Journal of Archaeological Science 97 (2018) 125–136

Contents lists available at ScienceDirect

Journal of Archaeological Science

journal homepage: www.elsevier.com/locate/jas

Early horse bridle with cheekpieces as a marker of social change: An experimental and statistical study

Igor V. Chechushkov[a,*], Andrei V. Epimakhov[b,c], Andrei G. Bersenev[d]

[a] Department of Anthropology, University of Pittsburgh, 3302 WWPH, Pittsburgh, PA, 15260, USA
[b] Research Educational Centre for Eurasian Research, South Ural State University, Lenina av., 76, Chelyabinsk, 454000, Russia
[c] Institute of History and Archaeology of the Ural Branch of RAS, Kovalevskaya st., 16, Ekaterinburg, 620990, Russia
[d] Main Directorate of the Ministry of Internal Affairs of the Russian Federation for Chelyabinsk Region, 3rd International st., 116, Chelyabinsk, 454000, Russia

ARTICLE INFO

Keywords:
Cheekpieces
Chariot
Bronze age
Experimental archaeology
Use-wear

ABSTRACT

The morphological similarities/dissimilarities between antler and bone-made cheekpieces have been employed in several studies to construct a relative chronology for Bronze Age Eurasia. Believed to constitute a part of the horse bit, the cheekpieces appear in ritual contexts everywhere from the Mycenaean Shaft Graves to the Bronze Age kurgan cemeteries in Siberia. However, these general understandings of the function and morphological changes of cheekpieces have never been rigorously tested. This paper presents statistical analyses (e.g., similarities, multidimensional scaling, and cluster analysis) that document differences in cheekpiece morphology, comparing shield-like, plate-formed, and rod-shaped types in the context of temporal change and spatial variation. We investigated changes in function over time through the use of experimental replicas used in bridling horses. This experimental work supports the hypothesis that these objects served to bridle harnessed (shield-like) or ridden (plate-formed and rod-shaped) horses. Moreover, comparison of use wear on the ancient artifacts with the replicas provides insight into how long the artifacts were used before they were deposited in the funeral contexts or discarded. These observations support that the Sintashta chariots dating back to ca. 2100 BC were ridden and suggest the end of the Late Bronze Age (ca. 1500–1200 BC) as the earliest possible date for horseback riding in warfare. This study highlights changes in horse exploitation and simultaneous shifts in human societies.

1. Introduction

The development of horse husbandry and wheeled transport has long been thought to accompany fundamental social shifts in many societies. In the Old World, critical social changes co-occurred with the appearance of chariotry and mounted warfare, rendering these practices useful avenues for studying social change. Through assembling the puzzle-pieces of the past, researchers have shed light on how equines and other means of transportation influenced the origins of social complexity, the development of inequality, and the spread of people and technologies. For instance, rapid adoption and development of chariot technology revolutionized ancient warfare in Babylon, Egypt, and Greece, allowing the expansion of early states and empires (Snell, 2008). On the other hand, chariot armies were expensive and less effective in comparison to the mounted cavalry that started to gradually replace chariots on battlefields after 900 BC. Employment of mass-scale cavalry tactics made it possible for the peoples of the Eurasian Steppes to effectively challenge the armies of the Mediterranean and Near Eastern states and to forcefully construct their own large political entities (Childe, 1954; Littauer et al., 2002; Drews, 2004; Kozhin, 2007; Anthony, 2007).

The onset of these processes can be traced back to the Eurasian Steppes, but they are known exclusively from the material culture of the Late Bronze (ca. 2100–1200 BC) and the Early Iron ages (ca. 1200–400 BC). They provide us with abundant data to study how the utilization of the horse changed in the pre-state complex societies from occasional horse riding to the use of chariots with the following appearance of cavalry. The unifying element that can be found everywhere in the steppes during the Late Bronze and Early Iron ages are so-called cheekpieces that were designed as the horse control mechanism. Designed based on the animal's physiology, cheekpieces display only minimal change over time depending on available materials. However, the form of horse utilization influences means of control, since communication with a ridden horse in quotidian contexts can be performed simply with a rope in the jaw and the rider's knees and weight. However, a battle situation requires immediate obedience of an animal,

* Corresponding author.
E-mail address: ivc2@pitt.edu (I.V. Chechushkov).

https://doi.org/10.1016/j.jas.2018.07.012
Received 12 December 2017; Received in revised form 20 July 2018; Accepted 24 July 2018

necessitating more rigorous forms of control (Littauer, 1969; Dietz, 2003). As a minimum, this implies a change in the means of control between horses used to perform everyday work and those used in warfare.

The Sintashta-Petrovka archaeological culture of the Middle/Late Bronze Age (ca. 2100–1800 BC) is the keystone sites for understanding how these changes started to unfold. Located in the southern Trans-Urals, the Sintashta-Petrovka graves contain material correlates of battle chariots (imprints of wheels and axles, evidence for a composite bow and blunt weapons), remains of domesticated horses and the earliest cheekpieces. The simultaneous Pokrovka-Abashevo sites of the Don-Volga region share similar characteristics and. Notably, there are at least twenty-five documented graves with evidence for chariots, and over 180 cheekpieces are known from a vast area stretching from the Don to the Irtysh Rivers. Together, these materials suggest that charioteers started to play a vital social role in the steppe communities as early as the Middle/Late Bronze Age.

The later periods of the Bronze Age are associated with the Srubnaya (Timber-Grave) culture of the Don-Ural region and the Alakul' culture of the southern Urals and Western Siberia (ca. 1800–1500). There is a single chariot grave, but there are abundant horse remains in settlements, ceramic vessels with images of two-wheeled vehicles, and a unique burial of a bridled horse in the Srubnaya culture's Komarovka Cemetery. Cheekpieces are also well-known at that period, with about 65 recorded specimens. In Siberia, the Final Bronze Age is associated with the Andronovo phenomenon (ca. 1500–1200 BC) and the Karasuk culture (ca. 1500–800 BC), which yielded numerous petroglyphs depicting chariot technology and utilized horses.

Extensive evidence for ridden warhorses (swords, spears, metal bits) is known from the burial sites of the transitional period between the Bronze and Iron ages (ca. 1200–1000 BC) in the Belogrudovo and Chernoles cultures (Terenozhkin, 1976). Similar objects have been found throughout the Eurasian Steppes, from the Black Sea region to the Altai Mountains (Fig. 1).

Due to poor preservation of organic materials, antler and bone-made cheekpieces serve as a primary source of evidence to track shifts in the technologies of horse control and utilization. Their frequent appearance in ritual contexts in northern Eurasia makes them one of the most widespread Bronze and Early Iron Age artifacts, allowing scholars to use their morphological similarities/dissimilarities to establish the relative chronological positions of Bronze and Iron Age societies (Potratz, 1941; Smirnov, 1961; Zdanovich, 1988; Kuzmina, 1994). However, the complex relationships between the morphology and functionality of cheekpieces lack detailed study. This study explores patterns in the morphology of antler and bone-made cheekpieces through statistical analyses and links them functionally through experiments with the goal of tracing and explaining changes in husbandry in Eurasia.

1.1. The study of cheekpieces

Over the last several decades, researchers have developed classification schemes to study the origin and evolution of cheekpieces. Smirnov (1961) developed a relative and absolute chronology of Eurasian cheekpieces and compared them with their near-eastern counterparts. Kuzmina (1994) distinguished three principal classes of cheekpieces and established their relative chronologies. These classes are the shield-like, plate-formed and rod-shaped *psalii* (Fig. 2). According to Kuzmina, the earliest shield-like artifacts are carved out of large bones and antler and often have studs on their flat platforms. Cheekpieces with studs appeared in the Eurasian steppes ca. 2100 BC, then spread to the Balkans and appeared in the Mycenaean shaft graves and then transformed into the bronze types found in Near East by ca. 1750–1650 BC. The following plate-formed cheekpieces are made from tubular bones that are split down the midline and then carved. The latest rod-shaped forms made from antler tines and lack spikes (Kuzmina, 1994). These changes in material and manufacture highlight variability in cheekpieces design and link the trajectory of their evolution with the utilization of chariots in the formative stage (studded cheekpieces) and the later emergence of mass-scale riding (rod-shaped cheekpieces) (Dietz, 2003; Zdanovich, 1988). However, these existing classificatory schemes are strongly biased by attempts to connect the artifacts with archaeological cultures or periods (Boroffka, 1998; Pryakhin and Besedin, 1998). The comprehensive statistical analyses that would allow groupings to naturally emerge from the data have not yet been applied to cheekpieces.

In contrast to the important advances made by these typological

Fig. 1. The map of the Bronze Age and Early Iron Age cultures with evidence for chariots and ridden horses.