ARTHROSCOPIC SURGERY AND REHABILITATION GUIDELINES OF SHOULDER INJURIES IN THE YOUNG OVERHEAD ATHLETES

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ABSTRACT

Research background and hypothesis. Overhead athletes are at higher risk to suffer from acute and chronic shoulder injuries.

Research aim was to evaluate shoulder complex functional characteristics of the overhead and non-overhead young athletes before and two years after the concomitant arthroscopic type II superior labrum anterior posterior (SLAP) and partial – thickness rotator cuff (PTRC) repair and to present specific rehabilitation guidelines needed for successful return to sports.

Research methods. The sample of the research included 38 male athletes: overhead (n = 19) and non-overhead (n = 19) athletes. All participants underwent concomitant arthroscopic type II SLAP and PTRC repair and were available for review at a minimum of two years after surgery. Shoulder range of motion was measured with goniometer. Constant score was used for the evaluation of the shoulder functional quality.

Research results. Function of the shoulder complex had higher increase in non-overhead group ($p < 0.05$). Constant score two years after surgery did not return to optimal level. Shoulder flexion and internal rotation ROM in both groups and external rotation ROM of non-overhead athletes were the same as before surgery.

Discussion and conclusions. Functional characteristics of shoulder complex measured with Constant score of overhead and non-overhead athletes statistically significantly increased two years after the arthroscopic surgery. Significant change of external rotation was established in overhead athletes: two years after surgery it was significantly smaller and did not return even to preoperative level. Sports specific and diagnose-based rehabilitation is needed to decrease deficit in function of the shoulder complex after concomitant arthroscopic type II SLAP and PTRC repair.

Keywords: shoulder complex, SLAP, partial-thickness rotator cuff tears, sports physical therapy.

INTRODUCTION

Shoulder injuries are serious health problems in athletes affecting performance, training schedule and competition results. Athletes who use overhead movements are at higher risk to suffer from acute and chronic shoulder injuries. Acute injuries of the shoulder involve traumatic episodes especially in contact sports. Symptoms of chronic shoulder injuries are: present pain, decreased range of motion, weak muscles of the shoulder complex, joint laxity (instability), scapula position and posture change. Players in basketball, tennis, volleyball, baseball, handball and etc. use overhead throwing motions. It is highly skilled movement, which requires flexibility, coordination, neuromuscular control, muscular strength and synchronicity. The throwing motion generates extraordinary demands on the shoulder joint. G. S. Fleisig et al. (1995, 1996) report that angular velocity of the overhead throw during baseball pitching reaches over 7250 degrees per second, which is the fastest recorded human movement. This motion results in high forces being generated at the shoulder joint, where the dynamic and static stabilizing structures of the shoulder are vulnerable. The authors suggested that anterior forces up to one time affect body weight during external rotation (ER) and up to 1.5 times – during the follow-through phase (distracting the joint) (Fleisig et al.,1995, 1996). These forces are similar to the ones in other overhead-throwing athletes. The overhead-throwing athletes demonstrate several different physical characteristics-specifically, shoulder ROM, scapular position, laxity, muscular strength and proprioception. These characteristics must be understood to accurately assess what is a normal physical adaptation rather than pathology (Reinold, Gill, 2009).

Range of motion. K. E. Wilk et al. reported such passive range of motion characteristics of the shoulder in 372 professional baseball players: 129° ± 10° of ER and 61° ± 9° of IR (internal rotation) in the throwing shoulder at 90° abduction. ER was by 7° greater on average, and IR was by 7° less on average in the dominant arm when compared to the non-dominant arm. Thus, total rotation ROM at 90° of abduction is bilaterally equal in asymptomatic overhead throwers (Wilk et al., 2002). Most throwers exhibit an obvious motion disparity, whereby shoulder external rotation (ER) is excessive and internal rotation (IR) is limited when measured at 90° of abduction. This loss of IR of the throwing shoulder has been referred to as glenohumeral internal rotation deficit (GIRD) (Wilk et al., 2009). M. M. Reinold et al. found that goniometric measurements of passive ER and IR at 90° of abduction were reliable in overhead-throwing athletes (intratester reliability intraclass correlation coefficients were 0.81 and 0.87). However, bilateral comparisons of ER and IR are not useful (Reinold et al., 2008). If the total rotation motion decreases on the throwing side, careful measurements of ROM should be made to determine if IR has been lost. A loss of IR with a hard endfeel may represent other pathologies, such as a thrower's exostosis (ie, calcification of the posteroinferior glenohumeral capsular attachment due to chronic traction stress) (Ferrari et al., 1992; Wilk et al. 2009).

Scapular position provides a base for entire shoulder complex function especially for motion in glenohumeral joint. The term "shoulder movement" describes the combined motions at both the glenohumeral and scapulothoracic joints (Neumann, 2010). To be able to function properly, the scapula needs to be in the proper position to assist in the movement of the humerus. W. B. Kibler defined alterations in motion of the scapula during coupled scapulohumeral movements as "scapular dyskinesis". Numerous authors have noted the role of scapular dyskinesis and the positive correlation to shoulder pathology (Kibler, 1991).

Joint laxity. The excessive motion observed in overhead-throwing athletes is commonly attributed to an increase in glenohumeral laxity (Reinold et al., 2009). This increased motion can show excessive ER associated to anterior capsular laxity. Excessive laxity may be the result of repetitive throwing or congenital laxity.

Muscle strength. Isokinetic testing of professional baseball pitchers' throwing shoulders during training showed external rotation peak torque by 6% lower on average ($p < 0.05$) than that of the nonthrowing shoulders at 90° of abduction. Internal rotation peak torque of the throwing shoulder was by 3% higher on average ($p < 0.05$) than that of the nonthrowing shoulder. The mean optimal ratio between ER and ER peak torque at 90° of abduction during isokinetic testing was between 66% and 75%. Adduction torque of the throwing shoulder was by 14% greater than that of the nonthrowing shoulder (Wilk et al., 2005).

Proprioception plays important role dynamically stabilizing glenohumeral joint in presence of capsular laxity and dealing with excessive range of motion in the overhead athlete. One study tested shoulder proprioception in 20 healthy overhead-throwing athletes by joint repositioning. The dominant shoulder exhibited diminished proprioception and improved proprioception toward end range of motion (Safran et al., 2001) Proprioception significantly decreased after throwing to fatigue, although deficits returned to normal within 10 minutes after throwing (Tripp et al., 2007).

Proper history taking, physical examination, imaging, type of sport are important for final decision which type of treatment to use: conservative or surgical. The decision of return to sport is always challenging. Each case is individual and lack of objective criteria brings confusion into the final decision of returning to sports. Successful return to unrestricted function requires integrating the appropriate diagnosis, surgical management and rehabilitation in a coordinated effort. It is critical to carefully follow a postoperative rehabilitation program that has been based on an accurate diagnosis that specifies the extent of superior labral pathology to ensure a successful outcome (Wilk et al., 2005).

SLAP lesions in overhead athletes often occur in combination with PTRC tears (Conway, 2001). It can be difficult to detect them because of the presence of concomitant pathology. Even 45% of patients with SLAP lesions had concomitant partial-thickness tears of the m. supraspinatus. R. A. Mileski and S. J. Snyder reported that 29% of their patients with SLAP lesions exhibited partial-thickness tears, 11% had complete cuff tears and 22% had Bankart lesions (Mileski, Snyder, 1998). During throwing motion when arm is in external rotation, tendon of long head of *m. biceps brachii* and tendon of *m. supraspinatus* impinges in acceleration – deceleration phase (Panossian et al., 2005). Repetitive motions in overhead activities are resulting in the appearance of the symptoms. J. R. Andrews et al. (1985) first hypothesized that SLAP pathology in overhead throwing athletes was the result of high eccentric activity of the m. biceps *brachii* during the arm deceleration and followed through phases of the overhead throw. Later on more data was presented by S. J. Snyder (1990, 1995).

S. S. Burkhart and C. D. Morgan (1998) presented a "peel-back" mechanism that produced SLAP lesion in the overhead athlete. They suggested that when the shoulder was placed in a position of abduction and maximal ER, the rotation produced a twist at the base of the biceps, transmitting torsional force to the anchor. C. Miller and F. H. Savoie (1994) found that about 74 % of the patients with rotator cuff tear had lesion of tendon of the long head of *m. biceps brachii*. S. J. Snyder et al. (1993) reported that 40% of 140 arthroscopically investigated patients with SLAP lesion had partial tear of rotator cuff tendon.

Predictable surgical outcomes can be expected after type II SLAP repair, but the effect of concomitant SLAP type II and PTRC tears on surgical outcome in overhead athletes and non-overhead athletes is still insufficient.

We hypothesize that concomitant SLAP type II and PTRC tears surgery will have good outcome for the overhead athletes but short term rehabilitation in acute phase after the surgery is insufficient for successful healing and fast return to sports.

The aim of the study was to evaluate shoulder complex functional characteristics of the overhead and non-overhead young athletes before and two years after the concomitant arthroscopic type II superior labrum anterior posterior (SLAP) and partial – thickness rotator cuff (PTRC) repair and to present specific rehabilitation guidelines needed for successful return to sports.

Research tasks:

1. To measure and compare shoulder joint ROM in of the overhead and non-overhead young athletes two years after concomitant arthroscopic surgery.
2. To evaluate functional characteristics of shoulder complex using Constant score of the overhead and non-overhead young athletes two years after concomitant arthroscopic surgery.
3. To prepare scientific literature based rehabilitation guidelines for the overhead athletes.

RESEARCH METHODS

The research was carried out following the principles of the Declaration of Helsinki about the ethics of experimentation with humans. The sample of the research included 38 male athletes, mean age = 22.91 ± 2.5 years, age range 18–28 years. According to their participation in different sport activities, they were divided into two groups.

The first group was composed of 19 *overhead athletes*. The mean age during surgery 23.6 ± 2.6 years (range 19–28 years). They underwent arthroscopic type II SLAP repair and were available for review at a minimum of two year after surgery. The second group was composed of 19 *non-overhead athletes* (mean age = 22.2 ± 2.4 years; range 18–26), who had the same shoulder pathology and arthroscopic repair procedure and were available for review at a minimum of two year after surgery. There was no significant difference among groups according to athletes' age ($p = 0.08$). Different sport activities of participants are presented in Table 1.

All surgeries were performed in Sports trauma and arthroscopic surgery sector of LUHS (Lithuanian University of Health Sciences) Hospital Kauno Klinikos, Orthopedics and Traumatology Clinic in 2008–2011. The same experienced surgeon performed all the arthroscopic surgeries.

Only those patients who were diagnosed with combined SLAP and PTRC injuries during shoulder arthroscopy and underwent full endoscopic reconstruction of both injuries, were included in this research. Those patients, who preoperatively had shoulder arthrosis (diagnosed radiographically), cervical osteochondrosis, osteoporosis or underwent opened shoulder reconstruction operations were not included in this study. All participants had shoulder lesions in their dominant hand.

Table 1. **Distribution of participants according to different sports activities**

Sport activities	Number of athletes	
	Overhead athletes group	Non-overhead athletes group
Basketball	1	0
Volleyball	3	0
Tennis	1	0
Handball	3	0
Swimming	4	0
Water polo	1	0
Javelin throwing	1	0
Gymnastics	2	0
Wrestling	2	0
Rowing	1	0
Football	0	4
Running	0	3
Cycling	0	1
Athletics	0	4
Shooting	0	3
Motocross	0	4
Total	19	19

All participants were assessed preoperatively and postoperatively. Postoperative measures were taken after 22.4 ± 2.7 months. All measures were performed by the same experienced scientist.

All the patients underwent standard rehabilitation process in acute healing phase including physical therapy and physical modalities. Gentle and protective physical exercises were used in acute phase after the surgery. No sport-specific rehabilitation and long term physical therapy was applied in later stages.

Shoulder functional ROM assessment was performed with plastic goniometer. Shoulder flexion ROM and shoulder IR and ER ROM at 90° of abduction were evaluated using standard procedures.

Constant score was used for evaluation of the shoulder functional quality. The Constant score is a widely used shoulder-specific scoring system. It uses subjective and objective measures to determine whether a certain functional movement is possible. As an outcome tool, the Constant score includes the analysis of pain, shoulder motion, strength and function. From a perfect score of 100, it reserves 35 points for patient-reported subjective assessment, including the presence of pain and the ability to perform basic activities of daily living, and 65 points for objective measurement. For the latter, 40 points are allocated to range of motion and 25 points are allocated to strength (Constant, 2008).

The data analysis was performed using *SPSS 17.0 package for Windows*. Hypothesis concerning the difference between groups was verified using nonparametric tests. Differences were regarded as statistically significant when error probability with respect to criteria was $p < 0.05$.

RESEARCH RESULTS

Constant score. Before surgery there was no significant difference according Constant score values between the groups. After 2 years Constant score in both groups of athletes increased statistically significantly (Table 2). Significant difference was established comparing both groups after two years. The mean improvement of Constant score value in overhead athletes group was 21 points, in non-overhead group – 31 points. Although the deficit of Constant score decreased in both groups, the mean value of Constant score after two years did not returned to optimal value (Figure 1).

Table 2. **Constant score values before surgery and after two years follow-up**

Subjects	Before surgery	After 2 years
Overhead athletes	76.2 ± 1.2 ◄—►	87.4 ±3.4 ▲
Non-overhead athlete	75.6 ± 3.4 ◄—►	94.1±1.8 ▼

Note. ◄—► – $p < 0.05$.

Shoulder functional ROM. Analyzing shoulder flexion, ER and IR before surgery, no significant differences were found in all shoulder movements comparing overhead and non-overhead athletes in both groups, the mean value of Constant score after two years did not return to optimal

When calculated total rotation ROM (external rotation ROM plus internal rotation ROM) was analyzed, significant difference among groups was established (141 ± 2.3 degrees in overhead athletes *vs.* 133 ± 2.9 degrees in non-overhead athletes). After two years, shoulder frontal plane flexion and internal rotation ROM in both groups and external rotation ROM of non-overhead athletes were the same as before surgery. Significant change of external rotation was established in overhead athletes. The external rotation ROM at follow up was significantly smaller and hadn't return even to preoperative value (Figure 2). Total rotation ROM after 2 years follow up significantly differed among groups (121 ± 2.9 degrees in overhead athletes *vs* 129 ± 2.8 degrees in non-overhead athletes).

Rehabilitation after shoulder injuries for overhead athletes. The main principles should be

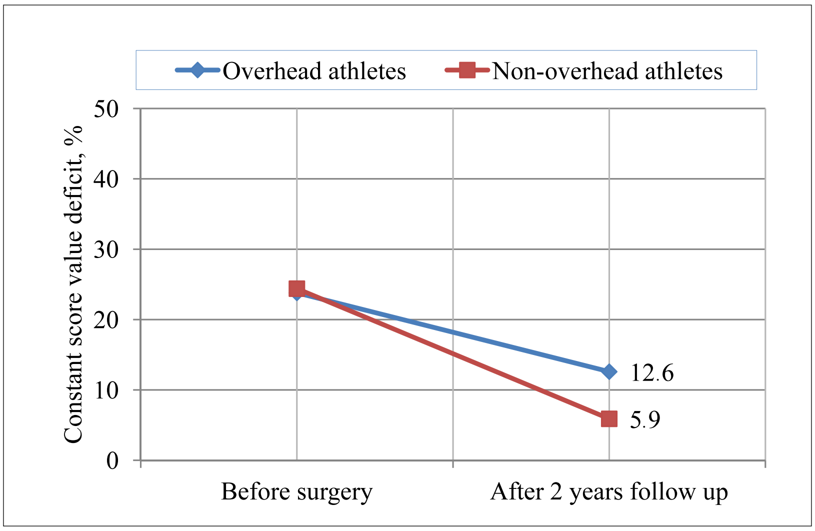

Figure 1. **Constant score value deficit before surgery and 2 years after surgery**

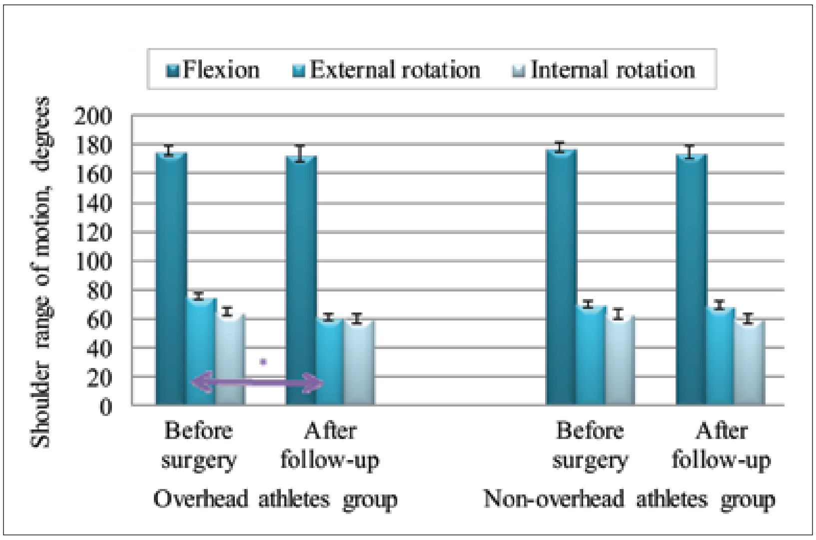

Figure 2. **Shoulder range of motion in overhead and non-overhead athletes groups**

Note. * – $p < 0.05$.

incorporated into prevention and rehabilitation protocol: to maintain or restore – ROM, strength of the glenohumeral and scapulothoracic muscles, dynamic stabilization and neuromuscular control, core stability and lower body condition, off-season preparation and in-season maintenance. Rehabilitation guidelines for overhead athletes differ in stages. In acute phase the main goals are to diminish pain and inflammation, to protect the anatomic repair, to prevent negative effects of immobilization, to improve posterior flexibility, to re-establish posterior strength and dynamic stability (muscular balance) and to control functional stresses. The athlete should abstain from throwing motion until pain-free full ROM and full strength (specific time should be determined by doctor) will be restored. Physical modalities can be applied – iontophoresis, phonophoresis, electrical stimulation and cryotherapy if needed. Flexibility exercises are used to improve IR at 90° abduction to normal total motion values and to enhance horizontal adduction flexibility. Gradual stretching into ER and flexion should be done (not to force into painful external rotation). Physical therapy covers exercises for rotator cuff strengthening (especially external rotation) with light-moderate weight (external/internal rotation with elastic resistance); scapular strengthening exercises (retractors, depressors and protractors); manual strengthening exercises; dynamic rhythmic stabilization exercises; proprioception training; electrical stimulation of posterior rotator cuff if needed during exercises; closed kinetic chain exercises; maintenance of core, lower body, elbow, wrist and forearm strength. A. Jaggi and S. Lambert (2010) suggest to use kinesiotaping for postural control. Early feedback of posture and shoulder girdle position is important for all overhead athletes to avoid inappropriate patterning and strengthening. Kinesiotapes can be invaluable in providing correct sensory feedback facilitating correct muscle activation. Early submaximal isometric exercises for the rotator cuff should be performed as pain allows and to the exclusion of inappropriate muscle activity for patients. The belly press test, used to test the integrity of subscapularis can be modified for this purpose using pressure biofeedback device (Jaggi, Lambert, 2010). Criteria to progress are: minimal pain or inflammation; normalized shoulder IR and horizontal adduction ROM; baseline muscular strength without fatigue. The goals of intermediate phase are restore full ROM to gradually, preserve the integrity of surgical repair, progress with strengthening exercises, restore muscular balance (ER/IR), enhance dynamic stability, maintain flexibility and mobility, improve core stabilization and lower body strength. Flexibility exercises are done with the control especially for IR and horizontal adduction gradually restoring full ER. Physical therapy involves progress strengthening exercises. For the rotator cuff and scapula shoulder isotonic exercises can be used (later with weights). It is possible to start dynamic rhythmic stabilization exercises (side lying exercises for ER, elastic resistance for ER till end range, wall stabilization onto ball, push ups onto ball with stabilization). If exercises are tolerated well, 2-hand plyometric throws can be started (chest pass, side to side, overhead soccer throws). Criteria to progress are: full, pain-free ROM, full 5/5 strength with no fatigue. Goals in advanced strengthening phase are: aggressive strengthening exercises, progress in neuromuscular control, improvement of strength, power and endurance, start of light throwing activities, maintain shoulder mobility. Physical therapy exercises: stretching before exercise program (continue to normalize total motion, continue strengthening program above, re-initiate upper-body exercises), dynamic stabilization motions (ER with elastic resistance with end-range at 90° abduction, wall stabilization exercises in 90° of abduction and 90° of ER, wall dribble in 90° of abduction and 90° of ER, plyometrics (two-hand drills, one-hand drills, stretch after the exercises)). Criteria to progress are: full nonpain ROM, 75–80% strength of contralateral side, no pain and tenderness, adequate static and dynamic stability, appropriate rehabilitation progression to this point. Goals of return-to-activity phase: progress to throwing motion, continued strengthening and flexibility exercises, return to competitive throwing. Physical therapy exercises: stretching and flexibility exercises, shoulder stability program, plyometrics, dynamic stabilization, interval throwing training, gradual progress to competitive throwing as tolerated (Wilk et al., 2005; Reinold et al., 2010).

DISCUSSION

Shoulder pain, impingement symptoms, variable labral signs, and often a history of shoulder trauma are the most common symptoms for patients with SLAP and PTRC lesion. In throwing athletes, it is common to encounter delaminated (split into layers), intratendinous, partial-thickness rotator cuff tears in conjunction with SLAP lesions (Dodson, Altchek, 2009). When lesions of the labrum and rotator cuff occur concomitantly, arthroscopic repair of both lesions will restore ROM and stability and provide good clinical results in the short term **(**Voos et al., 2007).

ROM. Numerous researchers have reported abnormalities of ROM in overhead athletes that may influence shoulder complex injuries. So proper assessment of shoulder ROM is very important in profound evaluation of athletes. For this purpose understanding baseline values of ROM is needed. Although the fact that the arc of motion of overhead athlete's shoulder is shifted posteriorly, which increases ER and decreased IR of the abducted shoulder, is well known, very often assessment is rather confusing as many diverse normative values are presented by different investigators. For example, the amplitude of ER at 90 degrees of abduction varies from 103.2 to 136.1 degrees and the amplitude of IR at 90 degrees abduction varies from 42.2 to 79.3 degrees in dominant shoulder of healthy overhead athletes (Wilk et al., 2012). Outcome data after arthroscopic repairs are also rather confusing and the type of surgical intervention has very significant influence on the outcome values. Outcome results in shoulder ROM after SLAP repair in both athlete and non-athlete groups in most cases are much better than outcome results after concomitant SLAP and PTRC surgery. Our results showed that IR ROM in both athlete groups was similar to healthy overhead athletes' data, but ER data differed significantly from normal values even before surgery. It can be explained by concomitant injury repair surgery type. However, there is a lack of outcome data after concomitant SLAP and PTRC surgery, especially comparing overhead and non-overhead athletes. J. E. Voos et al. (2007) reported very similar data of ER restoration after such surgery in the non-athlete (average age 49 years) group. But still there are conflicting reports in literature regarding the outcome of SLAP repairs in overhead athletes and a paucity of data demonstrating the ability to return to the prior level of competition (Neri et al., 2011). Recently there were some critical opinions about

SLAP repair outcomes in research studies which concentrated on using questionnaires that primarily evaluated patients' activities of daily living and which did not focus on sport-specific performance (Neuman et al., 2011). Although in this research we did not analyse how our participants who succefully returned to their sport , though according to their shoulder complex ROM data after two yearstheir returning to sport was not very effective/easy.

Constant score. We could not find research data about Constant score changes in overhead athletes after concomitant SLAP and PTRC repair. However, B. Forsythe et al. (2010) reported that in non-athletes, Constant score after such surgery was 95.8 points. For healthy 21–30 years aged male subjects, normal values of Constant score were 97–99 points (Constant, 2008). So our research data of non-overhead athletes are very similar to these values, but there is a significant deficit of Constant score in overhead athletes. It can be due to the still existing deficit of ER after surgery.

Rehabilitation after SLAP and PTRC arthroscopic repair of overhead athletes. Overhead athletes with an acquired tight posterior inferior capsule and tight scapulothoracic articulation are the most likely to develop the "dead arm syndrome". This posteroinferior capsular contracture is acquired in the throwing athlete and presents as IR deficit with the arm in the 90° abducted position. The healthy throwing shoulder will have increased ER in abduction at the expense of IR. If the gain of external rotation equals the loss of IR, allowing a 180° ROM, problems will be avoided. The shoulder with a posterior inferior capsular contracture that restricts the total ROM to less than 180° is truly a "shoulder at risk". Most overhead athletes who develop an acute posterior superior SLAP may complain of associated activity-related bicipital groove pain (Burkhart, Morgan, 2001). After SLAP repair, biceps muscle strengthening is not allowed until four weeks after surgery. A throwing program may begin after three months, if the following criteria have been met: shoulder motion has been recovered; trunk, scapula, and rotator cuff muscle endurance balance and strength have been restored; and there is no pain with activity or during examination (Conway, 2001)

Return to sports. Return to play following the surgical repair of a type II SLAP lesion typically occurs at approximately 9 to 12 months following surgery. Rehabilitation places emphasis on gradually restoring ROM, strength, and dynamic stability of the glenohumeral joint while controlling forces on the healing structures (Wilk et al., 2005). Only 8% of professional baseball pitchers (1 of 12) with repaired full-thickness tears have returned to the same level of competition at a mean 66-month follow-up (Mazoué, Andrews, 2006). Repair of partial-thickness rotator cuff tears in professional and college throwers allowed 89% to return to the same level of play, with follow-up of only 12 months (Conway 2001). Kim Seung-Ha et al. (2002) evaluated 34 patients at a mean of 33 months after surgical repair of type II SLAP lesions. While the overall results were good (94% satisfactory UCLA shoulder score, 91% return to preinjury shoulder function), significant differences were observed between patients who participated in different types of athletics. Specifically, throwing athletes had lower shoulder scores and a lower percentage of return to their preinjury level of shoulder function than patients who were not involved in overhead sports (Kim Seung-Ha et al., 2002). Overhead athletes without a specific traumatic injury had lower scores and a lower return to preinjury function rate than athletes with a history of a specific traumatic event. These publications suggest that surgical repair of type II SLAP tears in overhead athletes with an overuse-related cause may be less successful than in other patients (Dodson, Altchek, 2009).

CONCLUSIONS AND PERSPECTIVES

Functional characteristics of shoulder complex measured with Constant score in overhead and non-overhead athletes statistically significantly increased two years after the arthroscopic surgery. The function of the shoulder complex more increased in non-overhead group ($p < 0.05$). However, that Constant score did not return to optimal level after two years (healthy, physically active person should have Constant score close to 100). Two years after the arthroscopic surgery, shoulder flexion and internal rotation ROM in both groups and external rotation ROM of non-overhead athletes were the same as before surgery. Significant decrease of external rotation was established in overhead athletes. The external rotation ROM after two years after the surgery was significantly smaller and did not return even to preoperative level. Sports-specific and diagnose-based rehabilitation is needed to decrease deficit in function of the shoulder complex after concomitant arthroscopic type II SLAP and PTRC repair. Decision to return to sport should be based on clinical examination findings and functional evaluation of the athlete.

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JAUNO AMŽIAUS VIRŠ GALVOS RANKŲ JUDESIUS NAUDOJANČIŲ SPORTININKŲ PETIES SĄNARIO PAŽEIDIMŲ ARTROSKOPINIS CHIRURGINIS GYDYMAS IR REABILITACIJOS GAIRĖS

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SANTRAUKA

Tyrimo pagrindimas ir hipotezė. Virš galvos rankų judesius naudojantys sportininkai turi didesnę riziką patirti ūmias peties sąnario traumas ar lėtinius pažeidimus.

Tikslas – įvertinti virš galvos rankos judesius naudojančių ir nenaudojančių sportininkų peties komplekso funkcines ypatybes prieš bei praėjus dvejiems metams po kompleksinių viršutinės–priekinės–užpakalinės sąnario lūpos (SLAP) ir dalinių viršdyglinio raumens sausgyslės (DVSR) pažeidimų pilnai endoskopinių rekonstrukcijų, pateikti reabilitacijos gaires.

Metodai. Buvo tiriami 38 jauno amžiaus sportininkai vyrai: 19 virš galvos rankų judesius naudojančių ir 19 virš galvos rankos judesių nenaudojančių. Visiems tiriamiesiems buvo atliktos kombinuotos peties sąnario viršutinės–priekinės–užpakalinės sąnario lūpos (SLAP) ir dalinių viršdyglinio raumens sausgyslės (DVSR) pažeidimų rekonstrukcinės pilnai endoskopinės operacijos. Klinikiniai rezultatai vertinti prieš operaciją ir praėjus dvejiems metams po artroskopinės operacijos naudojant Constant skalę ir operuoto peties sąnario žasto judesių amplitudės matavimus.

Rezultatai. Abiejų grupių sportininkų Constant skalės rodiklių vidurkiai nepasiekė sveikų, fiziškai aktyviems asmenims būdingo peties sąnario funkcinio lygio. Praėjus dvejiems metams po artroskopinės peties sąnario operacijos, abiejų grupių sportininkų žasto lenkimo ir vidinės rotacijos judesių amplitudės grįžo į priešoperacinį lygį, o tik virš galvos judesius nenaudojančių sportininkų išorinės žasto rotacijos amplitudė grįžo į priešoperacinį lygį.

Aptarimas ir išvados. Abiejų grupių sportininkams funkciniai peties sąnario rodikliai, įvertinti Constant skale, statistiškai reikšmingai padidėjo praėjus dvejiems metams po operacijos. Virš galvos rankų judesius naudojančių sportininkų išorinės žasto rotacijos amplitudė praėjus dvejiems metams po operacijos negrįžo į priešoperacinį lygį. Virš galvos rankų judesius naudojantiems sportininkams po kombinuotos peties sąnario SLAP ir DVSR pažeidimų rekonstrukcinės pilnai endoskopinės operacijos vėlesniu reabilitacijos laikotarpiu būtina specifinė sporto šakos kineziterapija.

Raktažodžiai: peties kompleksas, viršutinės–priekinės–užpakalinės sąnario lūpos pažeidimas, dalinis viršdyglinio raumens sausgyslės pažeidimas, sporto kineziterapija.

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