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Diet at ancient Helike, Achaea, Greece based on stable isotope analysis: From the Hellenistic to the Roman and Byzantine periods

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ABSTRACT

Earthquakes and subsidence are common occurrences in the Helike Delta and caused serious destruction in the ancient city of Helike in 373 BCE. Archaeological excavations have uncovered artifacts and inhumation burials in the area, which indicate that resettlement began in the Late Classical/Hellenistic period (late 4th to 2nd centuries BC) and was continuous through to the late Byzantine period (14th to 15th centuries AD). This temporal continuity provides the opportunity to explore dietary resource use in this region of Greece. In addition, it allows for the comparison of dietary resource use between the Byzantine and earlier periods. Meat was prohibited on the numerous Orthodox Christian fasting days but fish and shellfish were acceptable substitutes. If religious practices influenced dietary customs, this may be visible in the stable isotope ratios of Christian era human skeletal remains from Helike.

Bone collagen from twenty-four individuals from the Hellenistic, Roman, and Byzantine periods at Helike was analyzed for its stable carbon and nitrogen isotope values. The results suggest that the Hellenistic individuals consumed more marine dietary resources than the later Byzantine individuals, as indicated by higher stable carbon isotope values. The Roman period individuals show values indicative of primarily terrestrial resource use with fewer marine additions. Given the geological history of Helike, the Hellenistic individuals may be distinctive because of access to a temporary lagoon that formed after the earthquake of 373 BCE. This lagoon may have offered a broader spectrum of aquatic resources to Helike's inhabitants, causing dietary differences between the Hellenistic and later periods.

Despite the constant availability of terrestrial and marine resources at Helike, lagoon resources appear to have contributed to the diet only at certain times. This study demonstrates the importance of taking into account seismic activity and changing landscapes when reconstructing past diet over a large time span. What may be assumed to be cultural dietary differences may in fact be the result of environmental differences.

1. Introduction

Diet and nutrition play an important role in the health of human communities. While set caloric and micronutrient requirements are required to sustain life and to maintain health, the ways in which these needs are addressed can vary widely. How past populations utilized local food resources can help us understand the interactions between people and their environment as mediated by cultural and individual factors. When combined with other archaeological evidence, dietary reconstructions of past populations provide us the opportunity to explore how communities changed their dietary resource use over time in response to these factors.

The purpose of this study is to examine any temporal changes in marine resource use at the site of Helike in Achaea, Greece. As reviewed in detail below, while the "Mediterranean Triad" of cereals, wine, and oils likely played a large role throughout the Hellenistic, Roman, and Byzantine periods, the sources of dietary protein may have changed in emphasis over time and according to region. Written records suggest that Classical and Hellenistic Greeks were primarily dependent on dairy and legume protein sources, with meat consumption happening primarily in association with religious sacrifices (e.g. Dalby, 1996; Rosivach, 1994, and Wilkins and Hill, 2006). Both meat and dairy consumption appear to have increased during the Roman period. During the Byzantine period, Orthodox Christian fasting rules prohibited the consumption of meat, and occasionally dairy, for a large portion of the calendar year. Fish and shellfish, though, could be consumed on most of these days. Since both terrestrial and marine environments are accessible from Helike, detecting such shifts in dietary

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protein sources is possible. Previous stable isotope studies (e.g., Bourbou et al., 2011) have found variation in marine resource use by other Byzantine Greek populations, largely related to coastal access.

1.1. Written and archaeological evidence for Greek diet

There is a rich literature describing Greek dietary practices in the Hellenistic through Byzantine periods. Philosophers and physicians of all eras had opinions about food and about what constituted the ideal diet; other sources, from inscriptions to poetry to taxation records, also make their contributions (e.g. Dalby, 1996, 2003; Garnsey, 1999; Koder, 2003; Talbot, 2003; Mylona, 2008; Wilkins and Hill, 2006). Despite this variety, many of these accounts focus on elite urban life, especially in Athens, to the exclusion of smaller communities (Dalby, 1996; Wilkins and Hill, 2006). While they give a good idea of what foods were available, as well as their desirability and status, they do not provide much information about what was actually consumed by the average, non-elite individual (Corbier, 1999; Talbot, 2003). There can also be challenges in allowing for ancient authors' personal, gender and class biases, and in untangling the meanings behind food metaphors intended to discuss other social and political concepts (e.g., Davidson, 1993; Marzano, 2013). Archaeological analyses can compensate for some of these limitations, and have been especially important for our understanding of meat consumption patterns (e.g. Jameson, 1988; Kroll, 2012; MacKinnon, 2007, 2014).

Although diet and food preferences changed over time, the fundamental Greek diet in all three eras centered around what is referred to as the “Mediterranean Triad” of cereals, wine, and olive oil (Teall, 1959; Foxhall and Forbes, 1982; Garnsey, 1999; White, 1995). Wheat and barley were the preferred cereals; other grains, including millet, were also available but were often considered animal fodder and may have been eaten by people primarily in times of food shortages (Dalby, 2003; Garnsey, 1999; Teall, 1959; Wilkins and Hill, 2006).

A wide variety of other plant foods was available. Although many of these, such as fruits or greens, would not have had significant impact on collagen stable isotope values, some higher protein items should be noted specifically. Legumes such as chickpeas and lentils were important cultivars both for human food and for animal fodder (Hodkinson, 1988; Flint-Hamilton, 1999). Although they were consumed by all social classes, they are most often described as a key food for the poor (Corbier, 1999; Dalby, 1996; Garnsey, 1999; Koder, 2003). Nuts including walnuts and almonds were also used. These could have provided significant protein if eaten in sufficient quantities, and some wild nuts were also an important source of fodder for pigs so would have indirectly impacted human diets (Jameson, 1988; Dalby, 2003).

In Classical Greece the slaughter and consumption of domesticated animals took place largely within sacrificial contexts, and average individuals probably rarely ate meat outside of these occasions (e.g. Jameson, 1988; Rosivach, 1994; see MacKinnon, 2014 for review). The resulting contribution to the diet was likely small but not insignificant; Rosivach (1994:64–67) estimated that a typical citizen of Classical Athens received a share of sacrificial meat on 40 to 45 occasions per year. Game could be consumed outside sacrificial contexts, and would have supplemented this amount for some (Jameson, 1988). Similar practices continued during the Hellenistic, though the number of sacrifices (and thus perhaps the level of meat consumption) may have increased (Prummel, 2003). In both eras, meat consumption was associated with both wealth and high status (Faas, 2003; Garnsey, 1999). In the Roman period, consumption of meat outside sacrificial contexts may have become more frequent (MacKinnon, 2014). There is also some evidence that this period saw an overall increase in meat intake (Brothwell and Brothwell, 1998; Faas, 2003). Attitudes would have changed once again with the adoption of Christianity. As MacKinnon (2014) points out, given that sacrifice was the primary context of meat consumption, its decline may well have changed meat-eating patterns. As well, Christian beliefs associated meat eating with gluttony and carnality and it was not particularly encouraged, especially for women who were thought to be at particular risk of these vices (Garnsey, 1999; Corbier, 1999; Wilkins and Hill, 2006; Louvaris, 2005).

Throughout these eras, cattle, goats and sheep would have been more useful for their draught labor, dairy products or wool rather than as meat (Hodkinson, 1988; Jameson, 1988; Rosivach, 1994; Prummel, 2003; Kroll, 2012; MacKinnon, 2014). Cheeses, yogurt and other dairy products allowed for some preservation and storage of milk, and provided a relatively cheap source of animal protein (Dalby, 1996; Kislinger, 1999). Especially for the poor, it seems likely that dairy and eggs would have provided much more of the animal protein in the diet than did meat (Bourbou et al., 2011; MacKinnon, 2014). This approach is reflected in zooarchaeological age assemblages; these tend to be dominated by mature animals, with the presence of some juveniles reminding us that writers of all eras praised the tender meat of young animals as a delicacy (Jameson, 1988; Rosivach, 1994; Prummel, 2003; MacKinnon, 2014).

Fish and seafood occupy a dichotomous position in historical sources on Greek foodways. Alternately portrayed as either a poverty food or a sought-after delicacy, fishes were variably priced in Hellenistic and Roman era markets based on criteria including species, freshness, size, cut and method of preparation (Lytle, 2010; Mylona, 2008; Marzano, 2013). Smaller fishes and the unwanted parts of large fishes could be fermented and made into fish sauce (*garos* or *garum*). This salty condiment, which added flavor to everyday meals and gourmet dishes alike, was used in Greece by Classical times but became particularly popular from the Roman era on (Curtis, 1991; Wilkins, 2005). Although fish and seafood could be caught and consumed with minimal specialized equipment, a number of scholars have argued that they were probably an addition to the Mediterranean Triad and not necessarily staples themselves, even at coastal sites. Instead, fishing may have been an activity that provided an occupation for some and a necessary dietary supplementation for the coastal poor, but a pastime or a source of delicacies for the wealthy (Gallant, 1985; Mylona, 2008; see however Wilkins, 2005; Marzano, 2013).

The Byzantine period saw Orthodox Christian dietary rules about fasting and abstinence come into full force. According to these rules, meat and occasionally dairy were to be avoided on designated holy days and periods, including ordinary Wednesdays and Fridays. For individuals in secular life, abstinence from meat was encouraged for at least 195 days out of every year and up to 203 days (Louvaris, 2005; Talbot, 2003). These fasting days applied to Wednesdays and Fridays every week and to four other extended periods, including Lent, Pentecost, the Feast of the Virgin, and Christmas (Louvaris, 2005; Talbot, 2003). Fish and seafood were allowed on most of these days. Written records suggest that monastery inhabitants, who would have been closely observed for compliance with fasting rules, consumed large amounts of fish (Kislinger, 1999; Koder, 2003; Talbot, 2003). However, it is not clear how closely secular individuals observed fasting days. While some researchers have stressed the general importance of fish to the Byzantine diet (e.g., Kroll, 2012), others associate fish-eating in this era more with the peasantry than the wealthy (e.g. Kazhdan, 1997). Given the proximity of Helike to the Gulf of Corinth, it is possible that its Byzantine era inhabitants observed fasting days by incorporating more marine foods into their diets, which should result in higher average stable carbon and nitrogen values than seen in earlier periods.

2. Dietary reconstruction using stable isotope analysis

Stable isotope analysis of bone has been used in the archaeological reconstruction of diet for over 30 years (Katzenberg, 2008). The basis of this technique is the knowledge that consumer tissues, including bone, will reflect the isotopic value of the diet in predictable ways. Bone collagen, the organic component of bone matrix, mainly reflects the protein aspect of the diet under most dietary conditions (Ambrose, 1993, 2000). Thus collagen stable isotope values do not provide