COMPLEX SURGICAL TREATMENT OF EXTENSION CONTRACTURES OF THE KNEE JOINT

The article describes experience with using new surgical treatment of patients with extensive contracture of the knee in the sport trauma department of Research Institute Traumatology and Orthopedics (Uzbekistan). Since 1998 to 2007 this method was used in treatment of 52 patient at age from 17 to 60. Follow-up results of the operative treatment at periods from 6 months up to 1.5 years studied in 43 patients. Good results were observed in 41 patients.

MURODJON IRISMETOV
Research Institute of Traumatology and Orthopedics, Uzbekistan

Keywords: Extension contracture, stiff knee, surgical treatment.
UDC: 616.728.3-009.12-02.168.

Background

Extensive stiffness of knee joint pertains to severe consequence of the traumas of the lower limbs and its treatment is one of unsolved and contemporary problems of traumatology and orthopedics. Posttraumatic extension contracture of knee joint with expressed changes of quadriceps femoris muscle is treated in most cases only by operative methods. Posttraumatic extension contracture of knee joint, due to degenerated and scarred changes in muscles of femur, their atrophy, soldering of soft tissues between itself and bone, have a steadfast nature. The treatment at rack restrictions of motions in knee joint remains actual problem of orthopedic rehabilitation.

Sukhonosenko (1988), Shimbareckiy (1986), Blauth (1982) reported that the steadfast extension contracture of knee joint, when there are secondary changes in muscles, tendo-capsular apparatus, skin with subdermal cellulose, fascia and even in cartilage and bone tissues, is managed in most cases only by operative way.

However, operative mobilization of the joint not always brings satisfaction to patient and surgeon as increasing of mobility is often small, operation leads to greater weakening of quadriceps femoris muscle, there is danger of loss of the full active extension with breach of the joint stability. Islombekov et al. (1984) and Chancev et al. (2000) report that in 1/3 of patients experienced mobilizing operations the flexion in knee joint does not exceed 90°.

In hard persistent extensor contractures of the knee joint after operative mobilization the defect of the knee joint capsule is formed; joint liquid stands out when moving, which leads to secondary periarticular edema and healing of wounds; often skin necrosis in the postoperative scars and wound festering are observed that are followed with secondary healing and full loss of joint function (Azizov, 1998; Mironova, et al., 1982; Shimbareckiy, 1986). This state demonstrates the need for improved treatments for extension contracture of the knee, which still remain complex and challenging task of orthopedics.

Materials and methods

Sport trauma department in the Research Institute of Traumatology and Orthopedics (Uzbekistan) has designed new operative access and treatment method for persistent knee flexion contracture. Using the method during the period 1998-2007 years there were treated 52 patients with with severe persistent knee extension contracture. The reasons for contractures development were prolonged immobilization of femur fractures in 26
patients (9 women, 17 men); in 16 cases (6 women, 10 men) fractures had been complicated by osteomyelitis. In 9 patients (3 women, 6 men) knee extension contracture developed after various surgical interventions and prolonged immobilization on the injured knee (meniscus tears, ligament and haemarthrosis). In 1 patient extension contracture was formed after a shooting wound to the patella.

For clarification of the reasons of contracture’s developing and nature of the changes of soft tissue, which provides function of the knee joint, to all patients were produced clinic-radiological, electromyographical, ultrasonographic and MRT studies. In 21 events alongside with said studies is organized arthroscopic diagnostics. To 12 patients examined by multispiral computer tomography with intraarticular entering of the oxygen.

To clarify the reasons for formation of contractures and the nature of structural changes in the soft tissues providing function of the knee joint, all patients were carried out clinical and radiographic, electromyographical, ultrasound and MRI. In 21 cases the arthroscopic diagnosis was performed alongside with the aforementioned studies; 12 patients proceeded multilayer spiral computed tomography (CT) with intraarticular administration of oxygen.

**Technology of operative method**

Operative interference is conducted in supine position of the patient, under the general or spinal anesthesia. The skin incision is carried along the line connecting the greater trochanter with the lateral condyle: from the lower 1/3 of the femur to the tibial tuberosity up to 15-18 cm. Skin and subcutaneous tissue are dissected. Skin and subdermal fat are divided from patella and till edge of the internal broad muscles of the femur. Fascia lata is separated from muscle fascia and patella. The skin is inverted and medial parapatellar incision of the capsule is made. Distal parts of quadriceps femoris muscle and patella are denuded. Quadriceps femoris muscle is fixed and mobilized, and separated from scar adhesions to 1/3 of upper thigh. Twisting seam joints and seams that hold the kneecap are cut. Scar-regenerated intermediate head of quadriceps femoris muscle is mobilized or deleted. Patella, upper and lateral pockets are carefully freed from scar tissue. Damaged menisci are deleted. If opening of the joint found residual intraarticular lesions in the form of bony growths and free elements preventing slide of capsuloligament apparatus, they were removed.

In order to rest the capsule ligament apparatus and provide its full flexion is fascia-teno-capsulotomy on the sides of the patella: parallel to the axis of the limb length from 3 to 6 cm, starting at the condyle of the femur with intervals of 1 cm, while the inner leaf the capsule is retained. These incisions are also made over the patella. Then capsule of the joint becomes free, and no defect of the capsule forms in its flexion. The knee joint is bent without any effort to end range of motion is 0/0/120-0/0/130 degrees. Arthroplasty of joint surface of patella was carried out in 5 patients as last stage of operative treatment using beforehand prepared allogeneic umbilical cord. The edges of the umbilical cord are mended by catgut sutures on the edges of the patella to the capsule.

Wound was sutured layer by layer in position of flexion 90-100 degrees in knee joint. Originality of this method is that the incision of the skin and subdermal fatty is performed from lateral sides, but cut of the joint capsule - from the medial. The skin with subdermal fat is completely separated from patella till the edge of the internal broad muscles of femur. Postoperative scarring is not superimposed on each other. After fascio-teno-capsulotomy the joint capsule becomes free and no defect of the capsule forms in its flexion. The skin and capsuloligament apparatus of the knee joint becomes mobile. The wound heals by primary intention, marginal necrosis of skin in the field of postoperative scar is not observed.

The mobilization of quadriceps femoris muscle and knee joint is executed in 37 patients, arthrolysis and mobilization of the knee joint - in 10, and arthroplasty of knee joint with using allogeneic umbilical cords - in 5 patients.
After surgery, all patients were imposed removable plaster cast for two weeks in the position of knee flexion angle of 90-80 degrees. On the fifth day the cast was removed, and re-dressed after the development of the knee joint. Such a bandage in the position of knee flexion angle of 90-80 degrees has its own advantage. In flexion of lower limbs in knee joint its cavity decreases, accumulation of liquid in joint under such position must be comparatively not big. In fact, clinical observations have shown that if the leg after surgery is in the knee flexion position, making puncture to evacuate fluid is not necessary even in cases of essential medical intervention.

**Results and discussion**

As arthroplastic material the allogeneic umbilical cord was used in 0.5% solution of formalin with 10% solution of the glycerine. The umbilical cord has such important for plastic material characteristic as toughness and elasticity, low antigenic activity, antibacterial activity due to contents in it of lyzocim, properdyne and complement. Umbilical cord contains in itself low differentiated cells, which can change in cells of this ambience.

Early and intensive functional treatment is decisive to achieve favourable outcome. Rare motion in the joint conditions repeated scarred adhesion of muscular heads with bone and fascial case develops easily. Intensive training of physical exercises starting the first days following operation makes possible overtaking the processes of scarring, limiting their extent. Systematically and persistently carried out exercises promote shaping muscle performance, power of the muscles, their resilience and elasticity, increasing the range of the motion in joint, preventing the formation of intraarticular and periarticular adhesions. Successful results are not possible without constant and active participation of patients in treatment process. On the 5th day after the operation cast was replaced by functional tire easily manageable by patients. Patients were assigned to make physiotherapy exercises - passive at the beginning of rehabilitation and active-passive exercises on the following stage. Intensity of exercises gradually increased and after removing of sutures it reached the most high level. Nonsteroidal anti-inflammatory drug - ketonal was used as analgesic. Intramuscular injection of ketonal continued in the following day after operation (100 mg 2 twice a day, sometimes - 3 times a day). On 3rd-4th day ketonal dose injection changed to peroral method of the drug (50 mg 2-3 times in day) or instead the patients were prescribed to take candles (in the morning and at night).

In this period used also massage, paraffin applications, electric stimulation of quadriceps femoris muscle, mechanotherapy. Due to using of this complex the volume of motion in knee joint was restored till 90-100°, but power of the muscles was completely restored only in 5-6 months after operation. Restoring of the full volume of the motion was generally achieved in 3-10 months since day of the operations.

Results of all 52 patients, treated by our methods, were studied during three months after operation. Wound healed by primary intention, marginal necrosis of the skin in the field of postoperative scar did not exist.

The amplitude of the motion, in these patients before operation formed 0/0/10-0/0/35 degrees, after mobilizing operation at nearest periods - 0/0/100-0/0/120 degrees.

Follow-up results of the operative treatment at periods from 6 months up to 1.5 years were studied in 43 patients. Volume of the active motion in joint served as the criterion of assessing of treatment results.

The good results of the treatment were noted in 41 patients (27 patients after mobilization on quadriceps femoris muscle and knee joint, 10 patients after mobilization of the knee joint, 4 patients after arthroplasty with allogenic umbilical cord). Amplitude of the motion forming 0/0/100-120 degrees, as well as reaching of flexion more than 0/0/90 degrees were treated as good results.

In 4 patients who were taken arthroplasty of knee joint with allogenic umbilical cord, the amplitude of the motion before operation formed 0/0/15-0/0/35 degrees, and after
mobilizing operation at nearest periods it made 0/0/100-110 degrees. Follow-up results of the operative treatment, studied in these patients through 1.5 years, have indicated the volume of the motion in knee joint at 0/0/110-0/0/120 degrees.

**Conclusion**

Using offered operative access and methods prevents forming the necrosis of the skin in the field of postoperative scar, secondary periarticular edema and suppuration of the suture.

Offered access and method of the surgical treatment allows significant perfecting the results at rack posttraumatic extension contractures of knee joint.

Postoperative introduction and early rehabilitation of patients have a great importance in treatment of extension contracture of the knee joint.

**References**


