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The Body: Human Remains and Gender Relationships Throughout Medieval Ireland

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Abstract

This research explores the conception of the body in archaeology as an entity formed from biological, historical, and cultural processes. This approach to the body avoids the pitfalls of universalizing static forms of identity and justifying hierarchies based on identities such as race and sex. The body as a cross-section of biology and culture can additionally inform biological anthropologists about the values and activities of the people in the past and present. The usefulness and effectiveness of the biological and cultural body in medieval Ireland using the health indicators of osteological remains is explored in this project. This research looks at various early medieval cemeteries and compares them to two prominent late medieval sites, Ballyhanna and Ardreigh, to understand gender relationships across the medieval period and throughout the Anglo-Norman colonization of Ireland. This research starts by exploring conceptions of the body in philosophy and biological anthropology and subsequently centers these theories in conversations with sex and gender. A brief summary of medieval Ireland and literary ideas of women in the early medieval period is included for reference. The methods section follows to explain the health indicators used for analysis. The data from the early and late medieval periods are laid out separately and then compared in the final conclusions to assess gender relationships by region and through time. The bodies as cultural and biological entities depict males and females of about equal status but participating in a division of labor and activity throughout medieval Ireland and even in the advent of colonization.

Bioarchaeology Theory

The body is not a topic raised often enough even though we exist as bodies. Phrases such as “my body is tired but my mind is racing” when describing an attempt to fall asleep or “mind over body” when people are working out are used often. The example of “mind over body” claims that the body responds to the mind and is in a sense subject to the demands of a separate

mind. These everyday statements about oneself assume a divide between one's mind and body. Rene Descartes is a point of origin for viewing the mind and body as separate entities. Descartes aimed to find knowledge or truth that could not be doubted by rejecting anything that could be false. He concludes that he cannot know anything from his senses, the world around him, or even if his thoughts about the world are real because they can be doubted (Cress 1998). For example, the senses deceive us all the time like when water appears to be on the road but is, in fact, heat on the pavement. Another example is dreaming, where experiences are not real despite feeling real. Therefore, anything that is physical must be doubted, even the physical body. Despite the physical world being doubtable, it can not be doubted that he is doubting. So, he cannot conclude anything other than that he is a doubting, thinking, being which gives rise to his famous line, "I think therefore I am" (Cress 1998). Just like the other physical and material things, the body cannot be known because he may be imagining it, dreaming about it, or being tricked into thinking that it exists (Ibid.). The mind is the component of the being that thinks, while the body cannot and therefore cannot be known to be real. Due to the unquestionable concept of the mind as a thinking thing and the doubtable or unknown state of the body, they must be taken as distinct entities. In other words, it is conceivable to think of the mind as separate from the body, so they must be two distinct entities. The body is perceived then as a remote-controlled object to which the mind sends signals.

From Cartesian mind/body dualism, a variety of dichotomies in anthropology and archaeology emerge, such as between living/dead, interpretive anthropology/bioarchaeology, and therefore, culture/biology (Sofaer 2006). Mind/body dualism maps onto the living and dead body quite easily; the dead body is considered to be an object and the living body is associated with the mind. The biological death of a person can be understood as them ceasing to be (Hallam et al.

1999). Their mind has left and only the biological body remains as a sort of husk (Sofaer 2006). The living individual is identified as 'subject' or mind and has influence and impact as a social being. The dead body or husk is simply an object that is natural or purely biological. The dead body and skeletal remains have "come to be identified as a residual biological object of nature to be investigated and observed by means of scientific paradigms" (Sofaer 2006). This conception of the body reiterates the body as a machine or a remote-controlled object, making the body a static and unchanging object that is simply inhabited or empty by the mind (Ibid.). The body then becomes a topic only of biology and is studied as such, while the living body with the mind becomes the topic of culture following the properties of Cartesian dualism (Ibid.)

Mind/body and the dead/alive body fall into two distinct areas of study, bioarchaeology and interpretive anthropology, furthering the effect of Cartesian dichotomies. Bioarchaeology studies just the 'biological' components of the dead body that can identify the age, sex, race, and other characteristics of an individual (Sofaer 2006). Due to the conception of the dead body being static and simply natural, interpretive anthropology focuses on artifacts like grave goods and other components like the placement of the body in a grave to access the 'mind' and 'cultural' of a dead population. Bioarchaeological reports are treated as the background data for the 'real' cultural analysis which occurs through looking at grave goods or other artifacts (Ibid.).

Through the dichotomies stemming from Cartesian dualism of dead/alive body and interpretive anthropology/bioarchaeology, culture and biology become dualistic. Bioarchaeological work investigates the body as a natural and biological entity devoid of culture in itself, making the body synonymous with nature (Sofaer 2006). On the other hand, interpretive anthropology studies the alive body or 'mind' through artifacts which animates the body and become equated to culture. After all, it is challenging to imagine the static material body creating

culture. The mind is inscribed or layered on top of the body (Meskell 2002). Culture is then just the layering of paint on an already-constructed, static, house, the body. These misunderstandings of the body are again possible because the mind and body are conceived of as distinct. Bioarchaeology and the dead body are biological, while the living body–animated by a mind or soul–and anthropology are cultural.

Conceptualizing the body as simply biological and static in this Cartesian sense naturalizes specific forms of identity, like race, and the hierarchies into which these identities are organized. In early bioarchaeology, Black[1] and white crania were studied in the United States. Black and white bodies in America were then compared, with white bodies being the normal standard (Blakey 2001). The data showed a general trend that Black skulls had different dimensions than white. The measurements were used to create a ranked system with whiteness on the top and Blackness on the bottom. Specifically, those of African descent were considered mentally inferior based on their biological skull shape (Ibid.). Bioarchaeological data was thus used to give grounds for segregation, colonialism, eugenics, and class (Ibid.). The data and ranking systems were taken as a standalone fact, erasing or obscuring the historical and cultural processes that make hierarchy based on race a natural fact (Ibid.). When handling studies of race, craniometric data was taken as a biological study of race with no concern for cultural history (Blakey 2001; Martin et al. 2013). The Black and white bodies were taken as purely biological bodies which caused a static form of each identity and from this, hierarchical systems were constructed.

In response, diaspora studies focused on subjects such as Black history, literature, poetry, and music giving primacy to the mind. Specifically, important topics such as slavery and

[1] Black with a capital 'B' is used in this research to refer to Americans with African ancestry following the transition to give the Black community validity as an ethnic community instead of a racial category much like the category of 'Hispanic'.

segregation were explored through mostly documents written by those who were experiencing the atrocities (Blakey 2001). The exploration of Black culture was a major step forward because it began to explain that the cultural context of the body was historical. Diaspora studies gave cultural evidence for the segregation and oppression of Black individuals in America and, therefore, animated the body by depicting 'mind' and culture in the Black experience. However, diaspora studies are in turn perpetuating the Cartesian dichotomies by understanding the body as inanimate and inscribed by culture. The body is not honored as a significant piece of information but rather is the house for the important information to be painted on. When culture and biology are dealt with separately, either the differences between Black and white bodies give rise to racial categories that can be organized hierarchically or the inscribed culture is given priority over the biology of the body. Effectively, either biology or culture tend to gain primacy in explaining identity but neither are achieving the full picture.

When T.W. Todd and Montegue Cobb analyzed the crania from different races, they accounted for both the empirical biology and historical context within which these bodies existed, bridging the divide between biology and culture (1930; 1939; Blakey 2001). They found that the crania from Black bodies were heavily impacted by the environment of slavery and colonialism. The differences between Black and white crania were present because of natural and cultural processes. Neither the idea of simply a stable and stagnant Black body nor only a cultural history could explain the causes of different cranial shapes and sizes. Instead, the Black body is a material entity shaped by history and biology. This approach breaks from Cartesian dualism and inscription because it understands the body as an active cultural and historical process that can explain the shape differences in crania and ends the perpetuation of biology as a tool for hierarchy creation. Only when the body serves as an intersection between biology and

culture could the “high adaptability of the African Americans against the adversities of slavery and racial segregation” be understood (Cobb 1939). The body as a cross-section of both culture and biology or mind and body not only addresses the issues of the Black crania but also adds to the understanding of the Black experience.

The body is the cross-section of cultural and biological or what Joanna Sofaer calls materiality (2006). However, the centuries of misunderstanding the body in a Cartesian way fuel racist and sexist ideas of the body but are exceptionally challenging to escape due to their pervasive nature. To avoid falling back into Cartesian dualism is challenging because the perceptions of the body have been around for around 350 years (Ibid.). Sofaer provides a way to climb out of the dichotomy of Cartesian dualism by understanding the materiality of bodies (2006). The ways we organize our world changes how our body interacts with it, like slavery’s impact on the Black cranium. The change was because of the biological response of the body making it neither a stagnant unchanging object nor simply inscribed with culture. The crania change was from the biological response and a response to a cultural phenomenon, slavery. After cross-cultural analysis of the human body in Sofaerian bioarchaeology, the body is understood not as a fixed entity decided by nature, but changes based on diet, daily activities, ecology, and other lifeways are the body (Larsen 2000; Sofaer 2006; Martin et al. 2013). “The environment in which a person learns to become an adult member of society often irreversibly transforms the physical body to fulfill the suitable social role” and continues to change throughout adulthood (Wesp, 2017). Therefore archaeologists can learn how past people from entirely different environments understood complex concepts such as gender and race (Wesp 2017). Furthermore, not considering the body as biological and cultural leads to ahistorical conclusions such as Black individuals being inferior intellectually to white bodies.

The dead body has agency and its living identity does not disappear in death making it not dissimilar to the living body. The dead and alive bodies are depicted as separate entities stemming from Cartesian ideology. However, Sofaer argues a dead body continues to have social significance through their body after death and, therefore, has agency (Sofaer 2006). For example, in the case of funerals, the dead body is still actively influencing the activities of the living (Harre 1991). There are many cases where the corpse or death is manipulated to influence the political state of the living (Hallam et al. 1999). Additionally, the social influence of a dead individual is perpetuated through memory and continues to create ripples in the lives of the living (Harre 1991). The body that is constructed in life through biological processes also does not disappear in death (Soafer 2006). As mentioned above, the body adapts to its environment and these bodily changes do not vanish with the onset of death. In this case, the dead body maintains the events, states, and social structures of a person's life, which can inform archaeologists of social practices. The dead body is not altogether different from a living body in that it has agency and reflects experiences in life.

Bodies are at the center of human meaning creation as well as biological processes. They should not be understood outside of biological, historical, and cultural contexts (Sofaer 2006; Larsen 2015). Cultural meaningscapes created and perpetuated by people are accessible through the skeleton because the ways humans interact with their ecology changes the body which remains a part of their body in death. On the contrary, bodies are biological in that they are corporeal and physical processes. Focusing on one, either culture in the body or biology in the body, is not sufficient to explain how they inhabit the world. The human body is the central axis for observing the interwoven nature and culture into material substance.

Gender Theory

Sex and gender, much like race, have been viewed in a Cartesian way. Both have been viewed as separate entities with no bearing on one another. Sex corresponded with the objective, static and dead body and gender as a cultural ideology and practice (Sofaer 2006). Sex, similar to race, was defined by static cranial and pelvic shapes through early bioarchaeology which gave grounding for sexist hierarchical structures. The emergence of women's studies that articulated and prioritized the cultural components of gender followed these assessments. While beneficial for understanding the historical and cultural processes that produce gender, gender studies failed to give primacy to the body by focusing on the inscription on the body much like diaspora studies. Again, as with race, the sexed and gendered body can only be understood as the materiality of biology and culture interwoven within the body. Sex and gender are culturally and biologically contextual experiences created throughout history and are incorporated into the living body which are retained in death.

Early archaeologists treated sex in a Cartesian way. Sex was considered the body and was categorized by chromosomes, hormones, sexual organs, and most relevant to archaeology, bone structure. The XX chromosome is associated with women, and the XY is associated with men (Sofaer 2006; Joyce 2008). Hormone levels are another mode of sexing the bodies in the contemporary West with males being associated with testosterone and females with estrogen. Other categorizations of male and female are often simplified into vagina, uterus, and breasts or penis and testicles (Ibid.). Genitalia are not commonly present on human remains so archaeologists resort to bone structure. The archaeological method for sexing a body is measuring the pelvis and cranium of males and females (Stone and Walrath 2006).

From these assessments of sex, early bioarchaeologists assumed that the sex categories and sex hierarchies were universal, not much unlike the conclusions from Black and white

cranium. The pelvis was used to show that females were less adept at managing bipedal movements because of the biological compromise between childbirth and walking (Ibid.). The pelvis was thought to be pulled into these two different directions making female bodies incompetent at both walking and childbirth (Ibid.). Again, very similar to the assessments of the Black craniums and concluding Black individuals were mentally inferior. Using this sex data it was concluded that females, who are perceived as physically weaker and subject to a reproduction strategy that left them open to exploitation, end up at the bottom of the hierarchy with strong and protective men at the top (Stone and Walrath 2006; Joyce 2008). From these conclusions, it was assumed that women were associated with the domestic world and men with the public world of politics, economics, and social relationships (Joyce 2008). Man the hunter and woman the gathering cook (Wrangham 2010). Male archaeologists did not study the female 'world' of domestic labor so intensely because it was perceived as interesting and more consistent. Additionally, the 'male' artifacts, such as tools, currency, and animal bones were preserved more often than 'female' artifacts, such as organic food goods and clothing (Joyce 2008). The 'male' artifacts were simply more accessible because they were better preserved and a 'bigger contribution' to society. Women were located when archaeologists found cooking materials, organic matter, clothing, and other goods associated with the domestic realm. The Cartesian body as a static machine is reflected in this conception because sex simply exists as an unchanging biological entity and again leads to universal conclusions about women and the hierarchical position in which they fall.

Women's studies emerged as a way to show the diversity in gendered experiences but in doing so gave primacy to only culture, ignoring the biological body. Women's studies permeated many fields such as philosophy, anthropology, archaeology, etc., and today most areas of

disciplines have contributed to the study of women. In this process, women's studies moved away from the sharp binary of men as political and economic and women as domestic laborers toward a fluid conception of gender. A primary first major step in moving away from the innate gender divide was Judith Butler's performance theory. Butler argued that gender is constructed through performance (2006). Men, women, and other are made because of their actions, mannerisms, appearance, repetitive actions and rituals. Gender does not innately exist but is created in the act of 'doing' gender (Butler 2006). Performance theory allows for more fluidity in how men and women interact with the world, detaching men from the public and women from the domestic. Just because they are males and females, does not mean they are inevitably tied to domestic labor. There are many ways of doing gender (Ibid.). Whether regarding women as part of the domestic realm or capable of performing many types of 'woman,' neither give reference to the body as having any bearing or relationship to culture and is therefore dualistic in nature. The body is still a static object in which gender is inscribed upon using clothing, rituals, and actions and is, therefore, still reflective of the Cartesian mind and culture.

Women's studies in the fields of anthropology and archaeology focus on the many cultures, past and present, that have different conceptions for what it means to be a gendered person. For example, the Greeks believed that women were simply underdeveloped men and fell into the same category as young men, therefore not receiving their own category of 'woman' (Joyce 2008). As archaeologists or historians, it is viewed as inaccurate to impose the western concept of 'woman' onto this cultural group. To do so, would not only be incorrect, but would limit the diversity of the human experience and fluidity of gender. Another example of gender diversity from the indigenous American groups provides evidence for more than two genders. In Indigenous American groups, certain males and females partake in the opposite sex's labor

(Joyce 2008; Schmidt 2001; Schmidt and Vos 2005) These people are considered religious leaders and to fluctuate between genders is considered difficult. However, to call these males that become females or females that become males, transgender is additionally reductive. In the West, there are two categories within which individuals fall and to go from one to the other is considered relatively permanent. To use this conception of transgender in another context is equally reductive. The indigenous groups do not necessarily start with two categories that can be switched between because this fluid gendered category is a category within itself (Schmit and Vos 2005). Additionally, there are many lengths of time that an indigenous person can act as another gender. For example, this may be for a single ceremony, for a portion of their life or for the entirety of their life (Ibid.). A better word category may be third gender to describe these people because they are not male, female, or trangender (Ibid.). Instead of attempting to superimpose these categories of man and woman, prominent anthropologists like Rosemary Joyce argue that archaeologists and anthropologists should look at how the culture articulates and expresses gender within their context (2008). At this point, women's studies provide evidence for a variety of gendered experiences in contradiction to the previously stagnant and universal claims. It is still a cultural practice with no reference to the physical body much like diaspora studies and race or Descartes' mind/body dichotomy with special focus on mind.

Women's studies continued to foster the concept of a diverse set of gendered experiences with the introduction of intersectionality which is used to help better understand the construction of culturally situated gender while still largely avoiding topics of the biological body. Intersectionality was introduced by theorists such as W. E. D Debois, Patricia Hill Collins, and many more, but the term was coined by Kimberle Crenshaw. Intersectionality is the theory that people experience the world through the interconnection between multiple identities such as

race, religion, socioeconomic status, sex, gender, sexuality, age, ability, etc (Crenshaw 2019; Springate 2020; Spencer-Wood and Trunzo 2022). Instead of a Black woman experiencing the world as a Black individual and a woman, she experiences it as a Black woman which is different from a Black man, white women, and other women of color. These identities are interlocked and indivisible (Crenshaw 2019). For example, In the Mayan culture, social class measured status and power (Ibid.) In different social classes or identity groups the concept of gender can change drastically. The wealthy or elites may have strict gender rules to control the power through posterity–like when a king needs an heir to be biologically his, he may control his wife's reproduction. On the other hand, lower classes may barely consider gender because they do not need to control posterity for inheritance purposes. Gender manifests in many different ways not only between cultures but within them because intersectional identities manifest different experiences. Intersectionality exposes further that there is no universal way to be a woman and to be a woman is not independent of all other intertwined identities. Using intersectionality, it is possible that people have many identities but in different contexts certain identities may be more important or not important at all (Joyce 2008). Returning to the example of the Black woman's experience, she may be around other black individuals and, therefore, the most distinguishing quality is that she is a woman. While, in a completely white female community, say a largely white sorority, her race may hold more significance in distinguishing her. Other societies may pull to the forefront different distinguishing qualities. Again, gender is being defined as cultural but constructively fluid.

Women's studies in the field of archaeology also indicate that cultures may prioritize alternative identities such as class, age, ethnicity, religious affiliation, type of body decoration, etc., instead gender (Joyce 2008; Schmidt and Voss 2005). For example, Tlatilco grave goods are

often placed in young individuals' graves while the older individuals typically receive fewer (Joyce 2008). There is a greater emphasis and celebration of the younger people likely because the youth were married to other young individuals to serve as the bridge between families (Joyce 2008). For them to die, a potential and significant tie would be destroyed making age a prioritized characteristic while gender is not. Women's studies provided the groundwork for a culturally and historically contextual form of gender much like the experience of race in diaspora studies. However, the sex and gender assigned to body and mind are still conceived of as separate entities, with women's studies giving primacy to gender and culture.

When women's studies do interact with sex, there is an attempt to invalidate sex. Specifically chromosomes, hormones, sexual organs, and bone structure are utilized as common exceptions and evidence for a non-universal experience of sex. Similar to the argument for gender. There are many chromosomes that do not fall into the two categories of XX and XY such as XXY (Joyce 2008; Sofaer 2006). While differing chromosomes are the exception and not the rule, these hormone combinations are common enough to be represented in almost every society (Ibid.). Hormones are also diverse across our species and vary significantly between individuals of the same sex and of different sexes (Ibid.). These hormonal balances are even more diverse when accounting for age because they change significantly throughout an individual's lifetime. Hormone changes can be extreme enough that males can have significantly more estrogen than females and vice versa (Ibid.). Instead of a dualistic system of hormonal levels, they are understood as running along a continuum across our species and even within an individual throughout their life. Sexual organs can be quite diverse as well with some intersex individuals having a mixture of typically male and female parts in many different combinations. These cases are also common enough to have existed in every society and are not innately unhealthy or

harmed by being intersex (Ibid.). Here, gender studies are writing off sex as a true indicator by pointing out its variability. While talking about chromosomes and sex organs may appear as making sex and the body less static and mechanical, variation in sex simply points out that it occurs in the biological body, not that the body is a culmination of biology and culture. In doing so, women's studies argue that culture takes precedence. Therefore, these examples are still largely dependent on Cartesian dualism with sex as statically variable.

Historically, women's studies, whether in archaeology or other fields, tend to disregard sex and biology, instead of employing sex and the body as reflective of the sex and gender systems in which a body exists. Gender is not grounded in biology while biology and studies of sex typically do not make gestures towards gender. Gender floats aimlessly without grounding and sex is not historically and culturally contextualized. In other words, Cartesian dualism strikes again. Neither can fully explain the experience of a sexed or gendered person because precedence is either given to biology or culture. Sofaer's approach can solve this sex and gender dichotomy by viewing both as interwoven in the body (2006). Differences in cranium and pelvis measurements, chromosomes, sex organs, and hormones do exist in the body and these processes are a culmination of both sex and gender or biology and culture (Ibid.). An example of this is foot binding. The anatomy, shape, and appearance of the foot is visible in the bones long after the individual is no longer living (Ibid.). Foot binding is a material expression of culture and biology that can illustrate a human practice. In this particular case, women are the ones having their feet bound and, therefore, a practice that constructs gender (Joyce 2006; Sofaer 2008). Gender then exists in a material expression in a permanent way on the body and the body responds to these cultural processes. The body is *being sexed* rather than *is sex* and the body is *being gendered* not *is gender* through biology and culture. Viewing the body as a culmination escapes Cartesian

dualism because it does not divide biology into the body and culture into the artifacts, grave goods, or literary accounts. Culture is not inscribed onto the body because the changes in bone morphology such as pathology are the bones responding to culture. Therefore, these morphologies or biological processes become an inseparable part of culture. The body 'talks' back and cannot be viewed as an inanimate machine. Biology responds to culture and then becomes itself part of culture. Just like the differences between Black and white skulls in America, the body has responded to a cultural phenomenon, but the skull morphology is also now part of what it is to be Black or white. The body is constructed by its ecology–cultural, historical, biological, and physical ecology–and is both sex and gender simultaneously interwoven.

The body as both biology and culture is not just a theoretical approach, but empirical. Sex identification is one component of understanding sex and gender creation in the past, but to only look at this would be falling back into the Cartesian conception of a static body. Instead, the body requires a more robust approach. The changes and morphology of the biological body structure and restructure sex and gender. As mentioned above, the body is malleable and impacted by the life course of the person and their culture. The body responds to the body's activities and therefore, the creation of sex and gender can be observed. The people of the past actively constructed culture into their biology and observations concerning the living social structure can be identified through these morphological changes. The body is both sex and gender like it is both biology and culture. The dead body, like the living body, is formed materially through both biological and cultural processes.

Medieval Ireland Overview

A brief historical account of medieval Ireland serves to contextualize the landscape that the Irish were navigating. This is in no way a complete account of the historical context of medieval Ireland but lays out the major political changes throughout Ireland. Specifically, it gives insight into a simplified view of the Anglo-Norman colonization to give a deeper grounding for this research's conclusions.

The early medieval period in Ireland starts in the fifth century and continues until the twelfth century. Ireland is both Christian and pagan with little apparent divide between the secular and sacred (Barlett 2010). Monasteries were the main structure of Irish culture. "Piety, manuscript production and Latin scholarship was unsurpassed" and monasteries promoted learning, piety, and scholarship wherever they were and where monks went (Barlett 2010). Half a million people are projected to have inhabited the island with 185 kingdoms spread throughout (Ibid.). These kingdoms were not just controlled by kinds but by poets, clergy, scholars, lawyers, judges, and other high-status professions (Ibid.). The upper class lived in crannogs and ringforts with all echelons of society ever-present. Relationships between all classes and allying kingdoms formed social interdependence (Ibid.). Subsistence, agriculture, and hierarchy were not unrelated, with the size of a group or individual's cattle herd representing status. They were a largely agrarian society that grew barley, wheat, and millet were their primary sustenance. Ireland had relative cultural homogeneity in religion, class systems, and old Irish as a shared unitary language (Ibid.).

The Vikings became an impactful component in Irish politics from the eighth to eleventh centuries onward (Barlett 2010). They began by attacking coastal towns and then worked further inland where they constructed more permanent settlements (Ibid.). In the early days, they would steal the vast amount of wealth in churches and monasteries as well as women while also

slaughtering people as they went. Records show that the Vikings may have been trading as often as they were sacking the cities while also participating in intermarriage with the Irish population. While the influence of the Vikings reverberated through Ireland, it did not cause the Irish to unify or create central defenses like were caused in England.

The late medieval period is marked by the invasion of Ireland by the Anglo-Normans in the 12th century. The Anglo-Normans successfully took over Wexford, Waterford, and Dublin and built a castle in Dublin effectively creating an administrative structure with English common law (Bartlett 2010). The Irish did not respond to this invasion with much force since many Irish people were working with the Anglo-Normans.

However, from the onset, Englishness was depicted in contrast with Irishness. The Anglo-Normans never called themselves Irish, unlike the Normans who quickly referred to themselves as English after their invasion of England (Bartlett 2010). The Anglo-Normans depicted the Irish as having an inferior military with primitive tools and armor, as well as a structurally backward religious system, despite the Irish also being largely Christian (Ibid.). Specifically, the Anglo-Normans disapproved of "the endemic warfare that revolved around cattle-raiding and slave taking" and the "[m]arried clergy, hereditary bishops, unreformed liturgies and the like – would, a hundred years on, be condemned as an abomination, as bestial, as pagan and as abuses that had to eliminated by outside, armed intervention" (Bartlett 2010). Once the Irish were labeled as barbarian, many other forms of Irish life became evidence of their backwardness. Their economy, diet, clothing, and male and female relations were categorized as primitive (Ibid.).

The initial colonization and vehement disgust with the Irish lifestyle were not the main concerns for the English monarchy but for the English inhabiting Ireland. The English

monarchy's focus was on Scotland, Wales, and France while Ireland served as a supply of men to fight and for levying taxes (Barlett 2010). Instead of mass government involvement, common Anglo-Normans migrated to Ireland with the promise of cheap land and a higher status (Ibid.). However, there was still the presence of upper-class Anglo-normans that brought with them castles and armies while remaining relatively unchecked by the monarchy in England (Ibid.). The Anglo-Normans in Ireland were, in fact, quite defiant against more formal control from the monarchy since they were typically left to their own devices (Ibid.). The Anglo-Normans could not be considered entirely independent or separate from the Irish since intermingling through trade, marriage, and intermixed armies occurred between Anglo-Norman groups and the Irish. However, the Anglo-Normans present in Ireland had prevailing conflicts with the native Irish. While English common law was put into place, the Anglo-Normans seemed to be disinterested in allowing the Irish to partake in the benefits giving "rise to the idea of natural enmity, an immemorial hostility, between" the Irish and English (Bartlett 2010). The reasoning for their exclusion was language, law, and customs. Specifically, Irish law was detestable by the Anglo-Normans. The parts of Ireland under Anglo-Norman control did not recognize Irish law and excluded anyone called Irish from accessing a court or having many rights. This meant that protections for women in Irish law were also invalidated to the point of "Irish widows [being] denied dower rights"(Bartlett 2010). The inclusion of only Anglo-Normans under English common law continually increased tensions.

A Scottish invasion of Ireland and the onset of the rampant Black Death caused Anglo-Norman control to falter. Many returned home but those who stayed continued to fashion their identity in opposition to the Irish. Without assistance from the monarchy, the Anglo-Normans remaining took to exploiting the Irish and "drew a circle around the notion of

Englishness, defining its essence as that which was not marked as Irish" (Bartlett 2010). To go against these views was to be disloyal. Throughout the late medieval period, the Anglo-Normans worked to facilitate a divide between them and the Irish by marking them as 'other' and excluding them from Englishness.

While written sources serve as a good basis for understanding the historical context, like diaspora and women's studies, the materiality of the body is the avenue for observing the Anglo-Norman impact on Irish practices and identity. With such vehement disgust for Irish life-ways, permitted cultural practices are likely to change. The body is neither stagnant nor unchanged by culture so the presence of Anglo-Norman administration, law, and ideology is likely to impact the morphology of the Irish body. The degree and type of impact can be read from the pathological changes constructing the Irish body since the dead body as biological and cultural will retain these new bodily formations from the early to late medieval period.

Conceptions of Women in Medieval Irish Literature

The conceptions of women from literature in the early medieval period will serve as the baseline for ideas about women within the literate class in medieval Ireland. Literature is again not in itself sufficient for understanding gender relationships because it only focuses on the Cartesian concept of mind or culture rather than biology and culture as manifested together. What is included in this research is not a complete summary of literature on gender, but relevant for depicting the landscape around gender relationships in medieval Ireland. Ideas about women will be compared to the early medieval data, then this data to the late medieval period, to better assess changes throughout the Anglo-Norman invasion. The literature focuses on a multitude of aspects of womanhood and male and female relationships. For the purposes of this research, I focus on how the literate class defined 'woman' as well as laws and myths surrounding male and female relationships, including but not limited to female freedoms.

Lisa Bitel provides a survey of relevant documentary data on conceptions of women in medieval Ireland. She argues that women were understood as mystical beings, animals, and humans meaning no definitive consensus could be made by medieval writers (Bitel 1996). Children were born genderless and became female and male when they became capable of reproduction. In this 'becoming' women were thought to be less valuable and like children to their husbands although other texts point out the great value of reproductive women and mothers. When women acted with 'autonomy' and lied, betrayed men, or behaved violently, they were considered mystical or otherworldly (Bitel 1996). Because men are perceived as the most human, it was viewed as otherworldly when women interacted with the world like humans. Women were compared to other beings as well (e.g., cattle, horses, cows) (Ibid.). However, women are not necessarily comparable to animals in a subservient way; rather, these animals disobeyed their masters as did women. Women were also similar to animals because they should be feared like beasts (Ibid.). Due to comparisons between animals and mystical beings, as well as their apparent volatility, relationships with women were often depicted as unwanted but necessary partnerships. The significant takeaway from the ancient Irish sources is that they could not decide what women are. At the time, they were mystical, dangerous, like beasts or spirits, autonomous, subservient, filled with malice, or underdeveloped (Ibid.). The failure to define women, even among the small group of literate people of the time, means that there was likely even less consensus among the larger population of medieval Ireland. Mixed with legal documents and mythology women take on even more qualities; they are "lover, wife, mother, economic partner, holy woman, warrior woman" and many more, showing the vast range of identities a woman could have as individuals and with men (Bitel 1996). Women were conceptualized not as separate from men but as a necessary extension of them (Ibid.). The Irish

understanding of women would make it impossible to just study males and females as two distinct categories since they are conceived as adjoining bodies in an unwanted but necessary partnership.

Legally, women had many freedoms that would have been rare in other parts of medieval Europe. For every law that appeared to limit women, there was another that afforded them freedoms. Legal documents tend to be the most severe and rigid form of understanding gender as oftentimes they represent the upper-class's *ideal* instead of the general population's reality (Bitel 1996). Certain laws defined women as "'legally incompetent, senseless' and on par with slaves, children and the insane" (Bartlett 2010). Other laws required that women did not hold or transfer land. However, there was significant pushback against this law shown through fathers' writing of the inconveniences since they wished to bestow land to their daughters (Bitel 1996). Additionally, another law demanded that in the case of marriage or divorce women were to keep their own property that was used for their labor (Ibid.). Women's labor was likewise categorized as "tending to their children, keeping tame animals and small gardens, weaving" and tending to their homes (Bitel 1996). Therefore, women likely held land despite the legal regulations and owned their own property.

A total of 9 types of unions or marriages were articulated in legal records. The main types were official marriages, secondary wives, and concubine unions (Bitel 1996). The official marriages afforded the fewest rights to the wife because she was unable to hold her own property or get divorced. The concubine unions allowed women to divorce her partner given that he was unable to perform sexually or he was insane. The coupling of males and females was depicted as an economic agreement between two parties without regard for emotional attachment. This legal view of relationships might paint a view of medieval Irish unions as apathetic. However, other

literature such as myths of the time tell of great passion and love (sometimes in the form of infidelity) between married and unmarried partners, so passion was not absent from male and female relationships.

A striking and strict law called the *Cáin Adomnáin* demanded more rights for mothers so they would be honored for their efforts (Bitel 1996). This law proclaimed specific punishments for harming women and defined harm against women. It prohibited striking, blemishing, fondling, and raping of women (Ibid.). If someone harmed a woman they were required to pay with the removal of their hand and no monetary compensation could be paid instead of the penalty of bodily mutilation (Ibid.). The law was upheld no matter the gender of the perpetrator, so women could not even harm other women. However, even though this law existed, it may not have been implemented or followed. Overall, women were depicted in a multitude of ways, on the one hand as their own autonomous bodies but also on the other as extensions of men. They were both restricted and afforded many freedoms in legal documents.

In late medieval Ireland, Anglo-Norman opposition to Irish customs, identity, legal proceedings, gender relationships, warfare, etc. was rampant (Barlett 2010). The Anglo-Normans were constructing an image of ‘self’ and therefore, ‘other’ with ‘other’ being suppressed and excluded from rights. The administrative changes put into practice by the Anglo-Normans showed legal upheaval of typical gender roles, values, and relationships by restricting women's access to benefits permitted under Irish rule (Ibid.). As mentioned previously, the English opposed the rights of widows to their dower rights (Barlett 2010) as well as likely many other rights afforded to women. In Gerald of Wales’ *Topography of Ireland*, he writes that women sit on horses like men and urinate standing upright (Cambrensis 2020). Irish women are depicted as stronger and bolder so that they infringe on males’ “superior privileges” (Cambrensis 2020).

Irish woman and gender relationships are depicted as barbaric and in contrast to English identity. Much like other forms of Irish culture, the Anglo Norman views are likely to impact the cultural practices of sex and gender creation.

Again, written sources serve as a good historical account of gender relationships throughout the medieval period but like women's studies, the materiality of the body is the avenue for observing the Anglo-Norman impact on Irish sex and gender. Simply focusing on the mind or gender, leads to static views of the body that can devolve into to racist, sexist, and colonial conclusions. The Anglo-Norman opinions on Irish gender are also from a perspective intended to create 'self', 'other' and 'barbarian' which present a colonial assessment of Irish gender relationships. Even in the early Medieval period, the literature was written by upper-class literate men and reflects few opinions of the time. Looking at only written documents gives precedence to inscribed culture which is neither an accurate representation of sex and gender formation nor a more robust depiction of the lives of Irish women and men.

Irish gender relationships are painted as barbaric and not restrictive enough for women so a change in cultural practices would be expected with Anglo-Norman administration. Again, the sexed and gendered body is constructed through cultural and biological processes. Therefore, the presence of Anglo-Norman law and ideology is likely to impact the morphology of the male and female bodies. The dead bodies' materiality will retain the degree and type of impact with new bodily formations in the late medieval period from the early period. From here, the effect of the Anglo-Norman presence and vehement opposition to Irish male and female relations can be more fully articulated. The biological responses to cultural practice will inform how the medieval Irish practiced sex and gender outside of literature and in everyday reality.

Methods

Bioarchaeologists can look at the body and see culture and biology reacting through many avenues. One of the cross sections of sex and gender is health and pathologies in the body. For this research, health indicators are the main way of observing the cross section of sex and gender in the past. Specifically, cribra orbitalia (CO), porotic hyperostosis (PH), dental enamel hypoplasia (DEH), stature, age-at-death, violence and day-to-day injuries, and joint disease are explored. Each of these leave traces on the skeletal remains. The first 5 indicators represent the overall health since they are generic signals to underlying health conditions, disease, malnutrition, and physiological stress (e.g. Stuart-Macadam 1991; Walker et al. 2009; Oxenham 2010: Kozalowski and Witas 2012; Mays 2012; Tesorieri 2016; McKenzie and Murphy 2018; Brickley, 2018). Health indicators generally show how well a population is faring and what pressures they may be under. Individuals and groups with overall better health are allocated more resources, better living conditions, and experience fewer instances of stress (Larsen 2015). In terms of sex and gender, the overall health of a particular sex can depict inequality or disparities in access to resources. Therefore, a society can be understood as valuing sex as a means for hierarchy and indicate a group of sexed individuals is valued over the others. The latter 3 indicators explore the conditions in which a person is conducting the majority of their everyday tasks and what repetitive labor is being carried out (e.g. Jurmain 1977; Merbs 1983; Lai and Lovell 1992; Lovell 1997; Resnick 2002; Felson 2004; Bennike 2008; Agarwal et al. 2015; McKenzie and Murphy, 2018). The labor and conditions of that labor show up as injuries and joint disease. These repetitive and specific life events can show what tasks males and females are responsible for completing, if they are the same, or there is the presence of a division of labor along the lines of sex (Sofaer 2006). The health of male and female sexed bodies appears on their

skeletons and indicate their cultural practices and values. Again, morphologies on the body are the materiality of sex and gender.

In this research, two time periods are explored, the early and late medieval periods in Ireland and each period is split into two geographically defined regions, Region I and Region II (explained in detail later). In the early medieval period, health data is compiled from a multitude of cemeteries to provide an equivalent population size (approximately 500) for comparison with the later medieval period skeletal assemblages (Tesorieri 2016). This data is largely used as a baseline to measure the influence of the Anglo-Norman colonization on the later medieval population as well as mark any other ideological or practical shifts overtime. The skeletal data from the later medieval period is from two cemeteries, Ballyhanna and Ardreigh. Each has sizable populations (approximately 1200), is rural, has varying Anglo-Norman influence, and falls within one of the two geographically defined regions (McKenzie and Murphy 2018).

The early and late medieval data will be first discussed separately. The two regions will be compared in the early medieval period to explore regional variation for the baseline and flag specifically Irish experiences with health. The later medieval data will be contrasted with late medieval English site, Wharrm Percy, to give a general indication of Irish health compared to European health in the middle ages and then the two later medieval sites will be analyzed against each other. The final comparisons will be between the early and late medieval periods in Region I and then another for data from the early and late periods in Region II. Due to the large number of cemeteries and two time periods, there are many cases when data has been recorded in different manners methodologically. When possible, data will be methodologically adjusted for comparison. If it is not feasible to adjust the data, it will be indicated and a comparison will be omitted. Many data points are considered to be statistically significant, suggesting that the

difference in percentages is great enough for the discrepancy to not be from methodology, random, or chance. Therefore, statistical significance represents an actual difference between the two data points being compared. Tests for statistical significance are calculated by the bioarchaeologists compiling the skeletal data and typically a chi-squared contingency test of statistical significance is used (McKenzie and Murphy 2018). The one instance when this test is run for the purposes of this paper, JMP® Pro is used to conduct the chi-squared contingency test.

Demographics

Sex Identification

There are various methods available to sex skeletons but the primary method is skeletal morphology of the skull (cranium and mandible) and pelvis (Stone et al. 1996; White and Folk 2005; Sofaer 2006; Skoglund 2013). Generally "male crania typically display more prominent supraorbital ridges, a more prominent glabellar region, and heavier temporal and nuchal lines," (White and Folk 2005). Females tend to have smaller mastoid processes, sinuses and occipital condyles, as well as more rounded orbits (White and Folk 2005; Gulekon and Turgut 2003; Rösing 2007). A simplified view of this looks at the skull's shape by looking at the ridge of bone where the eyebrows sit, the protrusion of the jaw, and overall, the different shapes and sizes of the bumps and divots on the skull. The morphological differences observed in the pelvis are in the size and shape of the greater sciatic notch, subpubic angle, ventral arc, subpubic concavity, etc. (White and Folkens 2005; Sofaer 2006; Pearson 2019). The skull and pelvic features are ranked on a five-point scale, and from here a sex determination is decided. Other studies have also looked at the robustness of skeletal remains and the length of the long bones (Bašić et. al. 2013). Additionally, children are not able to be sexed because puberty and growth are the catalysts for sexual dimorphism in humans (Sofaer 2006). The sexing methods for children are

typically very controversial (Ibid.). The most reliable method that is not currently used often for sexing children is DNA analysis (Ibid).

The severity of sexual dimorphism is also variable between populations (Sofaer 2006). A famous study from Machu Picchu initially identified a little over 80% of the population as female (Eaton 1916; Bethard and VanSickle 2020). This was not because the population was 80% female, but because the sexual dimorphism in Central America was different than European bodies (Bethard and VanSickle 2020). Again, the sexed body is not a static machine but is identifiable with cultural and historical context. When sexing the skeleton, the osteo/bioarchaeologist compares the male and female bodies within the context of the culture on a spectrum. In other words, the assessment of sex is not done on one independent skeleton then the next, but in the context of all of them a sex is determined. As mentioned above, the accuracy of sexing a human adult skeleton with the pelvis and skull present is projected to be 80-90% by some sources when taking in the non-universality of sexual characteristics (White and Folks 2005). However, some estimate that the accuracy is up to 97-98% when both skull and pelvis are analyzed within their cultural context (Meindl et al. 1985; Molleson and Cox 1993; Pearson 2019). The use of long bones was found to identify men correctly 86% of the time with only 80% accuracy for female remains (Bašić et. al. 2013). Long bone measurements are not used as consistently because of this inaccuracy compared to pelvis and cranium assessments. Kenneth Weiss estimates that skeletal sexing is biased at about 12% in favor of males (Weiss 1972; Pearson 2019). This explains why most cemeteries have a skewed bias towards males.

Mike Pearson argues that this sexing is complicated by the hormonal levels of an individual and the activities from life that can alter their morphology (2019). Within a population an insufficient level of estrogen in females and low levels of androgen in males can cause

dwarfism, elongated thin long bones, and differently shaped mandibles (Ibid.). It is also possible for females who participate in sustained strenuous physical activity to maintain high levels of androgen leading to a male like pelvis (Ibid.). There is also evidence that people throughout history have attempted to alter their hormonal levels by consuming certain products, possibly intentionally, which also affects skeletal dimorphism (Ibid.). These issues are only problematic if the body is viewed as static with culture layer on top, but these changes *are* sex. Just sex interwoven with culture and gender (Sofaer 2006). Rather, these changes are what tell archaeologists about sex and gender of the past, they are not exceptions. The variation in a population is accounted for methodologically by ranking structures on the skeleton from one to five and by considering each skeleton within the context of their population (Ibid.). The sexing of the skeleton is only problematic if the way the body is understood is not considered in the interpretation. The body is the intersection between culture, biology, and therefore, sexing the body cannot occur separately from gender. Neither sex or gender exist absolutely and universally. The sexing of the body is not a universal claim for the exact measurements of male and female, but rather accounts and expects variability in the sexual dimorphism of people across time and geographic location. Sexing of the body accounts and allows for fluidity in cultural understandings of sex and gender when the changes from performance on the body are observed, recorded, and interpreted.

Age Identification

Age for younger individuals is estimated using dental eruption, dental mineralization, lengths of long bones and epiphyseal fusion data (Moorrees et al. 1963; Smith 1991; Cunningham et al. 2016). Long bone growth and development is often more dependent on diet and health, while dental formation and eruption is less impacted making it the more reliable data

point so these methods are often used when possible (Ferembach et al. 1980; Smith 1991). Dental eruption is only applicable for the first 20 years of human development since by 18 to 20 years of age, the teeth are formed. For dating older individuals, late epiphyseal fusion, dental wear, joint degeneration, and the condition of the pubic symphysis are used (McKern and Stewart 1957; Web and Suchey 1985; Lovejoy et al. 1985; Brooks and Suchey 1990; Brothwell 1981; Scheuer and Black 2000;). From here age data can be estimated.

These methods are precarious and cannot provide narrow age ranges for adults (Bocquet-Appel and Masset 1982; Saunders et al. 1992; Konigsber and Frankenberg 2001; Hoppa and Vaupel 2002). Therefore, when cataloging the data, typically large age categories are used, such as young adult, middle-aged, and old adult. The broad age categories for adults erases aging error for interpretation. These age ranges may be around 18-35, 35-50, and 50 plus (McKenzie and Murphy 2018). Age ranges are relatively standardized throughout Ireland and England making comparisons between different cemeteries from each location possible (Ibid.). Specifically, Ardreigh and Ballyhanna use the same age ranges which is significant since these are the cemeteries of focus in this research (Troy 2010; McKenzie and Murphy 2018). Average age-at-death data will be discussed below and is directly related to the age data.

Health Indicators

This research investigates general health indicators including cribra orbitalia (CO), porotic hyperostosis (PH), dental enamel hypoplasia (DEH), average height and average age at death. General health indicators are non-specific indications of health that reflect a large portion of someone's life or the totality of their life (Tesorieri 2016). Opposed to looking at specific events that can be observed through evidence of violence on a body or specific disease, non-specific indicators reflect the larger trends of health because they track the development and

presence of the adaptive stress responses of the body (Ibid.). This research will be looking at the combination of non-specific health indicators as well as specific event indicators to collect as close to a holistic picture of health during this period as possible. Additionally, I will be utilizing many reports from two different time periods, the early and late medieval periods. The difference in methods and techniques for measuring and interpreting skeletal data is vast and when applicable I will address these disparities by health indicator. More specific data will not be omitted, but it will not be used to compare between sites or time periods to avoid available data bias.

Cribra Orbitalia and Porotic Hyperostosis

Both CO and PH are expressed on the skeleton in a similar manner as well. CO is the "osseous expression of hematopoietic marrow expansion that paleopathologists" (Oxenham 2010). In simpler terms, this is the expansion of spongy bone in the orbital plate (behind the nose)(Oxenham 2010). PH is the "destruction of the outer table of compact bone by porotic lesions, accompanied by increase in thickness of the internal diploe bone" (Stuart-Macadam 1991; McKenzie and Murphy 2018). MicroCT scans to see microscopic images of the bones and their lesions so that the bone does not need to be damaged in the process is becoming the common practice for measuring this health indicator. Studies before this technology simply measured and counted the lesions on the bone which was less accurate in discovering the severity of CO and PH (Stuart-Macadam 1991). A few bioarchaeologists studying the main cemeteries, like Ballyhanna, use Stuart-Macadam (1991) which involves making note of the severity of the lesions (Mckenzie and Murphy 2018). For the purposes of this study, the information regarding CO and PH will be examined as present or not present on human remains

instead of discussing severity, so that the information can be translated between many cemeteries in different time periods.

There has been extensive debate about the cause of cribra orbitalia and porotic hyperostosis and therefore what it can tell archaeologists about an individual (e.g. Stuart-Macadam 1991; Walker et al. 2009; Kozalowski and Witas 2012; Mays 2012; Brickley 2018). For a long time, CO was thought to be caused by iron deficiencies, but recent studies suggest that there are many influential health factors that cause CO and PH. CO can be caused by chronic infections, deficiencies of vitamins B12, C and D, a combination of poor diet, lack of hygiene, infectious diseases, iron deficiency, and cultural practices with pregnancy and breastfeeding (Stuart-Macadam 1991; Walker et al. 2009). It is similarly unclear what causes PH and therefore, CO and PH are sometimes conflated and recorded in tandem (Walker et al. 2009; McKenzie and Murphy 2018), but they will be treated separately in my research. The lengthy debate is an important issue, but in this paper, CO and PH effectively reflect overall health and dietary issues (Mckenzie and Murphy 2018) despite what causes them. When CO and PH data are interpreted, it can shed light on possibly different levels of malnutrition and dietary issues between males and females even though the exact source of these issues can not be identified at this time. CO and PH show the embodied experience of the intersection between sex and gender because both reflect the general health of male and female sexed bodies which changes based on their cultural practices.

Dental Enamel Hypoplasia

Dental enamel hypoplasia is identified as the reduced rate of enamel deposition or the presence of thin enamel on the teeth (Guatelli-Steinberg and Lukacs 1999). The most common type of DEH is linear enamel hypoplasia. Other tooth indicators that may supplement DEH are

caries. Caries or cavities are the demineralization of enamel and other dental hard tissue (Lukacs 2017). Other dental indicators are antemortem tooth loss, calculus, tooth wear, and alveolar bone resorption. DEH is measured by looking at the pits and grooves in the teeth from a population. Oftentimes studies use only the canines and incisors since these are the most affected by DEH (Goodman et al. 1980) and only when there have been two or more teeth with enamel hypoplasia on different sides of the mandible (Lewis 2002). Hypoplasia in the adult teeth of older children and adults typically form in the first seven years of life because this is the time period in which the adult teeth are forming (Reid and Dean 2000). DEH in deciduous teeth is formed in utero until one year of age (Blakey and Armelagos 1985).

Interpreting DEH and oral health data can be challenging because there are likely hormonal effects to teeth that cause non-cultural or biological variability between males and females. However, when these are accounted for, DEH data can show the stress levels in the first seven years of life and therefore give an indication of the difference between childhood health in males and females from adult sexable bodies. DEH, specifically, is also tied to health issues in adults and positively correlated with earlier death so gives an effective indication of overall health. The cross cultural contemporary and historical survey of oral health by John R. Lukacs found that there are differences in female and male dental rates that are consistent (2017). The totality of the survey was extensive and covered different geographical locations throughout history and the contemporary period. Out of almost all these time and places, females are more likely to have caries, or rather a surge of caries, during the start and duration of puberty (Lukacs 2017). Due to the strength of this research as accounting for possible cross-cultural and historical differences, Lukacs' research on the biological and hormonal effects on prevalence of DEH and caries will be accounted for in my research when possible. Additionally, males are slightly more

likely to be affected by DEH when under stress when compared to females (Guatelli-Steinberg and Lukacs 1999). Both males and females can be under the same stress and males will exhibit more signs of DEH (Ibid.). This difference does not provide an issue, but rather makes DEH a very good indicator for stress in biological male bodies. As long as these biological differences are accounted for, they provide no issue with interpreting DEH data in an informative way. DEH and other defects on teeth are helpful in determining an individual's overall health. The development of teeth in the first seven years of life allows there to be a comparison between female and male child rearing because the teeth of sexed adults can be compared (Tesorieri 2016). DEH is a particularly good way to reference childhood sex differences because, again, it is challenging to sex younger individuals. Additionally, DEH analysis of past societies "have found a positive correlation between younger age-at-deaths and DEH (Goodman and Armelagos 1988; Duray 1996; Armelagos et al. 2009). Thus, stress experienced during the first few years of life is presumed to have increased the difficulty of successfully responding to stress or disease later in life (Armelagos et al. 2009). On average, those in medieval populations with one or two instances of DEH died on average 10 years earlier which is a very significant difference (Ibid.). DEH is an important indicator for overall health even if it is not the only thing contributing to the actual death of the person (Ibid). DEH can serve as a good stress indicator for a male or female in childhood and show how these sexed bodies create and perpetuate gender.

Stature

Stature in archaeological context is the height of an individual during their life (at time of death). Unlike many cases of CO, PH, and DEH, a person's stature during life is not something that is always obvious from just looking at a human skeleton. A person's living stature has to be calculated by using the Trotter and Gleser equations (1977). Their formula uses measurements

from long bones and is sex specific, requiring a sex identification and categorization (Trotter and Gleser 1977; Mckenzie and Murphy 2018). Since it is sex specific only those that fit in male and female are typically utilized and the categories of probable male and probable female are left out.

The formula leaves out the variability in bodies that do not fit on the opposing sides of the sex spectrum which, as mentioned earlier, decreases the diversity in both male and female bodily experiences. In this research, the diversity in variability will hopefully be better seen through the other health indicators that do utilize the unsexed or more ambiguous bodies which will balance out the diversity lost in stature data. It is also possible that the Trotter and Gleser formula needs to be readdressed due to some research providing evidence for its inaccuracy as a universal measurement tool (Jantz 1992). Richard Jantz was using these measurements on contemporary populations to test their accuracy at predicting stature and found they were not accurate, specifically for female bodies (1992). Often, the measurements predict that females are shorter than they actually are (Ibid.). Jantz provides concern for making comparisons between large gaps in time and between males and females, but does not prevent time periods in close succession from being compared and sexes to be compared to one another. In other words, female statures can be compared to one another because they should both, as long as they are not chronologically too distant from one another, suffer from the same inaccuracy. Despite the interpretation issues from methodological implications, stature serves as an indicator for nutrition received throughout childhood. Average height or average stature can be influenced by many factors such as "genetic predisposition, childhood nutrition and health and hormonal influences," (McKenzie and Murphy 2018). Studies indicate that malnourishment or undernourishment tend to cause a shorter height in adulthoods (Larsen 2015). The reverse is also true. In times of abundance and adequate nutrition, the average height and stature increase (Ibid.). This means

that the difference in height between females and males at different sites indicates that there may be large differences between nourishment and therefore, who may be faring better in terms of resources. Stature is directly impacted by nutrition which can also indicate how resources are allocated within a group. In other words, height can show that males or females were being allocated more resources and represent a trend in the creation and perpetuation of gender.

Age-at-death

Average age-at-death is directly related to the age data discussed above. Once age is assessed in a cemetery population, average age-at-death can be roughly calculated. When interpreting age-at-death calculations it is important to consider that the total population may not be represented, fragile, or frail skeletal remains degrade quicker and may be less represented, and the issue of aging adult remains (McKenzie and Murphy 2018). However, most cemeteries included in this study have been assessed as representative of the overall population (McKenzie and Murphy 2018; Troy 2010; Tesorieri 2016) Between the methodological limits of non-specific age ranges and the faster decomposition of frail bodies, age-at-death data reflects how a population creates and responds to stress. Age-at-death data illuminates the construction and maintenance of cultural practices and for our purposes, gender. There has been a tendency to interpret high mortality rates in young females with pregnancy and birth complications. While this may be true in some cases, it is too simple of an explanation and based on the idea that female bodies are ill equipped to deal with pregnancy and birth generally. Another mechanical and static view of the body. Blaming early deaths in women on child bearing is reductive and limiting for bioarchaeologists (Stone and Walrath 2006). Female bodies are quite capable of dealing with this life producing process, but the social, environmental, and cultural factors put extra pressure on the female body making their context a major cause for death from child

bearing (McElmurry et al. 1993; Finkler 1994; Doyle 1995; WHO 2001; Maine and Chavkin 2002; Stone and Walrath 2006; Brettel and Sargent 2009). Instead of high percentages of young females deaths being because of reproduction in some populations, these deaths reflect social practices that add stress to a laboring process. Some cultural practice that add stress to childbearing and can cause of early death in women are working long hours (Harris and Ross 1987), sex bias in food allocation, and healthcare to both female adults and children (Waldron 1987; Manderson 1999; Rousham 1999; Stone and Walrath 2006). Age-at-death data shows the strains that cultural practices can add onto individuals because the body is embedded in the environment. Using this interpretive methodology, age-at-death patterns "are a reflection of a population's ability to alleviate stress, influenced by age, sex, health status and exposure to pathogens. These profiles therefore provide insight into the relationship between demography and economy, subsistence, settlement pattern, social organisation and cultural systems" (Tesorieri 2016) Like the CO, PH, and DEH, average age-at-death gives insight into the overall health of a population and how their bodies handles challenges in their social and ecological environment.

Violence and Day-to-day Injuries

In this research the distinction between violence and day-to-day injuries will be used for analysis. Violence and day-to-day injuries do not qualify as non-specific health indicators because both are typically single instances in an individual's life though there are particularly traumatic injuries that may affect them for the remainder of their life. It is worth noting that violence and injuries that affect the individual's bones are visible to archaeologists while injuries to the soft tissue are invisible (Mckenzie and Murphy 2018). In bioarchaeology, violence is recognizable through obvious sharp force trauma which are fractures that penetrate the bone termed 'penetrating fractures' (Lovell 1997). These show up as slices in the bone or compression

marks that are straight (McKenzie and Murphy 2018). Wounds that come from stabbing are deeper and narrower while cut wounds are shallower and wider (Ibid.). Violence is categorized as injuries that can be specifically linked to a weapon injury or interpersonal violence (Ibid.). Weapon trauma is recorded as ante-mortem and peri-mortem injuries. Ante-mortem injuries are before death and can be identified this way because they have begun to heal (McKenzie and Murphy, 2018). Peri-mortem injuries do not show any signs of healing and are clear and sharp which looks different from injuries postmortem (Ibid.). Both Ante-mortem and peri-mortem injuries are used to interpret violence.Violence data can answer questions like what weapons were being used, how much damage was done by these weapons and warfare techniques were in use. The interpretations of violence most important for this research are the level of interpersonal and intergroup violence as well as between whom and to whom the violence is directed either in warfare or interpersonal disputes. Stab and cut wounds look different on the body based "on the size of the weapon, the shape of the weapon, and the location, angle, and force with which the injury was caused"(Bennike 2008; McKenzie and Murphy 2018). Therefore, the type of weapon and typically warfare techniques from many cases can be interpreted. The sex and age of the individuals impacted shows who was typically involved in interpersonal violence which again shows the construction of gender. A society, like Çatalhöyük, may have equal evidence of violence against males and females which reflects an equally important impact of violence on what it is to be a woman and a man (Agarwal et al. 2015).

Unlike violent injuries, day-to-day injuries can not be directly identified as interpersonal violence or weapon marks, but rather are likely from accidents. Day-to-day injuries are any wound that impacts the soft tissue or bone of an individual (Roberts and Manchester 2005). Most of the trauma that shows up on the skeletal remains are fractures and dislocations (McKenzie and

Murphy 2018). Injuries can show the types of labor, danger, and environment in which a person is participating as well as their health and healthcare based on the level of healing. Injuries "may be caused by one of four main processes – accidents, interpersonal violence, underlying pathological conditions or by repetitive stress" (McKenzie and Murphy 2018). For example, different types of fractures indicate whether the injury was caused by a direct impact or injury caused by traction or torsion (Lovell 1997; McKenzie and Murphy 2018) while crush fractures are from direct impact while spiral fractures are from torsion (Lovell 1997). These injuries are from different activities and bodily movements, either repetitive movements or one time events, so they illuminate the types of activities the person is doing, like dealing with animals or handling machinery (McKenzie and Murphy 2018). An individual's labor and responsibilities can be observed through their injuries (Ibid.). Day-to-day injuries indicate the conditions in which a person lives and the repetitive activities people in which people participate (Ibid.). Additionally, the level to which either of these injuries healed can inform when the person died from the injury, shortly after, or fully recovered. The amount recovered can indicate the health of the individual–healthier people often heal while already compromised individuals do not–if a couple of factors are accounted for like the location on the body, type of injury, and if there are other complications observed (Ibid.).

Joint Disease

There are many types of joint disease, but the main one of focus in this research is osteoarthritis. Degenerative joint disease is "marginal osteophytes, or nodules of new bone or porosity on the joint surfaces" (McKenzie and Murphy 2018). Osteoarthritis is a more severe degenerative joint disease and differentiated by number of cases. Osteoarthritis is also "marginal osteophytes, nodules of new bone on the joint surface, porosity on the joint surface," but it is also

the “alteration to the normal joint contour,” (McKenzie and Murphy 2018; Jurmain 1991; Rogers and Waldron 1995).

The main difference between degenerative joint disease and osteoarthritis is the number of lesions. Osteoarthritis is two or more of the above lesions (Ibid.). This difference is significant because degenerative joint disease is just indicative of the normal aging process. Osteoarthritis, on the other hand, is caused by mechanical loading and repetitive movement of particular joints (Trotter 1964; Jurmain 1977; Merbs 1983; Lai and Lovell 1992; Sofaer 2006). Other things that contribute to joint disease are genetics, body mass index, nutrition, hormones, disease, and trauma (Resnick 2002; Felson 2004; Weiss and Jurmain 2007). Despite the alternative causes of osteoarthritis, it is still a strong indicator for representative activity done by a particular person in their daily life. When joint disease and day-to-day injuries are analyzed together, a picture of what males and females were doing on a daily basis becomes more clear through the repetitive activities marked on their bones. A division of labor or responsibilities allocated to both can be understood and therefore, quite literally see gender as performance. Gender is created in and through the everyday activities that show up on the osteological remains as osteoarthritis.

General health indicators facilitate a robust approach to sex and gender analysis because they are both biology and culture in the body. The diet, nutrition, level of disease, physiological stress events, and activities are solidified in the materiality of the body through CO, PH, DEH, stature, age-at-death, violence, day-to-day injuries, and joint disease. Liveways and values of living people are solidified into their bones and continue to be present in death. Pathology is the body responding to cultural practice and then becoming inseparable from culture. These pathologies reflect, or rather *are,* the people who are being allocated resources and under more or

less physiological stress. From here, a divide based on sex and gender and the manner in which these divisions are made in Irish culture can be empirically concluded. All indicators give substantial insight into the modes in which the Irish population organize themselves, which groups are valued, and who is contributing to society. A study that does not look at both the biological and cultural materiality of the both would perpetuate Cartesian dualism and in doing so, would make the body static and risk falling into universalization of sex and gender. Additionally, insights into the construction of sex and gender in medieval Ireland would be incomplete and so would misunderstand being a male and female during this period. The bodily changes are directly linked to the cultural environment and biological responses so the construction of sex and gender as well as gender relations are present in the living and therefore dead bodies of the medieval Irish population.

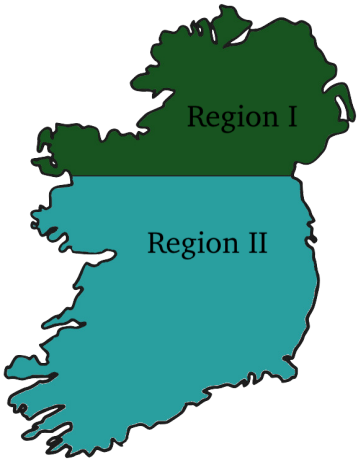
Early Medieval Osteological Data

The general burial practices for early medieval Ireland and the health information are reviewed in this section. The burial practices will be discussed as a preliminary background, while the health information will be divided into two geographical locations, Region I and Region II, when possible and discussed in detail by region (Figure 1). The geographical split created by Mara Tesorieri will be utilized for this paper. She makes this split between Region I and Region II because they are located in different climates, populations, trade and political structures (Graham and Proudfoot 1997; Cohen and Crane-Kramer 2012; Tesorieri 2016). Region I is dominated by oat production and bogs with poor soil due to the strong rains affecting this location (Tesorieri 2016). Region I is also less connected to trade routes between England and has fewer instances of contact with Viking raiders and settlers (Comber 2008). Region II relies on barely and/or wheat and has floodplains which are suitable agricultural land (Haughton

2008). Region II is more heavily impacted by Viking settlers while also having larger cities beneficial for trading resources (Bradley 1995; Edwards 2008).

In Tesorieri's study–a major contributing work to this section–she compiled a total of 356 bodies for Region I and 508 for region II to make comparable assessments for each region. These borders are not static and the distinction is largely arbitrary for the early medieval period. I combine the data for the early medieval period into these two regions so they can better correspond to the two cemeteries I cover in the late medieval period, Ballyhanna and Ardreigh. The regional distinction is relevant for the later period because Ballyhanna (Region I) is not influenced by the Anglo-Normans directly, while Ardreigh (Region II) is in contact with them. Since the early medieval period is not my primary focus, fewer cemeteries will be discussed in detail. Rather, I will focus on general trends from the early medieval period. This should not change the results since the information from both is largely the same, but making strong regional arguments should be avoided. In future research, these regional variations should be explored further.

Figure 1. Map showing the regional split taken from Mara Tesorieri and used in this study (2016, 125). There are no actual borders during the early or late medieval periods that correspond to these regions.



Prior to the medieval period most human remains were buried, cremated on pyres, or a mixture of cremation and burial (O'Brien 2021). The buried bodies were often placed in a crouched position. There was also variety at sites and across Ireland. For example, there is evidence of deposition of particular remains. In the early medieval period, there was a shift to extended inhumations and a focus on burial (Ibid.). This shift from cremation to extended inhumations likely represents a shift in ideological theory. The 'soul' may have been thought to be released during burning events when cremation was common, but inhumations indicate that the soul could be released through ritual instead of destruction of the body or they may have thought it no longer needed to be released and remained in the body (Ibid.). While the extended inhumations likely represent an ideological shift, this was probably not because of the introduction of Christianity. Pagans and Chrisitians began to be buried in the extended position and differentiating between the two is difficult because both were buried in the same locations and often right next to one another (Ibid.). When the burial is unmarked or without visible religious symbolism, Chrisitians may be identified based on their bodies being buried in a shroud which ultimately slightly changes the position of their body in the archaeological record (Ibid.). Due to the widespread use of extended inhumation as a burial practice, for Christians and otherwise, it is less likely from the introduction of Christianity than a general ideological shift.

Burials during this period, stone lined burials, unprotected graves, plank lined graves and log coffins were also occasionally implemented (O'Brien 2021). The wood lined graves or those with coffins may simply indicate that the individual was transported from far away (Ibid.). Few 'formal' cemeteries during the beginning of the early medieval period exist. Most were buried in isolated burials, already existing burial monuments, unenclosed cemeteries, or foundational burials (Ibid.). Foundational burials were burials organized around one individual at the center or

‘head’ of the cemetery. These individuals were likely significant people to a community. During the early medieval period, it is not uncommon to find males and females as the focal point for these cemeteries (Ibid.). According to Elizabeth O’Brien, 45 females spanning from teenagers to old age were buried in ancestral monuments, ring ditches, and some were foundational burials (2021).

Early medieval cemeteries also did not include many grave goods. A total of 89 burials or .81% of all burials found to date have grave goods and this number even accounts for minor objects (O’Brien 2021). Of the burial goods found, there is very little consistency. However, the ‘minor’ grave good finds still likely hold special significance. Some common examples of grave goods are deer antlers, beads, quartz, and hearth residue or burnt grain (Ibid.). Beads were mostly found buried with children and very occasionally adults sexed as female. Other, rarer, grave goods were rings or collars, toe rings (sandal hoop), spears, knives, a possible shield, earrings, brooches, stone amulets, and animal bones which were likely food offerings or refuse from funeral feasts (Ibid.). These other grave goods were spread relatively evenly between males and females with males having the weapons and toe ring (sandal hoop) and females being buried with the other jewelry. The number of grave goods is too few to make any accurate assessment of gendered objects or social class, although it is likely that individuals with the less common grave goods were of higher status (Ibid.). The general absence of grave goods reveals they were reserved to the upper class. The animal bones may have been one example of high statues because they indicate a funerary feast, which would suggest the individual had an excess of resources to be able to support such an event (Ibid.). Unlike the extended inhumations, grave goods were occasionally condemned in Christian literature such as feast refuse or food offerings and hearth residue because it was considered a pagan tradition. However, food offering, burnt

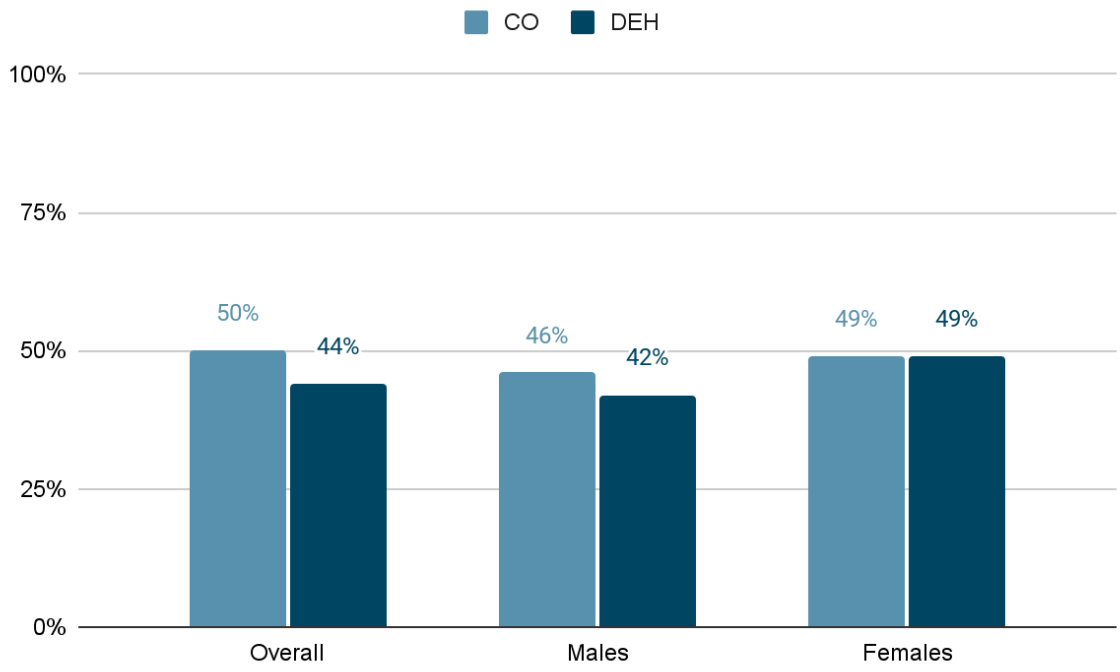
grain, and hearth residue continued to be practiced up until as late as the tenth century despite Chritian condemnation of these practices (Ibid.). The lack of grave goods during the early medieval period makes it challenging to know the dead and the one's burying them.

The skeletal remains are the best evidence for understanding the lives of those living in the past, especially with so little variation in burial practice and so few grave goods making bodily materiality that much more important as it is one of the main ways of accessing these people's lives. As mentioned previously, I will split the interpretation of early medieval burials into two geographical regions to compare to the later medieval period. Generally, it is accepted that Region I experienced the harshest climate of the regions and this is accentuated in the health data. Part of culture and biology is the ecology in which a body is situated and, therefore, affects materiality. Specifically, a harsher climate would cause increased physiological stress on the individuals from that region changing their morphology and constructed body. In Mara Tesorieri's study of 356 total human remains analyzed from Region I, 50% of the overall population showed signs of cribra orbitalia (2016). A large percentage (68%) of these individuals are non-adults that cannot be sexed. Of the adults, 46% of males and 49% of females showed signs of cribra orbitalia (Tesorieri 2016; Figure 2). The younger age group is being impacted the most which would begin to suggest that they are being hit the hardest by dietary deficiencies, but children are innately more likely to be susceptible to metabolic stressors (Novak et al. 2017). Adult females and males are not suffering from dietary issues to statistically different extents, beginning to suggest that they are not eating drastically different foods and neither are getting allotted more resources than the other.

The same study looked at dental enamel hypoplasia (DEH) by looking at all human remains that had at least one incisor and canine observable. The study found that 44% of Region

I's population showed signs of DEH with only 38% being non-adults (Tesorieri 2016). Again, of the females effectively sexed, 49% showed signs of DEH and men had an even lower percentage of 42% (Ibid.; Figure 2). As mentioned above, males have been shown to be more likely to be affected and develop DEH possibly making this disparity larger than the percentages initially appear. However, the disparity may be due to males dying more often before reaching adulthood when they can be sexed. Nonetheless, the percentile difference between males and females in Region I is only 7% which is not statistically significant (Tesorieri 2016). Although females are showing slightly higher levels than males, males and females are experiencing about the same number of physiological stress events during the first 7 years of life.

Figure 2. Comparison of cribra orbitalia (CO) and dental enamel hypoplasia (DEH) percentages for Region I by overall, male, and female (Tesorieri 2016, 131-132).



The average age-at-death for adult females in Region I was 24% of females dying before the age of 25 and in Region I "females showed the largest percentage in both the young (18-25 years) and middle adult (26-35 years) categories," (Tesorieri 2016; Table 1). However, higher

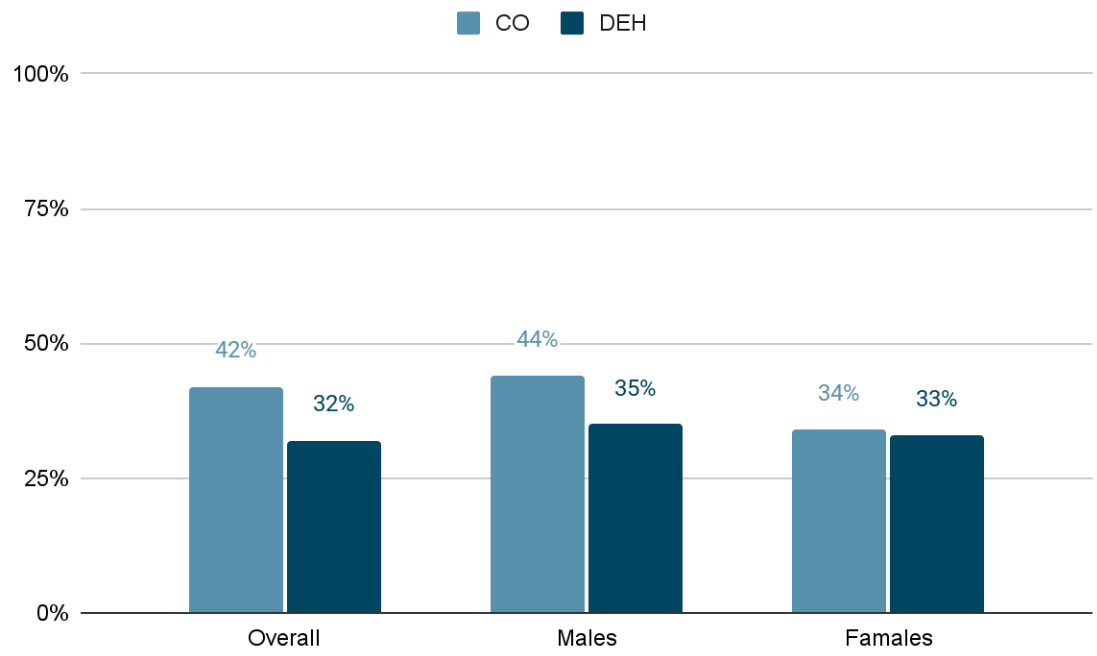
death rates in females from these age categories often suggests that there were also a large number of infants which was not reflected in the data. The health of females may not have been severe enough to cause the death of infants (Tesorieri 2016). Of the females with DEH, 52% of them did not live past 25 years of age and of men with signs of DEH, 23% did not make it past 25 (Ibid.; Table 2). There is no general age-at-death data for men in early medieval Ireland, but males with DEH are showing signs of living past 25 more often than females. This data would begin to suggest that males may be faring better than females in their adult years. Males may also be dying younger from DEH, as mentioned above, and therefore only look as though they are living more successfully with the added stressors from childhood. The latter may be more likely because males tend to be more affected by DEH which does not show in the adult male DEH data so they are dying more often than females before the ages where they can be properly sexed. This would mean males are hit harder in their younger years, going through the bottleneck before reaching maturity while females reach the bottle neck as young adults. The 'bottleneck' event for females could very well be child bearing. Again, childbearing deaths are innately cultural and biological. In this data, the cultural strains on the female body stem from malnutrition events in childhood and impact the female body's ability to handle the pressure of pregnancy. Overall, the heath in Region I is poor with many females dying at very young ages and half of the population expressing significant stress indicators from multiple points in their lives as shown from the high levels of DEH and CO.

Tesorieri's data shows that Region II in Ireland fared much better with only 42% of the population having CO (2016). Based on sex identification, the population of females (34%) had 10% fewer cases of CO than males (44%) (Tesorieri 2016; Figure 3). In Region II, males and females are not experiencing statistically significant different levels of dietary deficiency in

childhood. However, males are experiencing a slightly higher percentage of CO which may suggest that they are experiencing slightly different dietary patterns than females or have been more susceptible to infectious diseases. All that can be concluded from this data alone, is the presence of a slight difference between males and females.

The overall population in Region II has about 32% showing signs of DEH (Tesorieri 2016). DEH was about equivalent for males and females with only about 35% and 33% of them having DEH (Figure 3). Males are more likely to have DEH under the same pressures as females and this could explain the variation. More males in Region II were likely living past the childhood years with DEH and can explain why a higher percentage from this region are present. Generally, the variation between males and females is not significant, but the percentages are even more similar since males are more susceptible and generally living to an age when DEH can be recorded, compared to Region I populations. Males may be experiencing more stress from malnutrition in childhood, but it cannot be ruled out that they are generally more susceptible to expressing signs of DEH. Overall, dental health in childhood is about the same for males and females in Region II meaning they are likely experiencing similar physiological stress from a nutritional standpoint.

Figure 3. Comparison of cribra orbitalia (CO) and dental enamel hypoplasia (DEH) percentages for Region II by overall, male, and female (Tesorieri 2016, 131-132).



Most adult females in Region II were living more consistently into adulthood, with 82% living past the age of 25 (Tesorieri 2016; Table 1). More females were living over the age of 45 with about 24% dying by this age (Ibid.; Table 1). Region II also had the most representation of females making it to old age with about 13% of them dying in old age (Ibid.). For males and females in this region it was also more likely for them to live past young adulthood. In Region I, the percentage of women dying before 25 with signs of DEH was 52% while only about 17% were dying young with DEH in Region II (Ibid.; Table 2). Of the males with DEH only about 15% died before they were 25 and the percentages increased as expected with early and late middle age at a similar rate to women until mature age (Ibid.). The fact that males and females are living into mature adulthood is supported by the lower CO and DEH data in Region II compared to Region I. Region II was healthier because they did not have severe dietary deficiencies and malnutrition compared to Region I. Based on general health indicators such as CO, DEH, and age-at-death, Region II was faring better.

Table 1. Age-at-death data for females in Region I and II (Tesorieri 2016, 129).

	18-25	26-35	36-45	45+	Unknown
Region I (n=356)	24%	30%	23%	13%	8%
Region II (n=508)	18%	17%	23%	24%	16%

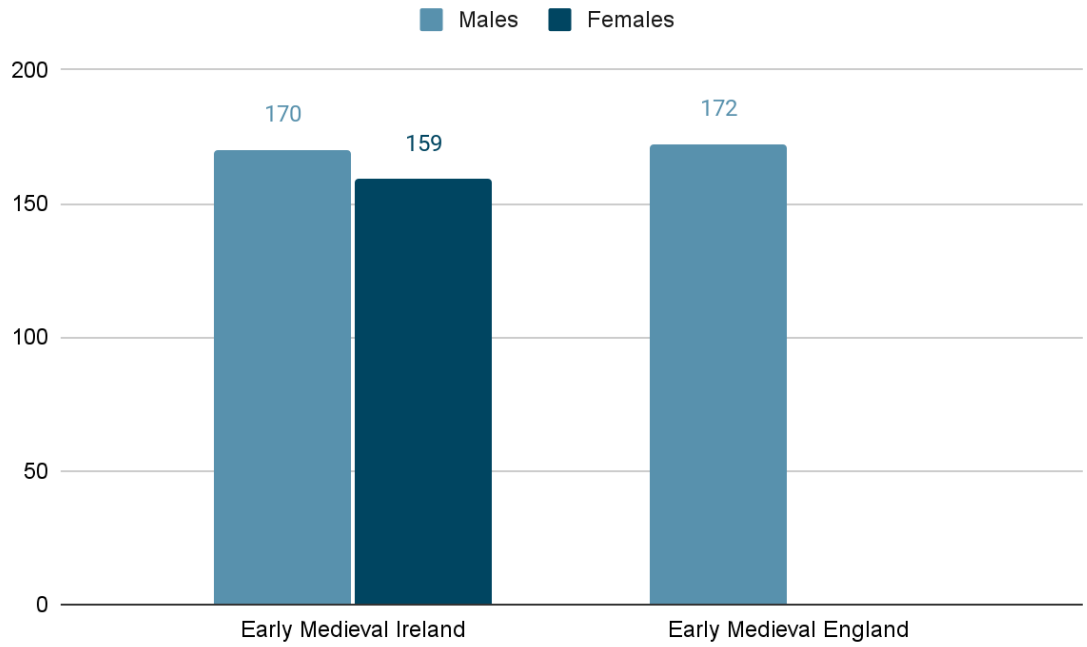
Table 2. Age-at-death data for males and females with dental enamel hypoplasia from Region I and II (Tesorieri 2016, 133).

	Male				Female			
	18-25	26-35	36-45	45+	18-25	26-35	36-45	45+
Region I	23%	23%	35%	19%	52%	20%	12%	16%
Region II	15%	35%	35%	15%	17%	22%	33%	28%

Tesorieri covers the CO, DEH, and age-at-death data but does not address the other health indicators this research explores so a shift to other sources is necessary for the remainder of the data. Due to other sources not using the regional variation, the rest of the data will be separated when possible into Region I and II but combined as general early medieval data when the regional split is not feasible. The lack of a split for some data points will not hinder the comparison with the later medieval period. For this research, the early medieval period is being used only as a standard to assess any changes that occur with Anglo-Norman colonization. The colonization event impacts Region II (Ardreigh) not Region I (Ballyhanna).

The last general health indicator is average height. At Faughart Lower cemetery, the average height of males is around 170 cm or a bit over 5 ft 5 in and 159 cm or 5ft 2in for females (*Final Excavation Report of Phase 2 Excavations* 2011; Figure 4). According to the site report this is comparable to the general Irish height for the medieval period (Ibid.). For comparison, the English during the early medieval period were around 172 cm or 5 ft and 6 in for males (Hanes and Wolcott 2018). Faughart lies between Region I and Region II in Ireland, but serves as a productive general height indicator for early medieval Ireland.

Figure 4. Stature comparison between males from early medieval Ireland and England with female data for reference (*Final Excavation Report of Phase 2 Excavations* 2011, 18; Hanes and Wolcott 2018, 8).



As discussed above, general health indicators serve as general measures of health throughout an individual's life. The next set of data is specific events that contribute to cultural practices and singular events, violence and injuries. There are many other cases of weapon injury from early medieval cemeteries, but many have been debated as postmortem trauma as a way to prevent the dead from returning to haunt the living (O'Brien 2021) or other postmortem practices. Many of these burials are separated out by the absences of hands, feet, and head with few to no other injuries present. Other burials such as a female from Kildare, has evidence of a stab wound into the chest, but because there are no defensive wounds, was from the community, and buried in a recognized burial, O'Brien suggests that this may have been evidence for postmortem heart removal (2012). For the sake of consistency, the weapon injuries that are not clearly from ante-mortem or peri-mortem instances will be considered indeterminate and not included.

About 13% of the skeletal remains found to date have signs of weapon trauma from early medieval Ireland (O'Brien 2012; Geber 2015). In Region II, two different types of weapon trauma are present from the eastern and western sides of Region II. At Owenbristy cemetery, on the western side of Region II, 18% of individuals showed signs of weapon trauma while Mount Gamble cemetery, in the East, only had about 3% of skeletal remains having weapon trauma (Geber 2015). The western side displayed more decapitation than the eastern and the neck was the most common body part affected by weapon trauma (Ibid.). The next most common were the head, torso, upper and then lower limbs, in order. Two adolescents showed signs of trauma with one being decapitated and suffering from stab wounds to the chest, back, neck, and clavicle (Ibid.). Another adolescent was decapitated and only had two cuts on the skull. There were also two cases of adult females being decapitated, with one also being cut through the lower spine and, in life, through the intestines (O'Brien 2012; Geber 2015). It is worth mentioning that one female body is carbon dated to before the law (*Cáin Adomnáin*) protecting women, children, and clerics from violent conflict in warfare (Ibid.). The two females were buried in the same grave but at different times so there may have been a further connection between them (O'Brien 2012). While evidence does show violence against women and adolescents, most violence at Owenbristy was targeted at men. 6 men showed signs of significant weapon trauma. 3 of the 6 men showed signs of decapitation and all showed a mixture of, stabbings in the chest, back, through the scapula, radius, mandible, and many more (Geber 2015). An exceptional example was one man having 127 individual cut marks from knives, and swords or axes focused mainly on the chest and stomach regions as well as several marks on the pelvis meaning the groin was targeted (Ibid.). However, this level of violence should not be taken as normal for early medieval Ireland though it is worth mentioning its presence. There are two similar cases at Raystown and

Faughart Lower where one male was stabbed 110 times and one male was likely genitally mutilated (Buckley and McConway 2010; Fibiger, 2021). Additionally, all the weapon trauma inflicted at Owenbristy was inflicted using swords and axes (Geber 2015).

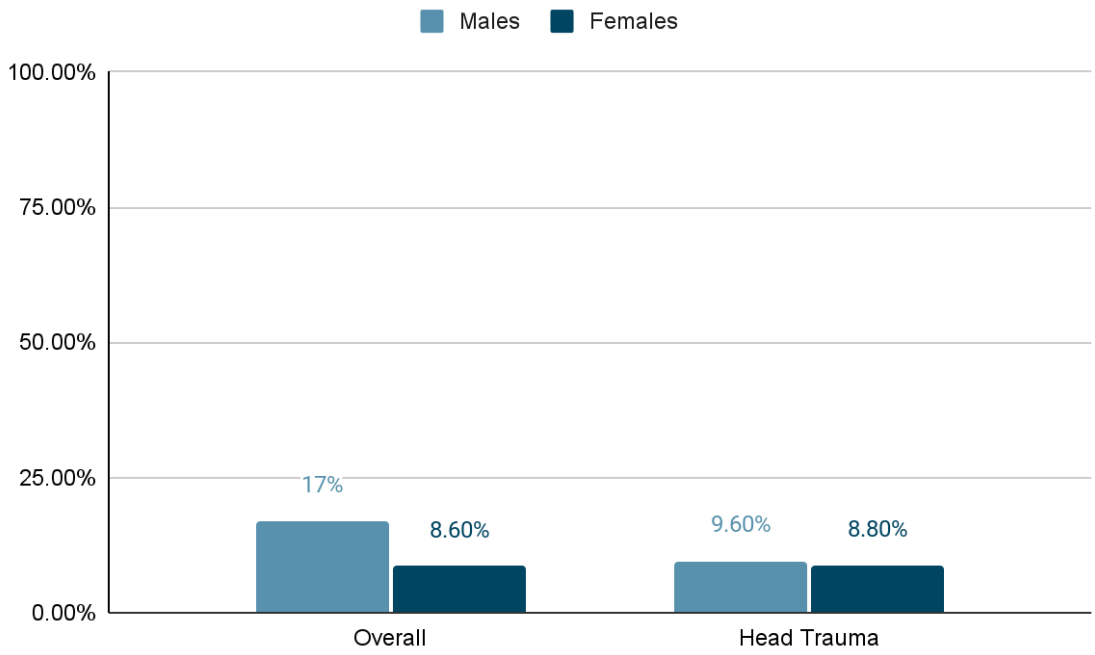
Mount Gamble, in the East of Region II, had significantly fewer cases of violence but still had most weapon trauma targeted at the neck, "followed by the torso, lower limbs, head and upper limbs" (Geber 2015). All evidence of violence was inflicted on skeletons identified as male (Ibid.). Evidence of two decapitations are present with both individuals having stab marks. One of these two males, had been stabbed in the back and had defensive cut marks on his forearms (Ibid.). Another male had been stabbed in the chest, abdomen, ribs, neck, back, hip, and interestingly, the feet and likely had their ear removed (Ibid.). The last two males were stabbed in the back and one displayed possible defensive wounds in the hands and forearms. None of the skeletal remains of adolescence showed signs of weapons trauma which matches the low percentages at 5 other early medieval cemeteries (Ibid.). All five of these cemeteries are located in Region II on the eastern side of Ireland. Only half of these inflicted individuals were delivered blows from axes or swords (Ibid.). These two populations at Mount Gamble and Owenbristy have many similarities, including decapitations, mutilation and conflict mostly centered around the males. These males also showed signs of os acromiale, or evidence of extensive stress on the shoulder joint and muscles, suggesting they were trained in warfare (Ibid.) The more eastern populations may have had more contact with axes and swords so they could have been more prepared for this type of conflict or were using different warfare techniques and morals (Ibid.). The level of violence against adolescence would support the idea that different morals or age ranges were expected between the East and West in Region II.

Lastly, there is evidence of non-fatal weapon trauma, from Owenbristy, Parknahown, Faughart Lower, Lehinch, Millockstown, Ratoath, and possibly a few others (O'Brien 2012). 3 males at Owenbristy, displayed violent injuries but they were partially or completely healed. One had blade injuries to the face, another had trauma that penetrated the skull, and the last had sharp cuts to the head (Ibid.). At Parknahown, four skeletons showed signs of injuries to the face and skull as well. Two of which were identified as male and two unsexed but one is identified as a probable male. One of the two identified as male was elderly and had sharp trauma to the head. At Faughart Lower, one middle aged (40-44 years) male had partially healed trauma to the head (Ibid.). There were also a few males from Lehinch, Millockstown and Ratoath that had blunt force trauma wounds that had healed but later still died due to weapon trauma (Ibid). For the most part, violence appears to be a male activity with females exhibiting few causes of weapon trauma. The low level of violence against female bodies shows that the *Cáin Adomnáin* or law that prohibits violence against women appears to be relatively effective. Males are exhibiting signs of being the perpetrators and recipients of formal warfare due to their os acromiale and having violent injuries significantly more often than females. Violence in early medieval Ireland is a male activity.

Non-violent related injuries are also common in early medieval Ireland. In a study of Ardsallagh, Augherskea, Claristown, Collierstown, and Omey Island –all in Region II and all but Omey Island in the East– 13.5% of 239 adults had some sort of fracture (Novak 2014). About 17% of males exhibited fractures while only 8.6% of women appeared to have non-violent injuries (Ibid.; Figure 5). Around 9.2% of adults had cranium fractures (Ibid.). Males represented 9.6% of the head traumas and females, slightly lower, at 8.8% (Ibid.; Figure 5). The vast majority of the injuries were "fractures of the ribs, crush fractures of vertebral bodies, and foot

bone (talus and calcaneus) fractures" (Ibid.). The fractures displayed were mostly on the left side. Of long bone injuries, most fractures were of the tibia (1.7%), clavicle (1.1%) and radius (0.5%). The vertebrae, rib, and foot injuries were likely from the result of a fall (Lovell 1997). The rib and clavicle fractures are also likely to be from labor, especially from close contact with large domesticated animals such as cows or horses. A study of early medieval Britain conducted by M. A. Judd and C. A. Roberts, looked at the skeletal remains of rural and urban communities. They found that fractures in both males and females during the medieval period were likely due to contact with large domesticated animals as well as occupational injuries because of the significant difference and type of injuries from rural and urban environments (Judd and Roberts 1999). Males have a higher rate of injury than females which suggests that they are participating in activities with different levels of danger. Both are likely participating in rural farming activities but are doing separate forms of labor. Some of the disparity in injury may be from higher percentages of males participating in violence but sharp force trauma is not identifiable so they have been considered non-violent injuries. Nonetheless, males are experiencing higher percentages of day-to-day injuries which show that they are at higher risk in their everyday lives.

Figure 5. Comparison of overall injuries and head trauma injuries for males and females (Novak 2016, 2).



Early Medieval Conclusions

Region I is managing far worse off with all health indicators, CO, DEH, age-at-death, and age-at-death with DEH than Region II (Figure 6-7). Tesorieri argues the regional variation could very well be due to unpredictable climate with inconsistent temperatures and weather (2016). Region I would have likely been experiencing wet and cold winters and mixed weather in the summer months (Ibid.). However, further research is required to conclude exactly why the patterns between Region I and II are experiencing different levels of stress. For now this difference will be used as a baseline for the cemeteries used for the later medieval period, Ballyhanna (I) and Ardreigh (II).

Figure 6. Region I and II cribra orbitalia data by sex (Tesorieri 2016, 132).

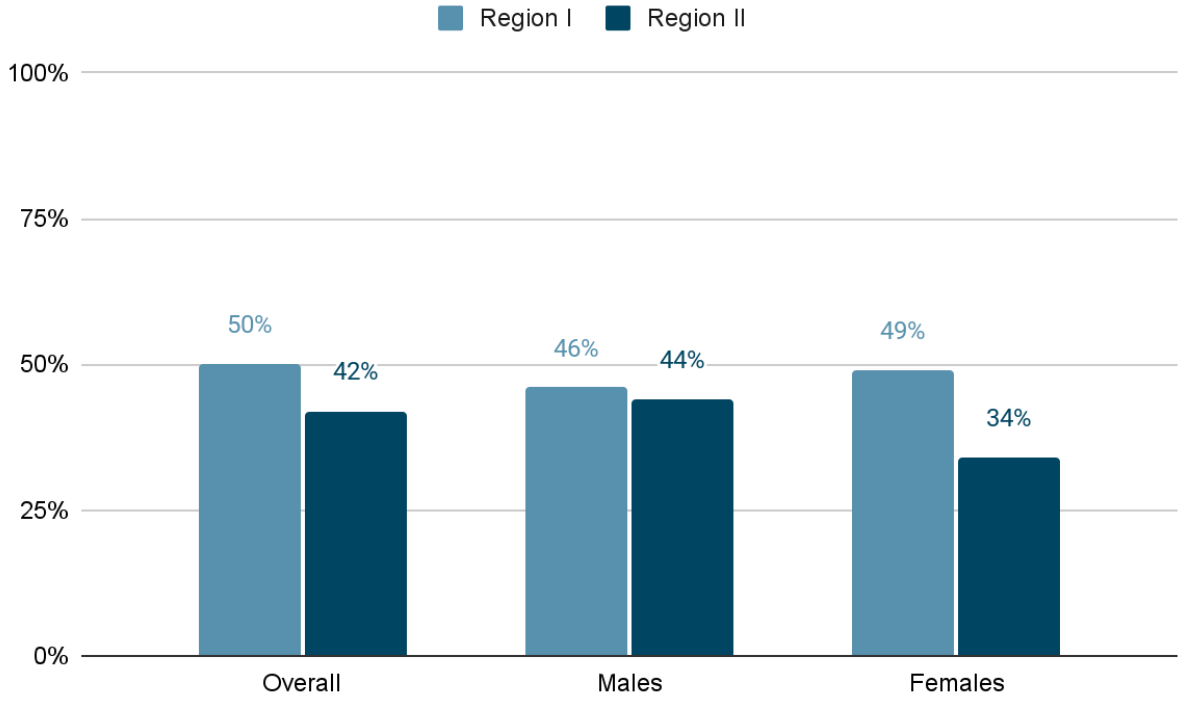
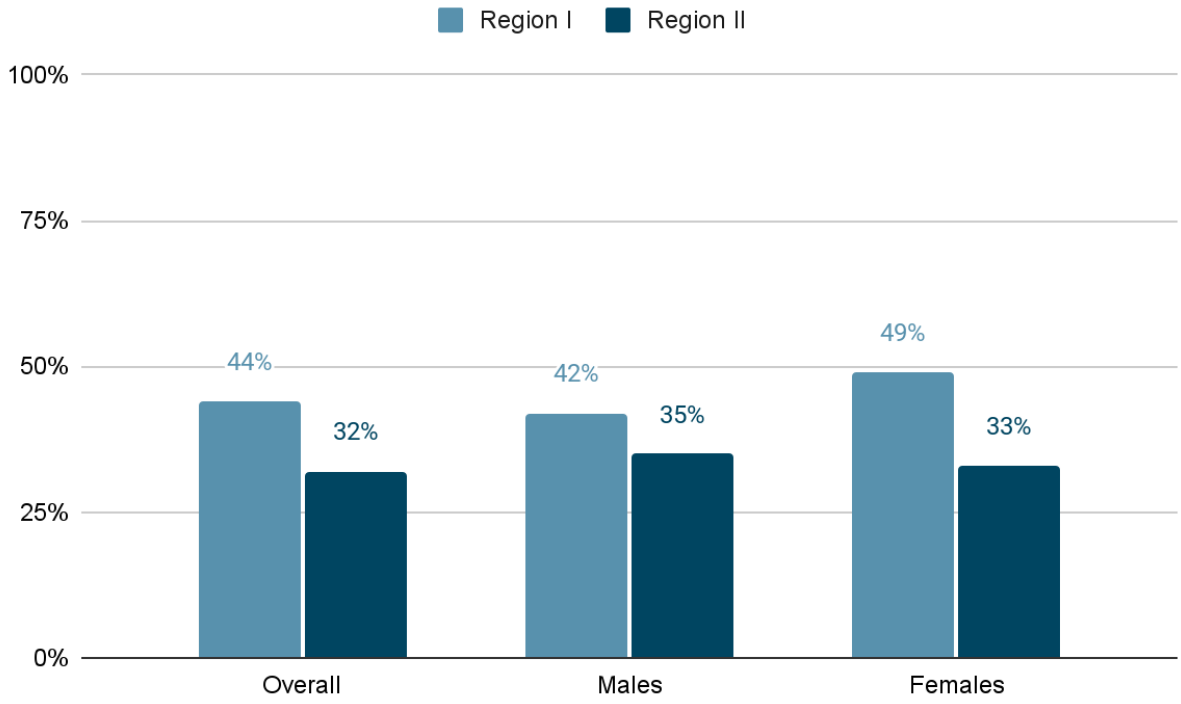


Figure 7. Region I and II dental enamel hypoplasia data by sex (Tesorieri 2016, 132).



The similarity in their bodily materiality and morphology represents the construction of males and females as equal by being allocated the same resources and to the same degree. The health is worse for Region I but the level of health is not split significantly based on gender (Figure 6-7). Males and females in both regions are showing similar percentages of CO and DEH meaning they are both experiencing similar dietary deficiencies and symptoms of malnutrition in the first 7 years of life. Neither males or females are given priority for resources or their health would be materially constructed as better than the other's. Females in Region I with life long compromised health shown through DEH data, are dying consistently younger than their male counterparts. Females may have been an especially vulnerable population in Region I when in childbearing years because of the multiplied stress of pregnancy and lifelong malnutrition (Tesorieri 2016). However, it is just as likely that males went through the 'bottleneck' episode or 'weeding' out process younger than females and are represented less in DEH data for Region I. Due to this possibility and the overall similarity between males and females in Region I, there appears to be little difference in the male and female experience. Females in Region II had less experience with malnutrition and, therefore, had fewer complications with the physiological episodes in their childbearing years. The biological responses of CO and DEH in the body show male and female bodies are being created through equal cultural treatment.

The age-at-death data does, at first, appear to suggest a slight difference in age-at-death for males and females. However, it is in the context of skeletons that have DEH. Individuals with physiological stressors in childhood tend to either not live through these events or are more likely to die later from added stress, as mentioned in the methods section. In this case, it is likely that males are dying in childhood while females are dying in their young adult years during pregnancy and birth. The female body's ability to deal with childbirth is culturally and

historically contextual and their lifeways from childhood negatively impact their survival rate. It is likely that the female bodies are constructed to be less successful in this endeavor due to malnutrition events in childhood. However, this does not mean that males are healthier. Instead, they are both heavily impacted and the added stress of childbearing is compounding the pressure on the female body and making them die earlier.

Two glaring differences between males and females are in the level of violence and day-to-day injuries experienced by each. The level of violence inflicted on a body is dependent on sex and gender in medieval Ireland and therefore sex is created through this violence. The male bodies are responding to violence and severe day-to-day injuries while the females bodies are not. Therefore, they are likely dealing with different types of labor, including both subsistence and combat activity. Including both general health indicators and patterns of injury, males and females are participating in different labor but are sharing equally in health deficits suggesting they are considered equally valuable because they are equally deserving of resources. The materiality of sex and gender in the bodies of the early medieval populations would suggest equal treatment but differences in labor.

The osteological data depicts a more equal relationship between males and females than the early medieval literature suggests. Laws compare women to slaves and children. Other literature paints a tedious relationship between males and females comparable to that of an animal and owner. While the written sources are relatively inconclusive on the state of male and female relationships, the material body depicts an equal relationship and status between males and females. Both male and female bodies are a product of similar cultural states since they are receiving the same amount of sustenance, similarly susceptible to disease, and are under the same levels of physiological stress. These health indicators point to a relatively equal partnership

because neither males or females are being favored in access to resources in childhood or adulthood nor is a group under substantially more stress from their cultural practices putting extra strain on their bodies. The lack of data indicating a difference of treatment may not even indicate that the general population divides themselves along the lines of sex and gender since they do not construct it into the health of their bodies. The materiality of male and female bodies is a more robust view of gender relationships because the construction of culture and biology show a depiction of male and female relationships that are quite equal.

The osteological report does show that a female and male identity are built through violence and labor reflecting statements from historical texts. Male bodies are formed under the pressures of more interpersonal violence which possibly reflects a level of cultural effectiveness of the *Cáin Adomnáin* law. The female sexed and gendered body is not created with the impact of violence reflecting a culturally accepted ideology of male on male violence. The labor completed by males is likely different from that of females because of the varying percentages of day-to-day injuries. The written records do specify a difference in labor which is reflected in the materiality of the body. Again, male and female identity are not static or universalized. The biological responses from varying degrees of danger in labor practices are the active making of Irish sex and gender categories. Their bodies are a product of equal treatment but with varying levels of interpersonal violence and types of labor. In reviewing the body as materiality, primacy is not given to culture or biology and in doing so a more complex version of early medieval Irish gender relationships can be understood, avoiding nasty misunderstandings in the process.

Late Medieval Osteological Data

The later medieval period had similar burial types as the early medieval. The general trends were supine inhumations and grave goods were still uncommon. The grave goods will be

discussed in the context of each cemetery. As mentioned earlier, I will be looking at two specific cemeteries, Ballyhanna and Ardreigh (Figure 8).

Figure 8. Map of Ireland depicting locations of the sites from the late medieval period.

Ballyhanna

Ballyhanna is in Region I of Ireland positioned on the River Erne (McKenzie and Murphy 2018). Little of the associated town has been excavated but little evidence of housing structures may remain due to the common dwelling being made from sod, clay, and thatched roofs (Ibid.). A chapel was established and likely administered to the community (Ibid.) In the later periods of occupation, a tower house was erected across the River Erne as an elite residence (Ibid.). The human remains are dated from the early 8th century to the 17th century with most of the population being buried between 1200 and 1650 (Ibid.). Ballyhanna is one of the first late medieval cemeteries to be studied extensively outside the area of control and influence of the Anglo-Normans making the site predominantly Gaelic. The vast majority of the remains were laid to rest in a supine position with their feet to the East and head to the West. This position

matches the typical Christian burial practices with the feet to the East so that they shall be ready for Christ's appearance in the East (Ibid.). Their arms were placed either over their pelvis or by their sides. The vast majority of the burials also seem to be wrapped in a shroud before burial which again matches the Christian burial pattern (Ibid.). Multiple styles of shroud wrapping were likely used based on the shoulder placement of the dead suggesting wrapping was not strongly regulated.

Some exceptions to this burial type were prone, flexed, and North-South burials. The prone burial may have simply been some confusion as to which way the dead were facing since they were wrapped before burial and there was no particular cluster of prone burials (McKenzie and Murphy 2018). These burials could have also been disturbed when the bodies were relatively fresh by other burials that came later which would explain some of the strange positioning (Ibid.). The flexed burials were less likely to be accidental since they were all located in one area and two of the three had lesions consistent with tuberculosis. The prone burials only make up .003% of the total remains so they are extremely rare (Ibid.). Only ten North-South and South-North burials were present. All three of the adults accounted for in this number were female and five of the oddly oriented burials were individuals with severely disabled either from a pathological condition or severe injury such as a vertebral fracture, severe hip dislocation, skull fracture, and palaeopathological lesions consistent with tuberculosis (Ibid.). Although many were physically impaired, this was likely not the only reason they were buried differently because many impaired individuals were also buried in the West-East orientation (Ibid.). Differently oriented burials were not necessarily indicative of a negative connotation since one of these burials had extensive grave goods, which was one of few.

There are few artifacts from Ballyhanna and few can be identified as grave goods. The others are likely accidental inclusions or not associated with a burial at all (McKenzie and Murphy 2018). The artifacts that can clearly be identified as grave goods include: coins, beads, scallop shells, flint, metal, and quartz (Ibid.). A total of four coins were found and only two were buried with female individuals. These coins were located by the knee and in the situ among the ribs (Ibid.). The strange placement of the coins likely indicates they were in the clothes of the individuals buried or sewn into the hem of clothing. The glass beads were found in a couple burials, all female and children. One woman had 14 beads and a fragment around her neck region (Ibid.). Another four beads were found in three burials and a few more were found in the burial of children. These beads may have been rosary beads for prayer or 'gifts' to protect the dead. Scallop shells were a sign of pilgrimage to Compostela for either religious rites or for cures for illness. Few males and females were buried with these shells. One female in particular had severe back misalignment and fusion so she or a loved one made the journey in search of a cure (Ibid.). The shells in general were not allocated more heavily to males or females so it is likely both went on pilgrimage and kept this shell as a sign of accomplishment (Ibid.). One woman was buried with a Neolithic or Bronze Age flint arrowhead in her hand. This was likely a prized possession or associated with nature and magic which was a common conception of prehistoric artifacts during this period (Ibid.). Two pieces of metal, likely a belt and Anglo-Norman arrow head, were found in two burials (McKenzie and Murphy 2018). The belt was found in an adolescent's burial and the arrow head in a young adult male's grave. There is no osteological evidence that this arrow caused this individual's demise (Ibid.). Instead, it is more likely to be intentionally placed or accidentally dropped into the burial. The most common grave good was quartz with 52 individuals buried with some quartz artifact and 76 total quartz pieces (Ibid.). Of

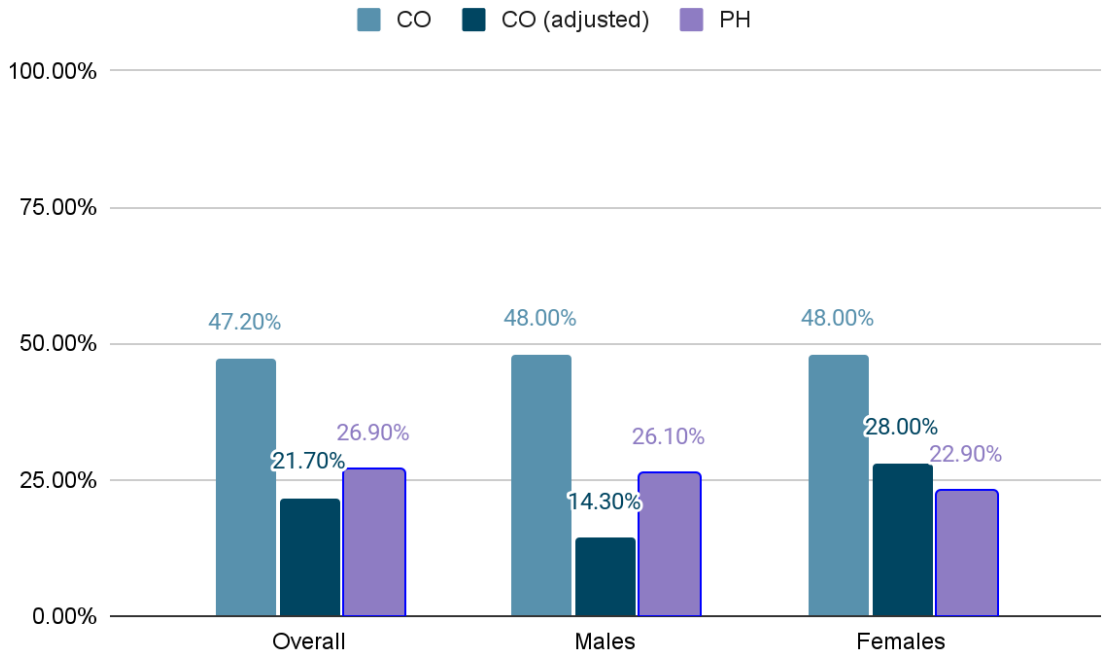
these 52 individuals only 18 could be identified as associated with a particular individual and of these 18, 17 were adults. Only four of the burials were male and the rest female. These quartz were accompanied by other religiously significant artifacts like beads and shells. This association may suggest the individuals buried with quartz were particularly devout (Ibid.). Overall, the grave goods were mostly buried in female graves but there are so few that very little can be surmised from this data.

Of the skeletal remains found, a total of 427 juvenile burials and 869 adult remains were identified (McKenzie and Murphy 2018). The completeness of the remains was poor with only 25% of juveniles having 75% or more of their skeletal remains present (Ibid.). The level of completeness followed the general trend that more robust bones were less fragmented (Ibid.). A total of 322 (37.1%) were identified as male, 333 (38.3%) as female and 214 (24.6%) as indeterminate out of the 869 adult individuals recovered. The high percentage of unsexed skeletal remains from Ballyhanna makes it imperative to include this third category in the research as much as possible since they make up around 25% of all the adult remains. The fragmentation of the remains makes it challenging to age a large majority of them as well. One third of the adults could not even be aged into a broad category (Ibid.). More specifics on the topic of age will be discussed below in the age-at-death section.

Of the bodies recovered from Ballyhanna, 47.2% of bodies showed signs of cribra orbitalia (McKenzie and Murphy 2018). Men and women experienced this about evenly with 48% of male and female skeletons showing signs of CO (Ibid.; Figure 9). However age is a factor, with 43% of young females and only 23% of young males showing signs of it. Mckenzie and Murphy suggest this disparity is due to difficulties with pregnancy and already struggling bodies having to deal with childbearing. It is also possible that more males died younger at

Ballyhanna and did not make it to older ages because there are more children that are probably male after a small DNA test was conducted (Mckenzie and Murphy 2018, Tierney and Bird 2015). Males would have been under more stress during childhood and 'weeded' out earlier while women would have undergone this process when they were older, making the prevalence of adult females with CO at a young age appear higher. When adjusted to compare to Ardreigh (where porosity was not recorded if only capillary impressions were present or when the lowest severity of CO is not included), men at Ballyhanna have 14.3% while females showed 28% which makes males one of the best results for the region at the time and females the worst when measured in relation to comparable populations (McKenzie and Murphy 2018; Figure 9). Porotic hyperostosis is evident in 26.9% of the Ballyhanna adults with about 26.1% in males and 22.9% in females (Ibid.; Figure 9). While this is not statistically significant, it is worth noting that males are exhibiting a slightly higher percentage of PH while the opposite is true for CO. Only 20 adults were affected by both CO and PH. In the younger age bracket, almost 17% of females and only about 4% of males were affected by both (Ibid.). These individuals may have been struggling with many vitamin deficiencies because they were impacted by both CO and PH (Ibid.).

Figure 9. Cribra orbitalia (CO) and porotic hyperostosis (PH) data for overall population, males, and females at Ballyhanna (McKenzie and Murphy 2018, 173 & 179). Adjusted cribra orbitalia data was created to facilitate a comparison with Ardreigh by not including the least severe symptoms of cribra orbitalia (Ibid.).



Males and females are equally showing symptoms of dietary deficiencies with 48% of them having CO. While these numbers are reflected differently when capillary impressions are not included (the lowest level of severity is not included), females appear to have a significantly higher percentage of CO and more severe cases. Males having less severe CO would also suggest that they were under more physiological stress and unable to live through the dietary deficiencies that cause CO to allow it to reach more severe levels (Wood et al. 1992; McKenzie and Murphy 2018). Males are dying younger with CO and before the ages when sexing the body is possible or before the symptoms can get severe (Wood et al. 1992). This is especially likely when coupled with the high percentages of males' dying early in both childhood and adulthood discussed below in the age-at-death data. Therefore, males and females, despite the adjusted data, would still be undergoing similar levels of physiological stress or that males were under slightly more pressure. Females are simply living to childbearing age and experiencing the effects of this stress

to a greater extent in this age group than males who have already gone through their 'bottleneck' or 'weeding' out process. Similar trends are apparent in the PH data with both males and females showing symptoms of the deficiencies that cause PH. The bodies' biological response to the culture diets of males and females show that both are participating in the same dietary practices.

The Ballyhanna assessment of DEH is focused on linear enamel hypoplasia which is a specific form of DEH. 17.7% of the total population at Ballyhanna displayed linear enamel hypoplasia with 15% of the 17.7% of these being in the young adult age group (McKenzie and Murphy 2018; Table 3). This may suggest a strong correlation between early death and stress during childhood. 11.9% of males and 9.9% of females had linear enamel hypoplasia (Ibid.; Figure 10). Both percentages are relatively low in comparison with the rest of medieval Europe meaning one of two things: either that the individuals from Ballyhanna were under less stress or that children were under way more stress and did not successfully make it to adulthood (Ibid.). For DEH to appear on teeth the child must have lived through the period of stress for it to show up on their teeth so these numbers may be skewed if many children did not make it past these points of stress (Ibid.). Either way, adults with linear enamel hypoplasia were experiencing earlier deaths than those without clear evidence of childhood stress. Other dental indicators such as caries and calculus were recorded as well. Caries and calculus increased in age which is consistent with trends in modern populations with the jump of about 30-40%% for both males and females from the young to old age brackets (Hillson 2001; McKenzie and Murphy 2018). Around 17% of young males had dental caries, 33% of young females showed signs of caries and 37.5% of those without an identified sex were affected (Table 3). In the older age group, males were at about 57% and females at 50% (McKenzie and Murphy 2018; Table 3). Overall, 31.4% of males and 41.4% of females were affected (Ibid.; Figure 10). When counting based on

the number of total teeth in the population instead of by individual, only 5.5% of teeth were affected which was relatively low compared to other populations during this period (Ibid.). A very large percentage of the population was affected by calculus. A staggering 100% in the middle age category for males, females, and indeterminate as well as 100% for males in the old age category (Ibid.). Overall, 96.2% of men had calculus and 96% of women (Ibid.; Table 3).

Figure 10. Comparison between male and female dental health at Ballyhanna using dental enamel hypoplasia (DEH), caries, and calculus as variables (Mckenzie and Murphy 2018, 146 & 183).

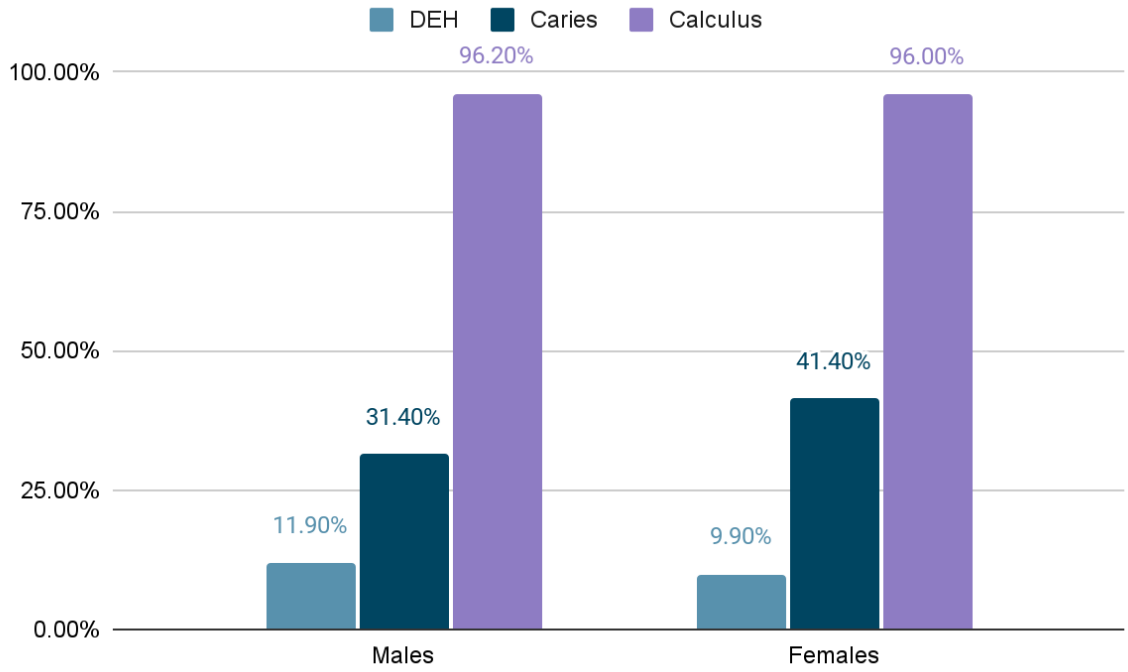


Table 3. Dental health indicators for males, females, and indeterminate by age category at Ballyhanna. *0 individuals are present for analysis in this category (Mckenzie and Murphy 2018, 146 & 183)

	Males			Females			Ind.		
	18-35	36-50	50+	18-35	36-50	50+	18-35	36-50	50+
DEH	19.3%	3.1%	0.0%	11.6%	10%	0.0%	14.3%	0.0%	0.0%*
Caries	17.7%	58.1%	57.1%	33%	56.4%	50%	37.5%	71.4%	0.0%*
Calculus	96.2%	100%	100%	96.8%	100%	83.3%	87.5%	100%	100%

DEH is incredibly low at Ballyhanna compared to other medieval Irish populations. Males and females are not showing statistically different percentages for DEH which means they

are experiencing the same physiological stress levels in the first seven years of life. Even if the Ballyhanna population has lower percentages because fewer children are making it to adulthood, both males and females are showing that they are dying younger at the same rate for these stressors because of the similar percentages in adults. As mentioned in the methods section, females are much more susceptible to caries than males because of hormones during puberty. The higher percentage of females in the younger age bracket with caries would reflect this high onset of cavities with female puberty. These numbers become more equal through their lifetimes and by old age only a 7% difference is recorded. An overall similarity in calculus further signals a similarity in female and male health and diet. Males and females are suffering from the same dietary deficiencies and evidence for malnutrition in childhood, so neither are receiving special treatment over the other in terms of sustenance. The male and female bodies' are again showing similar biologically responses which shows their experience with childhood cultural practice and diet must be similar.

Age-at-death statistics are often relatively unreliable and at Ballyhanna only about 62% of the population could be both sexed and aged. The numbers must be utilized with caution for anything specific but the large age categories of young, middle, and old adults should decrease some of the unreliability of age-at-death data. At Ballyhanna, 52.1% were not making it past 18-35 (McKenzie and Murphy 2018). Over half of the population was dying before they reached middle age. Another 39.7% of the population did not live past 35-50 and only 8.2% lived beyond 50 years of age (Ibid.). When this distribution was calculated along the lines of sex, a higher percentage of males (57.4%) were dying from 18-35 while only about 47.3% of females were dying in this age group (Ibid.; Table 4). As it follows from here more females were represented in the middle adult (42.5%) and old adult (10%) categories and males were less represented with

only 36.4% represented from the middle adult and 6.2% from the old adults categories (Ibid.; Table 4).

Table 4. Age-at-death data for males and females at Ballyhanna (McKenzie and Murphy 2018, 100-101).

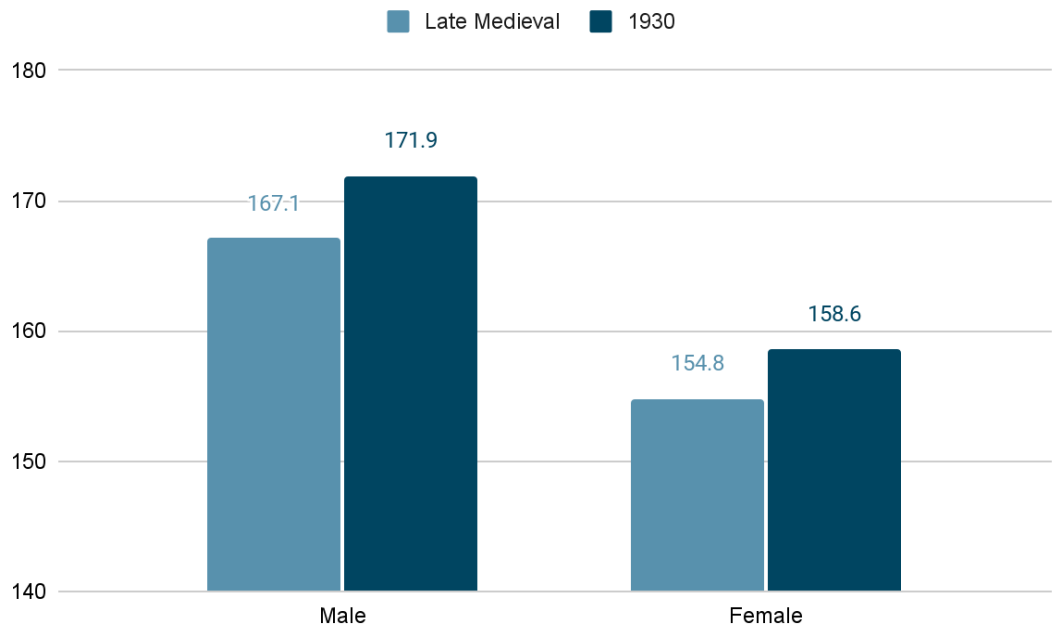
	Males			Females		
	18-35	36-50	50+	18-35	36-50	50+
Age-at-death	57.4%	36.4%	6.2%	47.3%	42.5%	10%

Unlike some of the other health indicators, Ballyhanna has a very low average age-at-death while this is not the case in medieval England where 40% of the population was living to the age of 50 and beyond (Ibid.). The high mortality rate for younger adults is not entirely surprising for a poor rural population. What is somewhat surprising is that the vast majority of males and females are dying in the younger age category, as well as males being more represented. As mentioned above, women are often associated simply with fertility (Joyce 2006; Stone and Walrath 2006) and their bodies are considered incapable of dealing with childbirth so it is not surprising that the early deaths of women were chalked up to pregnancy and childbirth (McKenzie and Murphy 2018; Stone and Walrath 2006). However, at Ballyhanna, males are dying early just as often or more often than females. The females may also be impacted by pregnancy but this is quite blatantly not the only cause of early death for them since men are also experiencing the same early death phenomenon. The males may be under more stress because they are dying earlier at a statistically high percentage even when accounting for the complications that can come with childbearing. The lack of extra social and cultural stressors on females is indicated in the age-at-death data. Males and females are both faring poorly in the young adult categories. If anything, extra cultural physiological stress appears to be impacting males more than females but this one data point is not enough. The CO, PH, and DEH data suggest an equal level of strain on male and female bodies so a non-dietary and nutritional cause

may be at play for early death in males. Male and female bodies are constructed under similar physiological stress and are dying, due to this pressure, around the same time.

The last non-specific health indicator to be discussed is average height which is based on a formula which is sex dependent so there is no category for indeterminate sex. As mentioned previously, the measurement specifically for female bodies may be slightly skewed shorter because of the bias in the formula (Jantz 1992). Despite the disagreement about the universality of the formula, females and males can be compared across Ireland with the same formula with little variation of bias but caution should be taken with comparing male and female average heights. The average height for females was 154.8 cm or 5 ft .8 in with a range of 142.7 to 166.7cm (McKenzie and Murphy 2018; Figure 11). The males ranged from 152.6 to 179.4 cm with an average height of 167.1cm or 5 ft and 4.8 in (Ibid.; Figure 11). Mckenzie and Murphy conducted an analysis with the present day populations in the Ballyhanna region using Hooton and Dupertuis data from 1930 to see if the Ballyhanna was short due to genetics. Early 20th century women averaged about 158.6 cm or 5 ft and 2 in and men averaged 171.9 cm or about 5 ft and 6 in (Ibid.; Figure 11).

Figure 11. Comparison between male and female statures from late medieval to 1930s Ireland in Region I (Mckenzie and Murphy 2018, 169).



Male and female statures are not directly comparable. These 20th century numbers are from the descendants of those at Ballyhanna and are not significantly from the overall average Irish population meaning those at Ballyhanna were likely not short due to genetics (Ibid.). The shorter height at the site is then more likely to have been from malnutrition or other deficiencies during childhood. The large disparity between the female average height at Ballyhanna and other late medieval Irish populations may suggest more strain on females in childhood but both males and females were experiencing a reduced height average compared to other regions. Although, otherall, the data would suggest that in comparison to other medieval sites, the Ballyhanna population is quite short. The height disparities would indicate undernourishment but to about the same degree due to the 1930s data being proportionally taller for both males and females. Overall, Ballyhanna is an undernourished town in late medieval Ireland as seen through stature as well as the other data provided.

The presence of observable violent injuries was relatively low at Ballyhanna with only 1.8% of the adults or 16 individuals showing signs in the skeletal remains (McKenzie and Murphy 2018). The adolescents had about 2.9% of skeletal remains affected by violence (Ibid.). Of the areas so far, male and female skeletons have been affected roughly the same with minute variation but violence is heavily male with about 3.7% of males being impacted versus 0.9% of females (Ibid.; Table 5). This 2.8% difference is statistically significant. Those in the indeterminate category only had one individual that showed signs of violence which averages out to only 0.5% from the indeterminate category (Ibid.). There was also a large disparity between violence inflicted on young versus older remains. For female remains, the highest percentage was 1.5% and this was within the younger age range (Ibid.; Table 5). Similarly, younger males were affected more often with 58% of males with signs of violence injury being from the young age grouping (Ibid.; Table 5).

Table 5. Violent injuries for males and females at Ballyhanna (Mckenzie and Murphy 2018, 356).

	Males				Females			
	18-35	36-50	50+	Total	18-35	36-50	50+	Total
% of weapon trauma	4.7%	1.1%	6.3%	3.7%	1.5%	0.0%	0.0%	0.9%

Of the 16 adults with weapon trauma, 12 had violent injuries to the head in the form of sharp-force trauma. All three of the females with violent injuries were on their cranium. Two of these females were severely fragmented so little could be surmised from their remains but each only experienced one sharp trauma to the cranium (McKenzie and Murphy 2018). The third female had two blade injuries to the posterior side of the cranium and both had time to heal significantly before death (Ibid.). Of the nine males, six only displayed one cranium injury. Three of the nine males exhibited other injuries such as rib and humerus fractures, dislocation of a knee

joint, rib inflammation, and a stress fracture in the spine (Ibid.). However, these injuries are not obviously from weapon or violence trauma. Only four adults showed signs of post-cranial weapon trauma (Ibid.). Three of these are male and one is the indeterminately identified individual. One male had blade trauma on the anterior side of their vertebra which are marks indicative of having their throat cut. The other two males had two blade marks each. One with marks on their right femur and patella and the other with two cuts on their metacarpals (hand bones). The male with hand wounds may have been acting defensively. The indeterminately sexed individual had one blade wound on their humorous (Ibid.). Two adolescents that were likely males aged 14 to 18 years also showed signs of blade trauma (Ibid.). One with blade wounds on their humerus and scapula and the other had trauma on two different ribs (Ibid.).

Overall, there are very few individuals that showed signs of weapon trauma even with the general fragmentation of the remains. These trends are consistent with the literature of the time and other funerary remains that show violence was mostly interpersonal and not to kill, just for expressing power through kidnapping cattle or humans (McKenzie and Murphy 2018). The wounds were mostly on the anterior of the body pointing towards face-to-face combat and the blade marks are largely consistent with sword fighting (Ibid.). Although, at Ballyhanna, of those who suffered weapon trauma, only 16.7% of the injuries showed signs of healing. Most of the individuals were dying from the weapon injuries so their healthcare was likely relatively poor in comparison to other contemporary groups (McKenzie and Murphy 2018; Troy 2010).

The violence against women was also strikingly low as it was in the early medieval period. This is again consistent with the records that severely condone violence against women and children (McKenzie and Murphy 2018). This rule seems to be strictly followed meaning that the young males aged 14-18 may have not been considered children anymore but adults that

could participate in combat. However, more information is needed to make this assessment fully since there were only two adolescents with trauma. There were no young children affected which would also follow with the condemnation of violence against children. As in early medieval Ireland, males are the main participants, making it a male activity and the effects of violence as a cultural practice are evident in their bodies. Of the females with weapon trauma, 33% of them healed meaning that violence against females was less deadly and they may have been more capable of recovering. Generally, those with weapon trauma appear to not have healed often meaning they were likely already compromised and could not recover and the healthcare was poor. The overall lack of weapon trauma suggests that combat on large scales were not a large part of their daily life.

Day-to-day injuries were much more prevalent than violent injuries with a total of 13.7% or 119 out of 869 with some kind of visible injury (McKenzie and Murphy 2018). A total of 17.3% of males, 14.1% of females, and 7.5% of the indeterminates showed signs of injury (Ibid.; Table 6). The difference between males and females is not statistically significant. The majority of these injuries occurred in the middle aged group but this is expected due to age factors (Ibid.). The most common long bone fractures in males were the ulna (45%), clavicle and radius (15%) with the ulna being significantly more represented (Ibid.; Table 6). For females the most common fractures were in the radius and ulna (37.5%) while only one case of each clavicle, femur, tibia and fibula existed (Ibid.; Table 6).

Only four individuals, three males and one female, had fractures in their clavicles which are most commonly caused by a fall onto the shoulder (McKenzie and Murphy 2018). Only one male possibly had a humeral fracture coupled with three rib fractures and blunt force trauma to the head (Ibid.). Humeral fractures are also common injuries from falls so this may have been the

cause. As mentioned above the most common bone fractures were the ulna and radius. All but one male had fully healed from ulna fractures. These fractures are indicative of a fall but could also result from raising a hand to protect the cranium from being hit (Ibid.). The radii fractures are common in older individuals and often females because of osteoporosis which is consistent with the data since four out of six were older females and the other two were an older male and an indeterminate in both the sex and age categories (Ibid.). Four individuals, two males, one female and one indeterminate, had a fracture in both their radius and ulna. Both just radii as well as both radius and ulna injuries are consistent with a fall but also could result from a fight. 21 individuals had wrist or hand bone fractures. A significantly higher percentage of males (2.5%) had metacarpal bone fractures than females (.5%) (Ibid.; Table 6). Males also had a higher percentage of fractures in the phalanges at about 4.1% compared to 1.8% of females (Ibid.). Both of these percentages are not statistically significant but they are indicative of an overall pattern of hand injuries in males. Both of these types of injuries can occur from falls, a blow to the hand, or a big animal stepping on the hand (Ibid.).

The majority of the injuries were in the upper body with only individual cases for lower body injuries. Only a few of the human remains display lower limb injuries. Two adults show signs of femoral fractures which is a relatively serious injury only attributed to severe trauma (McKenzie and Murphy 2018). This type of injury would have restricted the mobility of both the male and individual of indeterminate sex pretty significantly. There are also only two individuals, a young adult male and female, with knee injuries (Ibid.). However, foot injuries were relatively common for lower limbs with 18 individuals displaying injury (Ibid.). 15 out of 18 of these injuries were in the phalanges that are consistent with a heavy object being dropped or a heavy animal stepping on the foot (Ibid.).

Axial injuries, injuries to the vertebrae, cranium and ribs, were more common in females with about 9% having this type of injuries while males displayed 7.1% of these injuries (McKenzie and Murphy 2018). Skull trauma appeared more on male (5.8%) than female (3.4%) individuals with a cranium present (Ibid.; Table 6). Of remains that could not be sexed, only 3.3% of them had axial injuries. This form of trauma can occur from any object that can cause blunt force trauma such as a horse kick, hitting your head on a low hanging beam, or from a fight. Injuries to the vertebral column were more prevalent in the female than male population with 9% of females, 7% of indeterminants and only 1.6% of males having fractures in the spine (Ibid.; Table 6). The large percentage of females with vertebrae fractures likely stem from osteoporosis which is more common in women. The highest percentage of females with spine fractures are old suggesting further this may have been from osteoporosis which affects females earlier in life than males (Ibid.). A total of 31 adults who had at least one vertebral fracture (Ibid.). Ribs are typically the most affected area of the body but the Ballyhanna population's ribs were poorly preserved leading to only 3.2% or 16 individuals to display signs of rib fracture. Males (4.5%) had more rib fractures than females (1.8%) but not to a statistically significant extent (Ibid.; Table 6).

Table 6. Distribution of day-to-day injuries in the female and male bodies' at Ballyhanna (Mckenzie and Murphy 2018, 287).

	Total	Radius	Cranium	Vertebrae	Rib	Metacarpal
Males	17.3%	45%	5.8%	1.6%	4.5%	2.5%
Females	14.1%	37%	3.4%	9%	1.8%	0.5%

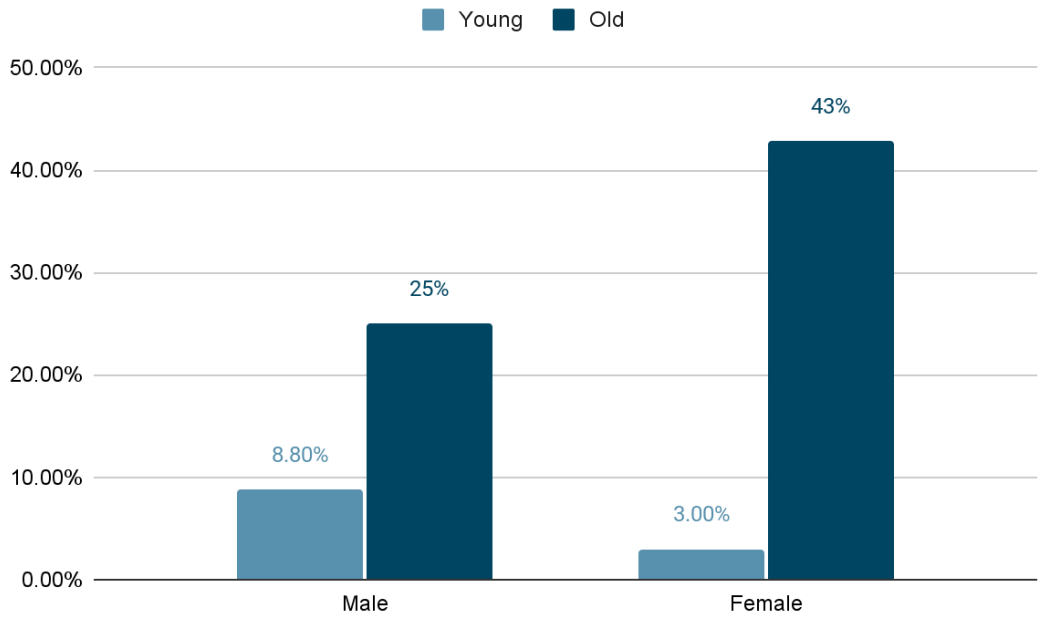
Overall, the rates for injury were relatively low at Ballyhanna with most day-to-day injuries happening in the upper body with the most affected region being the ulna (McKenzie and Murphy 2018). Many of these upper body injuries are likely from falls, contact with

domesticated animals or interpersonal violence. Due to the extremely low rates of violence it is possible that the former two interpretations are more likely (Ibid.). Most of the categories of injuries did not show a statistically significant difference between males and females. This indicates that they were likely participating in some of the same activities that exposed them to similar risks of falls and direct impacts (Ibid.). The main differences between males and females was the prevalence of vertebrae, lower arm, and hand injuries. Females had more spinal injuries suggesting a slightly different type of labor and danger.Males had significantly more hand and lower arm injuries meaning their activities were more dangerous to the lower part of the upper appendage. The other types of injuries suggest that they were doing similar work regularly as well. The hand injuries could still be from labor but an alternative conclusion is that males were participating in sports more frequently (Ibid.). In particular, they may have been playing an Irish stick and ball game (Ibid.). Aidan O'Sullivan suggests that nearly 20 stick and ball games were played in early medieval Ireland with an early version of hurling being one of them (1998). Hand injuries could come from being hit hard by a stick or the hard round balls used. The cultural practice of males more commonly playing than females appears in their biological skeletal remains. The day-to-day injuries sustained by the Ballyhanna people are consistent with a farming and laboring population where females and males were contributing to similar tasks but did have slightly different responsibilities. Overall, they each had slightly different working conditions and environments as their biological responses to their cultural practices would suggest.

The last health indicator from Ballyhanna is joint disease. 11.5% of the population suffered from osteoarthritis at least one joint in the appendicular parts of the body (McKenzie and Murphy 2018). The prevalence of osteoarthritis increased with age which is not surprising

due to the correlation with aging. The total young population only had about 17 cases out of 312 young individuals which increased to 19 out of 47 by old age or a percentage increase of 35% (Ibid.). 8.8% of young males displayed osteoarthritis in their appendicular joints while only 3% of young females did (Ibid.; Figure 12). This flipped by old age with 42.9% of females and 25% of males showing signs of osteoarthritis (Ibid.; Figure 12). No individuals from the young indeterminate sex category have osteoarthritis but 100% (only 3 old unsexed bodies total) of them from the old category do (Ibid.; Figure 12).

Figure 12. Comparing osteoarthritis data for males and females from young to old (Mckenzie and Murphy 2018, 321).



When the location of joint disease based on sex was recorded, males and females had significantly different areas affected (McKenzie and Murphy 2018). Males displayed osteoarthritis most in the shoulder and hip joints while females were more affected in their wrists and hands (Ibid.). The acromioclavicular joint (one of the shoulder joints) displayed signs of osteoarthritis in 15 individuals and eleven were males (Table 7). The disparity was statistically significant making males more likely to be affected in the shoulder (Ibid.). Another shoulder

joint (the ball and socket section) called the Glenohumeral joint, is often impacted by osteoarthritis from trauma to the muscles and ligaments in the rotator cuff (Klaus et al. 2009). This section of the shoulder is equally affected in males and females at Ballyhanna. Of those with osteoarthritis in the shoulder socket, all of the males (4) had evidence for it in their right shoulders while 3 out of 4 females displayed it in their left shoulder (McKenzie and Murphy 2018). There is not enough information to explain the disparity but it is an interesting difference that should be explored further in future research. Hip joints showed signs of lesions in 33 adults, the most affected area in the population. Males experienced this more often than females with 4.8% affected compared to 3% (Ibid.; Table 7). The wrists and hands were most affected in females (Ibid.). The wrist joints typically get osteoarthritis from injuries in the hands but can also form primary osteoarthritis (Ibid.). 24 adults had osteoarthritis in their wrists, 13 females (3.9%), nine males (3.2%) and two indeterminates (Ibid.; Table 7). The percentage of indeterminates was not given. The hands were impacted on 29 adult individuals. There is a statistically significant difference between males (2.5%) and females (5.7%) (Ibid.; Table 7). The highest percentage of hand joints affected were in the old adults with 20.4% of the older adults having osteoarthritis lesions (Ibid.). Females were more likely to be impacted by osteoarthritis in both the temporomandibular (jaw) and sternoclavicular (shoulder joint on proximal end of the clavicle) joints (Ibid.). Vertebral osteophytosis was very common at Ballyhanna with 52.9% of the adult population showing signs of the joint disease (McKenzie and Murphy 2018). 56.1% of females and 53.6% of males displayed lesions which is not a statistically significant difference (Ibid.; Table 7). Although, females were more affected in the top of their spine while males in their lower spine.

Table 7. Prevalence of osteoarthritis for males and females in joints (Mckenzie and Murphy 2018, 322). *ACC is acromioclavicular, TMJ is temporomandibular, and STC is sternoclavicular joint.

	ACC*	Hip	Wrist	Hand	TMJ*	STC*	Vertebrae
Males	7%	4.8%	3.2%	2.5%	0.4%	0.9%	53.6%
Females	2.3%	3.3%	3.9%	5.7%	1.8%	2.3%	56.1%

The joint disease in the spine and appendicular skeleton was very similar for males and females (and the indeterminates in large part) The difference being in the spine location, hips, and shoulders which may suggest that males were participating in heavier lifting and from younger ages than females (McKenzie and Murphy 2018). The joint differences may also be from sex variation since in modern studies female bodies are more likely to experience osteoarthritis in their hands for example (Srikanth et al. 2005). However, the understanding of sex and gender in the body could have become a biological ‘fact’ in today's population when it is in fact due to environmental factors. The body is an ever changing entity so the osteoarthritis in female hands and wrists is likely dependent on the construction of sex and gender in the bodies at Ballyhanna. Overall, the vast majority of joints were affected similarly between males, females, as well as indeterminate individuals suggesting that they were participating in similar activities. There is some variation in the amount of heavy lifting each were doing and possibly some specific tasks that required the hands and wrists. The joint diseases experienced by the Ballyhanna people were largely the same and so were their repeated activities because their biology has changed based on their cultural norms. Understanding these differences in tandem with the injuries would continue to suggest slightly different responsibilities of labor between males and females.

Ballyhanna Conclusions

The population at Ballyhanna has relatively poor health in comparison to English sites such as Wharram Percy. While Wharram Percy has worse DEH health with 38.5% percent of

males and 23.9% of females instead of 12% and 10% at Ballyhanna, their CO and age-at-death data presents them as a healthier population (Mays 2007; McKenzie and Murphy 2018). The DEH data may appear lower because children with DEH at Ballyhanna are not living into adulthood as often making them overall less healthy, despite the lower percentage in adults. CO at Wharram Percy is only affecting 16% of males and 23.9% of females meaning most are not suffering majorly from dietary issues (Mays 2007), while CO is more apparent in Ballyhanna bodies. Age-at-death data from Wharram Percy shows that a large portion of their population is living to old age, with 43.6% the population being from the 50+ category for males (Ibid.). Females are more commonly dying from the ages of 35-50 with about 41.6% dying in this age bracket (Ibid.). Overall, the data from a contemporary English site shows that Ballyhanna is struggling significantly with dietary deficiencies, malnutrition, and quite possibly from more bouts of infectious disease.

At Ballyhanna Females in Ireland have access to a status more closely resembling their male counterparts, which is not reflected in the broader context of medieval Europe. Wharram Percy has a larger disparity in health data between males and females that is not present at Ballyhanna showing a lack of equality in England, accentuating the equality in at Ballyhanna. Females are faring worse at Wharram Percy with statistically significant lower ages-at-death and higher percentages of CO. The female bodies at Wharram Percy are constructed with a lack of dietary resources and are under more physiological stress shown through their early deaths compared to males. The bodily formation at Ballyhanna does not represent this disparity meaning the status of females is on par with males. Females or males are not allotted special or better resources, living conditions, or are under significantly more stress meaning one group is not given preferential treatment at Ballyhanna. The differences not only show equality in access

to resources and an increased cultural equality between males and females at Ballyhanna, but it reiterates that the body is a biological and cultural structure and not universal. Ballyhanna males and females are suffering more than at Wharram Percy, but both to the same degree. They are likely both experiencing deficiencies in their diet, malnutrition, and illness in both childhood and adulthood.

The evidence of violence, injury, and joint disease at Ballyhanna does show a significant level of difference between male and female everyday activities. Violence is the most drastically sexed and gendered activity with an exponentially higher percentage of males being impacted by violent encounters. Again, the low level of violence against female bodies shows that the *Cáin Adomnáin* or law that prohibits violence against women is likely relatively effective even into the late medieval period. The injuries and joint disease show that males and females are participating in much the same type of labor, but males are responsible for more heavy lifting and females are responsible for more labor done with the hands. However, these differences do not reflect in their general health indicators which suggests that their cultural practices are of equal value. Again, neither males or females are allotted more dietary resources nor is one under more stress than the other resulting in an earlier death despite contributing to different types of labor. If one group's work was considered more vital, these value assessments would likely reflect in how they were treated and their material bodies would show different levels of strain. The materiality of male and female bodies are not *being* sexed and gendered differently from one another in terms of health indicators. Sexed bodies are both worthy of equal treatment in healthcare and resources according to the people of Ballyhanna despite them contributing differently to labor.

Ardreigh

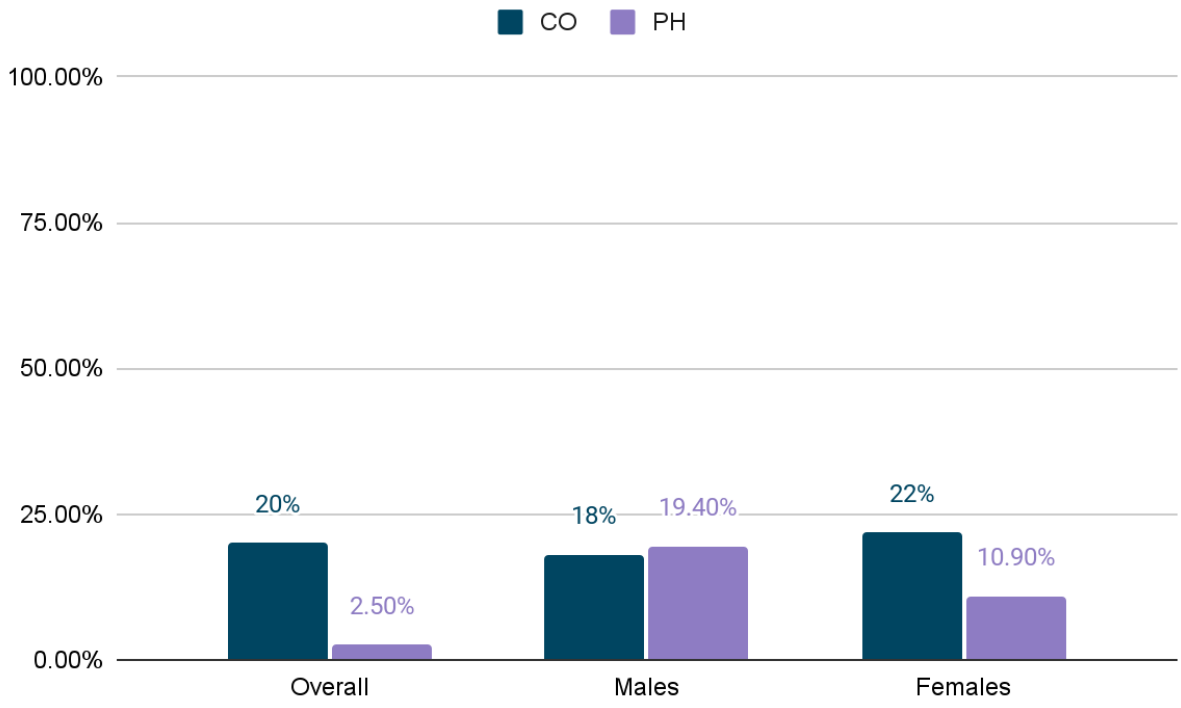
Ardeigh lies within the sphere of Anglo-Norman influence in Region II in present day Kildare (McKenzie and Murphy 2018) so this site will provide a comparison between more and

less contact with the Anglo-Normans when taking into account regional variations. The influence of the Anglo-Normans is apparent in the remains of the late medieval period town. The town was organized as a center point in the area as is typical of Anglo-Norman towns (Millar et al. 2016). Adreigh is identifiable as under Anglo-Norman influence by the presence of shallow ditches that mark property lines of a 'middle class' of craftspeople (Ibid.). These plots of the town are allocated to the craftspeople by the Anglo-Normans which requires that the Anglo-Normans had some form of centralized control over the people of Ardreigh (Ibid.). The presence of this structured town suggests that the Anglo-Normans were controlling the administration of the town and trade (Ibid.). The site was in use from 1000 to around 1450 CE with the majority of use occurring in the later medieval period (Troy 2010; McKenzie and Murphy 2018). Ardreigh was occupied in the early and late medieval period with about 155 burials from the early medieval and 1,060 skeletons from the late medieval period (Millar et al. 2016). 401 of these were females, 365 were males and 54 could not be sexed (Carty 2013). In both the early and late medieval periods the people were buried in the stereotypical Christian way of individual burials oriented in West to East supine positions. There was also evidence of these bodies being buried in shrouds, much like at Ballyhanna. Overall, there were similarly few burial goods at Ardreigh but the same scallop shells were found among those buried which would have indicated pilgrimage of some in the society (Millar et al. 2016). Ardreigh and Ballyhanna appear to be relatively similar based on burial type and grave goods (Troy 2010; McKenzie and Murphy 2018). A general trend in data collection at Ardreigh is that individuals whose sex could not be identified were not included in the study so I will include them when they are included (McKenzie and Murphy 2018).

Of the bodies at Ardreigh, 20.2% of adults showed signs of cribra orbitalia (Troy 2010). Similar to Ballyhanna, juveniles were the most affected. The majority of juveniles affected were in the age range of 12-18 years old. However, the data collected for the juveniles is not directly comparable to Ballyhanna because the low percentage of individuals affected may be due to methodologies used. At Ardreigh, only about 21.7% of juveniles showed signs of CO while at Ballyhanna, 43.6% of juveniles had CO (Troy 2010; McKenzie and Murphy 2018). The significantly higher rates at Ballyhanna would begin to suggest they experienced more stress in childhood than at Ardreigh. The lower level of stress earlier on at Ardreigh likely means they would be generally healthier in later years when compared to a population like Ballyhanna but more information is needed. 20% of Ardreigh adults displayed signs of CO (when Ballyhanna was adjusted methodologically 21.7% were affected by CO) (McKenzie and Murphy 2018; Figure 10). 18% of males showed symptoms of dietary deficiencies and females at 21.8% from Ardreigh (Troy 2010; Figure 10). The female and male bodies at Ballyhanna are likely being constructed under the same dietary conditions causing the same biological response within their bodies.

Porotic Hyperostosis was also recorded differently at Ballyhanna and Ardreigh. The osteological report from Ardreigh did not record type 1 and 2 PH (McKenzie and Murphy 2018). The percentage of adult individuals with PH was only 2.5% and when Ballyhanna's data was adjusted they had a prevalence of 4.8% (Troy 2010; McKenzie and Murphy 2018). Unlike with CO, the majority of individuals affected were the adults. The female adults only displayed PH in 10.9% of their population and 19.4% of males displayed PH (Troy 2010).

Figure 13. Cribra orbitalia (CO) and porotic hyperostosis (PH) data for overall population, males, and females at Ardreigh (Troy 2010, 54; Mckenzie and Murphy 2018, 173).

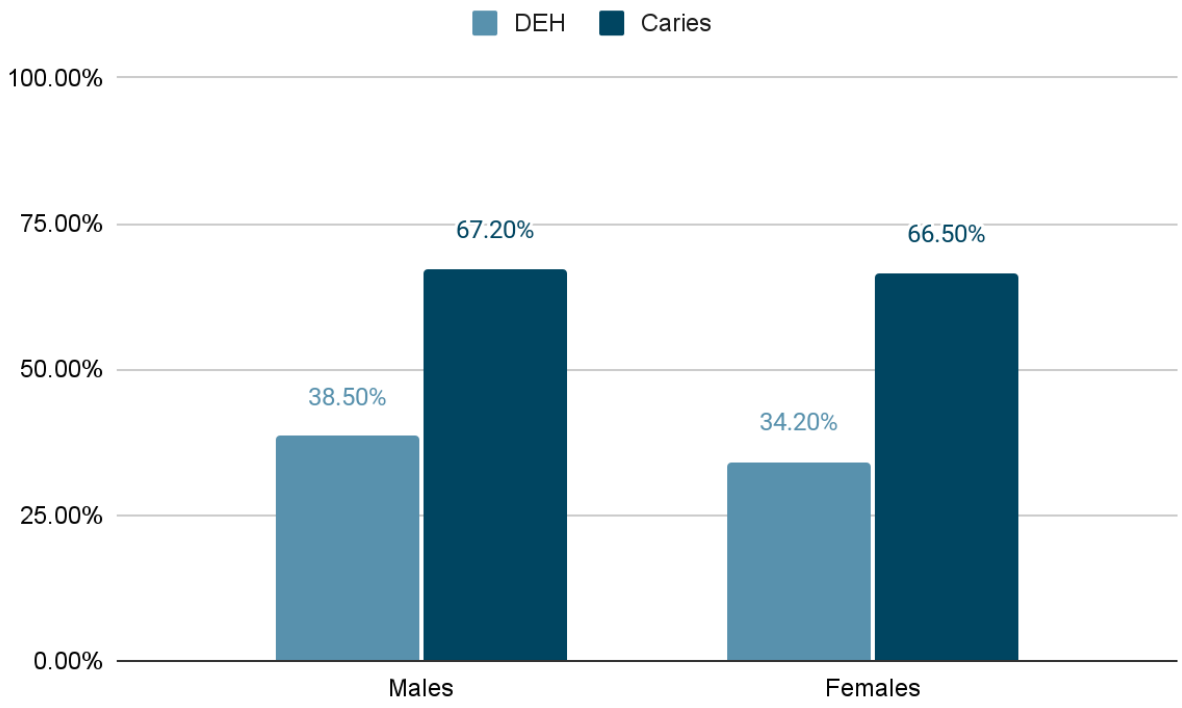


Males and females at Ardreigh are experiencing about the same levels of CO and PH with males generally suffering from a slightly higher percentage of PH than females. CO does not show up to a statistically different extent in male and female bodies. However, the difference in the PH percentage may suggest that the embodied experience of gender is reflective of different dietary deficiencies. CO and PH are likely caused by different vitamin deficiencies so males are experiencing a biological reaction to a cultural practice of dietary difference between males and females. In other words, males and females may be allotted different types of food but are still receiving similar nutritional intakes making one group materially more impacted by CO or PH. The percentages are similar enough that males and females may be simply given more of one food over another but still are consuming the same diets overall. The biological response to these different foods constructs CO and PH slightly different in the body. More data is required

to make a substantial claim in dietary difference based on sex because of the relatively minor gap of only 8.5%.

Like Ballyhanna, DEH data at Ardreigh is generally focused on linear enamel hypoplasia. A total of 36.2% adults displayed signs of linear enamel hypoplasia (Troy 2010). A total of 38.5% of males and 34.2% of females (Troy 2010; Figure 11). Rates of dental caries is generally high in comparison to Ballyhanna with 67.2% of males and 66.5% of females with caries (Ibid.; Figure 11). When these numbers are recorded by teeth instead of individuals, only 10.1% of male teeth and 9.2% of female teeth have caries (Ibid.; Figure 11). Data regarding the differences between age groups for all dental data is not available for Ardreigh and makes it challenging to look at trends between males and females throughout their lifetimes.

Figure 11. Comparison of dental health indicators for males, females, and the overall population at Ardreigh (Troy 2010, 22).



Males and females do not have statistically different levels of linear enamel hypoplasia. Although males are likely to suffer from DEH while under the same stress as females, the level

to which this is affecting the data cannot be known. It is possible the percentages may be closer based on males susceptibility but it would not change the general similarity between males and females. The biological response to the cultural practices of the people living at Ardreigh in the body depict males and females receiving the same level of resources in the first seven years of life. The similarities between males and females at Ardreigh would indicate that both were under similar stress in their first 7 years of life. The level of caries present in male and female bodies means their dental health experience is about equal. Mixed with the CO and PH data males and females are likely under the same amount of stress through four total general health indicators.

The average age-at-death categories are similar to that of Ballyhanna with large age groups of young, middle, and old. 58.2% did not live past the age of 35 years of age, 27.7% died at middle age, and only 14.1% lived past 50 or into old age (McKenzie and Murphy 2018). Of the male adults that could be aged, 57.4% died before 35, 28.6% lived to middle age, and 14% into old age (Ibid.; Troy, 2010; Table 8). For females, 59% were dying young, 27% between 35 and 49, and 14% were living past 50 years of age (Ibid.; Table 8).

Table 8. Age-at-death data for males and females at Ardreigh (McKenzie and Murphy 2018, 107).

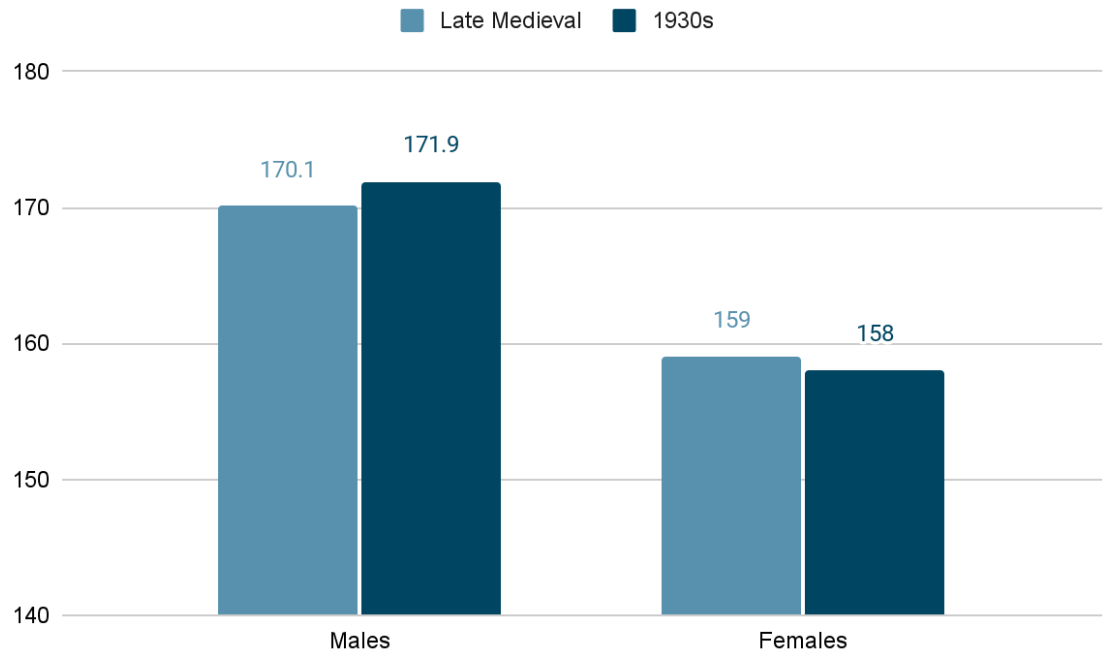
	Males			Females		
	18-35	36-50	50+	18-35	36-50	50+
Age-at-death	57.4%	28.6%	14%	59%	27%	14%

Compared to Wharram Percy in medieval England where 40% of people were living beyond 50, the people at Ardreigh are dying very early (McKenzie and Murphy 2018). The percentages between males and females are strikingly similar in each age group and even more similar than those at Ballyhanna. Like Ballyhanna, the ages-at-death were likely not solely because of the strains of child bearing because both males and females are dying relatively early which suggests that both are embodying similar cultural statuses and challenges. The

physiological stressors of dietary instability and deficiency are possibly key contributors to these early deaths. However, to this point Ballyhanna has had worse health overall or very similar in terms of diet and are still living to older ages so dietary issues in childhood and adulthood is likely not the only stressor causing early deaths at Ardreigh. The males and females bodies are experiencing biological changes of CO, PH, DEH, and age-at-death so they are likely experiencing similar cultural circumstances and practices when it comes to health.

Again, stature is measured using a method reliant on sex in the formula. The variation and issues with this method will not impede the comparison between Ballyhanna and Ardreigh and likely not impact the comparison between early and late medieval Ireland. The height for adult men at Ardreigh is 170.1 cm or 5 ft 5.8 in and 159 cm or 5 ft 2 in for women at Ardreigh (Troy 2010; McKenzie and Murphy 2011). These heights are not very far off from the present day population calculated for western Ireland of 171.9 cm for men and 158 cm for women in 1930 (Hooton et al. 1955; Figure 12). The average height for males and females were also some of the tallest for the cemeteries in late medieval Ireland. The males were about average for medieval Ireland while the females were slightly above average for cemeteries including those at Cork and Louth (McKenzie and Murphy 2018).

Figure 12. Comparison between male and females statures from late medieval to 1930s Ireland in Region II (Mckenzie and Murphy 2011, 134).



Again, male and female statures are not directly comparable. After comparison to other medieval sites, Ardreigh appears to be relatively tall and likely suffering less from malnutrition of other physiology stressors during growth. The 1930s data shows that the population is not particularly genetically predisposed to be shorter or taller than other sides such as Ballyhanna. Females are even on average taller than their 1930s descendants. The generally tall stature of both males and females again indicates that resources allocation is equal to male and female constructed bodies. The body as a biological entity responding to cultural practices and ecology show very little indication of undernourishment being a large problem during childhood at Ardreigh.

A study of violence at Ardreigh by Niamh Carty found that violence at Ardreigh was very low with only 18 individuals out of 1259 showing signs of violent injury to the cranium (2013). However, this study does not distinguish between early and late medieval bodies (n=882 adults) so the numbers will be used sparingly. The percentage of people who experienced

violence was small, only 1.4%, and all were adults (Carty 2013). In Cary's study, there was a slightly different age range with young adults and older middle which are capable of being collapsed into the broader categories used in the original osteological report for Ballyhanna. Young adults represented seven of the cases, middle aged adults six of the cases and five of the older adults (Carty 2013, [adjusted]). Fourteen of them were males (3.8%) and three were females (0.7%) and one was a possible female (1.9%) (Carty 2013; Table 9). The probable female was collapsed into the larger category of female for this study. Only 19 cases of violence against females existed in medieval Ireland as of 2013 and four of them were at Ardreigh (Ibid.). There was a larger spread in age for individuals impacted by violence at Ardreigh than Ballyhanna. No adolescents (age 17 or below) were impacted by violence. The most likely weapon used for each of these injuries were a sword or ax (Ibid.). Of the injuries from the late medieval period, 7 out of 882 had fully healed or 0.8% from weapons trauma (Carty 2013; McKenzie and Murphy 2018).

Table 9. Number and percentage of sharp force trauma the Ardreigh population by sex and gender (Troy 2010, 77; Carty 2013, 52-54).

	Overall	Males	Females	Indeterminate
# of bodies w/ evidence of violence	18 (n=1259)	14 (n=365)	3 (n=401)	1 (n=54)
% of violence	1.4%	3.8%	0.7%	1.9%

Overall, violence at Ardreigh follows a very familiar pattern to Ballyhanna. Few people appear to be affected by violence which would indicate they are not participating in all out warfare but rather shows of power and prestige. Males are again blatantly more impacted by violence than females. A few arguments for the small level of violence against females are that they are getting caught in the middle of an attack or from domestic violence (Haarman et al. 1981; Walker 1997). However, this is not an entirely thoughtful or justifiable conclusion since

there is little evidence suggesting that females were not more directly involved since the sharp force trauma used against males and females were similar (Carty 2013). Additionally, some of these bodies may be dated to prior to the law that forbids violence against women and children. More research is needed to understand the violence against females in late medieval Ireland due to the small percentage affected. Nonetheless, the material expression of sex and gender in the body shows that violence is a male rather than a female experience. The high survival rate from weapon trauma indicates that Ardreigh is a healthy population because they can recover from the added physiological stress from violent injury. Their healthcare is likely also impressive based on the severity of injuries that individuals recovered from.

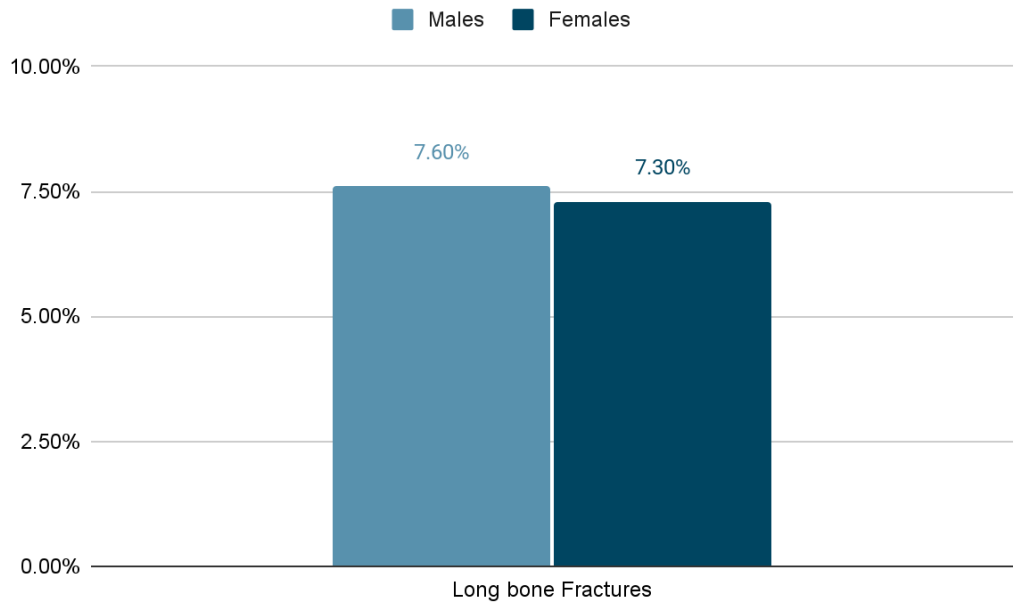
At Ardreigh, crude prevalence rates were utilized to report injuries; a different measurement was used to record day-to-day injuries at Ballyhanna (Troy 2010). Fewer percentages were recorded based on sex identification as well. Of the individuals at Ardreigh, 12.4% of adults suffered from injuries (McKenzie and Murphy 2018; Table 10). The rates of injury in the adult populations were not dissimilar but Ardreigh had a much higher percentage of juveniles impacted with a total of 2.5% (only 0.2% at Ballyhanna when adjusted)(Ibid.). The most common fractures in the adult populations occurred in the ulna (1.7%) then the clavicle (1.5%) (Troy 2010; Table 10). Blunt force trauma to the cranium was relatively low with only 1.2% of people being affected (Ibid.). Vertebrae fractures were also relatively uncommon with only about 9 out of 820 adults or 1.1% impacted (Troy 2010; Table 10). Rib fractures were affected only about 2.4% of adults having fractures here (Ibid.). Ardreigh had a much lower percentage of individuals with hand fractures with only 0.9% in their metacarpals or phalanges compared to Ballyhanna (McKenzie and Murphy 2018). Males and females were relatively

similar in their injuries with 7.6% of males and 7.3% of females displaying long bone fractures (Troy 2010; Figure 13).

Table 10. Percentage of injuries in adult bodies from Ardreigh (Troy 2010, 78).

	Total	Ulna	Clavicle	Cranium	Vertebrae	Rib	Metacarpal
% of injuries	12.4%	1.7%	1.5%	1.2%	1.1%	2.4%	0.9%

Figure 13. Comparison between long bone fractures in males and females at Ardreigh (Troy 2010, 78; McKenzie and Murphy 2018; 312-313)



The overall injury prevalence is not very high at Ardreigh suggesting they are doing slightly different tasks from other rural communities like Ballyhanna. The clavicle and ulna injuries are most likely caused by falls but may also be from direct blows from animals or interpersonal violence (McKenzie and Murphy 2018). The population at Ardreigh were not as consistently participating in agricultural production compared to other rural medieval populations and this is reflected in the low levels of injury in the skeletal data (McKenzie and Murphy 2018). The difference between males and females is not noticeable at Ardreigh but only long bone injury data is available for sex and gender comparison. Based on this one statistic, the biological response from injuries would suggest that males and females were participating in the

same labor since they were put into similar enough situations to obtain the same types of injuries. However, more information should be obtained to make a strong claim about sex and gender in injury patterns because they may share some of the same embodied experiences but not others in day-to-day life.

The osteoarthritis data collected from Ardreigh was not recorded in a way that it could be compared to Ballyhanna (McKenzie and Murphy 2018). There is evidence of osteoarthritis but the specific numbers and locations on the body are not accessible (Miller et al. 2016). The only comparable data point for the two was on Schmorl's Nodes which is a spinal injury caused by the slipping of a disc which can happen from "trauma, infection, metabolic and endocrine disorders or neoplasms" (McKenzie and Murphy 2018). At Ballyhanna men were more impacted with 45.6% affected and 38.1% of females (Ibid.). At Ardreigh this difference was even more significant with 40% of males affected and only 24.4% of females (Ibid.). The difference of Schmorl's Nodes between males and females is statistically significant (X^2=17.3, df=1, p=<.0001; JMP®).

At Ballyhanna this difference was attributed to males participating in heavier labor and starting this type of labor earlier in life than females (McKenzie and Murphy 2018) and this explanation is probable for Ardreigh as well. In contradiction to the one data point from injuries, joint disease data shows males and females doing different types of labor at Ardreigh to a significant degree. If more data were available for day-to-day injuries, it may show a pattern of difference based on the significant contrast between Schmorl's Nodes. However, other types of joint disease are not published for Ardreigh so joint diseases can not be looked at specifically.

Ardreigh Conclusions

The population at Ardreigh appears to be under comparable physiological stressors to Wharram Percy in medieval England based on CO, PH, and DEH data (Mays 2007; Troy 2010;

Figure 14-15). However, the age-at-death data is staggeringly different between the two sites. The CO data at Ardreigh is 18.1% for males and 21.8% for females and 16% for males and 23.9% for females at Wharram Percy (Mays 2007). The percentages do not represent significant differences in dietary deficiencies between the two sites. Dental enamel hypoplasia at Ardreigh is also on par with Wharram Percy and both have a relatively significant number of bodies with DEH. The higher percentages of DEH would suggest that both populations are healthy enough to live through physiological stress in childhood and live long enough into adulthood for their bodies to be sexed by archaeologists. The age-at-death data is staggeringly different between these two sites, with Ardreigh populations struggling to live past the age of 35 while at Wharram Percy, 43.6% of the population are living beyond 50 years of age. The difference in age-at-death data would suggest that Ardreigh is under more general physiological stress and is less healthy. This data is in contradiction to the data on dietary deficiencies, malnutrition, and illness which would suggest the stressors at Ardreigh may not be diet or disease related. Further research should be conducted on other health indicators for comparison between Irish and English sites since general health information is not effectively explaining the different typical ages-at-death pattern.

Overall, Ardriegh is showing strikingly similar levels of health between male and female bodies. PH is the only indicator that shows some variation, with males showing symptoms twice as often as females. PH is slightly lower for females and, therefore, males are likely suffering from a slightly different vitamin deficiency that is not affecting females. It is possible this is a difference in diet or allocation of resources, or it may simply be showing males have a propensity for disease. Alone, the difference in PH is a minor indicator and the only example of much difference. The rest of the general health indicators are far more similar. Levels of CO, DEH,

caries, and age-at-death data are never more than a 4% difference and most overlap exactly. None of these indicators are different to a statistically significant extent. Again, the body is not a static entity but is culturally and biologically constructed. This data shows how the biological indicators are reacting to the same cultural situations for males and females in terms of resources allocation and general physiological adaptability to stressful environments.

Violence is a very male activity at Ardreigh. While violence is not overly common at Ardreigh, the violence that is apparent on the skeletal remains is strikingly male. Very little data is available for injury and joint disease which would give clear indication of everyday activities. It appears that males and females have the same percentage of injury at Ardreigh, but the types of injuries may show different patterns once the further analysis is published on specific injury location. Joint disease and specifically, Schmorl's nodes begin to depict males and female bodies as responsible for different day-to-day activities. Males have Schmorl's nodes twice as much as females which would indicate they are doing significantly more hard labor and from a much younger age than females.

Males and females from Ardreigh are experiencing the same or very similar cultural practices of resource allocation of food and have the same access to resources. However, males appear to be encountering violence to a greater extent and males and females in general are likely participating in different day-to-day labor and responsibility. This last point requires further research but the drastic difference in a couple injury and joint disease indicators points to this difference of responsibility. Males and females are valued the same and worthy of receiving largely the same food resources while contributing different forms of labor for their community.

Discussion

Ballyhanna (Region I) versus Ardreigh (Region II) in Late Medieval Ireland

When the data is adjusted for methodologically, Ballyhanna and Ardreigh have around the same percentages of their population with CO (Figure 14). Females at Ballyhanna appear to be suffering more severe cases of CO and males less severe (Figure 14). Based on the other health indicators, it is likely that females are surviving with these deficiencies more successfully because males are dying off before their CO symptoms could reach the level of severity present in female bodies. Unlike CO, the percentage of the population with PH is higher at Ballyhanna and lower at Ardreigh overall, suggesting that Ardreigh may be suffering from fewer types of dietary deficiencies. The slight statistical difference in the rates of PH between males and females at Ardreigh is not reflected in the Ballyhanna data (McKenzie and Murphy 2018; Figure 15). When compared to the PH data from Ballyhanna, it is clearer that females may have been under less physiological stress brought on by vitamin deficiencies than males. The higher levels of PH and similar CO data between the two regions would indicate that Ballyhanna is suffering from a larger variety of deficiencies. Males and females at Ballyhanna and Ardreigh are under the same amount of pressure, with some possible added pressure on males. The slight increased pressure on males appears in two different ways at Ballyhanna and Ardreigh. The level of severity at Ballyhanna and the higher rates at Ardreigh are problems that seem to be affecting males. The CO data shows that males and females are experiencing relatively similar levels of malnutrition and the same types of dietary deficiencies, with males possibly but not conclusively under more dietary stress. The bodies' biological response to the culture diets of males and females show that both are participating in the same dietary practices.

Figure 14. Comparison between Ballyhanna and Ardreigh cribra orbitalia (CO) data for overall population, males and females. Data for Ballyhanna has been adjusted methodologically for comparison (Troy 2010, 54; McKenzie and Murphy 2018, 173).

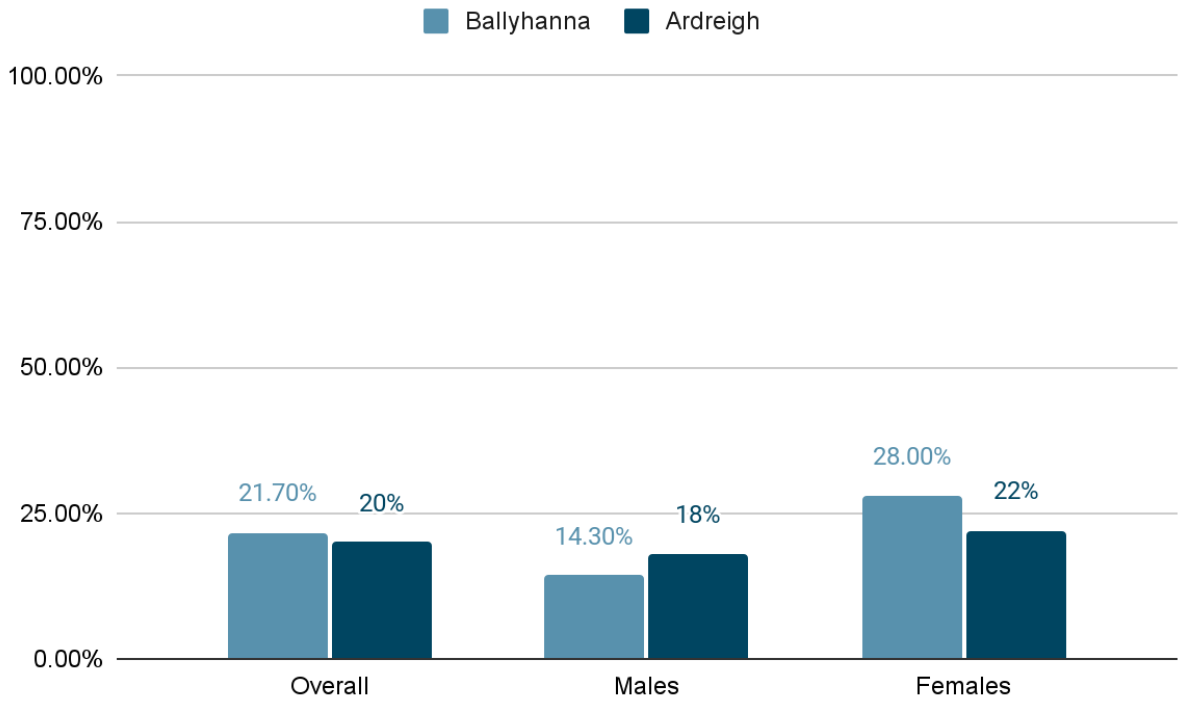
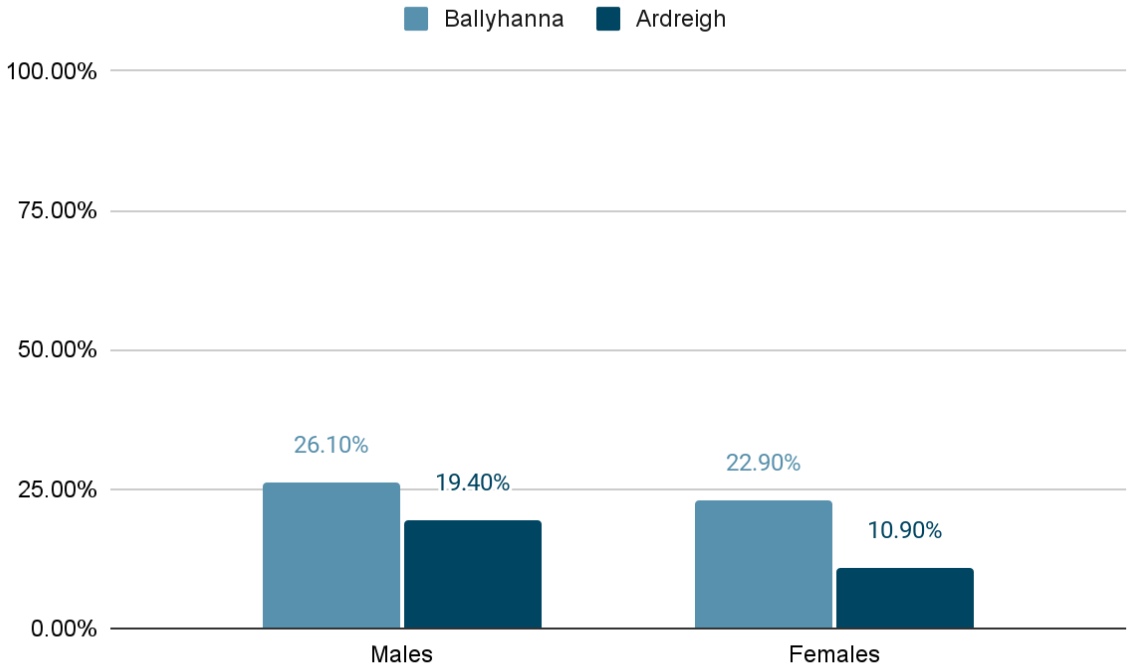
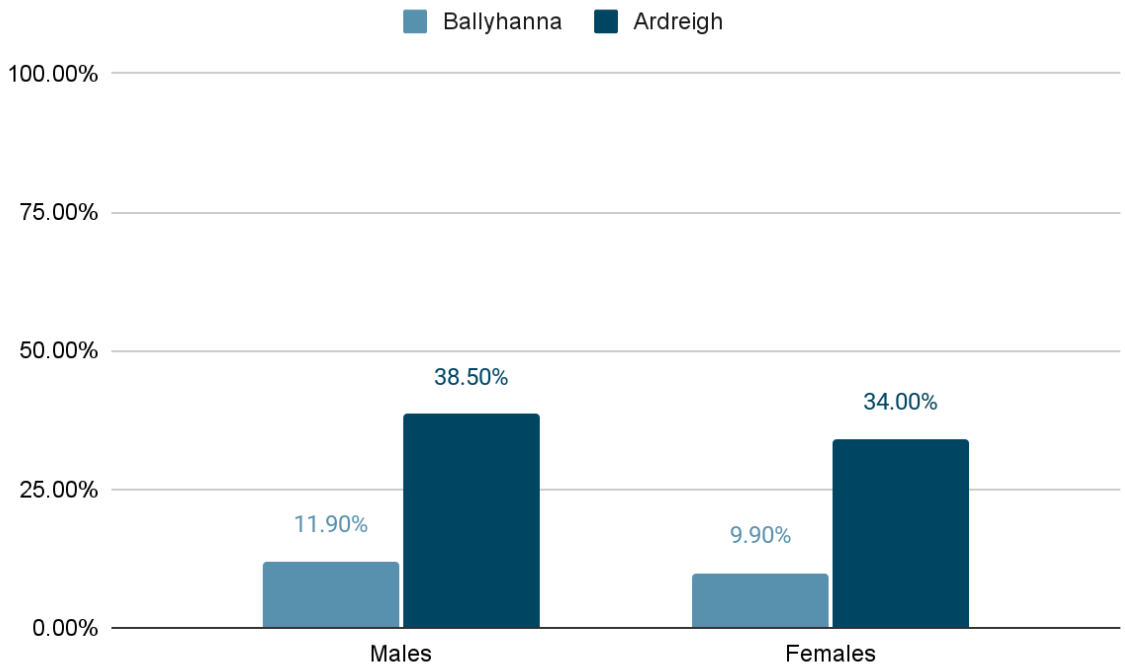


Figure 15. Comparison between Ballyhanna and Ardreigh porotic hyperostosis (PH) data for males and females (Troy 2010, 54; McKenzie and Murphy 2018, 179).



At first, the DEH data makes Ballyhanna appear healthier when in fact the lower percentages may reflect a younger age-at-death. Males and females at Ballyhanna have about a third the DEH levels that appear at Ardreigh (Figure 16). Based on the similar CO and PH data it is more likely that those at Ballyhanna experiencing malnutrition in childhood were simply not recovering from the stress episodes that would lead to DEH (McKenzie and Murphy 2018). This is especially clear considering Wharram Percy had triple the DEH levels and was significantly healthier on every other indicator compared to Ballyhanna. Ardreigh is then a slightly healthier population because they were able to live through these stress episodes and into adulthood. Males and females from Ballyhanna and Ardreigh do not show distinct trends in DEH data meaning that both regions have males and females experiencing malnutrition in childhood to the same degree based on region. The bodies at Ballyhanna are showing a stronger biological construction of malnutrition in childhood from their cultural and environmental circumstances based on all health indicators. Male and female bodies are being created within the same cultural contexts since the cultural impact on their biology is about the same at both Ballyhanna and Ardreigh.

Figure 16. Comparison between Ballyhanna and Ardreigh dental enamel hypoplasia (DEH) data for males and females (Troy 2010, 22; McKenzie and Murphy 2018, 183).



The age-at-death statistics depict different 'bottleneck' or 'weeding' out episodes for each region with some sex and gender variation in young adult deaths (Table 11). More individuals who were living in Ardreigh were dying before 35 than at Ballyhanna but a larger percentage of those who lived past 35 were living on to old age at Ardreigh. In other words, if those at Ardreigh got through the 'bottleneck' from ages 18-35 then they would live longer into adulthood. The males and females at Ardreigh had very little variation between their age-at-death data while Ballyhanna had more males dying young. The most conclusive reason for earlier deaths in males is because they were under more physiological stress. However, what type of stress cannot be concluded from the data in this research. Females at Ballyhanna may have also been dying more commonly before the age of 18 in an childhood 'bottleneck' episode but this is unlikely due to males being more highly represented in DNA testing in children from the site and the lack of cases for pregnancy in females under the age of 18. The biological reaction to a lack

of resources in childhood and adult life are putting strain on the bodies ability to adapt to added environmental stresses such as pregnancy or illness at Ballyhanna. The materiality of the bodies at Ardreigh is in better condition due to less physiological stress causing their biological body to adapt to old age and pregnancy more effectively. The malleability of the body is apparent when comparing Ardreigh and Ballyhanna because a purely biological body could not explain the added stress overtime at Ballyhanna causing them to die at earlier ages.

Table 11. Comparison between Ballyhanna and Ardreigh age-at-death data for males and females (McKenzie and Murphy 2018, 107).

	Males			Females		
	18-35	36-50	50+	18-35	36-50	50+
Ballyhanna	57.4%	36.4%	6.2%	47.3%	42.5%	10%
Ardreigh	57.4%	28.6%	14%	59%	27%	14%

A study conducted on maternal mortality in late medieval Ireland showed that a vast majority of females were dying between the age of 18 and 35 (Murphy 2021). Eileen Murphy looked at 15 cemeteries across Ireland with 29 females who died pregnant, during or soon after birthing were discovered (2021). At Ardreigh, four females were identified within this category and three from Ballyhanna (Murphy 2021). Of the total that could be aged, 21 out of 24 or 87.5% of maternal deaths occurred in the age group of 18 to 35 while the other three were from the 35 to 50 age category (Ibid.). Across all 15 cemeteries, there were no females aged younger than 18 who died from childbirth or bearing which is inconsistent with the younger females dying from early pregnancy (Murphy 2021). The low percentage of older females who are also susceptible to complications at a much higher rate are also not represented here (Nove et al. 2014) suggesting that the age group bearing the most children was from 18 to 35 (Murphy 2021).

The age at death for Ardreigh and Ballyhanna may have been in part due to issues with pregnancy since this age group is the most affected. However, males are also dying in large

numbers during this time and their deaths cannot be explained using pregnancy. Another notable aspect of this data is that females are typically capable of reproducing before the ages of 18 and after the age of 35. This would mean that females "may have been exerting a degree of control over their reproductive capabilities that reduced their ability to get pregnant on a regular basis until they reached menopause" (Murphy 2021). Out of the females from each cemetery only 29 out of 1,759 were clear examples of death by pregnancy or delivery which is only about 1.7% (Murphy 2021). This is likely way too small a percentage overall and would have been much higher but those that died later from complication would not be as obvious in the archaeological record (Ibid.).

However, the ages of the aged individuals are significant for understanding the age-at-death data from Ardreigh and Ballyhanna. Females were dying between these ages most often from bearing children, but males were also experiencing a similarly high mortality rate for these ages despite not participating in pregnancy at Ardreigh and more commonly in this age group at Ballyhanna. In this case, it is possible males were under more physiological stress than females and simply for reasons other than malnutrition and diet. Evidence of violence is relatively low and likely not the major cause of early deaths in males as well, especially in these areas where warfare was much more dependent on kidnapping and stealing resources than harming others (Murphy and McKenzie 2018). Nonetheless, males and females from both regions are experiencing relatively similar patterns for age-at-death. The challenges of pregnancy are culturally and biologically situated because of added cultural pressures on the female body making the process of birth more dangerous. The added cultural strains causing a biological reaction are not just a female experience. Both males and females are under physiological stress

from an inadequate diet as well as malnutrition and disease in childhood making both susceptible to an early death.

The average stature at Ardreigh is much taller than Ballyhanna and slightly above average for late medieval Ireland. The statures of both regions are likely not genetic due to current regional data. The height not being genetic would indicate Ballyhanna must have suffered from malnutrition to a more severe extent in order to cause that reduced height. Males and female stature data are not reliably comparable so they serve as a comparison between regions. The generally high levels of childhood deaths from malnutrition, CO, PH, and stature begin to paint Ballyhanna as faring worse than Ardreigh. However, the health data overall is not drastically different, which would be expected based on the early medieval data.

At both Ardreigh and Ballyhanna, the level of violence is low overall but is primarily linked to male activities. Low violence rates are not surprising at Ballyhanna given that the typical type of warfare being to steal rather than kill, but Ardreigh is in contact with the Anglo-Normans and there is no obvious higher level of violent conflict in the region. Additionally, the vast majority of those with weapons trauma had healed, even when the trauma was severe, suggesting a high standard for medical care at Ardreigh (Murphy and McKenzie 2018). This is direct opposition to Ballyhanna, where few to no weapon trauma had healed. The healthcare at Ardreigh may have been much better than at Ballyhanna, but the population would also need to be healthy enough already to survive such severe injuries since injuries are an added major physiological stress episode. The high death rates at Ballyhanna from violence is likely a reflection of their overall poor health, just as it is a reflection of their healthcare. Violent encounters were not drastically more likely in one region, but survival and, therefore, health was more likely at Ardreigh.

Violence is a male activity with a vast majority of all violent injuries happening to male bodies at Ballyhanna and Ardreigh. The changes in bone morphology from violent injury are constructed in male bodies which means culturally, violence is a male endeavor that females rarely partake in. The differences in levels of violence between males and females is in contradiction with other data that has been relatively similar in both regions, up to this point.

The crude prevalence rate of injury at Ballyhanna and Ardreigh were very similar with hand fractures being one major difference which could be a sign of Anglo-Norman suppression of Irish culture at Ardreigh. Only 0.9% of hand bones are fractured at Ardreigh, while 2.2% of individuals at Ballyhanna appear to have a fracture in metacarpal and phalanges. The difference in hand injuries between these two sites is statistically significant (Ibid). These injuries may have been from a difference in labor (McKenzie and Murphy 2018) since there are slight differences in prevalence of other types of injuries like juveniles impacted, most common fractured bones, and rib fractures. However, as mentioned above, these may have been so common at Ballyhanna because of a stick and ball game (Ibid.). It is possible that the Anglo-Norman influence may have limited the people at Ardreigh's ability to play this typical Irish game and may be evidence of more direct colonialism (McKenzie and Murphy 2018). More research should be done on this phenomenon. The differences in day-to-day injuries at Ardreigh and Ballyhanna are minute and represent populations participating in similar types of labor.

Hand and spinal injuries are the major difference between male and female injuries at Ballyhanna while no clear indicator of injury difference is observed at Ardreigh. The males and females at Ballyhanna were likely participating in different labor due to the contrast in their injury patterns. They were susceptible to different injuries meaning both were participating in labor but likely had different responsibilities. At Ardreigh, a disparity between the males and

females is not apparent but this is likely due to the limited data published for injuries by sex instead of actually representative of males and females participating in the same labor.

Another striking difference between males and females at both sites was joint disease. More data exists for comparing osteoarthritis between males and females at Ballyhanna but both Ardreigh and Ballyhanna have joint disease patterns in males that suggest they are doing significantly more heavy lifting from an early age than females. This disparity reiterates the non-violent and violent injury data. Males and females are experiencing differences in everyday activities because their bone morphology and damaged areas in their body are not consistently the same between the two. The female and male practices of everyday life are different causing their biological bodies to respond or 'talk back' differently. The body is not only not static, gender categories of labor are biologically and culturally constructed.

Overall, males and females bodily materiality, in large part, show they are struggling with the same dietary deficiencies, diseases, malnutrition, and early deaths. While this is not the full picture of late medieval life, it does indicate that males and females were experiencing a similar reality with very little evidence of inequality in their access to resources such as sustenance and healthcare. A lot of the data does not show a statistically significant difference. This is very important since it suggests that there is not a large gap between the way males and females are treated. Their bodies are culturally and biologically being constructed to resemble one another leaving little room for sexing and gendering of their population. For example, females likely received similar sustenance to males and therefore food is not taken away from females or males and given to the other in times of stress or when there is a lack of resources at Ballyhanna and Ardreigh. In other words, males or females do not seem to be prioritized and valued over the

other in terms of resource allocation. On the other hand, males and females have separate responsibilities and forms of labor at both Ardreigh and Ballyhanna.

The embodied experience of a female and males show that cultural labor practices are divided among them. While they are responsible for different activities, neither are valued over the other as is reflected in the health data. Again, the body is constructed through cultural and biological processes. Males and females are participating in a division of labor and this causes a biological response in the body of osteoarthritis. Osteoarthritis is experienced differently and becomes culturally divided, splitting male and female bodily experiences. Violence is another gendering experience. The lifeways of violence in Ireland is a male experience which materially expresses itself as cuts and injuries on the body. The impact of violence on males creates this a sexed gendered category because males experience violence. The Irish are creating gendered categories based on the labor completed and level of violence participated in. Despite the creation of these sexed and gendered experiences, gender is not constructed based on allocation of resources, level of disease, malnutrition, or physiological stress. CO, PH, DEH, age-at-death, and stature are similarly present in male and female bodies. The biological responses in the body are similar reflecting a similar reality for male and female bodies. Their bodies are being constructed through eating the same diet, and experiencing the same levels of malnutrition and stress. Their bodies are created at the cross section between biological and culture and show similar health indicators with varying contributions to labor and violence.

Ballyhanna in Region I is in contact with the Anglo-Normans to a much lesser extent or not at all in comparison to Ardreigh in Region II. As mentioned above, Ardreigh's town setup is organized in an Anglo-Norman way. The relationship disparities in data between Region I and II may be largely due to the ecology of the region instead of Anglo-Norman impact. Regional

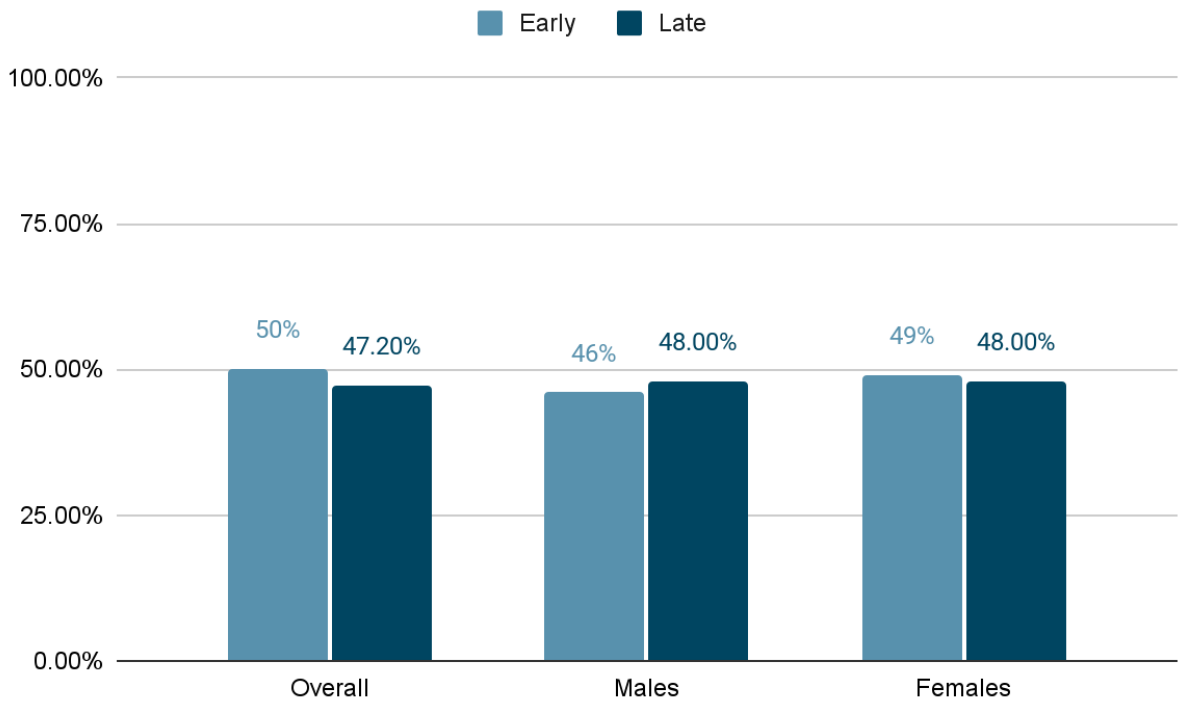
variation from other factors has already been explored as a possible cause for the differences between the two regions and this will be investigated more thoroughly below. Despite the overall regional differences, male and female relationships appear to be about the same within each region. In other words, males and females are doing different labor but are being treated equally in terms of resource allocation shown through their health. Therefore, any Anglo-Norman impact on gender relationships at Ardreigh appears to be almost negligible in the Archaeological data. This may not mean that the Anglo-Normans did not have an impact on the gender dynamics but this does indicate that the health of males is not affected negatively or drastically in comparison to females and vice versa. The only aspect of the health data that represents Anglo-Norman colonization is the rate of hand injuries in males. Males are suffering fewer hand injuries, that may be caused by an Irish game at Ballyhanna. This may indicate Anglo-Norman regulation of Irish culture but more information is needed to conclude this region was playing this Irish game prior to colonization. The fact that Anglo-Norman control is possibly visible at all, is by no means a small conclusion. To explore the extent to which the Anglo-Normans are having an impact it is necessary to compare the early and late medieval sites in region II.

Early versus Late Medieval Ireland

The comparisons between the early and late medieval period by region are preliminary in nature due to the vast number of assumptions required. Some of these assumptions are that the regions are a valid split for comparison and that similar populations are inhabiting these regions. Both Region I in the early and late medieval period are suffering to a greater degree than Region II. Region I is suffering from higher rates of CO, PH, and DEH when other factors are accounted for. In other words, the population from early and late medieval Ireland are experiencing more vitamin deficiencies, malnutrition, illness and overall, a higher level of physiological stress. The

CO data shows striking similarity with both showing signs of CO in about 50% of their adult population (Figure 17). The DEH data alone would suggest that Region I in the early period is faring better because more of their population is making it to adulthood with these stress indicators but this is a short lived success because of the high percentage of adults that die in their early 20s. Additionally, they have reduced statures further indicating malnutrition in childhood that does not allow their bodies to adjust well to life stressors in adulthood. In both time periods, their populations are not as consistently making it into adulthood. Ardreigh still has the highest percentage of males dying young but the compiled health data indicates they are healthier than their Region I counterparts overall. Overall, region I appears to be faring worse in both the early and late medieval periods.

Figure 17. Comparison between the rates of cribra orbitalia (CO) in the early and late medieval period for region I (Tesorieri 2016, 132; McKenzie and Murphy 2018, 173).



Overall, females are faring about the same as male in the later medieval period as seen through the cross section between biology and culture in their bodies. The variation of sex is also

showing slightly different patterns. The age-at-death data in particular indicates the early and late sites are seeing slightly different trends (Table 12-13). The early medieval period in region I appears to be seeing more stress on young females while young males appear under more physiological strain in the late period due to their early deaths. When the data is adjusted to compare the same age groups, females are dying exponentially younger in the early period with 72% not making it past 35 years of age. Males may be dying younger than the age at which they can be sexed in the early period making these numbers seem more drastically different but even if this is the case, females are likely still dying more often to an astonishing degree. The implementation of laws such as *Cáin Adomnáin* that occurred in the early medieval period may be indicating a shift in ideology around female wellbeing that is then reflected in the later period health standards. Based on the age-at-death data females are faring better in the later medieval period, even slightly better than their male partners, while this does not appear to be consistently the case in the early period. The early death of females is in contrast with the later medieval period in Region I. The biological and cultural body is being constructed differently here. The cultural pressures on the female body in the earlier medieval period are more severely impacting their ability to adapt to the challenges of pregnancy later in life. On the other hand, the male bodies are experiencing less cultural pressure creating fewer morphological changes which increases their longevity. In contrast, the later medieval males and females are experiencing a similar bodily construction because neither are put under more environmental pressure causing one to have a biological body that can withstand more stress.

Table 12. Age-at-death data for early medieval Ireland in Region I. Age categories adjusted for comparison. See table 1 for originally reported age-at-death data (Tesorieri 2016, 129; McKenzie and Murphy 2018, 100-101).

	Male			Female		
	18-35	36-45	45+	18-35	36-45	45+
Age-at-death	46%	35%	19%	72%	12%	16%

Table 13. Age-at-death data for late medieval Ireland in Region I (Tesorieri 2016, 129; McKenzie and Murphy 2018, 107).

	Males			Females		
	18-35	36-50	50+	18-35	36-50	50+
Age-at-death	57.4%	36.4%	6.2%	47.3%	42.5%	10%

In both time periods, males are the ones impacted by violence. Their biological reaction to the cultural impact of culture is apparent in that violence is a male experience. This paper does not detail the types of warfare used in each region on a specific level but the changes in conflict would be an interesting indication of Anglo-Norman conflict in both Region I and II.

With the data that is available for injury and joint disease, both regions seem to be constructing a division of labor but in different manners. In the early period, males experienced more injuries than females generally but share similarities in certain injury types like head trauma. In the later period, males and females are suffering from the same number of injuries but in different locations. When more data is available for the early medieval period, the types of injuries may show the same differences. Despite the different pattern in number and type of injury, males and females are likely experiencing a labor division. This validates the literature from the early period specifying different forms of labor for males and females. There needs to be an increase in data for the early medieval period on non-violent injury and joint disease for a full comparison between the two time periods and regions.

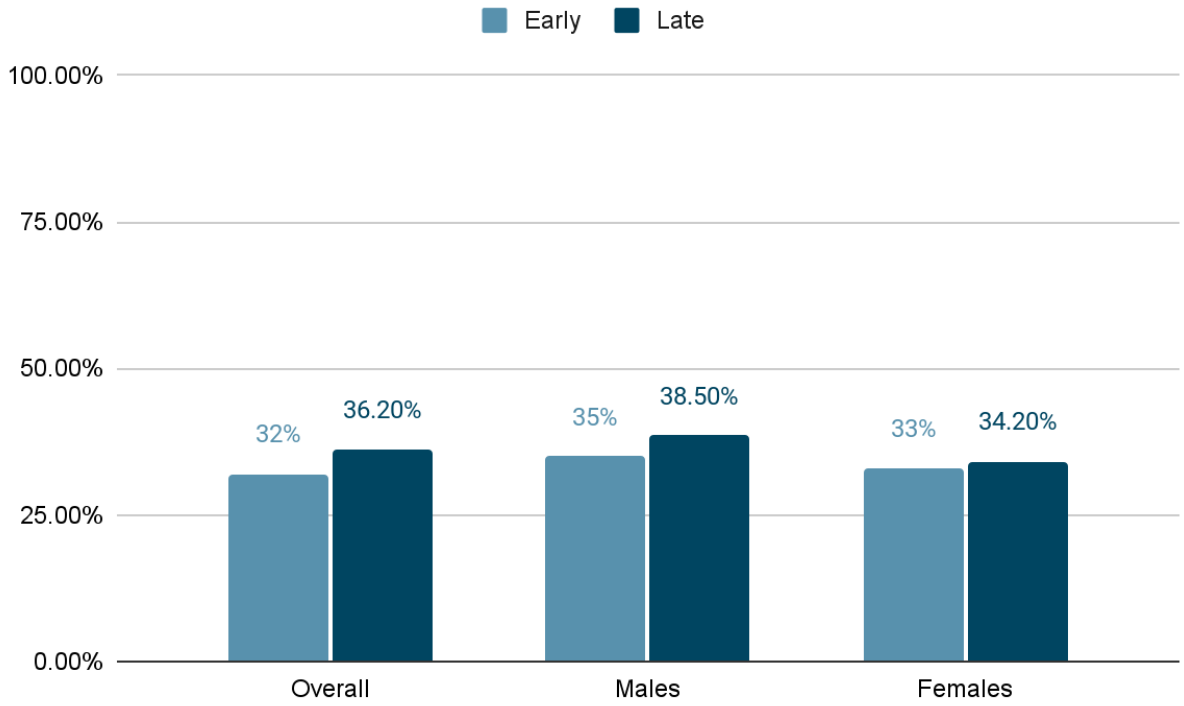
Early and late data from Region I indicates many differences between the early and late periods, but the overall data suggests that males and females are being allocated similar

resources and participation in a division of labor. The age-at-death data indicates that there may have been a shift in ideology to protect females due to their increase in longevity and overall slight health increase. Nonetheless, the bodily experience of females and males is relatively equal in terms of health even though there is obvious evidence for the separation of labor.

Region II is faring much better than region I with lower levels of CO and PH as well as higher rates of longevity. The CO data is not directly comparable due to the use of different methodological uses. Based on the data adjustment done for Ballyhanna with CO data, the proportional adjustment leaves both early and late medieval periods about on equal footing overall. The age-at-death data is much more complicated but does not directly indicate Region II is healthier than Region I. Stature data does show more similarities in health between the two regions since neither are experiencing a reduced height like that of Region I.

Region II does have a slightly larger disparity in levels of CO with females suffering from this deficiency more often which is not reflected in the late medieval period. Like the age-at-death data above, female health may be showing slight improvement from the early to late period. On the other hand, the DEH data is strikingly similar (Figure 18). The difference between overall population, male, and female data between regions is not significant. In region II, males and females are experiencing the same level of malnutrition in the first seven years of life. Again, their bodies are being formed from similar cultural processes causing ingrained biological changes that are equivalent. Neither are experiencing bodily construction and, therefore, there is little cultural or biological difference between male and female bodies in their childhood or adult health.

Figure 18. Comparison between the rates of DEH in the early and late medieval period for region I (Tesorieri 2016, 132; McKenzie and Murphy 2018, 183).



When the age-at-death age categories are adjusted to match the later medieval data, the late medieval population is dying at earlier ages than the early medieval populations (Table 14-15). Early medieval females appear to be faring better than all other groups with 10-20% fewer dying by 35. It is possible that the early medieval females are reaching their 'bottleneck' or 'weeding out' process much earlier than males and have fewer deaths in later years, which would make this data less severely different. However, they are also more consistently living past the age of 45 suggesting their overall health may be better. The age category for older individuals is not the same and it is harder to tell if males and females in later Ireland are also living past 45 to a similar degree. Females in the early medieval period are still living longer than their male counterparts in the early period suggesting a better overall health. The bodies' biological response to the culture stress of males and females show that both are participating in similar practices.

Table 14. Age-at-death data for early medieval Ireland in Region II. Age categories adjusted for comparison. See table 1 for originally reported age-at-death data (Tesorieri 2016, 129).

	Males			Female		
	18-35	36-45	45+	18-35	36-45	45+
Age-at-death	50%	35%	15%	39%	33%	28%

Table 15. Age-at-death data for late medieval Ireland in Region II (McKenzie and Murphy 2018, 107).

	Males			Females		
	18-35	36-50	50+	18-35	36-50	50+
Age-at-death	57.4%	28.6%	14%	59%	27%	14%

Again, in both periods males are the main individuals affected by violence and to a statistically significant extent. The type of warfare used would be a very interesting avenue of exploration between these two time periods in Region II to observe any changes that occur with Anglo-Norman colonization. The level of violence does not increase despite the Anglo-Norman presence suggesting limited violence between the two populations. The Anglo-Norman presence in Ardreigh also does not cause an increase of the violence against female bodies. This may suggest either a shared understanding of women as off limits or that there is limited physical violence between the Anglo-Normans and the Irish.

Data for day-to-day injuries and joint disease is not available for comparison between the two time periods due to the methodological differences and the published data. In comparing Ardreigh to Ballyhanna, Ardreigh was suffering from a similar degree and type of injury which does indicate a division of labor. Injury and joint disease data should be explored in further research to indicate whether male and female labor practices change under Anglo-Norman control.

Despite Anglo-Norman vehement opposition to Irish cultural practices, few differences are constructed into the sex and gender of their bodies representing little ideological or practical change for the Irish. Late medieval data in Region II does indicate a decrease in the age

expectancy but does not show an increase in dietary deficiencies, generic disease, or malnutrition. The decrease in life expectancy may be in part because of Anglo-Norman control but if this is the case it is not a gendered division. In other words, Anglo-Norman control may have negatively impacted health or simply decreased life expectancy in late medieval Ireland but did not increase the split in health among differently sexed individuals. The Anglo-Normans writings suggest strong distaste and disapproval of Irish culture and a larger change would be expected overall to reconstruct the Irish gender relationships. Due to an absence of large modification to the body, there is an overall lack of impact on the value assessments between males and females in Irish cultural practice. More research needs to be conducted to conclude the effect of the Anglo-Normans on the Irish population but in this preliminary study, the Anglo-Normans are not impacting the typical medieval Irish gender relationships. Consistently, the embodied experience of sex and gender points to an equal but separate identity for males and females. The Irish appear to allocate the same level of resources to males and females and treat them similarly enough that their health is about equivalent. They also appear to split labor along gendered lines but this does not cause a value adjustment where male or female labor is valued over the other. In the Irish literature men speak of an unwanted but necessary relationship with women and it appears that women are perceived as necessary for survival enough to warrant equal allocation of resources.

Conceptualizing the body as simply biological and static, in a Cartesian sense, naturalizes specific forms of identity which is not accurate in the apparent similarity in body construction between males and females in Ireland. Male and female bodies are made of the same or largely similar CO, PH, and DEH. In late medieval Ireland, these bodies were formed under similar

cultural conditions causing biological responses and more comparable bodies. Both males and females are under the same physiological stress from an inadequate diet as well as malnutrition and disease making both susceptible to early deaths at the same rates. This is particularly clear in the age-at-death data that shows males and females are dying young at Ballyhanna. The strain on the female body in childhood is causing them to die during pregnancy but not to a higher degree than males without participating in pregnancy or birth. The male and female bodies are being constructed similarly enough that each is dying from added cultural pressures on the biological body, not just females in the birthing process. The supposed 'natural' categories of male and female are not observable through health indicators in Ireland. Not only are these categories not natural in the Irish bodies but the lone fact that they are not, gives pause to the universalization of them for any context.

Hierarchies into which sexed and gendered bodies are organized are also not universally restricted by bodies. Wharram Percy's bodies showed a significant difference between male and female identity construction due to the biological reaction to cultural difference between two sexed and gendered categories. These biological differences then perpetuate a cultural disparity between males and females, effectively making and maintaining a hierarchy. Irish bodies did not show these differences for almost all the general health indicators. In the cases of age-at-death data for later medieval Ireland may even show that female bodies are under less stress from their culture. In this sense, the lack of difference in bodies represents that the Irish were not assigning value to the category of male over female. Neither were being given primacy in the resources they were allocated or put under particular stress due to their cultural practices. Male and female bodies were being constructed in the same status showing neither was valued over the other. The equality in treatment of males and females seen through the health indicators included in this

paper is evidence of societies that do not create strict hierarchies based on gender and do not perpetuate them based on culture and biological construction.

The dichotomy between the dead and alive body is similarly ineffective. The cultural and biological reactions that make the living body are present in the dead body. Evidence of CO, PH, DEH, stature, injuries, and joint disease are components constructed during an individual's life by culture and through biological processes. These components are equally observable in the skeletal remains of the medieval Irish. Therefore, cultural components live on in the dead body and do not evaporate with the absence of a 'soul' or 'mind'. Culture and 'mind' cannot be only ascribed to the living body because they are present in the dead body as well. A sharp divide cannot be effectively drawn between the living and dead because the body is not static and changes in the context of culture.

Along with the dichotomy of dead and living, the living body or 'mind' cannot be parsed out as the only cultural component. Only looking at literature or artifacts would not have given a complete understanding of the state of the Irish. Throughout colonization, it is expected that sex and gender relationships would change based on the vehement opposition to Irish culture by the Anglo-Normans. Big changes are not reflected in the skeletal remains, suggesting the lack of impact on the Irish in the construction of their bodies. Had the skeletal remains not been researched, the absence of sex and gender system restructuring could not have been gleaned within this historical context. Male and female relationships throughout the medieval period are both valued to the same degree even through the Anglo-Norman colonization and their vehement opposition to Irish gender systems. The body is subjected to colonization but little impact is observed in their health and gendered systems as may have been expected. In this sense, the voice is returned to the people of Ireland by viewing the reality of their bodily processes.

The body must be understood as materiality and created through both biological and cultural processes. Malnutrition, access to food, underlying health conditions, disease, and physiological stress are all aspects of health in medieval Ireland. The impacts of these life experiences appear in the body in the form of general health indicators. The cultural practices of the Irish cause a biological response and in return become a part of their culture. The mere fact of these changes in bodily morphology show that the lifeway of the people were shaping their identities throughout their lives. Therefore, the medieval Irish bodies and other bodies are constructed through biological and cultural processes. The injuries and joint disease construct sexed and gendered categories through the different repetitive activities completed by each group. These activities became ingrained in their body as fractured bones and osteoarthritis which created biological and cultural variation in their bodies. Irish males are also more likely to be impacted by violence perpetuating a sexed and gendered association between males and violence. These variations bodily variation then are reiterated in culture. Their bodies were not innately destined to male and female identities but rather these categories had to be formed through biological reactions to cultural practices ultimately making two separate forms of bodies.

Conclusions

The work done in this paper is a preliminary understanding of changes in health from the early to late medieval period as well as an exploration of some regional variation based on gender. Further research on this topic will require in depth assessments of each health indicator to fully understand the breadth of their meaning. The regional variation should be explored in more detail with more sites from late medieval Ireland being incorporated and a more definitive regional distinction should be drawn. With the addition of more information regarding

day-to-day injuries and joint disease for early medieval Ireland more can be concluded about male and female everyday activities as well.

Males and females in medieval Ireland can be understood as contributing different labor but are on equal footing in terms of health, with some variation based on time and region. The knowledge of these relationships can be known because the once living people leave biological and cultural traces in their bodies. Cribra orbitalia, porotic hyperostosis, and dental enamel hypoplasia are a few small examples of cultural processes, like allocation of food, that become part of the biological makeup of a population. The Irish body is a result of biology and culture and is constituted at this consection. Their gender relationships as relatively equal could not have been understood lest universal conceptions of sex and gender were avoided. A Cartesian conception of the body is not sufficient in explaining the biological change in the medieval Irish population. The body is not a machine that the mind inhabits but the place in which practices create biological reactions that then themselves become culture. Future osteological research would benefit from Sofaer's conception of the body.

Viewing the body in this way, not only allows researchers to understand people of the past and present, it avoids universalization that often leads to hierarchical claims like those made by misogynists and racists. To move past arguments of hierarchy based on race and sex, requires that we investigate the body as a changing being. Other identities should also begin to be conceptualized as a cross section between biological and culture which are founded in the body. Overall, the investigation of bodies is a primary concern because it combats static ideas placed on different types of bodies.

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