Simultaneous bilateral anterior glenohumeral dislocation: Rare entity with unique mechanism: A case report with review of literature

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Abstract
Background: Although anterior glenohumeral dislocation are common in EMD but simultaneous dislocation is rare phenomenon to occur.
Objective: This article intends to report a case of simultaneous non-sequential anterior glenohumeral dislocation along with reviewing the literature on this rare entity.
Case report: we present the case of 44 years old adult male who presented to the orthopedic emergency of our institute after road traffic accident with sudden onset of pain and restriction of movement in both shoulders following trauma. Immediately post trauma he had severe pain and restriction of both shoulders. On examination arms were abducted and externally rotated. Bilateral shoulder movements were painful and restricted. There was loss of round contour of shoulder with increased vertical diameter of axilla anteriorly. Radiological examination revealed anterior fracture dislocation of the shoulder on left side with simple anterior dislocation on right side.
Conclusion: Bilateral shoulder dislocations are rare and almost always occur in the posterior direction. Simultaneous bilateral anterior shoulder dislocation is even rarer and only a few cases are stated in the literature. The most interesting part of a bilateral shoulder dislocation is about its injury mechanism as a synchronous and simultaneous force is needed to result in it. All orthopedic surgeons and emergency physicians should be aware of such unusual possibilities to have an early diagnosis and treatment. An early reduction and appropriate rehabilitation can provide satisfactory functional outcome.
Keywords: Shoulder dislocation; accidents, traffic, closed reduction

Introduction
Shoulder dislocation is the most common type of joint dislocation encountered in humans [1, 2]. Anterior shoulder dislocation represents 95% of unilateral shoulder dislocations while unilateral posterior dislocation is far less common (4%) [2, 3]. Bilateral shoulder dislocations do occur and unlike unilateral dislocations they are most commonly of the posterior type [2, 4]. Bilateral anterior shoulder dislocations have rarely been reported in the literature [3]. The laxity of fibrous capsule as well as small and shallow glenoid cavity permits greater range of mobility, sacrificing stability of the shoulder joint. There are few reported cases of bilateral anterior shoulder dislocations with different mechanisms of injury: at the start of backstroke swimming competition, bench pressing athlete, fall on elbows, post seizure episode, trying to prevent a backward fall by extending both arms behind the back, in our case road traffic accident with both arms held in extreme external rotation and abduction.

Case report
A 44 years old adult male was presented to the orthopedic emergency of our institute after road traffic accident. Patient was sitting on rear seat of car when accidentally car hit roadside parapet after sudden application of break, patient was thrown to front of the car through the gap between two front seats, during the accident both the arms held the front seats and were forced into abduction, external rotation. Patient complained of severe pain in both shoulders and restriction of movements. The patient’s vital signs were within normal limits. His Glasgow Coma Scale score was 15, pain intensity rating was not obtained. The patient had no history of seizure, epilepsy, alcohol intake, or previous shoulder dislocation. None of his family had any
history of hyper laxity disorders, epilepsy, or convulsions. Clinical examination showed that arms were in slight abduction and external rotation. There was bilateral anterior flattening of the shoulder contour below the tip of the acromion. There was anterior globular fullness. Bilateral standard tests for the dislocation of shoulder were positive, associated with gross restriction of internal rotation, flexion and adduction. Inspection and palpation revealed bilateral sulcus signs of the shoulders. No signs of distal neurovascular deficit were witnessed. There were no signs of generalized ligamentous laxity. Full clinical examination was supplemented with imaging including a FAST scan and radiographs of shoulder joints, thorax, and pelvis. Radiographs revealed Neer’s One-part Sub-Coracoid fracture dislocation on left side with simple anterior Sub-Glenoid dislocation on right side. Immediate reduction was done under anesthesia by Kocher’s maneuver, first on the right side followed by left side. Post-reduction radiographs showed concentric reduction on both sides with falling back of avulsion fracture on left side. Post reduction both the arms were immobilized in shoulder immobilizer in adduction and internal rotation which was subsequently replaced by arm pouch sling on both sides by second week, intermittent pendulum movements of shoulders were started by third week along with passive range of motion exercises. Patient regained his full movements on right side by sixth week and slight pain on left side on abduction with no limitation to range of motion which subsequently waned off by eighth week on left side. There no subsequent episode of dislocation with no displacement of avulsion fracture fragment on left side by six months follow up and on one year follow up.

Discussion
Bilateral shoulder dislocation was first described by Mynter in 1902 in a patient with camphor overdose [6]. After that many case reports of bilateral shoulder dislocations were published in international literature, with/ without fractures. However most of these dislocations are posterior and very few cases of simultaneous bilateral anterior shoulder dislocation have been reported. The force leading to dislocation occurs at the same time in a similar manner on both the shoulder joints [7]. In the typical posture of extension and abduction of arm, the greater tuberosity comes in contact with the acromion which imparts an anteriorly directed force. The rotator cuff in addition pushes the humeral head downwards and leads to anterior dislocation by the contraction of flexors and external rotators of shoulder joint. In the present report the patient had exactly the same mode of injury, i.e. both the arms got trapped between two front seats in the abducted and extended position, resulting in Neer’s type 1 fracture dislocations on left side & simple dislocation on right side. The humerus lever arm imparted the force over the fulcrum (shoulder joint) trying to dislocate it in the opposite direction (Anterior dislocation). Bilateral shoulder fracture-dislocation usually results from high energy trauma such as traffic accidents or falls from height and it is usually associated with craniofacial, thoracic and spinal injuries [8]. The coordination of muscle contractions (Relatively weak external rotators and posterior deltoid fibers being overcome by internal rotators) in seizure or electrocution is responsible for the characteristic posterior dislocation of shoulder. Trauma remains main cause of bilateral anterior shoulder dislocation [9, 10]. Sequential bilateral anterior dislocations with one shoulder dislocating after the other have been reported in the literature and are extremely rare. There have been two cases of sequential
Bilateral anterior shoulder dislocation is a rare injury and such an injury without an associated fracture is far rarer. Dinopoulos et al. (1999) in their review of literature had 28 cases of bilateral anterior shoulder dislocation reported since 1966 out of which only 11 were simple dislocations without any associated fracture [15]. Siwach et al. (2008), in a similar type of literature review, reported only 14 cases of simple bilateral anterior dislocations [16]. Dodds et al. (2008) in their review of 1966 reported 24 cases of bilateral anterior shoulder dislocations of which 18 were simple dislocations [17].

After an extensive search of international literature, we found 82 cases of bilateral shoulder dislocation with/without fracture reported and we present the 83rd case in the literature.

Table: Reported case of bilateral shoulder dislocation.
Sudden exhaustion of shoulder muscles during work out can make the heavy weight push the shoulder joints in the position of instability and finally dislocation.[18]

Both sudden forward traction to upper extremities in position of flexion, internal rotation and slight abduction (Four cases) as well as sudden backward traction in position of extension, internal rotation and adduction (One case) can dislocate the shoulder joints anterior.[19] Fall with hands catching an overhead bar tends to dislocate the shoulder posteriorly but in the elderly population with age-related ligamentous laxity anterior shoulder dislocation is a possibility (Two cases). Diving (One case), backstroke swimming (One case), domestic assault (One case), push-ups (One case) and chin-ups (One case) were the other rare mode of injuries.[20, 21, 22] In three cases of bilateral simple anterior shoulder dislocation etiology was unknown.

**Conclusion**

Final functional outcome of bilateral simple shoulder dislocations is the same as that of unilateral dislocations. Trauma is the most common etiology of simple bilateral anterior shoulder dislocation. Seizure is nearly as common an etiology as is trauma. To conclude, both traumatic and atraumatic causes can attribute to bilateral anterior shoulder dislocation and the etiology causing dislocation should not bias the emergency physicians or orthopedic surgeons regarding the diagnosis. An early reduction and adequate physiotherapy can regain full range of movements.

**References**