# Echoes in the Bones: An Osteological Analysis of the Biological Impact of Roman Rule at Corinth, Greece.

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*The effect colonial regimes have on health has recently emerged as an important focus in bioarchaeological research. This study contributes to our understanding of this phenomenon by assessing the impact Roman colonization had on health in Corinth, Greece. Using previously published bioarchaeological data, frequencies of cribra orbitalia, porotic hyperostosis, linear enamel hypoplasia, and carious lesions were compared between pre-Roman (7th century B.C.E.-146 B.C.E.) and Roman period (44 B.C.E.- 4th century C.E.) populations from three cemeteries in Corinth: the North Cemetery, the Northern Cemetery, and Anaploga Cemetery. Results indicate a statistically significant decrease in the frequency of nonspecific indicators of physiological stress and carious lesions during the Roman period at Corinth, suggesting a change in disease ecology or food security after the onset of Roman imperial rule. This upward trend in health indicators diverges from previous bioarchaeological studies of colonialism in the Roman world and beyond, demonstrating the diversity of colonial experiences and encouraging scholars to question previous assumptions associated with colonizer/colonized models. By integrating multiple lines of bioarchaeological and historical data, this research promotes interdisciplinary explorations of the embodied effects of colonialism.*

## Introduction

Research on situations of colonial contact has historically operated upon a binary opposition of 'conquering' and 'native' groups, to the exclusion of more nuanced accounts of their interactions and entanglements.[1] Recently, scholars have challenged the colonizer/colonized dichotomy altogether on the grounds that it masks internal diversity in the colony and ignores the potential cross-cutting interests of the multiple social groups entangled in the colonial process.[2] Perhaps nowhere else are the complexities of colonial experiences more salient than in the Roman Empire, where local elites in the *coloniae* could rise to the Senate and colonial populations could earn Roman citizenship.[3] Such fluid political and legal boundaries illustrate how binaries oversimplify the nuances that existed in situations of colonial rule and demonstrate how they fail to address the complexities of people's experiences in imperialist contexts.

Bioarchaeology has also played an important role in the call to revising these binaries by utilizing skeletal analysis of social identity, occupational stress, and disease prevalence to call attention to the varied embodied effects of colonial processes. Building upon these recent theoretical and methodological advances, this study utilizes one of the most archaeologically well-documented examples of imperialism, the Roman Empire, as a model for understanding how people experienced health under colonial regimes. While bioarchaeology has been a methodological cornerstone in studies of colonial rule in other regions, such as the Americas, there is a considerable absence of bioarchaeological data within Roman scholarship which has not gone unnoticed.[4] In order to bring the available osteological data into larger debates regarding "Romanization" and colonial processes, this study synthesizes and reinterprets previously published pathological data from three major cemeteries from Corinth, Greece – the North cemetery, Anaploga cemetery, and the Northern cemetery – analyzing overall changes in health and morbidity prior to (7th century B.C.E. to 146 B.C.E.) and during the period of Roman rule (44 B.C.E. to 4th century C.E.),[5] a time frame that encompasses the rise of ancient Corinth, its conquest by the Macedonians and Romans, the introduction of a Roman settlement on the city's ruins, and its incorporation into the Roman Empire. Doing so will allow us to gain crucial new insight into the embodied experiences of individuals during a time of political and social transformation. Particular attention is paid to the pathological indicators that reflect stress episodes during childhood (cribra orbitalia, porotic hyperostosis, linear enamel hypoplasia) and poor dental health (dental caries), the latter of which is strongly tied to dietary behavior and overall nutritional health. Corinth is particularly well suited to this analysis because its transition from Greek *polis* to Roman *colonia* was marked by the sack of the city, creating a clear destruction layer in the archaeological record and a basis for producing chronological divisions of osteological samples. Such precise chronological separation is crucial for examining the periods prior to and during colonization.[6]

## Materials and Methods

Bioarchaeological data were culled from two previous publications from three major cemeteries representative of both the pre-Roman and Roman periods at Corinth: the North cemetery, the Northern cemetery, and Anaploga cemetery.[7] Osteological data from 112 adult individuals that belong to the chronological periods of the present study were then reanalyzed. The pre-Roman sample dates to the 7th century B.C.E. to 146 B.C.E. and contains 55 individuals from three sites: the North cemetery (n=36), Anaploga cemetery (n=12), and skeletons from individual burials discovered in close proximity to these cemeteries (n=7). The Roman period sample dates to the first century B.C.E. to the fourth century C.E. and contains 57 individuals from the

Northern cemetery (n=49) and Anaploga cemetery (n=4). Four additional skeletal individuals from a single grave nearby dating to the Roman period were also analyzed. Demographic information (age and sex) was collected from the samples based on the guidelines established by Buikstra and Ubelaker.[8] Previous investigators estimated sex using the pubis, while age-at-death was estimated using auricular surface changes, cranial suture closure, and dentition.[9] Only adult individuals (greater than 20 years of age) were considered in the present study.[10]

*Paleopathological Indicators*

In order to adequately evaluate potential changes in health following the Roman colonization of Corinth, the following pathological conditions were assessed: cribra orbitalia (CO), porotic hyperostosis (PH), linear enamel hypoplasia (LEH), and dental caries. These variables were chosen for analysis due to the scholarly consensus that they can function as general health indicators for diachronic comparison.[11] CO, PH, and LEH are thought to register physiological stress during childhood.[12]

The term cribra orbitalia (CO) describes lesions of the orbital roof, while lesions on the skull vault are considered porotic hyperostosis (PH). Paleopathologists suggest a variety of mechanisms that could cause these lesions, including iron deficiency and hemolytic and megaloblastic forms of anemia.[13] Accordingly, CO and PH are classified as non-specific indicators of physiological stress, meaning the etiology cannot always be confirmed.[14]

Similarly, this study uses linear enamel hypoplasia (LEH) as an additional marker for physiological stress during childhood. LEH results from a disturbance in the production of normal enamel (amelogenesis) and presents as macroscopic horizontal lines or pits on adult dentition.[15] Paleopathologists believe the pause in enamel formation is related to prolonged episodes of physiological stress brought on by malnutrition, illness, or even weaning.[16] However, etiologies cannot necessarily be narrowed further, resulting in LEH also being considered a non-specific health indicator.[17] However, indeterminable etiologies do not reduce the usefulness of CO, PH, and LEH for scientific analysis. These specific pathological indicators reflect the body's experiences and recovery from physiological stress during childhood; therefore, a contextualized analysis of these skeletal pathologies may suggest the biological, cultural, and environmental factors shaping their prevalence.

Just as CO, PH, and LEH provide valuable insight into the lived experiences of a population, dental caries can also be used to determine the health status and

| | **Condition Analyzed** | **Total number of individuals or teeth examined** | **Method of Reporting** |
|---|---|---|---|
| ***Pre-Roman*** | | | |
| | CO | 38 | CPR |
| | PH | 24 | CPR |
| | LEH | 28 | CPR |
| | Caries | 473 | TPR |
| ***Roman*** | | | |
| | CO | 57 | CPR |
| | PH | 57 | CPR |
| | LEH | 57 | CPR |
| | Caries | 520 | TPR |

Table 1: Total number of individuals or teeth examined at Corinth, Greece for each pathological condition (adult population only).

dietary behavior of an individual. Caries, commonly known as cavities, are caused by the breakdown of plaque by bacteria and the subsequent demineralization of tooth enamel.[18]

*Methodology*

CO and PH were identified by previous researchers macroscopically as confined areas of pitting and porosity on the external surface of the orbital roof or cranial vault.[19] LEH and dental caries were also macroscopically diagnosed on adult dentition.[20] However, not all excavated skeletons were analyzed for CO, PH, LEH, or caries due to poor preservation of the remains; the total number of individuals or teeth examined is detailed in Table 1. In the present study, CO, PH, and LEH are reported according to presence or absence using crude prevalence rates (CPR).[21] All permanent adult teeth were assessed for evidence of LEH by Fox and McIlvaine. Dental caries are reported as a true prevalence rate (TPR).[22] In all, 993 permanent teeth were examined, 473 from the pre-Roman period and 520 from the Roman period. CPR and TPR help to facilitate a more equal comparison between chronological periods. Two-tailed Fisher's exact tests were used to compare frequencies of all pathological conditions between the two chronological periods. Fisher's exact test was selected due to small sample sizes.

Results

*Demographics*

The demographic profile for the two chronological periods, as well as for each site, can be seen in Tables 2 and 3. McIlvaine was able to estimate the sex of 48 skeletons from the pre-Roman period. Of those 48 sexed individuals 40% were female and 60% were male. The Roman period had a similar sex distribution; out of the 36 securely sexed skeletons 44% were female and 56% were male. The age-at-death profile revealed significantly fewer Middle Adults in the Roman period than the pre-Roman period (p= 0.0001). However, 63% of individuals in the Roman period were unable to be accurately aged more specifically than adult (Fox 1999). The small percentage of Middle Adults in the Roman period and the discovery of only two subadults in the pre-Roman period could indicate that the samples are not representative of a living population.

Another important component of analysis is the socioeconomic means of an individual, which can affect and their susceptibility to, and severity of, certain diseases. Potential wealth disparities may be reflected in grave style, therefore burial type was evaluated (Fig. 2)[23]. Grave typology for 24 out of 55 Pre-Roman period graves was accessible through excavation notes; 100% of those

| | | *Female % (n)* | *Male % (n)* | *Indeterminate % (n)* |
|---|---|---|---|---|
| ***Pre-Roman*** | | | | |
| | North Cemetery | 36 (13) | 64 (23) | 0 (0) |
| | Anaploga | 33 (4) | 33 (4) | 34 (4) |
| | Individual Burial | 29 (2) | 28 (2) | 43 (3) |
| | ***Total*** | 34 (19) | 53 (29) | 13 (7) |
| | | | | |
| ***Roman*** | | | | |
| | Northern Cemetery | 24 (12) | 39 (19) | 37 (18) |
| | Anaploga | 50 (2) | 0 (0) | 50 (2) |
| | Individual Burial | 50 (2) | 25 (1) | 25 (1) |
| | ***Total*** | 28 (16) | 35 (20) | 37 (21) |

Table 2. Sex distribution for Corinth, Greece

| | | YA (20-35) % (n) | MA (35-50) % (n) | OA (> 50) % (n) | A age indeterminate % (n) |
|---|---|---|---|---|---|
| *Pre-Roman* | | | | | |
| | North Cemetery | 28 (10) | 42 (15) | 30 (11) | 0 (0) |
| | Anaploga | 25 (3) | 58 (7) | 17 (2) | 0 (0) |
| | Individual Burial | 29 (2) | 57 (4) | 14 (1) | 0 (0) |
| | *Total* | 27 (15) | 48 (26) | 25 (14) | 0 (0) |
| | | | | | |
| *Roman* | | | | | |
| | Northern Cemetery | 10 (5) | 10 (5) | 10 (5) | 70 (34) |
| | Anaploga | 50 (2) | 25 (1) | 0 (0) | 25 (1) |
| | Individual Burial | 50 (2) | 25 (1) | 0 (0) | 25 (1) |
| | *Total* | 16 (9) | 12 (7) | 9 (5) | 63 (36) |

Table 3. Age at death distribution for Corinth, Greece.

graves were sarcophagi. The Roman period showed slightly more diversity; of the 57 tombs 2% were rock-cut tombs, 2% were tile graves, 12% were simple inhumations, and 84% were Roman chamber tombs.[24]

*Physiological Stress Indicators*

CO prevalence decrease from 29% in the pre-Roman period to 7% in the Roman period, a difference that is statistically significant (p= 0.0080). The difference in rates of PH between time periods is also statistically significant (p= 0.0237), decreasing from 13% in the pre-Roman period to 0% in the Roman period. LEH has the largest difference between chronological periods with a decrease from 89% in the pre-Roman period to 21% in the Roman period, which is statistically significant (p= 0.0001). Dental caries frequency also declines in the Roman period, dropping down to 5% from 11% in the pre-Roman period, a result that is also statistically significant (p= 0.0007). Figure 1 presents the comparative data for CO, PH, LEH, and dental caries for both chronological periods. All raw data used in this study is available on the *Chronika* website under "Supplemental Data" (Table 4). Additionally, each chronological period listed in Table 4 was compared for the pre-Roman and Roman periods. Although sample sizes are small, the distribution of frequencies during the pre-Roman period does not suggest significant changes throughout the centuries, though the sample is notably biased toward the Archaic period. Like the pre-Roman period, the Roman period sample size representing each century is small; however, the rates of pathologies appear relatively stable throughout the four centuries.

Discussion

This study found a statistically significant decrease in disease indicators between pre-Roman and Roman period skeletal samples at Corinth suggesting an improvement in overall health. In this section, I will explore two possible explanations for the decrease in disease indicators: (1) Roman rule had an overall positive impact on population health at Corinth; and (2) prior Greco-Macedonian occupation of Corinth may be influencing the results seen during the Roman period. The current evidence points to an improvement in overall health as a result of Roman rule, although social status differences between pre-Roman and Roman samples cannot be ruled out as a factor.[25] Ultimately, I argue that a modification in lifestyle, diet, and/or disease ecology generated by Roman occupation of the site may have been responsible for the marked decrease in physiological stress indicators and the improvement in oral health.

*Roman Rule Had an Overall Positive Impact on Health*

CO, PH, and LEH are physiological stress indicators that can be the consequence of infectious pathogens or malnutrition. The decrease in CO, PH, and LEH frequencies at Corinth therefore suggests that individuals sustained less childhood stress during the Roman period compared to the pre-Roman period.[26] It is possible that changes in infrastructure or food security during the Roman period altered disease ecology, resulting in an improvement in overall health. We must look to the archaeological record for evidence of infrastructural changes that could have altered the previous patterns and processes of disease at Corinth.

While many modifications to Corinth's infrastructure occurred during the Roman period, changes to water transportation, storage, and distribution have the strongest connection to CO, PH, and LEH etiologies. Hemolytic and megaloblastic anemias, two of the most prominent etiologies for CO and PH have been linked to malaria and waterborne pathogens.[27] Possible etiologies for LEH also include consequences of waterborne pathogens, such as dysentery. Given Corinth's water rich environment, the cultural importance water held for ancient Corinthians, and the significant changes to water systems during the Roman period, it is possible that infrastructural changes to water management reduced waterborne pathogens and ultimately decreased the frequencies of CO, PH, and LEH.

The standard procedure during the pre-Roman period at Corinth was to construct fountain houses at natural springs to pool and protect water.[28] This design prevented water from flowing and rendered it stagnant, thereby attracting insects which would increase rates of malaria and create unsterile drinking water. During the Roman period engineers began to focus on maintaining higher quality (smell, sight, taste) water and providing greater access to clean water sources for people of all socioeconomic statuses.[29] With new Roman designs, stagnant water became running water and new spouts increased the circulation of springhouses. The priority placed on constant water flow and regular cleaning of the distribution channels may have decreased the rates of malaria and waterborne pathogens by disturbing insect breeding grounds and the incubation of parasites and bacteria, which can provoke dysentery and can lead to nutrient loss, both of which could lead to anemia and subsequent marrow hypertrophy. By improving the city's water management, Roman rule may have subsequently contributed to the 76% decrease in rates of CO and 100% decrease in PH.

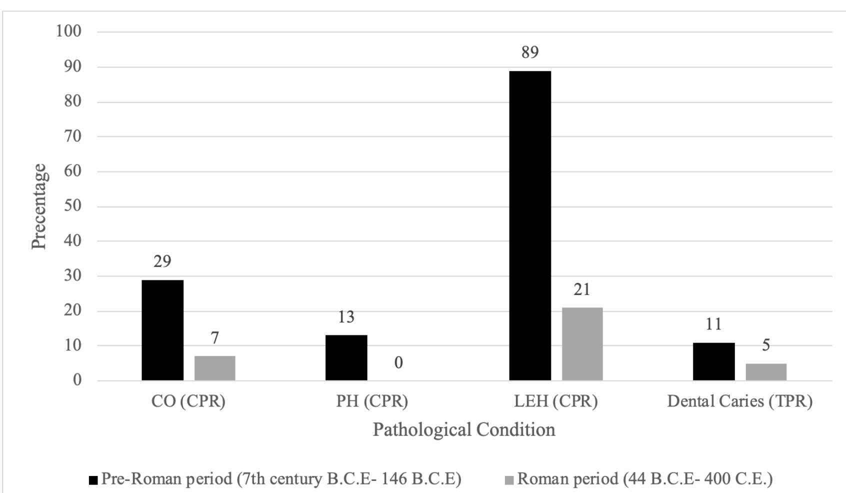


Fig. 1. Frequencies of pathological conditions in adult burial population from Corinth, Greece.

Changes to the infrastructural design of water management at Corinth were not simultaneous but occurred throughout the four centuries of Roman rule in the region. Although the Roman sample in this study has been analyzed as one chronological period, in the course of four centuries, historical, cultural, and environmental circumstances would have evolved. It is therefore important to note that individuals' experiences may have differed greatly throughout the Roman period. However, the paleopathological data suggests that childhood health during the formative years of Roman rule (44 B.C.E. to the end of the 1st century C.E.) was not appreciably better or worse, compared to the later stages of Roman occupation (Table 4). It stands to reason then that infrastructural designs instituted in the early Roman period contributed to improvements in health, with later contributions building upon the healthier foundations previously established.

Progress in water technology and sanitation may have also lowered the rates of LEH, as disease can be an influencing factor; however, malnutrition is among the most common causes of LEH and should not be ignored as a potential factor. It is possible that inhabitants of pre-Roman Corinth experienced greater nutritional stress than their Roman-era counterparts. The archaeological and geological record show strong evidence of severe incident of drought and grain shortages in pre-Roman Corinth.[30] New policies surrounding grain acquisition and distribution implemented during the Roman period may have also contributed to the 76% decrease in frequency of LEH in conjunction with improved water management. For instance, the institution of the *curator annonae*—a prestigious municipal office responsible for procuring adequate food supplies for the city at a reasonable price— likely helped reduce famine and nutritional deficiencies in Roman Corinth.[31] Unlike Pre-Roman Corinth, Roman Corinth had an elected official to raise funds for grain, procure grain supplies for the city, and oversee the distribution of the city's stores.[32] This official designation may have reduced malnutrition within the Roman population. However, the effectiveness of the *curator annonae* is highly debated.[33] Although few epitaphs have been recovered from Corinth, several commemorate *curator annonae* for their contributions to the city.[34] While epitaphs can exaggerate an individual's importance, the repeated reference to the appointment makes it unlikely that the position of *curator annonae* was completely ineffective.

The economic conditions of a city can also impact health, particularly nutritional health. For that reason, another possible factor to consider is the increased prosperity of the Roman city. The increased trade brought by Corinth's status as a Roman *colonia*, and eventually its position as capital of Achaia, likely provided an abundance of goods that would have traveled through ports and trading stations into the region.[35] Increase in trade and access to new resources may have been beneficial for the population at Corinth during the Roman period. Although the inflow of goods would have also brought an increase of merchants and perhaps diseases, the data suggest that the affluence and stability of the city did not negatively impact health; rather, it may have contributed to its improvement.

Additionally, a rise in imported food sources most likely resulted in a more varied diet at Corinth. Not only could well-balanced nutrition decrease rates of LEH within the population, but it would also account for the decrease in dental caries.[36] Less reliance on more cariogenic foods would decrease the frequency and severity of carious lesions. Furthermore, studies have also shown a link between meat consumption and rates of PH; the more meat an individual consumes, the less susceptible they are to PH.[37] The Roman diet relied more heavily on meat than the traditional Greek diet, and Roman expansion resulted in a considerable increase in the meat and livestock trade.[38] It is possible that the influence of Roman dietary customs encouraged Corinthians to consume more meat resulting in a lower frequency of

PH. Although it is conceivable that trade benefited individuals of all social spheres and strata, the degree to which individuals profited was likely unequally distributed within the population.

*Multiple Instances of Colonial Rule at Corinth*

While aspects of the built landscape under Roman rule may account for changes in CO, PH, LEH, and dental caries, we also need to consider the longer-term colonial history at Corinth. Immediately preceding Roman control of the city, Corinth was under Greco-Macedonian rule which calls into question whether the changes in water management and diet associated with Roman rule directly caused the decrease in disease indicators. It is possible that Antigonid occupation during the Hellenistic period at Corinth caused a considerable increase in disease.[39] The precise relationship between Macedonia and Corinth during the Hellenistic period is obscured by minimal archeological evidence. Nonetheless, the fight for power after Alexander the Great's death (323 B.C.E.) is likely to have negatively affected the city. Perhaps Roman rule was simply less oppressive than Antigonid rule and improved health was not a direct effect of Roman rule, but rather a byproduct of the removal of Greco-Macedonian control over Corinth. Yet, the struggle for control lasted only twenty years, ending in 303 B.C.E. when Demetrios Poliorketes seized power in Corinth. Although the pathological data employed in this study lack the ability to securely separate out Greco-Macedonian remains from those of the late Classical period, the available data do not point toward a uniform increase in disease indicators during the Hellenistic period (Table 4). Nevertheless, observations for childhood stress indicators are limited to three individuals during this time period, underscoring the need for larger, temporally specific samples. Additionally, Michael Dixon's historical account of Hellenistic Corinth has called into question the degree of oppression Corinthians suffered during Antigonid rule.[40] According to Dixon, there is no evidence that Corinthians were taxed or compelled to finance the garrison's presence on Acrocorinth, or that Macedonian rule infringed greatly upon Corinthian autonomy and freedom.[41] In fact, he argues that Greco-Macedonian rule provided Corinth with protection, stability, and security. However, there has been limited work published on Hellenistic Corinth; more evidence may be needed to shed light on the experiences of individuals during the Antigonid occupation. Future bioarchaeological studies should make use of radiocarbon dating, which will grant greater chronological control and allow researchers to investigate the effects of multiple colonial processes at Corinth.[42]

*Chronological Representation within the Sample*

Another factor related to sample composition that may be driving the observed results concerns uneven chronological representation. The pre-Roman period sample consists of 55 skeletal individuals, and of those, 63% date to the Archaic period. This bias towards the Archaic period in the sample could be affecting the comparative results between the pre-Roman and Roman periods. Although sample sizes in this study are small for the Classical and Hellenistic periods, the paleopathological data do not suggest that childhood health during the Archaic period ($7^{th}$ century-$6^{th}$ century B.C.E.) was better or worse, compared to the Classical and Hellenistic periods at Corinth (Table 4). In fact, from an epidemiological perspective, we might expect childhood health during the Archaic period to have been better than the later Classical era. The majority of local citizens in Archaic Corinth remained subsistence agriculturalists and pastoralists, rather than city dwellers; less densely populated areas would lessen and slow the spread of disease and living conditions may have been more sanitary in less populated spaces.[43]

With regards to dental health, 67% of the teeth analyzed in the pre-Roman sample belonged to individuals from the Archaic period. There is no statistically significant difference between the rates of carious lesions between the Archaic period and the Classical or Late Classical/ Early Hellenistic periods (Table 4). There is, however, a significant difference between the Archaic period (12%) and the Hellenistic period (38%) ($p = 0.0041$), which might suggest the later adoption of more cariogenic foods. There is also a significant difference between the Late Classical/ Early Hellenistic periods (2%) and the Hellenistic period (38%). Ultimately, these results are based on relatively few individuals recovered from the post-Archaic, pre-Roman period, cautioning against the over-interpretation of these changes as broader social shifts in diet and underscoring the need for larger samples with which to address these questions.

Broader Implications for Studies of Colonial Contact

As the above discussions have suggested, this case study, although examining a bioarchaeological approach to Romanization, has wider implications for studies of colonialization. Bioarchaeological research on colonial processes has predominantly shown an increase in physiological stress indicators and worsening oral health in colonized populations.[44] These results have often unintentionally reinforced the notion of a dominant ‘colonizer’ and a passive or submissive ‘native’ population. These findings inadvertently reduce individuals to cultural and political label of either/or, limiting academic interpretations to one over-simplified perspective. In contrast to previous studies examining health in colonial contexts, disease frequencies at Corinth declined.[45] The results of this study demonstrate that health does not respond uniformly to instances of colonial rule. In fact, the low rates of disease indicators at Roman period Corinth suggest that the effects and form of even one colonial regime appear to have varied widely across the Empire.[46] The emerging portrait of health under Roman rule is a mosaic, demonstrating that one model or theory cannot be applied to all Roman sites. The inter-regional comparison between Corinth and other sites of Roman colonization serves as a reminder that colonial experiences are unique to each site and do not conform to previously constructed ideals of colonizer/ native binaries. This paper therefore provides opportunities for future researchers to ask more nuanced questions regarding the diversity of colonial experiences and to rethink problematic assumptions associated with the colonizer and native paradigms used across regional disciplines.

Conclusion

Bioarchaeological data from Corinth indicate that the frequencies of disease indicators decreased in the centuries following Roman colonization of the city. The Roman sample exhibited lower rates of cribra orbitalia, porotic hyperostosis, linear enamel hypoplasia, and dental caries, suggesting a marked change in disease ecology. The overall decrease in physiological stress indicators during the Roman period may be explained by advancements in water storage and distribution, better sanitation, government positions specifically designed to reduce famine, and increased economic opportunities that came with the Roman colonization of Corinth. However, the possibility remains that the large quantity of chamber tombs in the Roman period, a potential indicator of higher socioeconomic standing, may be a factor influencing the frequencies of pathological indicators.[47] By revealing an improvement in overall health after a colonial event, this study exposes the diversity of colonial experiences and invites future research to examine the unique nature of colonial processes.

Endnotes:

1 Haverfield 1915; Millett 1990; Collingwood 1932. Colonialism is defined in this paper as foreign control over a society with an imbalance of power and the process of social and cultural transformation as a result of these interactions (Dietler 2010, 15-17).
2 Versluys 2012; Ferris et al. 2014; Silliman 2016; Van Oyen 2017.
3 Terrenato 2005; Wallace-Hadrill 2008. *Colonia/ Coloniae* is an emic Latin term, referring to a Roman ruled city outside of Rome itself (Romano 2013, 253). The term also has political and legal implications. Roman law was typically instituted at a *colonia,* whereas other designations, such as a *municipium,* retained more of its own law and governing structure (Purcell 2012). Although the English word colony derives from the Latin *colonia*, modern definitions of a colony lack the political and legal distinctions associated with Roman *coloniae*. Therefore, the contemporary term colony will be used in this paper.
4 MacKinnon 2007; Sperduti et al. 2018; Killgrove 2018.
5 Fox 1997; McIlvaine 2012. Recent research suggests occupation of the site did not cease after the sack (Wiseman 1979, 491-96; James 2014). Therefore, it is possible that some graves could date to the period between Mummius' sack and the founding of the *colonia*, despite being recorded as early Roman. More precise chronologies would be necessary to intervene in this debate.
6 For a history of colonization in Corinth see Dixon 2014; For Roman sack and control of the city see Paus 2.1.2; Strabo 8.6.23; Cicero 4.5.4; Wiseman 1979, 450-462; Engels 1990; Alcock 1993; Walbank 1997, 97-98; Romano 2003, 279-280; Romano 2005; Pettegrew 2007; Millis 2010; Robinson 2013; James 2014; Lepinski 2015; Frey 2015.
7 Fox 1997; McIlvaine 2012.
8 1994.
9 Fox 1997; McIlvaine 2012. For an explanation of age estimation techniques, see Nikita 2017, 135-174.
10 While subadult remains were excavated and analyzed for pathological indicators, the sample size for the pre-Roman population (N= 2) was too small for statistical analysis; therefore, subadult populations were excluded from this study.
11 Steckel and Rose, 2002; Roberts and Cox, 2003; Belcastro et al. 2007; Redfern 2007, 2008; Redfern and DeWitte 2011.
12 Larsen 2015, 41; Roberts and Manchester 2005, 75.
13 Angel 1966; Walker et al. 2009.
14 Goodman and Martin 2002.
15 Guatelli-Steinburg and Lukacs 1999.
16 Guatelli-Steinburg and Lukacs 1999.
17 Goodman and Rose 1990; King et al. 2005.
18 Hillson 1998; Erdal and Duyar 1999; Hillson 2001; Hillson 2208; Lukacs 2012.
19 Fox 1997; McIlvaine 2012.
20 Fox 1997; McIlvaine 2012.
21 Crude prevalence rate (CPR) is equal to the number of individuals exhibiting the condition (n) divided by the number of individuals examined (N) X 100.
22 True prevalence rate (TPR) is the number of teeth affected (n) divided by the number of teeth examined (N) x 100.
23 This figure, as well as other supplemental materials, are available on the Chronika website at http://www.chronikajournal.com/.
24 ASCSA; Corinth XIII; Corinth XXI.
25 One alternative explanation for the changes in disease frequencies found at Corinth is the potential unequal distribution of "elite" individuals between the pre-Roman and Roman samples. To test if "wealth" disparities may be driving patterns in the data, pathological frequencies were compared by burial type for a subset of the sample where burial architecture could be identified in excavation notes (see Table 5, online supplemental data). While it remains possible that the changes in disease frequencies at Corinth are the result of sample bias, the data are not unambiguous in this regard. However, the absence of a statistically significant difference in physiological stress indicators between tomb types does not necessarily assure that there is no meaningful difference in health outcomes between individuals of varying social strata.
26 Although subadult frequencies are not discussed in this paper, juvenile frequencies for both the pre-Roman and Roman periods show low rates of CO, PH, and LEH (see Table 4, online supplemental data). During the Roman period, 7% of subadults (2/29) showed evidence of CO. 0% (0/29) of subadults presented with PH and 0% (0/29) of juveniles had LEH. This indicates that rates of childhood stress were quite low during the Roman period.
27 Walker et al. 2009; Zuckerman et al. 2016; 44. Malaria was endemic at Corinth until after World War I (Corinth XXI, 236).
28 Robinson 2013.
29 Landon 2003; Robinson 2013.
30 Camp 1982; Garnsey 1998, 150-164; Montgomery 1986, 463-61; Tracey 1995, 30-36; Dixon 2014, 33-36.
31 Engels 1990.
32 Garnsey and Saller 2014, 214
33 Engels 1990.
34 Ibita 2016, 36.
35 Alcock 1993, 160.
36 LEH may also form on teeth developed prior to weaning. It is possible then, that more varied imports did not *directly* improve childhood diet at Roman Corinth, but perhaps *indirectly* impacted childhood health through the diet of the breastfeeding mother.
37 Stuart-Macadam and Kent 1992.
38 Kron 2002; 2008a; 2008b.
39 The Hellenistic period in Corinth is referring to the time between Alexander's death in 323 B.C.E. and end of Antigonid occupation of Corinth in 196 B.C.E.
40 2014.
41 21-22.
42 Corinth's history of colonial experiences also raises new questions: how do we approach regions which have experienced "nesting doll imperialism"? That

is to say, how might several occurrences of colonial rule, particularly one immediately following the previous, affect how we interpret changes in health? By simplifying regional studies to one colonial process, we ignore how past histories mold the future. Antigonid control over Corinth prior to Roman rule may alter how people were affected by and reacted to the next colonial experience. Resistance may manifest itself differently after repeated experiences of colonial rule, identities may be negotiated unconventionally given the influence of multiple cultural and political systems, and health may be uniquely embodied under the changing social and physical conditions; therefore, we cannot simply examine these colonial rules in isolation, as they did not occur in isolation from one another. We must consider the impact previous imperialist events have had on the experiences of the people we seek to understand. Understanding the data within the context of Corinth's entire history will improve interpretations and allow for a more nuanced discussion of the potential impact colonial processes have on a site and its people.

43 Gwynn 1918, 89 and 93; Angel 1972; Pomeroy et al. 2004.

44 Verano and Ubelaker 1992; Larsen and Milner 1994; Larsen et al. 2001; Littleton 2005; Buzon and Richman 2007; Klaus and Tam 2009; Spielmann et al. 2009; Murphy and Klaus 20017.

45 As this study gives us one piece of the diverse portrait of Roman colonization, it is valuable to compare the results from Corinth in relation to previous studies from other Roman provincial sites. Peck (2009) analyzed skeletons from Rudston, Burton Fleming, Garton Station, and Kirkbur, in the Northeast of Britain; Redfern and DeWitte (2011) published an overall health analysis of Roman Dorset. All three studies produced very distinct results, showcasing the local and regional diversity of colonial experiences and Roman rule (see Figure 3, online supplemental data).

46 See Peck 2009; Redfern and DeWitte 2011.

47 Flamig 2007, 109-110.

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