

SHOULDER INSTABILITY – COMBINED SURGICAL
TREATMENT

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Abstract

The goal of this study is to present the results after one-stage combined surgical treatment of the unstable shoulder joint by arthroscopic stabilization followed by operative technique of Matev. For the period from 2004 to 2009, we operated on fourteen patients: twelve with anterior and two with combined shoulder instability. Each of the patients had between ten and fifteen incidents. The period of follow-up was between 4 and 7 years. The results were evaluated radiographically and clinically. Functionally, the patients recovered according to a well-established protocol of physiotherapy and external rotation regained full range of motion. They were able to return to sports activity. The successful results in all patients warrant this combined operative technique to be the method of choice in the treatment of a greater number of dislocations of the shoulder, especially in people who want to quickly return to active sports.

Key words: shoulder instability, arthroscopic stabilization, combined operative technique

Introduction. Arthroscopic treatment of shoulder instability is becoming more popular with the progress of endoscopic surgery. The indications for it widened because of the improvement of the implants and technical skills. This treatment increasingly meets basic requirements: secure stabilization of the joint and minimises the possibility of restraint postoperatively [1-5]. It is essential that this operation be performed in the initial period of the unavoidably long series of untreated recurrent dislocations in adolescents and young people, regardless of their requirements for the lifestyle – whether actively practicing sports or not. This period is often missed, and later larger lesions need more invasive surgical

procedures. It is known that most arthroscopic techniques are an alternative type of Bankarts' capsuloplasties that are successful in cases of physiological predisposition, bone lesions of the glenoidal edge, rotator cuff lesions and Hill-Sachs lesions – up to 15%–20% [6–15].

In an arthroscopic technique with anchors, technically it is important to ensure the anterior and lateral part of the neck of the scapula and the capsule-ligament apparatus, not just the glenoidal labrum. Only thus the healing process responsible for the future stability of the joint can be ensured. In the cases of multidirectional instability, the technique of the extracapsular suture for the plication of the posterior capsule can be used [2–5].

However, many patients come to us after several recurrences of dislocation of the shoulder. Moreover, they have higher requirements as to continue with active sport activities. At this moment, it is not appropriate to make bone operations to restore stability to the joint yet. It is then best to perform single-step combined surgery involving both the passive and active stabilizers of the shoulder joint, which includes the arthroscopic technique combined with the operating method of IVAN MATEV [20], who improved the original technique of BOYCHEV [16, 17].

Surgery techniques and postoperative rehabilitation protocol.
Arthroscopic surgical technique. The patient is placed in the lateral decubitus position with the affected shoulder exposed. By using standard arthroscopic approaches, the glenohumeral ligaments and the anterior capsule, especially their integrity and their mobility or adhesion to the medial scapular neck, were evaluated. Thereafter, the surgery was prolonged with preparation of capsule-ligament complex. This included debridement of fibrous tissue (Fig. 1a), followed by the mobilization of the middle and lower glenohumeral ligaments, detachment of their adhesion medially (Fig. 1b) and release of the anterior-inferior capsule for free reinsertion in the proximal direction (Fig. 1c). After that, the preparation of the anterior surface of the glenoid was performed (Fig. 1d). The reinsertion of the capsule-ligament complex was provided by means of anchors (Fig. 1e–g), most commonly with Mitek G II system (DePuy) and rarely with Bio-pushlock system (Arthrex). After fixation the degree of stability of insertion of the shoulder joint was tested in external rotation of the humerus (Fig. 1h). After that, the surgery continued with the operative technique of Ivan Matev.

Operative surgical technique of Ivan Matev. This technique consists of three steps. The first step included construction of a muscle flap. This flap is thinner and consists of the short head of biceps brachii muscle and the coracobrachialis muscle. Usually, the flap is 4–5 cm wide in the middle. It is detached 1–1.5 cm distal to the coracoid process through an L-shaped incision of the conjoint tendon, whose medial part stays intact. The musculocutaneous nerve is traced, identified and preserved. The second step is presented by subscapularis muscle plasty. After the muscle flap is passed through the tunnel and its tendon is reattached, the exposed part of the loose subscapularis muscle is longitudinally

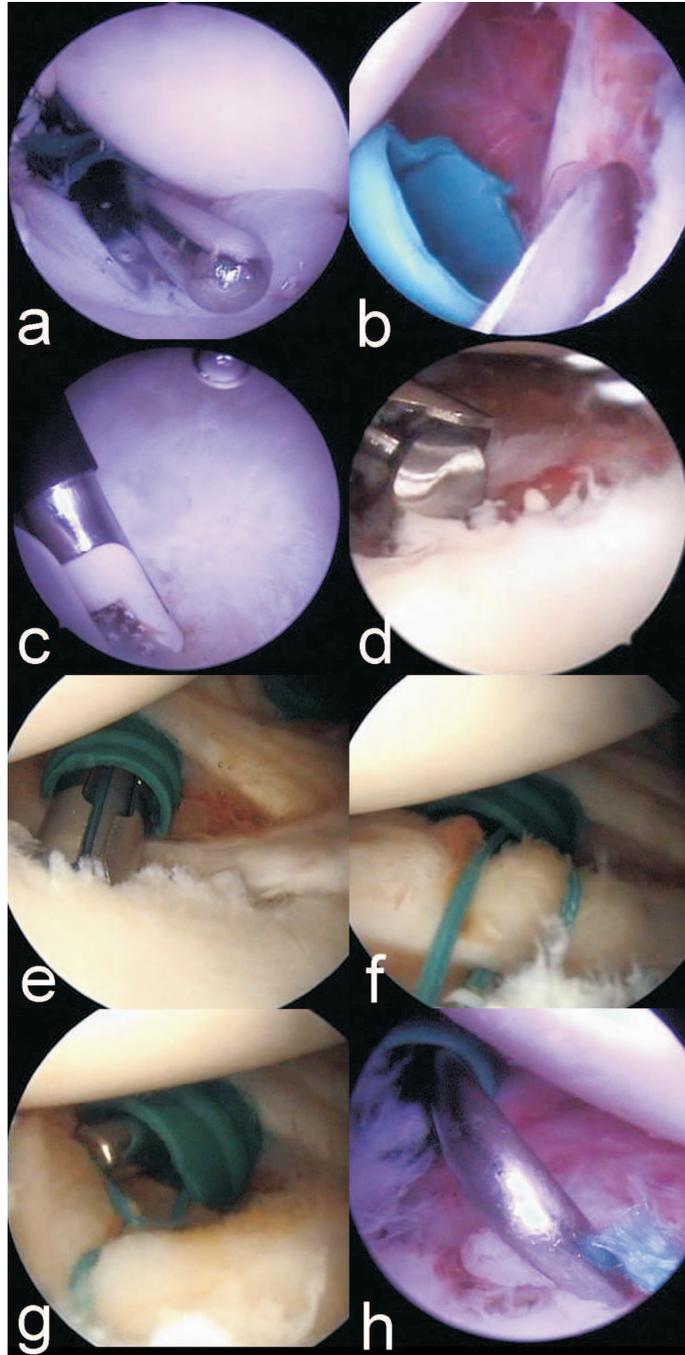


Fig. 1. a-h: arthroscopic findings during different steps of the procedure

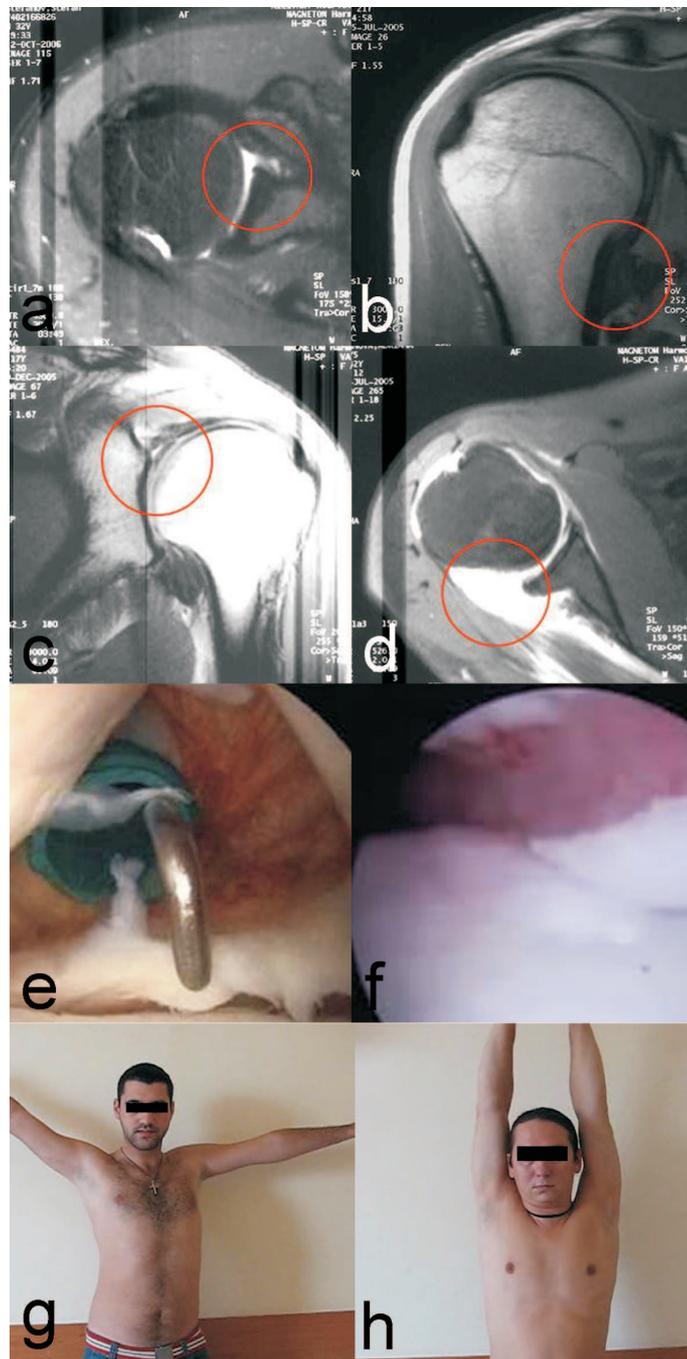


Fig. 2. a-d: MRI of the shoulder joint. a – presence of Bankart lesion; b – ligament lesions; c – ligament lesions in combination with SLAP lesions; d – lesion of posterior labrum; e, f – arthroscopic findings presented enlarged inferior recessus of the capsule – “front-bottom pocket”; g – postoperative clinical examination 15 days after immobilization; h – postoperative clinical examination 3 months after immobilization

shortened with multiplication. The third step includes the use of the long head of biceps brachii muscle. At the level of subscapularis tendon, the tendon of the long head of biceps brachii is also identified at 45° flexion of the shoulder. After that, the tendon of the biceps brachii is fixed to the subscapularis insertion to the humeral bone, to the neighbouring periosteum and soft tissues. The tendon must be fixed in this position for optimal tension to be achieved.

Postoperative rehabilitation protocol. After surgery a well-established postoperative programme was followed. In the first four to five weeks, brace immobilization with active and passive movements of the elbow and wrist were performed. At the sixth week, the patient started passive movement of the shoulder as tolerated and active movements without internal rotation. At the eighth week, the external rotation should be up to 30°. At the start of the twelfth week, the patient could do stretching exercises and after the sixth month sport activities could be resumed.

Patients and methods. For the period from 2004 to 2009, fourteen patients between 15 and 25 years were operated at University Hospital “Prof. B. Boychev”. Twelve of them were with anterior and two with combined shoulder instability. All patients were active athletes practicing in the following disciplines: wrestling – 6, weightlifting – 3, gymnastics – 2, javelin – 2, volleyball – 1. The average age of the first dislocation was 17 years. In ten patients, the first dislocation was without significant trauma, nine of them were with anterior shoulder instability and one with combined shoulder instability. In four patients with anterior instability, there was a serious injury during the first dislocation. The number of dislocations varied between ten and fifteen in all patients.

Each patient was examined with various clinical tests for instability of the shoulder. Translational load (load and shift), anterior apprehension and relaxation tests were positive in all patients. The Gerber anterior drawer test for shoulder instability was positive in eleven and negative in three patients. The sulcus sign test was positive in three patients. The translational and posterior apprehension tests were positive in one patient. In all patients, the second degree of instability of the shoulder was assessed by the scale of Hawkins–Monhtadi.

All patients with anterior instability had almost full range of motion with the exception of external rotation, which was limited to an average of 20°. The patients with combined instability had painful internal rotation with slightly limited range of motion between 5° and 10°.

The patients were also evaluated by radiography, including: AP-view, Y-view, and axillary views. The roentgenograms revealed no dysplasia of cavitas glenoidalis and no bony lesions of glenoidal edge in all patients. In eight patients, Hill–Sachs type lesions were established. Magnetic resonance imaging was made in ten patients. This imaging modality revealed the presence of Bankart lesion in all ten patients (Fig. 2a). The partial lesion of the rotator cuff with inconclusive data in one patient was found. Ligament lesions in all ten patients (Fig. 2b), in

combination with SLAP (superior labral tear from anterior to posterior) lesions in three of them (Fig. 2c), were detected. The lesions of posterior labrum in two patients were established (Fig. 2d).

The arthroscopic findings revealed true Bankart lesions in four patients. The connate labrum and the ligament apparatus to the medial glenoidal edge after previous lesions in ten patients were found. The glenoidal damage of the posterior edge in two patients and enlarged inferior recessus of the capsule, the so-called “front-bottom pocket”, were established in thirteen patients (Fig. 2e, f).

Results. The postoperative follow-up was between 4 and 7 years. Clinical examination after surgery showed significant improvement in the patients (Fig. 2g, h). The apprehension, relaxation and anterior drawer tests were negative in all patients after surgery. The load and shift test was negative in twelve patients in the third month. In the other two patients of the study, this test was fully negative in the fifth month and their shoulder stability was 0–1st degree by Hawkins–Monhtadi scale. The sulcus sign test was negative in five patients. No

T a b l e 1

Examination	Movements	Min°	Max°	R°	X°
Beginning	Extension	0	40	40	10
	Flexion	100	120	20	105
	Abduction	80	90	10	85
	Int. rot.	45	70	25	55
	Ext. rot.	5	10	5	8
1 week	Extension	25	55	30	45
	Flexion	130	145	15	140
	Abduction	95	110	15	103
	Int. rot.	70	75	5	73
	Ext. rot.	10	20	10	17
2 weeks	Extension	55	60	5	57
	Flexion	130	150	20	147
	Abduction	110	115	5	113
	Int. rot.	80	90	10	87
	Ext. rot.	35	45	10	38
4 weeks	Extension	50	55	5	52
	Flexion	150	160	10	158
	Abduction	120	130	10	124
	Int. rot.	85	90	5	88
	Ext. rot.	45	55	10	52
2 months	Extension	50	60	10	56
	Flexion	155	160	5	157
	Abduction	135	145	10	141
	Int. rot.	85	90	5	89
	Ext. rot.	60	75	5	70

musculocutaneous nerve lesion was observed in the current study. The improvement of the range of motion in the postoperative period was significant as shown on Table 1.

Several complications after surgery were established. In one patient, a 22-year-old female, an active athlete (javelin) with previous open surgery, relaxation in the sixth month after returning to sports, injury was detected. In this patient, the load and shift test was completely negative in the fifth month after surgery. In one patient, mild soreness up to the eighth month after surgery was established. The migration of hardware material in one patient was also found. In one patient who did not comply with the rehabilitation protocol, the external rotation deficit up to 30° was established.

Discussion. The arthroscopic operative technique addresses the elements which stabilize the shoulder joint: the glenoidal labrum and the capsule-ligament complex. Only the restoration of ruptured ligaments and reinsertion of the torn or stretched capsule may lead to reliable stabilization. Implants that meet these requirements are anchors with a pair of sutures. Treating only the labrum would risk the success of the intervention. The technique is not suitable in the presence of bone lesions or dysplasia of cavitas glenoidalis. The most convenient time for surgery is immediately after diagnosis – first or second dislocation [1-5]. But when dislocations are more and the patients are active athletes, the combined single-step surgical intervention involving arthroscopic surgery combined with the operative technique of Ivan Matev is a method of choice [20]. It uses the main positive characteristics of Boychev's operation, adding security of stabilization: the subscapularis muscle is tightened by shortening in the area of tendon fibres; a flap made of the coracobrachialis muscle and the short head of biceps brachii; the musculocutaneous nerve is protected by the flap medially; building one more passive barrier against the anterior dislocation using the long head of biceps brachii muscle.

Conclusion. Successful postoperative results in fourteen patients at University Hospital "Prof. B. Boychev" warrant this combined operative technique with its indications, advantages, observing the technical requirements and performed on time to be the method of choice in the treatment of patients with greater number of dislocations of the shoulder, who want to quickly return to active sport.

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