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Case Report

An interesting case of a wristwatch associated open wrist fracture

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ABSTRACT

Wrist fractures are commonly encountered injuries during bicycle accidents. Wrist fractures represent the most prevalent upper extremity fractures and account for over a sixth of all fractures seen in emergency department visits. Despite their common occurrence, many cyclists wear wristwatches without considering the potential consequences this may have during an accident when they sustain an upper limb injury. We present a unique case involving a 59-year-old woman with a wristwatch-associated open distal radio-ulnar fracture sustained from a cycling road traffic accident with the crown of the wristwatch being found embedded in the ulna shaft. Currently, there exists a limited knowledge in the literature addressing the safety implications of wearing wristwatches while cycling. This case serves to highlight the hazards associated with wristwatch use during cycling and underscores the hypothesis that wristwatches may act as stress risers, potentially exacerbating fracture severity and necessitating more intricate surgical interventions and subsequent follow-up care.

Keywords: Wristwatch, Wrist, Fractures, Open fracture, Ulna fracture, Distal radial fracture, Bicycle, Cycle

INTRODUCTION

Wrist fractures are one of the most common injuries encountered in orthopaedic practice.[1] Distal radial fractures in particular may be associated with fractures of the ulnar styloid process (55-61%) and distal ulna (6-9%).[2] The primary mechanism of injury is a fall onto an outstretched hand. Diagnosis is typically confirmed through radiography or ultrasonography. In cases where initial imaging is inconclusive but clinical suspicion of fracture persists, splinting and repeat radiography within seven to fourteen days are recommended.[3] Appropriate management of these fractures is essential for restoring forearm function, encompassing supination and pronation, as well as facilitating elbow, wrist, and handgrip mobility and strength.[4] The rising occurrence of complex fracture patterns following high-energy trauma and the desire for prompt resumption of daily activities have escalated the need for surgical intervention in patients with distal radial fractures.[5]

The incidence of cycle-related accidents has risen correspondingly with the growing population of cyclists utilizing public roads. Factors contributing to these incidents, particularly collisions involving motor vehicles, include suboptimal road conditions, insufficient cycling infrastructure, and occasional cyclist behaviour.

Urban areas are focal points for most cycle-related accidents, whereas rural settings pose distinct challenges such as higher velocities on less frequented roads. While many incidents result in minor injuries, a notable proportion entail more severe consequences such as wrist fractures, head trauma, and occasional fatalities.

This article sets out to discuss a possible association between wearing a wristwatch and sustaining a more complex wrist fracture from a cycle related road traffic accident.

CASE REPORT

We present a case of a 59 year old woman who was cycling near her home when she had a head on collision with an oncoming car. The closing speed was reported to be 45 miles per hour. She was wearing a helmet and riding a road bike with her hands on the lower side of her "drop" handlebars. Her head bulls-eyed the windscreen of the car with both her wrists fully flexed, impacting simultaneously. She was brought in as a major trauma call by the paramedics with a Glasgow Coma Scale (GCS) of 15. She was resuscitated in the Emergency Department and underwent a rapid sequence induction prior to her trauma CT scan. The images revealed an open left distal radial ulnar fracture with Gustilo-Anderson grade II lesion (Figure 1) and a right closed distal radial fracture (Figure 2), in addition to her multiple injuries of her face, thorax and spine.

Initial radiographs of the wrists demonstrated an intra-articular fracture involving the radiocarpal joint and distal ulnar (Frykman IV). Interestingly the winding crown of her wristwatch was found within the shaft of the left ulna (Figure 1). After appropriate emergent resuscitation the patient was taken to theatre. The open fracture was thoroughly washed and debrided in a standard fashion, the winding crown was removed and the radius and ulna were definitively fixed with locking plates (Figure 3). The skin was closed primarily. She was transferred to ICU postoperatively for stabilisation and subsequently transferred to the orthopaedic ward a few days later. She recovered well from her injuries with no complications and was repatriated to her home town.

Figure 1: AP radiograph of the left wrist in plaster cast shows transverse fractures through the distal shaft of the radius and ulna with volar displacement.
A metallic foreign body is projected over the distal ulnar shaft. The radiocarpal alignment is preserved.

Figure 2: AP radiograph of the right wrist in plaster cast shows an extra-articular comminuted, impacted fracture of the distal radius with minimal displacement. The radiocarpal alignment is preserved.

DISCUSSION

Cycling related Wristwatch fractures are extremely rare and with no reported literature, there is no advice for cyclists on the potential dangers of wearing a wristwatch. Upper limb injuries are a common occurrence in cyclists accounting for 40% of cycling related injuries. In 2021, 4,353 cyclists were injured in reported road accidents, including 111 who were killed or seriously injured.[6,7] Cyclist casualties have risen in recent years as cycling has become more popular, particularly after the London 2012 Olympic games. Most non-fatal cycling accidents take place in urban areas but half of cyclist deaths occur on rural roads. A large majority of cyclists killed or seriously injured were involved in collisions at, or near, a road junction, with T-junctions being the most commonly involved.[8] With most accidents taking place in urban areas and 80% occurring in daylight a large majority of the injuries appear to be upper limb often complicated with 5% chest and abdominal injuries and 40% suffering head injuries.[6]

Much of the upper limb injuries are consequential to the rider's position on the cycle making them vulnerable to injury. In this case, the rider was using a titanium-built bike with drop handlebars. The rider explained that her hands were in a fully flexed position using a technique described as "feathering the brakes (Figure 4). Both wrists collided against the front of the car applying the same force and energy. Though only the left resulted in an open fracture (Figure 1). Since the winding crown of the wristwatch was lodged in the left ulnar medullary canal, this could suggest the wristwatch acted as a fulcrum, further displacing the fracture thereby increasing the severity and open nature of the injury. Thus, the position of the wrist at the time of the injury dictated the

mechanism of the fracture and displacement of the distal bone.

Figure 3: AP radiograph of the left wrist shows fixation plates across the fracture sites with evidence of bony bridging and adequate alignment.

Figure 4: A picture depicting a cyclist typically "feathering the brakes."[9]

There have been two documented reports in the literature of wristwatches acting as a stress riser. The first was ski injury in which the skier fell backwards onto their outstretched hand, wearing a wristwatch.[10] It was documented that the watch acted as a fulcrum resulting in a distal radio-ulnar fracture. This case was a closed injury.

Cheng et al reported the splint and distal forearm may act as a single unit to convert the impact from the level of the wrist to a torque moment with the fulcrum located at the proximal border of the splint. This acted as stress riser concentrating the force over the distal forearm.[11]

Yewlett et al described a case of 14 year old boy who tripped and fell onto an outstretched hand wearing a wristwatch sustaining a segmental fracture of distal radial and ulnar.[12] They concluded that the position and shape of the wristwatch acted as a stress riser resulting in the configuration of the fracture.

Injuries may continue to occur despite safety measures taken by cyclists with the use of a helmet, gloves and lights. As cyclist become more technically advanced , the use of smartphone wristwatches have increased its popularity in this community. Further increasing the risk of cycle related wrist injuries. Interestingly, Cope et al recommended that wrist guards are designed to take the full force of the fall transmitting it over the forearm and over the wrist.[10]

CONCLUSION

In conclusion, we believe wearing a wristwatch or wrist strap during cycling can increase the chances of a complex fracture and result in unexpected complications such as infection, neurovascular injury, skin flaps and operations as demonstrated in this case study. Our case study demonstrated that the wristwatch acted as a stress riser ultimately determining the pattern and open nature of the fracture. We recommend that cyclists contemplate very carefully about wearing wristwatches when cycling as there is a potential for more complex wrist fractures if an injury were to occur.

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