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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии

საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

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GMN: Georgian Medical News is peer-reviewed, published monthly journal committed to promoting the science and art of medicine and the betterment of public health, published by the GMN Editorial Board since 1994. GMN carries original scientific articles on medicine, biology and pharmacy, which are of experimental, theoretical and practical character; publishes original research, reviews, commentaries, editorials, essays, medical news, and correspondence in English and Russian.

GMN is indexed in MEDLINE, SCOPUS, PubMed and VINITI Russian Academy of Sciences. The full text content is available through EBSCO databases.

GMN: Медицинские новости Грузии - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией с 1994 года на русском и английском языках в целях поддержки медицинской науки и улучшения здравоохранения. В журнале публикуются оригинальные научные статьи в области медицины, биологии и фармации, статьи обзорного характера, научные сообщения, новости медицины и здравоохранения. Журнал индексируется в MEDLINE, отражён в базе данных SCOPUS, PubMed и ВИНИТИ РАН. Полнотекстовые статьи журнала доступны через БД EBSCO.

GMN: Georgian Medical News – საქართველოს სამედიცინო სიახლენი – არის ყოველთვიური სამეცნიერო სამედიცინო რეცენზირებადი ჟურნალი, გამოიცემა 1994 წლიდან, წარმოადგენს სარედაქციო კოლეგიისა და აშშ-ის მეცნიერების, განათლების, ინდუსტრიის, ხელოვნებისა და ბუნებისმეტყველების საერთაშორისო აკადემიის ერთობლივ გამოცემას. GMN-ში რუსულ და ინგლისურ ენებზე ქვეყნდება ექსპერიმენტული, თეორიული და პრაქტიკული ხასიათის ორიგინალური სამეცნიერო სტატიები მედიცინის, ბიოლოგიისა და ფარმაციის სფეროში, მიმოხილვითი ხასიათის სტატიები.

ჟურნალი ინდექსირებულია MEDLINE-ის საერთაშორისო სისტემაში, ასახულია SCOPUS-ის, PubMed-ის და ВИНИТИ РАН-ის მონაცემთა ბაზებში. სტატიების სრული ტექსტი ხელმისაწვდომია EBSCO-ს მონაცემთა ბაზებიდან.

WEBSITE

www.geomednews.com

К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

1. Статья должна быть представлена в двух экземплярах, на русском или английском языках, напечатанная через **полтора интервала на одной стороне стандартного листа с шириной левого поля в три сантиметра**. Используемый компьютерный шрифт для текста на русском и английском языках - **Times New Roman** (**Кириллица**), для текста на грузинском языке следует использовать **AcadNusx.** Размер шрифта - **12**. К рукописи, напечатанной на компьютере, должен быть приложен CD со статьей.

2. Размер статьи должен быть не менее десяти и не более двадцати страниц машинописи, включая указатель литературы и резюме на английском, русском и грузинском языках.

3. В статье должны быть освещены актуальность данного материала, методы и результаты исследования и их обсуждение.

При представлении в печать научных экспериментальных работ авторы должны указывать вид и количество экспериментальных животных, применявшиеся методы обезболивания и усыпления (в ходе острых опытов).

4. К статье должны быть приложены краткое (на полстраницы) резюме на английском, русском и грузинском языках (включающее следующие разделы: цель исследования, материал и методы, результаты и заключение) и список ключевых слов (key words).

5. Таблицы необходимо представлять в печатной форме. Фотокопии не принимаются. **Все цифровые, итоговые и процентные данные в таблицах должны соответствовать таковым в тексте статьи**. Таблицы и графики должны быть озаглавлены.

6. Фотографии должны быть контрастными, фотокопии с рентгенограмм - в позитивном изображении. Рисунки, чертежи и диаграммы следует озаглавить, пронумеровать и вставить в соответствующее место текста **в tiff формате**.

В подписях к микрофотографиям следует указывать степень увеличения через окуляр или объектив и метод окраски или импрегнации срезов.

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

8. При оформлении и направлении статей в журнал МНГ просим авторов соблюдать правила, изложенные в «Единых требованиях к рукописям, представляемым в биомедицинские журналы», принятых Международным комитетом редакторов медицинских журналов - http://www.spinesurgery.ru/files/publish.pdf и http://www.nlm.nih.gov/bsd/uniform_requirements.html
В конце каждой оригинальной статьи приводится библиографический список. В список литературы включаются все материалы, на которые имеются ссылки в тексте. Список составляется в алфавитном порядке и нумеруется. Литературный источник приводится на языке оригинала. В списке литературы сначала приводятся работы, написанные знаками грузинского алфавита, затем кириллицей и латиницей. Ссылки на цитируемые работы в тексте статьи даются в квадратных скобках в виде номера, соответствующего номеру данной работы в списке литературы. Большинство цитированных источников должны быть за последние 5-7 лет.

9. Для получения права на публикацию статья должна иметь от руководителя работы или учреждения визу и сопроводительное отношение, написанные или напечатанные на бланке и заверенные подписью и печатью.

10. В конце статьи должны быть подписи всех авторов, полностью приведены их фамилии, имена и отчества, указаны служебный и домашний номера телефонов и адреса или иные координаты. Количество авторов (соавторов) не должно превышать пяти человек.

11. Редакция оставляет за собой право сокращать и исправлять статьи. Корректура авторам не высылается, вся работа и сверка проводится по авторскому оригиналу.

12. Недопустимо направление в редакцию работ, представленных к печати в иных издательствах или опубликованных в других изданиях.

При нарушении указанных правил статьи не рассматриваются.

REQUIREMENTS

Please note, materials submitted to the Editorial Office Staff are supposed to meet the following requirements:

1. Articles must be provided with a double copy, in English or Russian languages and typed or compu-ter-printed on a single side of standard typing paper, with the left margin of **3** centimeters width, and **1.5** spacing between the lines, typeface - **Times New Roman** (**Cyrillic**), print size - **12** (referring to Georgian and Russian materials). With computer-printed texts please enclose a CD carrying the same file titled with Latin symbols.

2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

5. Tables must be presented in an original typed or computer-printed form, instead of a photocopied version. **Numbers, totals, percentile data on the tables must coincide with those in the texts of the articles.** Tables and graphs must be headed.

6. Photographs are required to be contrasted and must be submitted with doubles. Please number each photograph with a pencil on its back, indicate author's name, title of the article (short version), and mark out its top and bottom parts. Drawings must be accurate, drafts and diagrams drawn in Indian ink (or black ink). Photocopies of the X-ray photographs must be presented in a positive image in **tiff format**.

Accurately numbered subtitles for each illustration must be listed on a separate sheet of paper. In the subtitles for the microphotographs please indicate the ocular and objective lens magnification power, method of coloring or impregnation of the microscopic sections (preparations).

7. Please indicate last names, first and middle initials of the native authors, present names and initials of the foreign authors in the transcription of the original language, enclose in parenthesis corresponding number under which the author is listed in the reference materials.

8. Please follow guidance offered to authors by The International Committee of Medical Journal Editors guidance in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication available online at: http://www.nlm.nih.gov/bsd/uniform_requirements.html
http://www.icmje.org/urm_full.pdf
In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

9. To obtain the rights of publication articles must be accompanied by a visa from the project instructor or the establishment, where the work has been performed, and a reference letter, both written or typed on a special signed form, certified by a stamp or a seal.

10. Articles must be signed by all of the authors at the end, and they must be provided with a list of full names, office and home phone numbers and addresses or other non-office locations where the authors could be reached. The number of the authors (co-authors) must not exceed the limit of 5 people.

11. Editorial Staff reserves the rights to cut down in size and correct the articles. Proof-sheets are not sent out to the authors. The entire editorial and collation work is performed according to the author's original text.

12. Sending in the works that have already been assigned to the press by other Editorial Staffs or have been printed by other publishers is not permissible.

Articles that Fail to Meet the Aforementioned Requirements are not Assigned to be Reviewed.

ავტორთა საყურადღებოდ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დავიცვათ შემდეგი წესები:

1. სტატია უნდა წარმოადგინოთ 2 ცალად, რუსულ ან ინგლისურ ენებზე,დაბეჭდილი სტანდარტული ფურცლის 1 გვერდზე, 3 სმ სიგანის მარცხენა ველისა და სტრიქონებს შორის 1,5 ინტერვალის დაცვით. გამოყენებული კომპიუტერული შრიფტი რუსულ და ინგლისურენოვან ტექსტებში - **Times New Roman (Кириллица)**, ხოლო ქართულენოვან ტექსტში საჭიროა გამოვიყენოთ **AcadNusx.** შრიფტის ზომა – 12. სტატიას თან უნდა ახლდეს CD სტატიით.

2. სტატიის მოცულობა არ უნდა შეადგენდეს 10 გვერდზე ნაკლებს და 20 გვერდზე მეტს ლიტერატურის სიის და რეზიუმეების (ინგლისურ, რუსულ და ქართულ ენებზე) ჩათვლით.

3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ, რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი, მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემაჯამებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრამების ფოტოასლები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შეღებვის ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფჩხილებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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TRAUMATIC ANTERIOR SHOULDER INSTABILITY (TUBS): A NARRATIVE REVIEW OF CURRENT LITERATURE

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Abstract.

Background: Traumatic anterior shoulder instability (TUBS) is defined as one-directional shoulder instability that is often associated with Bankart lesions and glenoid bone loss. If not managed properly it can lead to recurrent shoulder dislocation. TUBS usually occurs as a result of traumatic dislocation. Early diagnosis and intervention are essential to achieve favorable outcomes and prevent long term complications.

Aim: This narrative review offers a comprehensive overview of traumatic anterior shoulder instability, with an aim to cover all aspects including patient presentation, tools that can aid in diagnosis and both conservative and operative management options. This is done with special emphasis on patient-centered care.

Materials and methods: This review is based on peer-reviewed articles and summarizes the diagnostic principles, both conservative and operative management criteria, and recent operative techniques including arthroscopic Bankart repair, and the Latarjet procedure.

Results: The diagnosis of TUBS is multifactorial, depending on factors such as patient history, clinical tests and imagining such as MRI to evaluate the soft tissue and assess bone integrity. Conservative treatment was found to be a suitable option for elderly patients, but young active individuals benefited more from surgery. The choice of which operative technique to use depends on the extent of bone loss and patient-specific factors.

Conclusion: Effective treatment of traumatic anterior shoulder instability requires a personalized approach, with consideration for anatomical variation, recurrence rates and the patient's activities of daily living. While Conservative management has a role in select patients, early surgical treatment is favorable for good functional outcomes in high-risk patients. Advancements in imaging and operative techniques are essential to improve management protocols and long-term shoulder stability.

Key words. Shoulder instability, anterior dislocation, bankart lesion, glenoid bone loss, arthroscopic repair, latarjet procedure, traumatic dislocation.

Introduction.

Traumatic anterior shoulder instability (TUBS) is a common condition in young and active individuals, especially after a traumatic dislocation of the shoulder joint [1]. It is characterized by instability and is often associated with structural lesions such as a Bankart lesions [2]. Bankart lesions are defined as anterior labral tears that cause anterior glenohumeral instability [3]. If not managed appropriately they can result in recurrent dislocations [4].

The shoulder joint is very susceptible to instability, mainly due to the fact that the shoulder anatomy prioritizes mobility over stability [5,6]. The structures of the shoulder such as the shallow glenoid fossa, large humeral head, and relatively lax capsule allow for 360 degrees circumduction of the joint but make it very vulnerable to dislocation [2,7]. Recurrence after first time dislocation in young athletic individuals is common with rates reaching to 90% in some studies [8].

First time dislocations are usually treated conservatively by physiotherapy and lifestyle modification [1]. However, new upcoming evidence show that early surgical intervention is crucial to reduce recurrence rates and improve functional outcomes [8]. Currently, the most commonly used procedures are arthroscopic Bankart repair and the Latarjet technique [2,9]. The decision of which of the aforementioned procedures to opt for is influenced by the patient's own risk factors and anatomy [10].

While a lot of advancements have been made in diagnostic tools and surgical approaches, there is yet to be a defined gold standard management for TUBS. Different factors such as age, bone loss, activities of daily living and patients' own exceptional criteria all are crucial in determining the management course [1,2]. Clinical decision making and individualized surgical planning have benefited from the new preoperative scoring systems and advanced imaging [10].

This narrative review will cover common mechanisms of injury, clinical presentation, diagnostic tools and both conservative and different surgical management approaches. This review has the aim to summarize the current understanding of traumatic anterior shoulder instability while maintaining a special focus on current approaches and controversies.

Mechanism of injury:

TUBS is usually caused by forced external rotation and arm abduction, which is common in contact sport injuries and falls onto an outstretched hand [4,5]. The mechanics associated with these mechanisms lead to anterior dislocation of the humeral head out of the glenoid fossa, especially when the shoulder is in a vulnerable position, which occurs when the arm is 90 degrees abducted and externally rotated [6]. This is a common position in rugby, football and overhead throwing [1,11].

Key stabilizing structures in the shoulder are disturbed during this dislocation mechanism [7]. For example, the anterior inferior glenohumeral ligament (AIGHL) is often torn or stretched, and the anteroinferior labrum may also detach from the glenoid rim, resulting in a Bankart lesion [6,12]. Bone damage can occur in severe injuries leading to Hill Sach lesions, defined as a compression fracture of the humeral head [6]. Glenoid bone loss may also accompany soft tissue damage [7]. Both lesions lead to shoulder instability and increase the recurrence rate of shoulder dislocation and subluxation [10,13].

Rotator cuff muscles play a critical role in maintaining shoulder stability as they are dynamic stabilizers of the shoulder joint [5,7]. During a dislocation, the rotator cuff (particularly the subscapularis muscle) may be strained or imbalanced, making it less effective in stabilizing the joint [14]. Recurrent dislocation and repeated trauma lead to capsular laxity and persistent instability [7]. Understanding of the biomechanics and the associated structural injuries is crucial for management planning, as the extent and type of tissue damage help determine whether conservative or surgical intervention is more appropriate [12,15].

Diagnosis:

Clinically, patients with TUBS present with severe pain, a visible shoulder deformity and an inability to move the shoulder or bear weight through the ipsilateral arm [4]. A sensation of the shoulder "giving way" or "popping out" is commonly reported among these patients, especially during contact sports or overhead activity [1]. In patients with recurrent episodes of instability, they might report these episodes even after minimal trauma or during specific movements [12].

Physical exam: Clinical findings in TUBS patients include humeral head prominence anteriorly and loss of shoulder contour [16]. The apprehension test is a special test that is considered a key diagnostic tool [7]. The test causes discomfort when the arm is externally rotated and abducted [7]. Relief of those symptoms with the relocation test confirms shoulder instability [7,12]. Additional special test such as the load and shift test or the sulcus sign are used and indicate a generalized capsule laxity [5,7].

Imaging: Standard radiographic imaging is helpful in anterior shoulder dislocation as it confirms the humeral head position and reveals any lesions such as Hill Sachs or bony Bankart lesions [12]. Computed tomography (CT) scans are usually required when planning bone reconstruction procedures as they provide a three-dimensional view of the bony structure [12]. Additionally, CT scans help in revealing any glenoid bone loss [10]. Magnetic resonance imaging (MRI) is the modality of choice for soft tissue assessment as it can detect labral tears or capsular injuries in young athletic individuals [17].

Primary Management:

Initial treatment for anterior shoulder dislocation is closed reduction which is usually done under sedation or analgesia [7]. Once the shoulder is reduced, the arm is immobilized in a sling for one to three weeks (depending on the patient's condition and the surgeon's preference) to promote capsular healing [7,8,18]. Non-steroidal anti-inflammatory (NSAID) drugs are the analgesic of choice for adequate pain management [15]. Patients are also advised to avoid overhead activity and abduction while the limb is immobilized [6,18]. Early rehabilitation is encouraged to avoid stiffness and restore full range of motion, with gradual transition to weighted exercise, which helps in strengthening the muscles of the shoulder, thus providing more stability in the long term [5].

Early orthopedic referral is strongly recommended, especially for young athletic individuals or patients with recurrent shoulder instability [19]. These Patients are at a higher risk of recurrent dislocation, thus timely surgical consultations allow for imaging, classification and individualized treatment planning [1]. In some cases where there are bony Bankart lesions or Hill Sachs defects, early operative intervention may increase shoulder stability and prevent the chances of recurrence and long-term dysfunction [12].

Patient reported outcomes following TUBS are assessed using a number of scoring systems, including the ROWE score, Western Ontario Shoulder Instability index (WOSI) and Oxford Shoulder Scores (OSS) among others [20-23]. The Rowe score is a postoperative scoring tool used to assess outcomes of Bankart lesion repair and is based on three main criteria: stability, motion and function [22]. The WOSI score is symptom based, scoring domains such as pain, sports/recreation/work, lifestyle and emotional wellbeing [23]. Other scoring systems include OSS, which is a 12-point symptom-based questionnaire [21]. These scores can be used to assess patient satisfaction and compare patient-reported outcomes of conservative and operative management [21-23]. **Conservative management:**

First time dislocations are often treated conservatively, especially when the risk of recurrence is low [1]. This approach assumes that healing will occur with rehabilitation and adequate immobilization [5]. After reducing the shoulder, it is immobilized in a sling for one to three weeks to keep it stable [1,7,8,18]. The arm is usually adducted and internally rotated; however, some studies show that the arm should be externally rotated to promote labral healing [1].

For optimal results, patients should undergo physiotherapy sessions to improve range of motion after the period of immobilization is over [7,18]. This is followed by weighted exercises to strengthen the shoulder muscles [18]. The ultimate goal is to restore dynamic stability in the shoulder to reduce the recurrence rates [8]. Routine clinical follow up during this period is crucial to assess for recurrence symptoms such as subluxation and a positive apprehension test [6].

Although conservative management can be successful, it is associated with higher recurrence rates, especially in young active individuals such as contact sport athletes, with rates up to 90% in some studies [19]. Studies comparing operative vs nonoperative management shows that although patients avoid the surgical risks with non-operative management, it is less effective at preventing recurrence and returning athletes to pre-injury performance levels [21]. Conservative management for this reason is only appropriate in low-risk patients [1]. The average ROWE score in patients managed conservatively was 86/100 and average WOSI score 75%, compared to 89/100 and 86% in operatively managed patients, respectively [20,24]. A study showed that all patients who were treated conservatively and were asked to complete a follow-up WOSI score had experienced an episode of shoulder instability [23].

Arthroscopic Bankart Repair:

Indication: Patients with recurrent anterior shoulder instability are treated with arthroscopic Bankart repair, especially patients with Bankart lesions but without significant bone loss [8]. It is commonly done in young active individuals who fail conservative management [16,21].

Technique: The procedure is done arthroscopically using anterior and posterior portals [8,25]. The surgeon attaches

the detached labrum to the glenoid using suture anchors after preparing the bone rim [8,12,25]. This enhances stability and restores tension in the capsulolabral entity [8,12].

Advantages: Arthroscopic Bankart repair offers quick recovery and less morbidity than open repair as it is minimally invasive [2]. It has good outcomes when selecting patients appropriately, offering the procedure to those with lower Instability Severity Index Scores (ISIS) [2,7].

Drawbacks: It is not as effective in the presence of significant glenoid bone loss or Hill-Sachs lesions [15,17]. In the case of those with higher ISIS scores, such as young high-demand patients or contact sport athletes, it carries a high recurrence rate [7,19]. Recurrence rates in the Bankart group was 3.08 times higher when compared to the Latarjet group [26]. As for patient-reported outcomes, those who underwent the Bankart repair reported an average Rowe score of 84 [25]. This is significantly lower when compared to the Latarjet procedure [26].

Latarjet Procedure:

Indications: Patients with recurrent anterior shoulder instability with significant bone loss (>20-25%), Hill-Sachs lesions, high ISIS scores, or failed prior soft tissue repair attempts, are treated with a Latarjet procedure [5,11]. It is particularly favorable in contact sport athletes or those in higher demand sports that are amenable to high recurrence rates after arthroscopic Bankart repair, as previously discussed [27].

Technique: In this procedure, the coracoid process and its attached conjoint tendon are transferred to the anteroinferior glenoid rim [1]. This transfer increases the articulating surface area, enhancing the shoulder stability by providing a dynamic sling effect using the subscapularis muscle [10,27]. Following this, fixation is usually done with screws [5].

Advantages: The Latarjet procedure offers reliable stability even in the presence of significant bone loss and has lower recurrence rates in comparison to the arthroscopic Bankart repair [19,28]. In addition, it facilitates faster return-to-sport rates, which is favorable considering the nature of patients offered this procedure [2,11]. The Rowe score for this patient group is on average 89, 4.76 points higher when compared to patients who underwent the Bankart repair [25,26]. Postoperative pain was also lower in this patient group, although the difference when compared to the Bankart repair group was not significant [25]. Satisfaction rates were higher at 92% when compared to the Bankart repair group at 85% [25].

Drawbacks: This procedure is more invasive and associated with potential complications, such as neurovascular injuries, arthritis and graft malposition [6,10]. The complication risk in those undergoing the Latarjet procedure was 47% higher when compared to the Bankart repair [26]. It is also associated with a reduced range of external rotation in some patients, which is an important consideration for overhead athletes [15].

Bone Grafting Procedures:

Indications: Bone grafting is often offered to patients with bone loss above 25% that are not amenable to standard soft tissue repair [5,27]. It is also considered a revision surgery when other procedures such as Bankart repair or Latarjet procedure have failed [5,13].

Technique: Autografts and allografts are used to reconstruct the anterior glenoid [10,27]. They are usually harvested from the iliac crest or the distal tibia [10,27]. The graft is used to restore the glenoid arced and is fixed by screws to the anterior glenoid rim [10,27]. This is done to achieve articular surface stability and restoration of bony anatomy [27].

Advantage: Bone grafting offers a solution in the cases of significant bone loss by restoring stability and preserving joint mechanics. It improves outcomes in complex cases, or cases needing a revision [5,10]**.**

Drawbacks: These procedures carry a lot of risk, including graft resorption, nonunion, hardware irritation, and neurovascular complications as well as being technically difficult [6]. Postoperative recovery is prolonged, requiring close radiological monitoring [5]. Assessment of patient satisfaction following these procedures is not widely researched yet.

Discussion.

Young athletic individuals with TUBS management remain very complex. While conservative management is an appropriate option in select cases such as low-risk patients, multiple studies have shown it has higher recurrence rates of shoulder dislocation, particularly in young active individuals, with one study showing numbers as high as 90% [1,4,19]. This calls to question the sustainability of conservative management in high-risk groups. Furthermore, the Rowe scores in conservatively managed patients was 86, compared to 89 in operatively managed patients [20]. Short term, WOSI scores did not show significant difference between conservatively managed vs operatively managed patients, but long-term surgery was found to show improvements in WOSI scores [24].

Operative management on the other hand offers lower recurrence rates and better return-to-sport time and outcomes [2,9]. Arthroscopic Bankart repair is commonly used, achieving good outcomes when bone loss is minimal with good soft tissue quality [6]. Despite this, recurrence in contact athletes or those with engaging Hill-Sachs lesions remains a concern, with 3.08 higher risk of recurrence when compared to the Latarjet procedure [10,26,27].

In cases of inadequate soft tissue repair or in the presence of significant bone loss, the Latarjet procedure achieves stability by restoring the glenoid rim, creating a dynamic sling effect [5]. Research shows that the Latarjet procedure provides better functional outcomes and lower recurrence rates in compassion to Bankart repair in high demand patients [10,11]. The Latarjet procedure leads to more favourable patient outcomes, as reflected in the Rowe score, post operative pain score, and satisfaction rates [20,25,26].

Subcritical bone loss remains very debatable with regards to appropriate management options [29]. Some studies suggest soft tissue repair with adjuncts like remplissage, while others support methods like bone augmentation, even at a lower bone loss threshold [1,6,10]. This highlights the importance of an individualized patient management approach, and informed preoperative surgical decision making [15].

Delaying treatment has been well documented to cause complications, such as capsulolabral degeneration and further bone loss [5]. This supports what is already an ongoing trend, which is that early operative intervention for high-risk

groups improves stability and lowers recurrence rates [17,19]. Successful operative outcomes have proven to not only depend on the choice of procedure, but also on other factors such as patient selection, precise operative technique, and identification of risk factors early on [1,6,27].

Conclusion.

In conclusion, management of TUBS requires a multi-step evidence-based approach that must take in multiple factors such as patient age, activities of daily living, and structural damage. Early operative stabilization in young active individuals, and patients with significant bone loss is supported by evidence to improve outcomes and return-to-sport time, while also being associated with lower recurrence rates. Since no single approach fits all, patients' functional baseline and expectations are crucial to satisfactory outcomes and adequate shoulder stability and functional activity.

Authorship confirmation statement.

Rashid Nassar: software, formal analysis, writing- original draft, visualisation, methodology. **Nadine Khayyat:** conceptualization, validation, investigation, writing- review and editing, supervision. **Michele Halasa:** writing- review and editing. **Fahad Hussain:** writing- review and editing.

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