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REVIEW ARTICLE

Arm Wrestling Related Injuries: A Literature Review

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Abstract

Arm wrestling is increasing in popularity and is practised mostly among young people as a recreational or professional sport. During this sport, it can cause various injuries in the muscles, ligaments, veins and radial nerves, especially the humerus. The follow-up period can extend up to 16 months, especially in patients with radial nerve injury. Although the treatment methods of patients with humeral fractures vary according to the patient and the doctor, it is chosen as surgical or conservative.

Keywords

Arm wrestling, Humerus shaft fracture, Radial nerve injury

Introduction

Arm wrestling is a sport that begins with two people, usually by taking mutual positions around a table, placing their elbows on the table and joining their palms, and ending with the back of the opponent's hand touching the table floor [1]. Arm wrestling performed for sports or entertainment purposes in many countries around the world, and it is becoming increasingly common. This sport generally perceives as a show of strength among young people.

Although this sport seems harmless, it can cause various injuries such as muscle, joint, connective tissue, nerve injury and extremity fracture when performed improperly. Most of the injuries from arm wrestling are soft tissue injuries as sprain of the shoulder's muscular strain, wrist and elbow joints. However, different types of fractures can occur during arm wrestling such as the spiral fracture of the humeral shaft with or without butterfly fragment [2], fracture of the medial humeral epicondyle [3,4], radial head fracture with anterior dislocation, even a radial shaft fracture [4].

During the match, a significant torque occurs as a result of torsional and axial forces in the humerus shaft [1]. When the humeral shaft cannot resist these forces, muscle, joint, connective tissue, nerve injury and fracture may occur [2,5]. While the elbow joint is fixed in flexion by the biceps and brachialis muscle, the shoulder joint is actively internally rotated against the opponent by pectoralis major, subscapularis and teres major muscle. During the match, the arm wrestlers take opposite positions, and the defending arm-wrestler taking or being forced to take a posture in which his centre of gravity and therefore his body weight has shifted. When the offensive wrestler continues the attack, the internal rotator shoulder muscles of the defender suddenly and passively stretch, transforming from their maximum concentric contractions into an eccentric compensatory contraction, resulting in intense rotational force [1].

Mechanism of humeral fracture in arm wrestling

After arm wrestling, different types of fractures have reported in the literature, but the most common fracture is humeral shaft fracture. A fracture of the humerus due to arm wrestling was first reported in 1975 [6]. It has reported that 4-6% of the extremity fractures are humeral shaft fractures [2]. Among the humeral shaft fractures, the most common region is 1/3 mid-region fractures, and spiral type fractures are the most common [5]. In fractures caused by torsional forces, firstly a fracture line occurs on the bone surface. The spiral fracture line is formed as a result of high energy stress [3]. Spiral fractures have two different fracture lines, one of which is an angled line rotating around the bone, and the other is longitudinal, extending to the proximal and distal of the spiral [4]. These fractures have been described as a strong internal rotation force created by the

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subscapularis, pectoralis, and latissimus dorsi muscles in the shoulder, which are resisted by an opponent's external rotation force or another counter force [7]. Also, forceful elbow flexion and shoulder internal rotation may lead to fracture of a spiral nature have been reported in the literature [8,9]. According to some authors, pure rotator force without axial load on the humerus causes spiral fracture only, while axial load and rotator force can cause a butterfly fragment [10]. Some authors mentioned that factors such as body and arm position during a competition, fatigue, muscle hypertrophy of muscle and body weight may determine the location and type of humeral fracture [11,12]. It has been mentioned in the literature that patients with regular sport activity may be injured only muscle strain [13].

Frequency of humeral fracture in arm wrestling

In a study of 93 patients with a closed humerus fracture, it was determined that only nine patients (8%) had a fracture due to arm wrestling [13]. In another study, it was reported that humeral fracture caused by arm wrestling was seen in 30 cases in the general population [13]. In another study conducted with 123 young soldiers who had humerus shaft fractures in 2020, it was reported that arm wrestling was the cause of the fracture in 65 (52.8%) of the cases [9].

Other injuries with or without a fracture of the humerus in wrist arm wrestling

A sharp fragment of the humerus can damage related structures such as the brachial artery and the median or radial nerve [9,14-17]. It has also been reported in the literature that there may be an injury to the radial nerve as a result of arm wrestling. Although the radial nerve injury rate due to humeral shaft fracture was reported to be 9.1% [17] and 11.3% [16] in the normal population, the rates of radial nerve damage as a result of humeral shaft fracture due to arm wrestling were reported to be 23% [2] and 26.2% [9]. It has been reported that the radial nerve is mostly injured in the spiral fracture of the shaft of the humerus, but also in oblique fractures frequently [9,15,17]. Also, It has been stated that the recovery of radial nerve palsy in the upper arm reaches a noticeable level in an average of 5-7 months after the injury and this period can be extended up to 16 months [9,18]. As a result of radial nerve damage, weakness and atrophy may occur in the wrist muscles, especially in the wrist extensor muscles. It is also stated that this weakness lasts for 6 months [9].

Risk factors

Various factors have been identified that may facilitate possible arm injuries during arm wrestling. These include biomechanical factors such as the position of the body and arm during arm wrestling, anatomical peculiarity of bone, bone quality (osteoporosis), trained versus untrained wrestlers, newer versus experienced wrestlers etc. can be listed as factors [2-4].

Age range of cases

Fracture of the humerus in a fit young man after arm wrestling match has seen in a rare occurrence [1]. Fractures of the humeral shaft may occur at any age in anyone engaging in this type of sport [2,9,19]. The patients with humerus fracture ranged in age from 22 to 48-years-old, average of 31.2 years [12]. Also, it was reported that the cases mean (± SD) age was 21.7 ± 3.9 years in another study [9].

Injuries more common in which arm?

It has been reported that fractures mostly occur in the right arm and left side of the right arm [9].

Treatment methods

Currently, two different treatment methods are most commonly used in the treatment of humeral shaft fractures. These are surgical method and conservative method [2]. The first approach is surgical method; open reduction, internal fixation, and resting the arm with plaster or splint. The secondary approach is conservative method approach, which is followed by resting the arm with plaster or splint [2,15,17,18,20,21]. Fractures of the humerus are often successfully treated with conservative treatment but rarely operative treatment may be required [21]. A displaced fracture should be managed by open reduction and internal fixation if there is a vascular or neural injury [15,17,18,20].

In some literature studies, it was reported that patients were treated conservatively or surgically and recovered without complications [12,22]. We prefer the conservative follow-up method after consultation with the orthopedist, if there are no signs of radial nerve damage or vascular injury in those who have applied to our emergency department due to arm injuries as a result of arm wrestling. Also, we prefer the surgical method for people with signs of radial nerve or vascular damage (Figure 1).

Conclusion

As a result, arm wrestling is a type of sport that seems innocent but can cause serious complications when performed without professional training. Although the treatment of patients with humeral fractures varies according to the patient and the physician, it is determined surgically or conservatively. In addition to humerus fractures, patients may have soft tissue, vascular, muscle and radial nerve injuries. In addition to humerus fractures, patients may have soft tissue, vascular, muscle and radial nerve injuries. Therefore, it is important to note that there may be damage to the other anatomical structures of the arm, especially the humerus, and whether complications occur particularly in the vein and radial nerve during the first examination and follow-up of the patients. It should be kept in mind that the follow-up period of the patients may take up to 16 months depending on the complication status.

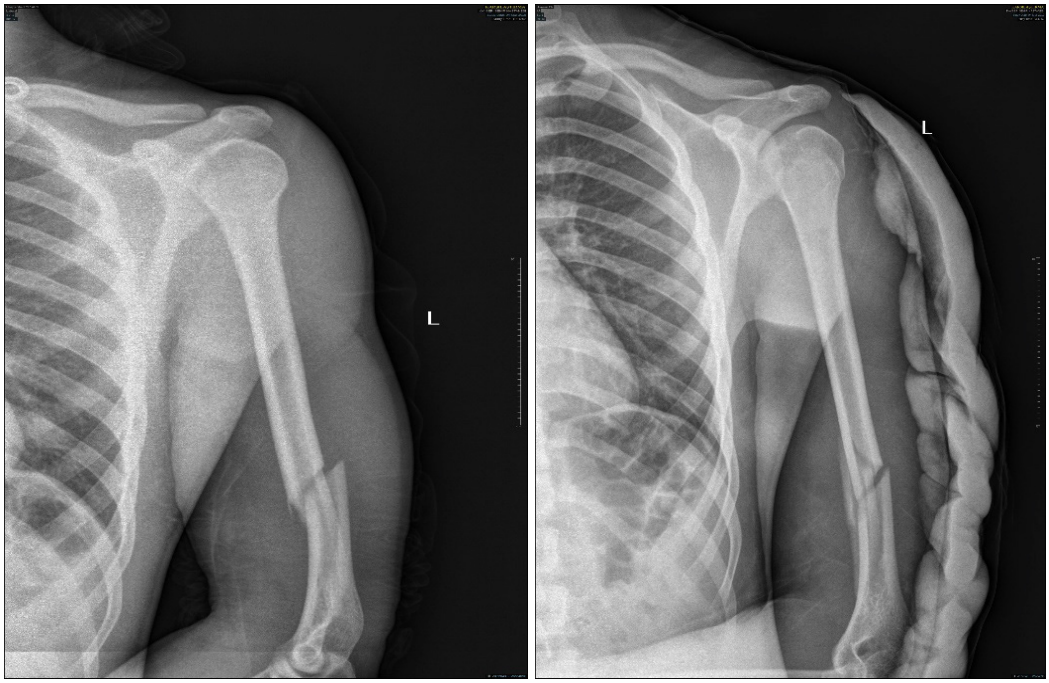

Figure 1: Conservative follow-up with plaster of a 17-year-old patient with humeral shaft fracture after arm wrestling match [22].

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