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"Buck and Ball": Identification and interpretation of buckshot injuries to the pelvis from the War of 1812

Laura Lockau [a,*], Rebecca Gilmour [a], Jean-Paul Menard [b], Narayanaswamy Balakrishnan [c], Ana-Maria Dragomir [a], Madeleine Mant [a], Lelia Watamaniuk [a], Megan Brickley [a]

[a] Department of Anthropology, McMaster University, Chester New Hall Rm. 524, 1280 Main St W, Hamilton, ON L8S 4L9, Canada
[b] Physical Sciences Section, Firearms and Toolmarks Unit, Centre of Forensic Sciences, Northern Regional Laboratory, Ministry of Community Safety and Correctional Services, 70 Foster Dr, Suite 500, Sault Ste Marie, ON P6A 6V3, Canada
[c] Department of Mathematics and Statistics, McMaster University, Hamilton Hall Rm. 218, 1280 Main St W, Hamilton, ON L8S 4L9, Canada

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ABSTRACT

During the War of 1812, the flintlock smoothbore musket represented a significant cause of injury and death. Putative musket ball and buckshot injuries were observed in the skeletal remains of individuals from the Smith's Knoll collection, comprised of soldiers killed during the battle of Stoney Creek (1813, Ontario, Canada). In order to confirm the identification of three impacts from buckshot ammunition in two innominates from this assemblage, faunal proxies were shot using a replica War of 1812 flintlock smoothbore musket and ammunition. Experimental research also aimed to evaluate whether the spacing of lesions could be related to impact characteristics such as projectile velocity as associated with range of fire. Significant differences in distance values for lesion spread were found between shots taken from distances of 9.14 and 18.29 m (10 and 25 yards), however, there was some overlap between the ranges for these distances. While the small distance between archaeological injuries suggests they are more likely to result from a shot taken at a closer range of fire, a shot from further away cannot be ruled out. The archaeological lesions display characteristics associated with musket injuries, and their sizes correspond specifically to the experimental injuries caused by buckshot ammunition. This represents the first identification of buckshot injuries in archaeological skeletal material.

1. Introduction

Skeletal trauma, often cited as one of the most prevalent types of lesions encountered in archaeological samples, is of significant interest to paleopathologists. These injuries can reveal much about life in the past, including the types of risks individuals were exposed to and the ways they interacted with their physical and social environments (Lovell, 1997, 2008; Ortner, 2003). Investigating skeletal evidence for traumatic injuries is particularly important in military contexts; the availability of documentary evidence describing historic battle conditions allows for a contextually informed interpretation of lesions. Such is the case for the Smith's Knoll assemblage, a collection of fragmented, disarticulated, and commingled remains of soldiers killed during the Battle of Stoney Creek, in Ontario, Canada (Fig. 1), during the War of 1812 (1812–1814). War erupted between Britain and the United States in 1812 largely as a result of lingering resentment following the American War of Independence, and of Americans' dissatisfaction with the negative effects that Britain's naval policies during the Napoleonic wars had on the United States as a neutral power (Sutherland, 2001). The Battle of Stoney Creek was important in turning the tide from American advance to retreat, representing a major strategic victory for the British army (Elliott, 2009; Turner, 2000).

The battle of Stoney Creek occurred on the night of June 6th, 1813 during the American advance into the Niagara Peninsula. The British army raided the American camp in Stoney Creek, and the ensuing battle involved close-range fighting and hand-to-hand combat atypical for the period. Contemporary battle strategy revolved around the main weapon, the flintlock smoothbore musket, which performed most effectively in movements of massed infantry formations. Lines of infantrymen would fire mass volleys at an advancing enemy line, from an effective range of fire of up to 200 yards (Kaufman, 2003). Dark, chaotic conditions during this particular battle made the coordinated advance of infantry lines impractical (Fredriksen, 1984, 1989; Sutherland, 2001). As a result, injuries experienced at Stoney Creek may differ from those inflicted during other War of 1812 battles.

The Smith's Knoll collection was examined for skeletal evidence of traumatic injuries sustained during the battle, revealing lesions relating to perimortem fracture, sharp force, and projectile trauma (Lockau,

* Corresponding author.
E-mail addresses: lockaulm@mcmaster.ca (L. Lockau), gilmourj@mcmaster.ca (R. Gilmour), JP.Menard@ontario.ca (J.-P. Menard), bala@mcmaster.ca (N. Balakrishnan), dragoma@mcmaster.ca (A.-M. Dragomir), mantml@mcmaster.ca (M. Mant), watamalu@mcmaster.ca (L. Watamaniuk), brickley@mcmaster.ca (M. Brickley).

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Fig. 1. Map of Ontario, Canada showing the location of the Smith's Knoll site.

2012; Lockau et al., 2013). Potential musket injuries were observed in three fragments of innominate (pelvis). Given the chaotic conditions at Stoney Creek, and primary accounts indicating atypical battle strategy, the location and characteristics of these lesions may contribute to our knowledge of how unusual battle conditions affected the experiences of soldiers involved in this conflict.

To address questions surrounding these injuries, experimental work was performed using a replica flintlock smoothbore musket and ammunition, as well as paper targets and proxy buttocks constructed using porcine bones and soft tissue. Injuries resulting from musket balls have been well documented from a range of contexts, and the appearance and characteristics of these lesions are established (e.g. Constantinescu et al., 2015; Kaufman, 2003; Owsley et al., 1991; Scott et al., 1998). Therefore, experimental work focused on confirming the identification of impacts from buckshot ammunition. It also aimed to evaluate whether the spacing of buckshot lesions could be related to circumstances surrounding projectile impacts, namely association of the increased dispersion of bullets with increasing range of fire, and associated decreasing velocity. To date, no experimental work involving the impact of buckshot ammunition on bone has been published; this study presents results from an initial set of experiments that will serve as a foundation for future studies in this area of research.

2. Background: firearms ammunition and typical associated lesions

During the War of 1812, soldiers used smoothbore flintlock muskets loaded with musket balls and/or buckshot ammunition. Musket balls were large (0.69 or 0.64–0.65 caliber), spherical, lead projectiles (Kaufman, 2003). Buckshot ammunition was much smaller (0.31 caliber) and also made of lead. These heavy, soft projectiles deformed upon impact with bone. They had significant destructive potential despite a velocity much lower than that of modern bullets, probably both because they often penetrated rather than perforated the body, thereby transferring all of their kinetic energy into the tissue (Di Maio, 1999), and could create significant damage along a large permanent wound channel.

Typical firearms injuries produce characteristic lesions in bone. Based on comparative forensic and clinical data, several characteristics of bullet wounds aid in their recognition and interpretation in archaeological skeletal material (Willey and Scott, 1996). Bullet impacts produce bevelling or flaking of bone on the exit side of the wound, establishing directionality (Smith et al., 2009). Lesion shape differs depending on the bullet's angle of impact and velocity, as well as bone shape at the impact point. Rather than perforating, projectiles may glance off the bone, or may penetrate only deeply enough to become embedded. However, given the forensic literature's primary focus on through-and-through cranial injuries from modern high-velocity projectiles (e.g. Quatrehomme and Işcan, 1999; Smith et al., 2009; Zych et al., 2008), the possibility of recognizing other manifestations of gunshot wounds is likely to be understated (Willey and Scott, 1996). This may affect the visibility of certain types of injuries in archaeological skeletal samples, potentially overlooking less obvious and non-typical lesions.

A bullet's wounding potential is determined by velocity, shape, size, construction, the maintenance of integrity of its flight path, and tissue density at the site of impact (Zych et al., 2008). Di Maio (1999) suggests that these determining factors contribute to the amount of kinetic energy lost by a bullet during its passage through tissue, and that this energy loss in relation to the permanent wound cavity and the organs and structures disrupted is what ultimately determines wound severity. The wounding potential of some musket balls was likely to be greater than modern full metal jacketed projectiles, (LaGarde, 1916), although no published studies have evaluated differences between modern ammunition and musket balls such as those used during the War of 1812.

2.1. Materials and methods: the Smith's Knoll skeletal sample

The Smith's Knoll assemblage contains 2701 identifiable fragments representing a minimum of 24 individuals. Extensive commingling, disarticulation, and fragmentation probably result from hasty burial in a mass grave following the battle, as well as from significant disturbance with continued site use (Casaca, 2014). Ontario-based archaeology consultant RGS Services excavated the assemblage in 1998 and 1999 (Griffin-Short, 2000), and commissioned initial analyses (Liston, 2000; McVeigh, 1998). Commingling of remains is so severe that no fragments could be identified as belonging to the same individual. Therefore, during *re*-examination of the assemblage by the authors in the years