

Retraction

Retracted: Observation on the Effect of Shoulder Pain Caused by Volleyball Training Injury Based on MRI Image Scanning

Scanning

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

- (1) Discrepancies in scope
- (2) Discrepancies in the description of the research reported
- (3) Discrepancies between the availability of data and the research described
- (4) Inappropriate citations
- (5) Incoherent, meaningless and/or irrelevant content included in the article
- (6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

In addition, our investigation has also shown that one or more of the following human-subject reporting requirements has not been met in this article: ethical approval by an Institutional Review Board (IRB) committee or equivalent, patient/participant consent to participate, and/or agreement to publish patient/participant details (where relevant).

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

- [1] K. Li and N. Fu, "Observation on the effect of shoulder pain caused by volleyball training injury based on MRI image scanning," *Scanning*, vol. 2022, Article ID 4368871, 5 pages, 2022.

Research Article

Observation on the Effect of Shoulder Pain Caused by Volleyball Training Injury Based on MRI Image Scanning

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In order to observe the effect of MRI image scanning on shoulder pain caused by volleyball training injury, this paper proposes to analyze the value of MR arthrography and conventional MRI image scanning in the diagnosis of shoulder injury. Taking the female volleyball players in a no. 1 middle school for nearly ten years as the research object, the injury investigation and statistics were carried out. The shoulder joint injury was investigated using arthroscopy and no injury was found. All patients underwent MR arthrography and routine MRI image scanning after admission. All patients underwent MR arthrography and routine MRI image scanning after admission. The patient took the flat lying position and put their arms flat on both sides of the body, and the Philips Achieva 3.0T MRI image scanning and Sense Flex M soft coil for MRI image scanning detection were used. The plain scan included oblique sagittal, axial, and oblique coronal proton density weighted image sequences; echo chain ETL = 6, TR/TE 2300/25 ms; and oblique sagittal and oblique coronal SET1W1; TRTE is 400/10 ms. Comparison was made with regard to the sensitivity, specificity, Jordan index, and accuracy of MR arthrography versus conventional MRI imaging in the diagnosis of shoulder injuries. The results were 38 true positives, 19 true negatives, 1 false positive, and 2 false negatives; a normal MRI scan showed 33 true positives, 13 true negatives, 7 false positives, and 7 false negatives. MR arthrography is more accurate than MRI image scanners in the diagnosis of shoulder injuries.

1. Introduction

The shoulder joint is the most active in all the joints of the human body. Due to degenerative changes in different shoulder tissues (ligaments and rotator cuff), or trauma, excessive repeated use, and activities, the patient's shoulder joint will be damaged, and the tissues around the shoulder joint will be damaged [1]. Therefore, it has a serious impact on the normal life and work of patients. If it is not diagnosed and treated in time, it will easily lead to many serious complications [2]. In the clinical diagnosis and treatment plan, there are many examination methods used to determine whether shoulder joint injury occurs. The most commonly used ones are X-ray plain film and computerized tomography (CT). Traditional conservative treatment can avoid the trauma and risk of surgery but may cause seri-

ous obstacles to respiratory function and circulatory function. MSCT and MRI examination methods have the advantages of simple operation, convenience, noninvasiveness, and high detection rate. They have been gradually used in clinical diagnosis. Figure 1 shows the composition of the MRI imaging system [3].

2. Literature Review

In response to this research problem, Ba reported a 13-year follow-up experiment in which patients with rotator cuff injury diagnosed by MRI received conservative treatment. The treatment included range of motion training, strength training, and intra-articular steroid injection. In the final follow-up, 88% of patients had no slight pain and 72% of patients had no daily dysfunction [4]. Tang and Pan

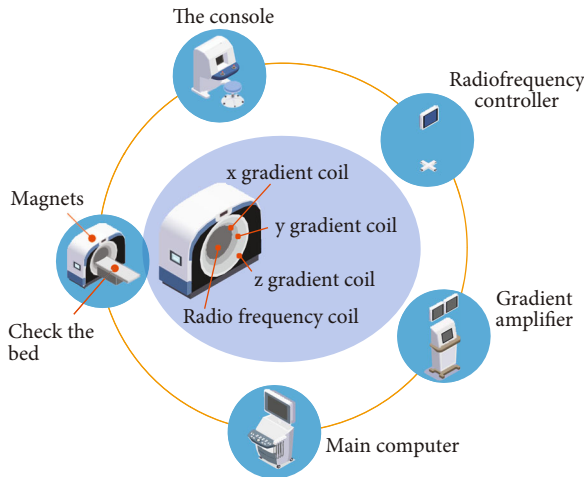


FIGURE 1: Composition of MRI imaging system.

reported 452 patients with noninvasive rotator cuff injury with an average age of 62 years. They underwent range of motion training and stretching exercises three times a day for 6~12 weeks. In the final follow-up, the patient reported a significant improvement in the outcome score at 6 and 12 weeks, and 75% of nonsurgical patients were effective after 2 years [5]. Hwang and others used ultrasound combined with acupuncture to treat 30 cases of calcified rotator cuff tendinitis. The research results have good clinical efficacy [6]. Chu and others reported the efficacy of acupuncture and moxibustion in the treatment of rotator cuff injury. There is evidence to support the effectiveness and safety of acupuncture and moxibustion in the treatment of chronic musculoskeletal diseases including shoulder pain. However, whether acupuncture and moxibustion are effective and safe for rotator cuff injury is still uncertain. The authors believe that part of the reason is the lack of high-quality basic research and systematic evaluation specifically for rotator cuff injury [7]. Krishnan and Rewale found that the activity was preserved, there was no impact sign, and there was slight ridge. The presence of superior muscle atrophy and supraspinatus tendon connection is an important predictor of the success of nonsurgical treatment. If three of the above four criteria are met, 87% of patients may be successful in conservative treatment [8]. Liu selected 70 patients with moderate irritation rotator cuff injury as the research object, through strict randomized controlled trials and rehabilitation training as the control group [9]. Pasquier and Andersson put forward corresponding prevention suggestions in combination with the causes of sports injury in relevant volleyball training [10]. Yang et al. Discussed the imaging diagnosis of shoulder pain caused by sports injury [11]. Xiong and others observed and analyzed the effect of multislice spiral CT and magnetic resonance imaging (MRI) in the joint diagnosis of shoulder injury [12]. Based on the current research, this paper proposes to analyze the value of MR arthrography and conventional MRI in the diagnosis of shoulder injury. Through the investigation and statistics of the sports injury of female volleyball players in a first middle school, this paper studies the causes and pre-

ventive measures of the injury in training and competition in volleyball. The results show that MRI has high soft tissue resolution, can well show the anatomical structure and histopathological changes of the shoulder, and can make multisequence and multidirectional imaging to clearly show the complex anatomical structure of the shoulder joint.

3. Method

3.1. Research Object. The research object is the female volleyball players in a first middle school for nearly ten years.

- (1) *Documentation method.* Collect relevant data and literature on volleyball injury through the China Journal Network, China Sports Information Network, reference room, and other channels to provide reference for the conception, design, and research of this paper [13].
- (2) *Questionnaire survey method.* An online questionnaire "volleyball injury" questionnaire was distributed to female volleyball players in a no. 1 middle school in recent ten years. 70 questionnaires were distributed and 60 were recovered. The effective rate of the questionnaire was 85%. In this process, the test-retest reliability method of the reliability analysis method is also used to analyze the reliability and sort out the investigated data and materials [14, 15].
- (3) *Mathematical statistics.* The questionnaire star is used to summarize and count the results of the questionnaire and analyze and study the statistical data.

3.2. Findings of Investigation

3.2.1. Investigation and Statistics of Damaged Parts. The injured parts of athletes are shown in Table 1. Among the volleyball players investigated, the main injured parts are the ankle, knee, waist, and finger joints, accounting for 60%, 55%, 45%, and 45%, respectively; the shoulder joint accounts for 40% and the foot accounts for 15%. Arms and legs account for 10% and 5%, respectively. It is easy to get injured in the knee and ankle [16].

3.2.2. Investigation and Statistics of Damage Types. The injury types of athletes are shown in Table 2. The results show that the main injury types are joint sprain, accounting for 40%; muscle strain and lumbar muscle strain, each accounting for 20%; abrasion, accounting for 10%; fracture, accounting for 5%; and other types of injuries, accounting for 5%.

3.2.3. Investigation and Statistics of Damage Properties. The statistics of the nature of athletes' injuries are shown in Table 3. The results show that chronic injuries and acute injuries account for 50% of the nature of athletes' injuries.

3.2.4. Investigation and Statistics of Damage Causes. As can be seen from Table 4, carelessness and having no sense of protection; insufficient training level; violating the principle of scientific training; unscientific preparatory activities [17];

TABLE 1: Statistics of injury parts of volleyball players.

Damage site	Number of injured	Percentage (%)
Ankle joint	36	60
Knee joint	33	55
Waist	27	45
Finger joint	27	45
Shoulder joint	24	40
Foot	9	15
Arm	6	10
Lower leg	3	5

TABLE 2: Statistics of volleyball injury types of volleyball players.

Damage type	Number of injured (person)	Percentage (%)
Joint sprain	24	40
Muscle strain	12	20
Lumbar muscle degeneration	12	20
Scratch	6	10
Fracture	3	5
Other	3	5

TABLE 3: Statistics of volleyball injury types of volleyball players.

Damage property	Number of injured (person)	Percentage (%)
Chronic injury	30	50
Acute injury	30	50

neglecting relaxation activities; improper organization and arrangement of competition and training; poor competitive condition, clothing, protective equipment, and field equipment; bad equipment and natural environment; influence of seasonal environment; poor physical quality; insufficient muscle strength; and influence of personal physiological and psychological factors may cause unnecessary sports injury [18].

3.3. Detection Method. All patients underwent MR arthrography and routine MRI after admission. The patient took the flat lying position, put their arms flat on both sides of the body, and used the Philips Achieva 3.0T MRI and Sense Flex M soft coil for MRI detection. The plain scan included oblique sagittal, axial, and oblique coronal proton density weighted image sequences; echo chainETL = 6, TR/TE 2300/25 ms; and oblique sagittal and oblique coronal SET1WI; TRTE is 400/10 ms [19]. 15 ml of 1:200 magenweixian solution and 5 ml of 2% lidocaine were extracted, 20 ml of contrast medium was injected into the articular cavity, and then, enhanced scanning was performed after fully moving the shoulder joint, including oblique sagittal position, axial position, and oblique coronal position. Fat

suppression SET1WI sequence, TR/TE was 650/10 ms. FOV is 18 cm × 18 cm, and the matrix is 320 × 256. Without knowing the diagnosis results of arthroscopy and the patient's medical history, one sports medicine doctor and one skeletal muscle system imaging doctor were asked to analyze the results of MR arthrography and routine MRI of all patients to evaluate whether there were rotator cuff injury and anterior glenoid lip injury [20].

3.4. Observation Indicators. Taking the arthroscopic results as the gold standard, the sensitivity, specificity, Jordan index, and accuracy of MR arthrography and conventional MRI image scanning in the diagnosis of shoulder injury were compared [21].

3.5. Statistical Methods. The data were analyzed using SPSS 21.0. The counting data were represented by $(x \pm s)$, t -test, n (%), and χ^2 test, and $P < 0.05$ indicated that the difference was statistically significant [22].

4. Results and Analysis

4.1. Comparison of MR Arthrography and Conventional MRI Diagnostic Results. Among the 60 patients, MR arthrography showed that 38 cases were true positive, 19 cases were true negative, 1 case was false positive, and 2 cases were false negative; conventional MRI diagnosis showed that 33 cases were true positive, 13 cases were true negative, 7 cases were false positive, and 7 cases were false negative, as shown in Figure 2.

4.2. Comparison of Various Indexes of MR Arthrography and Conventional MRI in the Diagnosis of Shoulder Injury. The diagnostic accuracy of MR arthrography in shoulder injury was higher than that of MRI, and the difference was statistically significant ($P < 0.05$) (see Table 5).

As the joint with the maximum range of motion of the human body, the shoulder joint is easy to injure after a wide range of complex movements because the humeral head is large and round, while the scapular pelvis is small and the joint capsule is relatively loose. The injury factors include acute or chronic trauma caused by the impact and friction of the coracoacromial arch by the rotator cuff and the acromial glider capsule and excessive exercise when the patient is doing zenith exercise or abduction exercise; if not diagnosed and treated in time, it will greatly affect the daily work and life of the patient. Therefore, more and more attention is paid to the diagnosis and treatment of shoulder injury. MRI has high soft tissue resolution, can well show the anatomical structure and histopathological changes of the shoulder, can be multisequence and multidirectional imaging, and clearly shows the complex anatomical structure of the shoulder joint [23, 24]. In addition, clinical studies have also found that MRI can provide surgeons with detailed information such as the location of rotator cuff tear, retraction degree of muscle waist junction, and partial or full-thickness rotator cuff tear, while it has relatively low sensitivity in the diagnosis of joint cavity stenosis and chronic injury. As one of the effective means to diagnose shoulder soft tissue injury, MR arthrography mainly injects iodine solution and

TABLE 4: Statistics of volleyball injury types of volleyball players.

Cause of damage	Number of injured (person)	Percentage (%)
Errors in detail actions	42	70
Unscientific preparation activities	33	55
Seasonal environmental factors	24	40
Site equipment factors	21	35
Excessive exercise load	15	25
Lack of awareness of sports injury protection	12	20
Poor physical fitness	9	15
Lack of muscle strength	9	15
Unscientific recovery after injury	6	10
Poor physical and psychological state	6	10

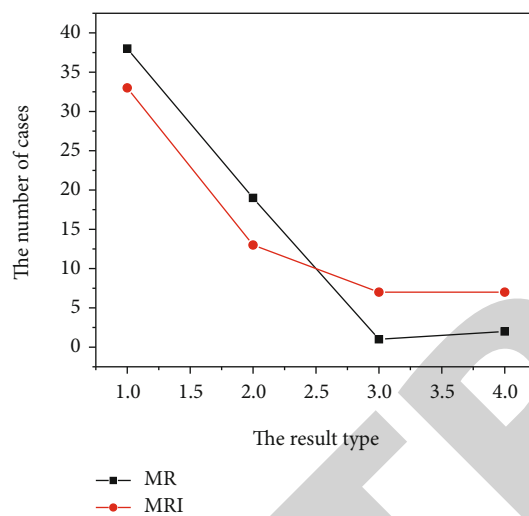


FIGURE 2: Comparison of MR arthrography and conventional MRI diagnosis results.

TABLE 5: Comparison of various indexes of MR arthrography and conventional MRI in the diagnosis of shoulder injury.

Diagnosis mode	Sensitivity	Specificity	Accuracy	Jordan index
MRI	85%	80.47%	83.1%	0.6761%
MR arthrography	95%	96.26%	95.48%	0.9348%
X^2 value	1.945	3.489	6.522	/
P value	0.159	0.05	0.022	/

paramagnetic contrast agent into the shoulder joint cavity, so as to fully expand the joint capsule and completely expose the position of shoulder injury. The purpose of diagnosis can be achieved through routine scanning. It is suggested that MR arthrography has a higher application value in the diagnosis of shoulder injury, which can improve the sensitivity and accuracy of diagnosis, minimize the risk of missed diagnosis or misdiagnosis, and carry out corresponding treatment in time in the early stage [25].

5. Conclusion

This paper puts forward the effect observation of shoulder pain caused by volleyball training injury based on MRI imaging. Through the investigation and statistics of the sports injury of a female volleyball player in a first middle school, this paper studies the causes and preventive measures of the injury in volleyball training and competition. Arthroscopic findings were used as the gold standard to compare the sensitivity, specificity, Jordan index, and accuracy of MR arthrography with conventional MRI in diagnosing shoulder injuries. The results show that MRI has high soft tissue resolution, can well show the anatomical structure and histopathological changes of the shoulder, and can make multisequence and multidirectional imaging to clearly show the complex anatomical structure of the shoulder joint. Although MRI is very sensitive for the diagnosis of acute shoulder injuries, it is relatively insensitive for joint stenosis and chronic injuries. In the future, multi-incision spiral CT and magnetic resonance imaging (MRI) could be used to study its role in the diagnosis of patients with shoulder injuries.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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