Editorial

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Tactical field management of penetrating arrow injuries in ancient Asia

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The bow and arrow is one of the oldest weapons invented, and it has ties back to ancient civilization. It has been estimated that the arrow has killed more individuals than any other weapon in history [1]. The arrow was a deadly weapon in its most basic form; however, ancient civilizations developed multiple additions to enhance its effectiveness [2]. In fact, advances in developing tools and approaches for the extraction of arrows served as a major stimulus for modern surgery [3].

It is known that Celsus (Aulus Cornelius Celsus, 25 BC–50 AD) wrote a chapter on arrow wounds and the treatment of these wounds with surgical techniques in his *De Medicina* (published around 47 AD). He understood the importance of pushing an arrow through emergence as opposed to pulling with traction. He innovated a surgical instrument called the spoon of Diocles [4]. He wrote:

> If the missile is not deeply seated, and lies in superficial tissue, or if it is certain that it has not crossed the line of large blood vessels or sinews, there is nothing better than to pull it out by the way it entered. But if the distance it has to be withdrawn is greater than that which remains to be forced through, or if it has crossed the line of blood vessels and sinews, it is more convenient to lay open the rest of its course and so draw it out. For it will be more easily got at and more safely pulled out [4].

In ancient China, tactics for the emergency management of penetrating arrow injuries were described. Zuo Qiuming (556– 452 BC) wrote *The Zuo Tradition* (*Zou Zhuan*, published in the late 4th century BC), which is an ancient Chinese narrative history covering the period from 722 to 468 BC and focusing mainly on political, diplomatic, and military affairs from that era [5]. In this book, a warrior reflects upon the battle he won despite a penetrating arrow wound of the hand and arm:

> At the beginning of the battle, the arrow that the enemy shot pierced through my hand and elbow. I broke the shaft of the arrow and drove my chariot pulled by horses. The left wheel of my chariot was stained red with blood. Although I was injured seriously, I endured it and continued the battle [5].

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In the Joseon dynasty of Korea, Yu Mong-in (1559–1623) wrote a book titled *Eou's Unofficial Histories* (*Eou yadam*) in 1622 [6]. In this book, he introduced a case of tactical management of a penetrating arrow wound in a Chinese soldier who fought against Japanese troops in the Japanese invasion of Korea in 1592. The soldier pointed at his scar of the face and said:

> At the battle of Pyongyang castle, an arrow penetrated my face. I tried to pull it out; however, the blood spurted out from the wound. Thereafter, I broke the shaft and left the remaining half on my face, continued fighting, and killed two Japanese soldiers (Fig. 1). On returning to my camp, I pulled out the arrowhead and filled the wound with medicine. I survived [6]!

Nowadays, archery is enjoyed in sports, as in the Olympic Games. Surgeons rarely meet patients with penetrating arrow injuries. However, similar approaches to the extraction of arrows are still used in the field treatment of many penetrating injuries. In a stab wound, the knife should not be removed, rolls of gauze are placed around the handle, and it is fixed with bandages. Emergency medical technicians must carry a cutting device to cut penetrating materials. In a penetrating wound with a sharp spear-like object fixed to the ground, it should be cut at the base to mobilize the victim. The remaining shaft is fixed with gauze and bandage to prevent further insertion or movement.

At a trauma center, the remaining part is removed, as Celsus described:

> Whatever the missile may be, it is extracted, either by the wound of entry, or through the spot towards which it is pointing. In the former case, the missile has already made a way for its withdrawal; in the latter the way out is made with the scalpel; for the flesh is cut through upon its point [4].

Fig. 1. An arrow penetrated a Chinese soldier's face. He broke the shaft and left the remaining half on his face and continued fighting.

NOTES

Ethical statements

Not applicable.

Conflicts of interest

The author has no conflicts of interest to declare.

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