Traumatic Rupture of Biceps Brachii - a Hazard of Military Parachuting

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SUMMARY: Closed traumatic rupture of the biceps brachii has not been reported occurring to a British military parachutist. This paper describes such an injury to a British military parachutist using United States (US) Army equipment and procedures. The discussion highlights differences between British Army and US Army equipment and procedures which make the chances of this injury occurring to a British paratrooper very small.

Introduction

Military parachuting has a deserved reputation as a hazardous activity. Injury statistics for parachuting show that the majority of injuries are caused by landing (1,2,3,4,5). This is a direct result of parachuting that cannot be avoided. However specific injuries attributable to parachute design and procedures do occur. This article discusses a case of traumatic rupture of biceps brachii which has not previously been reported occurring to a British military parachutist. The injury has been reported to be a hazard of US military parachuting (6,7). The US Army military parachute, the TX 10, has a different design to the British PX 4. The in-flight pre-parachuting drills also differ. The increased frequency of this injury in US Army experience may be directly attributable to these factors.

Case Report

A twenty-one year old British paratrooper was involved in parachute training with the US 82nd Airborne Division on an exchange visit to the United States. He was using the US TX 10 parachute and harness and followed US parachuting drills. On his second descent he was number twenty on the port side in the aircraft. On leaving the aircraft his left arm became entangled with the static line of the previous parachutist. As a result of this entanglement he sustained a friction burn over his upper arm and a closed transection of the body of biceps brachii. There was no neurological or vascular damage.

The injury was treated by maintaining his left elbow in acute flexion for four weeks in a sling, followed by four weeks of physiotherapy to mobilise the arm and restore muscle power. Figure 1 shows the condition of his arm eight weeks after the injury. The friction burn had healed well but a permanent defect remained in the body of his biceps muscle bridged by scar tissue. There was complete functional recovery and no significant loss in muscle power compared to the uninjured side.

Discussion

Injury to the upper arm as a result of entanglement with the static line has been reported several times in the US medical literature (1,6,7). The injury can be serious

Fig 1. Left arm showing the biceps defect.

and lead to functional disability. The mechanism of injury is directly attributable to US Army parachuting drills and the design of the US TX 10 parachute. It will be seen that the British drills and parachute ensure that this injury is unlikely, and indeed has never been reported.

Paratroopers jump from both side doors of the aircraft. They leave from alternate doors at half-second intervals. The parachute is deployed automatically by means of a static line. One end is attached to a wire passing the length of the aircraft. The other end is attached to the apex of the parachute. The static line on the TX 10 is folded and packed on the external surface of the parachute (Fig 2). On exiting the aircraft the static line pulls the parachute from its bag as the parachutist falls to earth. Once the static line, parachute and rigging lines have deployed the attachment between the static line and parachute breaks and the parachutist falls free.

As the parachutists move down the aircraft to leave the door they pull their static lines along the cable in the aircraft. With the TX 10 the static line is held by the arm nearest the centre of the aircraft. On reaching the door the US paratrooper is trained to grasp both sides of the door and push himself out. If at this point the static line is between his arm and his body the static line will become trapped. This creates a sudden localised force on

Fig 2. British paratroopers wearing the US TX 10 parachute. The externally stowed static line is clearly seen.

the mid-portion of the anterior surface of the upper arm leading to local tissue damage. If the interval between parachutists is shortened it is possible for a paratrooper to ensnare his arm on the static line of the previous paratrooper in the same manner.

The training of a paratrooper emphasises keeping the static line clear of his arm. However, because the static line is attached to the outside of the packed parachute it is vulnerable to becoming partially deployed inside the aircraft. This creates a slack loop which may then become snagged on the arm. The US Army drills increase the chances of this occurring because the paratrooper is required to place both hands on the sides of the door as he exits. This creates a large space between his arms and his body to trap the static line.

The British PX 4 has an internally stowed static line (Fig 3.) This reduces the chances of a partial deployment inside the aircraft. The static line is clipped to a strop on the wire. This has a handle in front of the static line attachment. Therefore the arm that pulls the static line along the wire on moving down the aircraft is kept away from the static line. Finally the parachutist is taught to bring both arms in tight to his body on exiting the aircraft which reduces the opportunity for the static line to trap his arm.

Although a very specific mechanism of injury, this example shows how military occupational medicine can benefit from an international analysis of injury patterns, equipment design and operational procedures.

Fig 3. A British military paratrooper demonstrating the PX 4 parachute, internally stowed static line and 'strop'.

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