint caused by impaired blood flow to the femoral head; the disease belongs to the group of osteochondropathies and represents aseptic osteonecrosis of the femoral head, in the severe course of which a functionally significant deformity of the proximal femur is formed. The aim of this study was to assess the degree of blood supply to the lower limb hip joints using laser Doppler flowmetry (LDF) in children with Legg-Calve-Perthes disease, as well as to determine the effectiveness of treatment.[1]

Methods. LDF method, which is non-invasive, was used to measure volumetric blood flow rate and assess the state of microcirculatory bed of the lower extremities. The method is based on probing the tissue with laser radiation and processing of the reflected signal. 20 male patients aged 7-9 years diagnosed with Legg-Calve-Perthes disease of III-IV degree and 20 healthy subjects as a control group were examined using this method on the basis of the pediatric trauma department of the Republican Clinical Hospital. Treatment included prolonged epidural anelhesia followed by conservative treatment with drugs that improve blood supply to the joint[2,3]. All investigations and treatment were conducted after written consent of the adolescents' legal representatives. Statistical significance of the results was determined using Student's t test and nonparametric Wilcoxon-Mann-Whitney test.

Results. In the control group, the parameters of blood supply estimation of the hip joint area were the same in both limbs; in the patient group there was a significant decrease in the indices on the affected side. The difference compared to healthy subjects averaged 70% ($p \leq 0{,}001$). After the course of treatment, the microcirculation indices in the area of the pathological hip joint increased, on average, 5-fold compared with the indices before treatment.[4]

Conclusions. All patients with Legg-Calve-Perthes disease have a significant decrease in microcirculation in the area of the hip joint on the affected side. Prolonged epidural analgesia causes an increase in blood flow and thus has a positive effect on the course of the disease. The obtained results indicate that the method of laser Doppler flowmetry may be useful to confirm the effectiveness of treatment, as well as for early diagnosis of Legg-Calve-Perthes disease in children.