Reconstructing the Life Histories of the Individuals Buried in the Rock-cut Cave Church of St. Georges, in Gurat, France

By

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Author's Declaration

This thesis consists of material all of which I authored or co-authored; see Statement of Contributions included in the thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

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Abstract

In the 1960s and 1970s, eighteen individuals were excavated from the cave church of St. Georges, located in Gurat, France. This thesis develops osteobiographies for these individuals to build on previous studies relating them to the cave church in which they were found providing further contextual analysis. By incorporating the data from previous studies with the osteobiographies, it is possible to suggest who these individuals were, where they came from, and how they may have ended up in Gurat. These theories include these individuals being monks, pilgrims, peasants or some combination thereof. In addition, special attention is given to the life threatening fractures some individuals suffered and other pathological conditions that provide information about their lives and the circumstances that led to their burial at Gurat.

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Chapter One

St. Georges Church Background

1.1 Introduction

In the 1960s and 1970s eighteen individuals were excavated from the Church of St. Georges located in Gurat, France by Dr. Michael Gervers of McMaster University. This rock-cut cave church likely originated as a hermitage and evolved into a monastery (Gervers 1967). The burials inside this church contained women and men, as well as children. How these eighteen individuals ended up in Gurat, why they were buried there, and what their lives were like are questions that have not yet been answered.

The main goal of my study was to see if the life ways of the St. Georges individuals can be examined using in-depth osteobiographies and paleopathological analysis, an avenue of research that has not yet been completely explored on the skeletons. The skeletons will be analyzed using standard methodologies of biological analysis as outlined by Buikstra and Ubelaker 1994 (Phenice 1969 ; Ascardi and Nemeskeri 1974; Ubelaker 1989 ; Krogman and Iscan 1986; Todd 1920 ; Lovejoy et al 1985 ; Meindl and Lovejoy 1989) and a survey of the pathological conditions that left evidence on the bones. Evidence for activity patterns of these individuals also was evaluated using the guidelines outlined by Kennedy (1989). These results will be contextualized and presented with the information already collected on the St. Georges site.

A secondary goal of this study was to humanize these individuals. Ryan Harrod and Debra Martin (2016) suggest that taking note of pain and suffering humanizes the remains being analyzed. The pain of those in the past is the same as our pain. By populating the past with real people, modern people can gain a better perspective of a time and place that is very different from their own lives.

1.2 Osteobiographies

Osteobiographies are the reconstruction of life of a skeleton as outlined by the bones themselves. Frank and Julie Saul (1989) attribute Larry Angel's work on fragmentary Greek skeletons to the rise of osteobiographies. When writing osteobiographies, there are many things one has to consider. Robert Jurmain (1999) and Alison Galloway (1995) both suggest that anthropologists are affected by their own biases and viewpoints and see what they want to see. Jurmain states that "an essential component of any scientific approach is to consider all possible explanations…alternative explanations must be more honestly entertained" (Jurmain 1999 pg 9). Galloway reminds anthropologists that

> "The ability to read life histories in the bone is extremely attractive, it 'gives voice' to the deceased and permits us to contribute to a more rounded picture of the individual. We must always remember though, that the voice which is spoken is through our mouths and there may be discrepancies between the life events and what we think we see" (Galloway 1995 pg 83).

These are pitfalls of osteobiographies. No diagnosis or hypothesis is certain, they are only one possibility. It is important to remember that anthropologists cannot speak for the individuals they study because there is no way of truly knowing how an individual lived. It is important to keep in mind researcher biases that may impact interpretations made from any study. While my goal is to reconstruct the lives of the St. Georges individuals, ultimately any conclusions I draw from the bones are my personal interpretation and these interpretations can be agreed upon or contested.

1.3 Importance of the St. Georges Skeletons

The St. Georges individuals represent the 14th century, a time period we know little about. The 14th century was a time of great turmoil for Europe. France was engaged in the Hundred Years War with England for most of the 1300's. During this time period, the English raided French villages and burned their crops, causing a series of famines that affected the entire country. France was also suffering from the Black Death, which began in 1347. Several waves of the disease came and went through the 14th century. Due to the instability in France, mortality rates were high and many people were relocating; as a result it was difficult to keep accurate historical records or keep track of population movements (Berkhofer 2004; Neillands 2001). The St. Georges individuals are also the main evidence left behind that could shed some light on the use of the church of St. Georges itself. There are very few artefacts that remain in the cave church, making the St. Georges individuals the main research base for the church (Gervers 1967).

1.4 History of the Excavations

The church of St. Georges was excavated in the mid 1960s to early 1970s by Dr. Michael Gervers and his team primarily to study its architecture. It was not known that human remains would be discovered inside. When the first set of skeletons were excavated it was estimated that the church St. Georges might contain approximately two hundred burials (Gervers 1967). These additional burials have not yet been excavated and there has been no further archaeological activity involving the monastery since the 1970s. Work on evaluating the site itself has continued while the work on the skeletons stalled until recently. A preliminary report on St. Georges was published in 1972 by Dr. Michael Gervers but only briefly mentions the skeletons. All follow up

reports were based on art and architecture and did not include the skeletons (Gervers, per comm. 2018).

1.5 Public Issues Regarding Gurat

The main public issues regarding the skeletons of St. Georges church are that the remains have been excavated but not fully analyzed, and that the remains have been subject to many experiments that have not been completed and do not contextualize the individuals. As a result, the people of Gurat have learned little about the history of the town from the excavations and have no information to develop tourism or other public interest. These issues matter to the public for a variety of reasons. To understand these reasons we must first define what the public is.

1.5a Defining the Public

For the purpose of this thesis, the public is anyone who has a stake in the Church of St. Georges or the individuals found at St. Georges. Since it is highly likely that the eighteen individuals found outside the Church of St. Georges were connected to the church in some way (either as a monk, pilgrim, or a part of the religion in general) members of the Christian religion or at least French Catholics would possibly have stakes in these individuals.

The public also includes the people of Gurat. The people of Gurat are currently trying to expand tourism in their town which has caused renewed interest in the rock-cut cave church (Mena report, 2016). New discoveries in the cave church would eventually promote an even greater interest in the site.

1.5b Orphan Sites and Analyzing Remains

The St. Georges skeletons were never fully analyzed after excavation. Clements and Gruspier (n.d.) and Gretenhart (n.d.) both did preliminary reports but the skeletons were never contextualized or published. These two reports differed significantly in their findings and often conflict on sex estimations, age estimations, and pathologies. Jacqueline Meijer (2018), a graduate student at the University of Waterloo, performed strontium isotope analysis on the St. Georges individuals and conducted sex and age analyses. I will expand on that work with a thorough examination of the pathologies in the skeletons and by developing osteobiographies of the more complete individuals.

The St. Georges skeletons were used in a variety of studies ranging from chemical analysis of archaeological bones (Hancock et al, 1987), to a blood type study (Lengyel 1975), to a never finished bone density study (Webber and Gretenhart 1978). None of these studies included a complete analysis of the skeletons as the focus was on the methodologies themselves rather than the results. The chemical study conducted by Hancock et al, (1987) attempted to find if there was a difference between archaeological and modern bones. This study used the St. Georges individuals as a control sample and attributed them to a much earlier period (11^{th} century) than they are currently dated to (14^{th} century) (Hancock et al, 1987). It did not provide much new information about the St. Georges individuals themselves as they were only a control group.

The blood typing study sought to obtain data on sex and blood type through sampling of the St. Georges individuals (Lengyel 1975). This study had conflicting results with the findings from the preliminary report by Clements and Gruspier (n.d.). Lengyel's (1975) study found all the skeletons to be male, and had very different age estimates for individuals such as GU2 and

GU6, placing them at 26-30 years and 31-40 years respectively. Clements and Gruspier (n.d.) found GU1 and GU6 to be female, as have two subsequent studies that also examined the skeletons thus far (Gretenhart n.d. ; Meijer 2018). These projects estimated GU2 to be 40-50 years and GU6 to be 14-16 years (Clements and Gruspier n.d.). It is unusual that these estimates of age and sex would be so different from one another. The blood typing portion of the study determined all individuals to be A or O blood type, with the exception of GU6 who was determined to be AB (Lengyel 1975). This information was intended to supplant the preliminary skeletal analysis written by Clements and Gruspier (n.d.) and Gretenhart (n.d.), but the data was never combined or analyzed. The data on blood type on its own does not offer much insight on the background of the St. Georges individuals.

Webber and Gretenhart (1978) were attempting to estimate body weight from the calcaneus of adult individuals. They removed the calcanei of GU1, GU2, GU3, GU7 in 1975, and still retained them for study in 1972 (personal letter written by Dr. Michael Gervers). For an unknown reason, the study was never published past the rough notes of a preliminary report. More importantly, the bones were never returned and GU1, GU2, GU3, and GU7 still lack their calcanei. At some point, additional bones were taken from the McMaster University where the bones were stored (Gervers, pers.comm. 2018). These were mostly facial bones, including GU9's zygomatics and maxilla. These bones have not been returned since. Thus valuable data has been lost and will likely never be recovered.

1.5c Curation and Study Issues

The St. Georges individuals have also been subjected to additional sampling. For an unknown purpose, samples were taken from GU1, GU2, GU3, GU7, and GU9 by cutting out

pieces of bone. These samples were not taken from the same bone on all the skeletons; GU2 had a sample taken from the tibia while GU1 had a sample taken from a metacarpal. Earlier protocols did not recognize that where possible, samples should be taken from the same bones in order to minimize error (Mulligan 2006).This was not done because the skeletons lacked any common bones; each individual who was sampled had both tibiae present. These samples also varied in size, the GU2 sample is 5 cm long and 2cm wide while the GU1 sample is a mere 1.5 cm long and 0.5 cm wide.

1.5d Ethics

There are several important ethical issues with the St. Georges individuals. The eighteen skeletons were excavated and never contextualized along with the rest of the site. Klesert and Powell (1993) state that researchers do not have an automatic right to access and study human remains and that academic studies must be properly contextualized in order to include public interests. This brings up a second important issue. In many countries, excavation of skeletons is required to take place if any remains are discovered. France has strict laws protecting cultural heritage and created legislation to protect archaeological sites and burials (Inrap 2017). France created Inrap (French national institute for preventive archaeological research) on February 1, 2002 for the protection of archaeological sites and artefacts (Inrap 2017; Michel and Charlier 2011). However, there are no laws on what happens after excavation regarding curation (Michel and Charlier 2011). Fortunately, the skeletons from the cave church of St. Georges were preserved and are now being studied in a variety of ways.

1.6 Publication

A possible avenue for publication of chapter two of this thesis is the *International Journal of Osteoarchaeology*. The goal of this journal is to publish original research regarding human or animal bone in archaeological contexts (International Journal of Osteoarchaeology 2018). The osteobiographies I produce and their results would match the criteria required by the Journal since the skeletal collection I am working on is archaeological and primarily focuses on deducing life histories from the bones.

Chapter Two

Analyzing the St. Georges Individuals

2.1 History of Gurat and Medieval Religious History

Gurat is located in the area of Poitou-Charentes, France (Figure 1). The rock-cut church of St. Georges likely started out as a hermitage in the 11th century initially but later evolved into a monastery (Gervers 1967). The church was appears to have been occupied and abandoned several times in the site's history. The church may have served as a refuge for travellers during the Wars of Religion (1562-1598) but was not occupied during this time as there is a lack of archaeological evidence for any long term occupation the in the 16th century. Eventually the cave church became completely unoccupied and was became a garbage dump for the nearby local village (Franklin and Gervers 1978).

Gurat has two main pilgrimage routes passing near it. One route is between Charroux and La Reole (Gervers 1967) and another is Vezelay and Bordeaux (Stopford 1994). Both lead to the popular pilgrimage destination Santiago de Compostela. Santiago de Compostela is the home to the remains of St. James the Greater (a saint associated with Emperor Charlemagne). The reasons people sought out Santiago de Compostela varied greatly. Some went for forgiveness, healing, miracle seeking, or a desire to see the world. Some pilgrims were employed by others to make the journey for those that were too weak to request healing (Melczer 1993 ; Stopford 1994).

Monasteries and other religious centres were open to pilgrims undertaking the trek to or from Santiago de Compostela as it was seen as a very holy undertaking. Religious orders would

provide directions, shelter, food, and take care of burials for any pilgrim who died on their journey (Melczer 1993).

Pilgrims could be any free person (usually male) who was an adult and not bound by the church (Melczer 1993 ; Stopford 1994). While pilgrims escaped the social stratification of the medieval time period, however certain social rules still applied to them. Women, for example, were not permitted to trek alone and very rarely made the trip unless their husband accompanied them. This makes it less likely to find female pilgrims, although not impossible. Another rule was that only the rich could choose to go on their trek whenever they saw fit. The poor went only when they were nearing the end of their lives as they were required to labour until this point (Melczer 1993; Stopford 1994).

As a monastery, St. Georges also would have housed monks who devoted themselves to their God and lived a life of piety and hard labour. Monks farmed the large tracts of land around their monastery and sold their excess crops and products. Monks were only men, but if a woman wanted to devote her life to God she would become a nun instead. Monks allowed women into their monasteries for one purpose, which was to wash clothing and clean rooms (Berman 1986 ; Nugent and Brooke 2003). Monks, like pilgrims, could go on treks to religious sites but different monastic orders had different rules regarding pilgrimages. Some were not permitted to trek as they were bound to the church, some were able to go on pilgrimmages to certain holy sites but not using the name pilgrim. Most of the people buried at religious centres were monks or nuns, however the elite could buy plots for their own burials at these abbeys and monasteries so that they could be remembered in prayer and reach heaven more quickly (Nugent and Brooke 2003 ; Sheridan and Gregoricka 2015).

In the medieval world, the dead were buried in the cemetery of their local church. Funerals were often conducted the same day as the death, apart from Sundays in which case the burial would take place on Monday. Peasants could be buried in the same church cemetery as the elite, although their funeral would have far less expense (Orme 2004 ; Zadora-Rio 2003). It was considered desirable to be buried in a monastery as this ensured the monks would say a person's name in prayer and speed their release from purgatory to heaven (Nugent and Brooke 2003 ; Orme 2004).

2.2 Dating the Site

The burials were excavated outside the rock-cut church (Figure 2). The church may have been established 1237-1286 CE and last occupied ca. 1655 CE (Franklin and Gervers 1978). It is estimated that there are as many as two hundred individuals buried within this church (Gervers 1967). Only eighteen skeletons were excavated from a limited area of the church, and of those eighteen, only thirteen are complete enough for study. The eighteen individuals excavated from St. Georges have been tentatively dated to ca 1390CE (Gervers 1967). This date is based on the radiocarbon dating of a few charcoal fragments found in Grave Hb. However, these charcoal fragments may have ended up being associated with the grave coincidentally and the range of dates is tentative. It is unknown whether or not the St. Georges individuals were buried within the same time period or if the graves are from completely different time periods. The fact that several of these individuals (GU8, GU9, GU10, GU11, GU12) indicate secondary burials complicates the dating further, as they may have been originally buried in a primary burial far earlier than the estimated date of 1390CE.

2.3 About the St. Georges Individuals

The St. Georges skeletons have never been comprehensively studied before, although there have been many preliminary reports (Clements and Gruspier, n.d.; Gretenhart n.d.; Hancock et al, 1987; Lengyel 1975). The most recent study by Jacqueline Meijer (2018) was the first to link the skeletons to the archaeological context of the monastery. She confirmed via strontium isotopes that the all of the St. Georges individuals had spent the last 5 years of their lives in or around the area of Gurat (Meijer 2018), but that most of these individuals did not originate in Gurat. Their strontium ratios correlated to highland or lowland France, or in the case of GU10, outside of France entirely (Meijer 2018).

In my work, the skeletons were initially evaluated for standard osteological characteristics. Of the thirteen complete skeletons I examined, the evaluation of the morphology of the skull and pelvis (Buikstra and Ubelaker 1994 ; Phenice 1969) indicated that six are male, three are female, and three are unidentifiable. There are four infants, two young adults, and eight mature adults (Table 1). The thirteen skeletons chosen for this project were selected because they are the most complete and are represented by more skeletal material than just a single tooth or bone.

Grave Number	Skeleton Number	Age	Sex	Height	Trauma
Ha	GU1	40-50	Probable Female	164.5cm	No
Hb	GU2	45-50	Probable Male	185.75cm	Yes

Hb	GU3	20-25	Probable Male	174.88cm	Yes
Hb	GU4(5)	3 +/- 12 months	?	X	No
Ja	GU6	14-16	Probable Female	X	?
Ja	GU6(A)	Birth-3 years	?	X	No
Dc	GU7	40-50	Probable Male	169.84cm	Yes
Dc	GU8	35-40	Probable Male	157.56cm	Yes
Dc	GU9	40-50	Probable Male	X	Yes
Dd	GU10	3 +/- 12 months	?	X	No
Dd	GU11	45-55	Probable Male	X	?
Dd	GU12	30-50	Probable Female	X	No

Table 1. List of the individuals used for this thesis and their age and sex estimations

2.4 Methodologies

When I began my work, the eighteen individuals had already been cleaned, sorted, and labeled by previous researchers (Clements and Gruspier n.d.; Gretenhart 1973). The remains were then stored in cardboard boxes. This meant that very little pre-research processing had to be done. To begin my data collection, I organized and inventoried each set of remains. I laid out each individual on a divided table and articulated them. I then determined age and sex using the standards outlined by Buikstra and Ubelaker (1994). I used the Todd pubic symphysis method

(Todd 1920) for aging as this method was developed using an earlier reference collection which better suits a medieval sample. When the pubis was not available for study, I used auricular surface aging (Lovejoy et al, 1985 ; Meindl and Lovejoy 1989). I used Acsardi and Nemeskeri (1974) suture closing technique in conjunction with the pelvis. I used the Phenice (1969) method for sex differences in the pubis for sex determination. Height estimation was achieved using the regression formula for estimating stature (Trotter 1970).

For the juveniles, dental age for the juvenile individuals was determined using dental eruption as outlined by Ubelaker (1989). I used the epiphyseal fusion chart created by Krogman and Iscan (1986) to determine age when longbones were available.

I surveyed all the bones for evidence of trauma and pathology using Galloway and Wedel (2014), Ortner and Putschar (1981), Aufderheide and Rodriguez Martin (1998) and Roberts and Manchester (2007) as references. I conducted more focused research on the various traumas and pathologies that I found. I then investigated the impact of these pathologies on quality of life for the individuals in an effort to produce more fully developed osteobiographies.

2.5 Osteobiographies of the St. Georges Individuals

GU1: Female, 40-50 years.

GU1 was a primary burial in grave cluster Hb (See Figure 2) and was buried in an extended position with the arms above the head and the legs stretched out. This is a unusual manner to be buried in, as Christian burials usually have the arms crossed over the chest. GU1 has a fragmented skull but is otherwise a fairly complete individual. GU1 is estimated to be a female due to pelvis and skull morphology and was approximately 40- 50 years old at death. Age was determined by examining the pubic symphysis and auricular surface analysis (Todd 1920 ;

Lovejoy et al 1985 ; Meindl and Lovejoy 1989). Stable isotope analysis indicated that this individual did not grow up in the area around Gurat (Meijer 2018). GU1's stature is approximately 164.5cm which was estimated from their tibia using Trotter's (1970) height regression formula.

Pathology

GU1 has worn teeth, but shows no sign of caries although there was large dental calculus build up. The mandibular and maxillary molars are worn to the point of dentin exposure (Figure 3 and Figure 4). The heavy wear may be because of GU1's age or due to a rough diet, or indicative of both (Tayles et al 2000 ; Roberts and Manchester 2007). It may also have prevented cavities by wearing the cusps of the teeth away where food tends to be caught (Roberts and Manchester 2007).

GU1 shows a large amount of enthesophytes which means that she was likely accustomed to hard work. There appears to be a correlation between enthesophytes (the musculoskeletal markers of stress at the tendons and ligament insertions) and specific activities (Kennedy 1989 ;Roberts and Manchester 2007). However, these enthesophytes can occur for other reasons besides activities and increase with age (Jurmain 1999). The metacarpals, ulna, radius, humerus, and clavicles were extremely robust and even had some compression and flattening at the distal end. GU1's nuchal crest is extremely pronounced and indicates heavy lifting or weight bearing activities that strained the back, shoulders, and neck (Kennedy 1989).

This interpretation is supported by evidence of Schmorl's nodes, caused by herniation of vertebral discs (Rehman and Mattei 2013; Roberts and Manchester 2007). Schmorl's nodes were found in the 6th to 8th thoracic vertebrae, as well as arthritic lipping of the spine in almost all vertebrae, most notably in the lumbar. In addition, GU1 may have engaged in activities that

compressed the thorax. A right rib fragment that shows compression and has a distinct groove on the superior surface, as well as the costal groove on the inferior edge of the rib (Figure 5). This is frequently seen in individuals with collapsed vertebrae due to osteoporosis or other causes, but in this person the vertebrae are intact (Kennedy 1989). This suggests that there is another cause of the compression of the ribs, presumably related to some habitual activity. The indications of robust musculature on the arms are probably related to this activity as well (Kennedy 1989).

Analysis

GU1 is a woman who probably lived a life full of hard work, and died in her late 40's to early 50's. GU1 may have been a worker in the monastery as monks allowed females into monasteries for tasks such as washing and cooking (Nugent and Brooke 2003). Washing garments on a wooden scrub board is the type of activity that could have produced the muscles indicated by her robusticity and enthsophytes (Kennedy 1989).

It is unlikely that GU1 is a pilgrim. Since pilgrims could be peasants or labourers who began their treks near the end of their lives, this would explain why GU1 is heavily muscled and why they were buried in a monastery that is on route from Santiago de Compstela (Melczer 1993). However, female pilgrims were rare as women could not travel alone (Melczer 1993).

It is also unlikely GU1 was an elite individual. Monasteries allowed burials of the elite for a high price within their walls (Melczer 1993). However, this seems unlikely in GU1's case. This individual has been a hard worker for most of her life, and elite women in Medieval France didn't do as much physical labour. In fact, elite women were often frail and prone to osteoporosis (Agarwal and Grynpas 2009 ; Roberts and Manchester 2007).

GU2: male, 40-45 years

GU2 was a primary burial in close proximity to GU1 in grave Hb (see Figure 2) but in a separate stone enclosure. GU2 was buried in a similar manner to GU1, with their arms extended and raised above their head. GU2 was extremely robust and tall. GU2 is estimated to be approximately 185.75cm according to Trotter's stature estimation equation which was calculated using the tibia (1970). GU2 is relatively complete, missing both calcanei and delicate bones from the skull such as the vomer, ethmoid, etc. GU2 is estimated to be a male based on skull and pelvic morphology which show hyper masculine traits (Buikstra and Ubelaker 1994). GU2 was approximately 40-45 years old when he died (Todd 1920 ; Lovejoy et al 1985 ; Meindl and Lovejoy 1989). Stable isotope analysis of this man's teeth indicate that he did not live all of his life in Gurat but was spent time in northern France (Meijer 2018).

Pathology

GU2 has many dental problems including caries, heavy calculus build up, and 4 dental abscesses in which infection from the tooth spreads into the alveolar bone holding the teeth (see Figure 6). GU2 has an expanded incisive foramen which is a sign of infection and bacteria in the blood stream, possibly caused by his poor dental hygiene (Hillson 1996; Roberts and Manchester 2007) (see Figure 11).

Like GU1, GU2 appears to have been accustomed to hard work for most of his life. The humerus, ulna, radius, and clavicles are also slightly bowed, likely from constant use and heavy labour. This changes occur from the insertion of muscles and tendons pulling on the bone, and that this tension causes compression and a bony response of either bone recession or addition (Kennedy 1989, 134). However, it is still worth noting that GU2 is an older individual and this may account for some of the changes seen in his bones (Jurmain 1999).

GU2 suffered many fractures. The first was a severe, potentially life-threatening fracture involving the first three cervical vertebrae. (See Figure 7). C1, C2, and C3 all suffered a fracture (Galloway and Wedel 2014; Lovell 1997). This fracture broke the facet on the right side of the atlas and travelled through the 2nd and 3rd cervical vertebrae obliquely. This fracture caused the facets on all three vertebrae to deviate from their natural shape and flatten out and enlarge.

In addition the 6th thoracic vertebra was fractured along the spinous process (Figure 8). This fracture was also well healed, but incorrectly. The spinous process was deviated from its normal position, deflected downward and leaning towards the right side and projecting down from the vertebral column. Fractures to this area of the neck typically result in paralysis or death, as important cranial and motor nerves are located inside the neck (Galloway and Wedel 2014). These fractures are well healed, indicating he survived for many years after this injury, and there is no evidence for disuse atrophy in his limbs, indicating GU2 was not paralyzed from this fracture.

The five lumbar vertebrae in this skeleton all have Schmorl's nodes indicating he had herniated intervertebral discs at these joints. The 3rd and 4th lumbar vertebrae have osteophytes projecting from the vertebral bodies. These are so extensive that they form an ankylosis, knitting together and immobilizing that section of the spine although the vertebrae have fully ankylosed (fused) (Figure 9) It would have been very difficult for this individual to move their lower back and would have caused stiffness throughout their spine (Roberts and Manchester 2007).

The left talus, the uppermost bone in the ankle; has a fracture on the inferior surface that extends through both the trochlea and subtalar articulate surfaces (Figure 10). This type of fracture is known as a coronal fracture of the body (Galloway 2014 ; Lovell 1997). This fracture has fully healed.

GU2 has severely imflamed periosteal bone on both fibulae and midshaft on the tibiae. This is localized and the periosteal bone is located at the same location on both the tibiae and fibulae, which may indicate an impact across both legs. GU2 also has Harris lines on his left tibia. Harris lines represent periods of stress during childhood, when an individual has stopped growing, but then recovered (Harris 1931; Roberts and Manchester 2007; Ortner and Putchar 1981).

Analysis

After a childhood of repeated stresses, GU2 lived a life full of pain. The fracture to his neck and arthritis in his spine would have limited mobility and been exceedingly painful both during healing and afterwards (Harrod and Martin 2016). The cervical fractures (C1, C2, C3) are unilateral which is rare (bilateral being the more common fracture type) and may have come from a fall, a blow to the head, or hyperflexion (Galloway and Wedel 2014). The break to T6 removed the tip of the spinous process which fused back to the vertebrae lower down and likely resulted from a fall or blow to the spine. While these fractures are commonly associated with car accidents today, they can also be caused by horseback riding accidents and may indicate that this was a higher status individual if that is the source of his injury (Galloway and Wedel 2014). Despite these injuries, GU2 was apparently quite physically active and worked hard.

The fracture in his talus would have given GU2 a great deal of trouble when walking and does not appear to have healed correctly, indicating GU2 was putting weight on their injured foot too soon or that it was not adequately immobilized (Galloway 2014). GU2's talus had both a coronal fracture of the body and a neck fracture (Galloway 2014).The most common causes of fractures such as these are from falls from height, or forced inversion when the foot was in a neutral position (Galloway 2014). GU2 may have injured their foot when walking and rolling

their ankle, or from a fall where their calcaneus was not the first bone to strike the ground (İşcan and Kennedy 1989 ; Galloway and Wedel 2014).

The inflamed periosteal bone located on GU2's right and left tibiae and fibulae may indicate a generalized infection (Aufderheide and Rodriguez-Martin 1997; Roberts and Manchester 2007) or can be caused by trauma. Since the fibula is covered by many layers of muscle and is not weight bearing, it is difficult to damage but not impossible (Roberts and Manchester 2007).

GU2's abysmal dental health would also have caused this individual a lot of pain and may have contributed to his death. Each of the four dental abscesses in GU2's mouth had a draining canal and had severely damaged the integrity of the affected teeth. Once the root of the infected tooth dies, the individual would have felt no pain in the tooth anymore (Hillson 1996; Langsjoen 1998). However, before that point, dental abscesses cause extreme amounts of pain so intense that the individual can no longer chew food on the tooth or tolerate cool or hot sensations near it from beverages (Langsjoen 1998). Abscesses can be lethal, as bacteria from the infected teeth can easily enter the bloodstream and infect the heart (Hillson 1996 ; Langsjoen 1998). Alongside these dental abscesses were plenty of caries (located mostly in the premolars and molars) which would have given GU2 a toothache. The amount of problems GU2 had with his teeth could indicate a carbohydrate rich diet.

GU3: Male, 20-25 years

GU3 was a primary burial buried in the same position as GU1 and GU2 and in the same grave section Hb (see Figure 2). GU3 is robust like GU1 and GU2, and is estimated as a male due to pelvis and skull morphology. GU1 is considerably younger than GU1 or GU2, his

manubrium has not fused to their clavicle which means that this individual is around 20-25 years old (Krogman and İşcan 1986) and GU3 stood at approximately 174.88 cm tall (Trotter 1970). Stable isotope analysis indicates that this man migrated to Gurat and grew up elsewhere in France (Meijer 2018).

Pathology

GU3 has unusual dental wear. This individual is missing their mandibular and maxillary 2nd and 3rd molars. These losses appear to have been from long before GU3's death as the tooth sockets have healed and filled in almost completely. GU3's maxillary incisors are worn at an unusual angle which is not due to an underbite or overbite. This suggests GU3 was eating something that wore the teeth down in this manner or was using his teeth as a third hand (Roberts and Manchester 2007). All the teeth show heavy calculus and the palette has an enlarged incisive foramen, much like GU2.

GU3's clavicles are bilaterally flattened distally, indicating that this change is likely due to behaviour or the individual was born like this, probably not due to trauma (Kennedy 1989). More notably, there are 2 large pits at the sternal end of each clavicle on the inferior surface. The depth of the pit in the right clavicle is 5.41mm at the greatest depth, while the left is 3.96mm at greatest depth. These holes may be from strain on the costoclavicular ligament from lifting heavy objects in a farmers carry position (Figure 12) (Kennedy 1989).

GU3's ribs are rough on the interior surface. They show plaque that indicates a lung infection and or irritation of the pleural membrane (Aufderheide and Rodriguez Martin 1998 ; Roberts and Manchester 2007; Ortner and Putschar 1981) (Figure 13). Some irritation would be normal for a population that was surrounded by cook fires and smoke most of their lives, but to this degree it may indicate something more serious (Roberts and Manchester 2007).

GU3 has what appears to be erosion on the base of his nasal aperture, but what remains of the nasal spine indicates that it was present until excavation. This could indicate leprosy or another pathology with similar osteological changes (Aufderheide and Rodriguez Martin 1998 ; Ortner and Putschar 1981).

In the 2nd cervical vertebrae the lateral foramina never fused completely. All the vertebral bodies are compressed, and many have Schmorl's nodes, but due to the fragmented nature of the remaining vertebrae the position of these features in the vertebral column cannot be identified.

Both the right and left fibulas have periosteal bone on the midshaft (14). There is no evidence of periosteal bone on the tibia, which is unusual to see no evidence of when the fibula is affected (Galloway and Wedel 2014). It is unlikely that this periosteal bone is from trauma as the fibula is difficult to injure owing to its position and the muscle surrounding it (Galloway 2014). This suggests that the periosteal bone is a pathological response and does support the of leprosy (Aufderheide and Rodriguez Martin 1998 ; Roberts and Manchester 2007; Ortner and Putschar 1981).

When the bones in GU3's legs were radiographed, it became apparent that GU3 had Harris lines on both tibiae. This indicates that GU3's growth paused in childhood due to a stress of some kind; disease, weaning, or nutritional deficits (Harris 1931 ; Roberts and Manchester 2007).

Analysis

GU3 was likely a male who worked hard in his short life. Since GU3 appears to be male, he may have been a monk, however, it cannot be ruled out that GU3 could have been a pilgrim. As mentioned, monks worked their own lands and farming in the medieval period was highly

labour intensive (Berman 1986 ; Judd and Roberts 1999). Pilgrims who came from peasant groups also experienced intensive labour through their work which was also primarily agricultural (Melczer 1993).

GU3 was suffering from an inflammation of the lungs before their death. Diseases affecting the lungs include tuberculosis, pneumonia, constant lung irritation (likely due to smoke) or a generalized lung infection (Aufderheide and Rodriguez Martin 1998 ; Ortner and Putschar 1981). All of these can cause the plaque noted on GU's ribs (Aufderheide and Rodriguez-Martin 1998; Roberts and Manchester 2007; Ortner and Putschar 1981). However, to get the plaque GU3 has, the individual would have had to have been suffering from pneumonia for more than a few weeks (Ortner and Putschar 1981). Tuberculosis was a common disease in medieval Europe and could be picked up in crowded conditions, from cows, and from unpasteurized milk. Tuberculosis changes the ribs by leaving periosteal bone deposits which can form raised lumps (Aufderheide and Rodriguez-Martin 1998 ; Roberts and Manchester 2007; Ortner and Putschar 1981). This is a plausible explanation for why GU3 had these bumps, however GU3 shows none of the spinal changes that one would expect with tuberculosis.

Since GU3 has a slightly eroded nasal aperture and periosteal bone on both fibulae, it is tempting to say that GU3 may have been suffering from leprosy as it was prevalent in the 14th century in mainland Europe. It's likely that the fibulas are either affected by the lung infection/disease GU3 had or was the result of a trauma of some kind (Aufderheide and Rodriguez Martin 1998 ; Ortner and Putschar 1981).

GU4(5): Unknown sex, 4years +/- 12 months

GU4(5) was buried in grave cluster Hb (see Figure 2), close to GU1, GU2, and GU3. GU4(5) was buried on their left side in a fetal position. GU4(5) is a juvenile individual who is approximately 4+/- 12 months. This estimate came from the eruption of the dentition and averages of the long bone lengths (the femur, tibia, and humerus) (Buikstra and Ubelaker 1994; Scheuer and Black 2004). GU4(5) was labeled 4(5) because the excavators initially believed this individual to be two people (Clements and Gruspier n.d.). The sex is not discernible from the remains, nor is the stature. Stable isotope analysis indicates that GU4(5) was not born in Gurat but elsewhere in France and migrated to Gurat (Meijer 2018).

There is limited wear on the recovered deciduous teeth and limited calculus buildup which is consistent with the estimated age of the individual (Roberts and Manchester 2007). A canine and second adult molar were also found which indicates there may have been an earlier or additional burial in this grave, but there are no additional bones or fragments of this second individual.

Pathology

GU4(5) has no pathology in their bones aside from the cranium, which shows deep meninges. This could indicate a bacterial infection (Aufderheide and Rodriguez Martin 1998 ; Ortner and Putschar 1981 ; Lewis 2007). It's likely that this individual died of a rapid disease or infection as there is no trace of pathology otherwise.

Analysis

GU4(5) shows no sign of pathology, but evidently something went wrong as this individual died in early childhood. This is not an uncommon occurrence during the medieval period. Children were likely to die between birth to 3 years of age due to pathology (Lewis 2007). The risk of death increased after wearing, as weaning is a particularly stressful time for

the infant. When weaned, infants lose the passive immunity they have been getting from their mothers through breast milk. This makes them susceptible to different illnesses as their own immune systems are still learning and beginning to function (Roberts and Manchester 2007; Lewis 2007). As a child aged, the likelihood of their death decreased until puberty (Lewis 2007). GU4(5) appears to be at the threshold of when likelihood of death decreases.

GU6: Female, 14-16 years

GU6 was buried in grave cluster Ja (see Figure 2) with the arms crossed over the chest rather than above their head like the other individuals. GU6's grave was shallow, much more so than any of the other excavated graves (Clements and Gruspier n.d.). GU6 is estimated to be female from pelvic morphology. This is supported by the presence of very fragmentary infant remains in the grave (GU6a) This individual's skull was damaged, likely due to disturbance of the shallow the grave. GU6 also appears to be young, approximately 14-16 years old as the epiphyses have not fused (specifically the humerus, femur, and tibia) (Figure 15) and the pubic symphysis is heavily striated. Due to the lack of teeth associated with this burial, stable isotope analysis was not possible (Meijer 2018).

Pathology

Unlike the other individuals GU6 is more gracile than robust. There are slight enthesophytes on the humerus, ulna, and radius of both arms but nowhere near as prominent as the other individuals. This suggests that this individual was either not participating in the same activities as the other individuals, or that she died before she was able develop like the others, since enthesophytes are associated with increasing age (Kennedy 1989).

One of the few fragments of parietal bone from GU6 shows extremely deep meninges which may suggest infection (Aufderheide and Rodriguez Martin 1998 ; Ortner and Putschar 1981).

GU6 has periosteal bone along the shafts of both fibulae. The tibiae have minor periosteal bone in corresponding areas. This could indicate a blow to the legs or that GU6 was suffering from a systemic pathology (Galloway 2014 ; Roberts and Manchester 2007). The patellae have pitting on the superior face and have begun to groove on the inferior face, an odd occurrence for an individual so young (Jurmain 1999) (Figure 16). This suggests that GU6 was spending a lot of time on her knees or doing activities that wore out the joint such as repeated flexion and extension (Kennedy 1989). GU6 also has severe Schmorl's nodes on 2 thoracic vertebrae (Figure 17). There are very few vertebrae associated with this individual but all show signs of compression of the vertebral bodies.

Analysis

GU6 is clearly a young individual but has osteological changes in her bones typical of older individuals. The schmorl's nodes and knee changes may indicate that GU6 was carrying heavy loads and spending lots of time kneeling. (Kennedy 1989 ; Jurmain 1999). Another possible cause of these changes could be horseback riding or sitting in a cart being pulled by livestock (Kennedy 1989). These activities would suggest that GU6 might be an elite individual as the poor did not often own horses, preferring oxen (Neillands. 2001). Despite how much more gracile GU6 appears when compared to the other skeletons (particularly the other female, GU1), GU6 still shows enthesophytes on all the major bones of her arms. This suggests that GU6 was also living an active and hardworking lifestyle (Kennedy 1989).

Like GU1, GU6 may have been a pilgrim passing through or a washerwoman who worked in the monastery (Berman 1986). Also like GU1, it is unlikely that GU6 was an elite female as this individual has been working since a young age to produce osteological changes of this nature. This individual's shallow grave may suggest that this individual was buried at a different time period as opposed to the rest of the individuals buried in Gurat (Pearson 1999).

GU6A: Unknown sex, unknown age

GU6A was buried next to GU6 in Ja (see Figure 2) and is highly fragmented. Only a few fragments were recovered from the grave. It is unknown if this proximity means GU6A and GU6 are connected or related, and there is no evidence to suggest so. There is no evidence of pathology.

GU7: Male, 40-50 years

GU7 was buried on his back with his arms flexed over his chest in grave cluster Dc (see Figure 2). This individual is the most complete skeleton excavated from St. Georges. GU7 is a highly robust individual. According to Trotter's stature estimation (1970) GU7 stood at approximately 169.84 cm. GU7 is estimated to be male based on pelvic and skull morphology, and was about 40-50 years old. The upper squama of GU7's occipital bulges below the sagittal suture, and depending on how GU7 wore their hair this could have been noticeable (Figure 18). The cause for this is currently undermined. The bulging occipital does not match the typical signs of premature sagittal suture fusion (Opperman 2000). Stable isotope analysis determined that this man migrated to Gurat and was born elsewhere in France (Meijer 2018).

Pathology

GU7 has extreme alveolar resorption due to loss of teeth and there are many caries present on the remaining teeth. Only 3 molars are present (maxillary right M3, mandibular right M2 M3). GU7 also has a dental abscess above the second maxillary molar (Figure 19).There is a lot of dental calculus present on remaining teeth. All of the preserved vertebrae have severe lipping, arthritis, and Schmorl's nodes. All the vertebrae are extremely light, indicating a loss of bone density (Roberts and Manchester 2007).

Each humerus shows changes due to the pulling of the deltoid muscle (Kennedy 1989). (Figure 20).There is some arthritis on the trochlear notch on both the right and left ulna. The capitas of both femurs and the acetabulum of both halves of the os coaxe also show arthritis. The right and left patella both exhibit a fair amount arthritis and lipping, which would have caused GU7 a lot of pain when walking (Jurmain 1999) (Figure 21).The arthritis in these locations could be due to age, as GU7 was an older individual. However, GU7 exhibits enthesophytes on every bone in the arm and legs, which suggests GU7 was participating in some hard labor which may have promoted the arthritic changes (Kennedy 1989).

The right tibia has periosteal bone that correlates with similar deposits on the right fibula. Both fibulas have a fair amount of periosteal bone on them and are slightly bowed (Figure 22). This suggests a blow to the legs or a pathology that altered the fibulas and tibia (Aufderheide and Rodriguez Martin 1998 ; Galloway 2014 ; Roberts and Manchester 2007).

Analysis

Like GU2, GU7 dealt with a lot of pain in life. The arthritis in his spine, hips, elbows, and knees would have caused stiffness and pain when walking and or bending (Jurmain 1999 ; Harrod and Martin 2016). The Schmorl's nodes coupled with the robustness of the individual indicate that GU7 was carrying or lifting heavy burdens (Kennedy 1989 ; Mattei and Rehman

2013). The bilateral enthesophytes on each humerus coupled with the mild arthritis on the corresponding ulna indicates that GU7 was lifting heavy loads or performing a repeated action with their arms, such as threshing grain (Judd and Roberts 1999 ; Kennedy 1989).

GU7's teeth would have caused this individual a great deal of pain. GU7 lost several teeth during life which has caused severe alveolar absorption (left maxillary molars M1, M2,M3 and right maxillary molars M1 M2). These losses can likely be put down to the work of dental caries, as it is unlikely that molars were purposefully removed and GU7 shows evidence of caries on other teeth (Hillson 2005). This loss of chewing surface would have meant that GU7 required soft foods or foods that had been ground up for them (Harrod and Martin 2016).

GU8: Male, 35-45 years

GU8 was buried on top of GU9 in cluster Dc (see Figure 2). This means that GU8 is either a secondary burial on top of the primary burial of GU9, or that GU9 ad GU8 were contemporary (Clements and Gruspier n.d.). GU8 appears to be male based on pelvic morphology and approximately 35-45 years old. GU8 was approximately 157.56cm tall based on Trotter's stature estimation using the tibia (1970).

GU8's teeth are worn and dentin is exposed on the molars. There are caries on the first molars of the maxilla and a buildup of dental calculus which indicates a carbohydrate rich diet (Hillson 1996). The mandible could not be examined for this individual as it was part of the lost material (Gervers pers.comm. 2018).

Pathology

The left humerus has scarring and pitting on the proximal end. It may be from muscle usage, but it is not mirrored on the right (Kennedy 1989). When radiographed there was no evidence of a break or healing (Galloway 2014).

The left tibia has an infection indicated by a massive periosteal response on the distal end anterior surface. This injury likely came from a cut or a blow to the leg. It should be noted that it was in the process of healing when GU8 died (Galloway and Wedel 2014 ; Lovell 1997).

Analysis

GU8 suffered some kind of injury (possibly from a cut) on their left tibia (see Figure 23). The right tibia has stronger muscle markings and a different morphology when compared to the left which led to speculation that these two bones do not belong to the same individual. The reason for confusion was that the left tibia was somewhat atrophied, due to the injury. This indicates that GU8 was putting their weight more heavily on their right leg to spare their injured left and walked with a limp (Kennedy 1989).

GU9: Male, 40-50 years

This individual was buried directly underneath GU8 in cluster Dc (see Figure 2). GU9 is estimated to be male based on pelvic and skull morphology and is approximately 40-50 years old. A stature estimate could not be made as GU9's long bones were broken post mortem and no complete long bones could be reconstructed.

Pathology

GU9 has had the 1st cervical vertebra fused to the foramen magnum. In an earlier study it was suggested that this was due to a blow on the back of the skull by Gretenhart (1972) but this is unlikely as 1st cervical fusion is a relatively common occurrence (Folkens and White 2005). GU9 has extreme alveolar resorption which was caused by losing the majority of his teeth while still alive. The 3rd molars were lost most recently as their sockets are still partially open. The remaining 3 teeth are highly worn but do not contain cavities, likely because the dental wear has reduced the number of cusps for food particles to become lodged in (Hillson 2005).

GU9 has only 4 complete lumbar vertebrae. All have Schmorl's nodes and some inner body collapse. There is extreme compression on all vertebrae (Figure 24). The sacrum also has an oblique fracture that travels through the body of the sacrum to the ala, extending to the right. (Figure 25). There are similar signs of trauma in the right half of the pelvis (see Figure 26). The ischium is larger than expected in size and has severe bony outgrowths which suggests an ischial fracture (Galloway 2014). It should be noted that this fracture has healed, albeit incorrectly. Rather than uniting cleanly, the broken ischium has become offset.

Analysis

GU9 was an older individual whose fracture patterns appear to be indicative of a fall (Clements, Gruspier n.d. ; Galloway 2014 ; Galloway and Wedel 2014). A severely damaged spine, sacrum and broken pelvis would be extremely difficult to recover from and was a potentially life threatening injury. GU9 was able to heal from his injuries as evidenced by the healed fractures on the sacrum and the healed ischium fracture. This individual could not have healed from these extensive injuries alone, and would have required care which they clearly received. However, as evidenced by the unusual lump on GU9's ischium, the bone did not heal correctly and likely would have caused discomfort and or loss of movement for GU9. Together

with the loss of almost all of his teeth, his injuries indicate that GU9 represents an individual who would have required a high degree of care. This means that a person or multiple people were aiding GU9 while he healed.

GU10: Unknown sex, 3 years +/- 12 months

GU10 was buried near GU11 and GU12 in cluster Dd (see Figure 2). GU10 is a subadult represented by a fragmented cranium, rib fragments, a single tooth, the epiphyses of long bones and diaphyses. This individual is difficult to age, but they appear to be approximately 3 years of age. Determination of sex in children is too uncertain to attempt here. Stable isotope analysis indicates that this individual was not born in Gurat and came from somewhere other than France. This individual appears to have come from Eastern Europe, possibly Italy or Austria (Meijer 2018).

Pathology

GU10 has severe criba orbitalia in the eye orbits. (Aufderheide and Rodriguez Martin 1998 ; Lewis 2007 ; Roberts and Manchester 2007).

Analysis

GU10 was a young child who appeared to suffer from iron deficiency of some kind, causing anemia as indicated from the cribra orbitalia (Aufderheide and Rodriguez-Martin 1998 ; Lewis 2007). This could be from an internal parasite of some kind (likely worms), or from weaning, or from a particularly hard year for crops (Lewis 2007).

GU11: Male, 45-55 years

GU11 was a disarticulated burial found mixed in with GU12 in cluster Dd (see Figure 2). Clements and Gruspier (n.d.) suggest this means that GU11 and GU12 were secondary burials. GU11 may also be the individual found in the reliquary. The bones found in the reliquary match GU11's bones for basic morphology and colouration changes. The pelvic morphology indicates GU11 is a male, and 45-55 years old at death. A stature estimate cannot be determined for GU11due to the degree of fragmentation of the skeleton, there are no complete long bones from which to take the estimate. There were no teeth associated with this individual. The fragment of mandible that remains shows that molars were lost in life as the mandibular alveolous is atrophied.

Pathology

GU11 has severe arthritis present on his only thoracic vertebrae which is interlocking but not quite ankylosed.This would have been quite painful for GU11 to live with, as the arthritis likely would have affected other vertebrae and caused stiffness and pain when bending (Harrod and Martin 2016). Both humeri are extremely robust and there is some slight periosteal bone around the capitulum at the right elbow. The sacrum is fragmented but very arthritic and has ankylosed. The pelvis is very fragmented but arthritic looking with severe lipping arthritis in the acetabulum. Previous sampling of these bones has revealed unusually thick cortical bone.

Analysis

The arthritis as well as the missing teeth, indicates that this individual was older, and that they likely had a lifestyle similar to the other individuals found at St. Georges. GU11 would have had pain moving, particularly in his hip where the arthritis is severe (Harrod and Martin 2016). The loss of most of his teeth would have restricted what GU11 could have eaten.

GU12: Female, 30-50 years

GU12 was mixed in with GU11 in cluster Dd (see Figure 2). GU12 is a highly fragmented individual, but the remaining intact bones are quite gracile. This individual was buried with GU11. With the pelvis mostly destroyed and no skull present (apart from 2 fragments) it is difficult to establish the sex of this individual. Because of the gracile nature of the bones it is more likely that this individual is female (Buikstra and Ubelaker 1994). Based solely on the wear of the bones and arthritic changes GU12 is approximately 30-50. A stature estimate could not be made for GU12 because of the fragmentation of the individual; no long bones remain from which to make the estimates from.

Pathology

The cranial bones suggest a possible endocranial infection, which could be associated with the cause of death. There are deep grooves for meningeal arteries on the parietal fragments (Aufderheide and Rodriguez-Martin 1998).The radius and ulna has excess bone growth from entheophytes at the proximal ends. This probably indicates muscle usage and hard work (Kennedy 1989). Arthritis is present especially at the elbow.The tibia and femur are both fragmented. There is periosteal bone found on tibia fragments, which may indicate an infection or trauma (Aufderheide and Rodriguez Martin 1998). Only the acetabulum and ischium remain of the pelvis and there is evidence of arthritis in the acetabulum. The metatarsals are arthritic as are the pedal phalanx, however, these bones are extremely fragmented and cannot be identified to specific type.

Analysis

The arthritis present on this on this individual as well the enthesophytes on the bones suggests this individual is older and had been a hard worker (Kennedy 1989). While the sex cannot be determined with certainty, if this individual is a woman then, like GU1 and GU6, GU12 could have been either a washerwoman or a pilgrim.

The deep grooves for meningeal arteries on this individual's parietal may indicate that GU12 had some kind of an infection (Aufderheide and Rodriguez-Martin 1998).

2.6 Discussion and conclusions

It is important to note that the St. Georges individuals are a small sample of only eighteen individuals. While this sample includes men, women, and children, it may not adequately represent the population of the village of Gurat. It is unknown if these individuals were contemporaneous with one another and they may not be members of the same biological population or cohort. From the distribution of the graves and possible secondary burials, it is possible some of these individuals were buried long before the others were deceased. Secondly, the osteological paradox outlined by James Wood et.al. (1992) illustrates how cemetery populations are inaccurate representations of living populations. Often, the cause of death is not visible in the bones, and if there is evidence of disease it means the individual lived long enough to have their bones respond to the pathology (Wood et.al, 1992). This must be kept in mind when coming to conclusions about the lives of the St. Georges individuals. Both of these issues, of course, are always a problem with archaeological cemetery assemblages.

Females

There are two possible females in the assemblage, aged 14-16 and 40-50 years. The older female, GU1 shows extreme robusticity in muscle attachment of the upper limbs and was clearly engaging in labour intensive activities of some kind (Kennedy 1989). The other probable female, GU6, is much more gracile, but she is much younger than GU1 and the development of enthesophytes is age-related as well as the result of activity (Kennedy 1989, Jurmain 1999). GU1 and GU6 may have been workers in the monastery, functioning as cleaners or washerwomen (Berman 1986). Since GU6 shows less robusticity, she may have been an elite that was buried there, but her muscular development makes that less likely (Kennedy 1989). There are no teeth remaining in GU6 to compare to GU1 so conclusions about comparative dental health cannot be drawn. There were no traumas or other pathologies noted in the female skeletons.

Males

There were 6 males, aged between 20 and 50. All of the males show robusticity and enthesophytes in varying degree of size. All of the males have some teeth available for study, and most have suffered from dental caries and or dental abscesses. GU2, GU3, GU7, and GU9 are specific examples of this. This may give an indication about diet and poor dental hygiene. Four of these individuals show signs of trauma. GU2 and GU9 have extreme trauma indicating life threatening injuries, and GU7 and GU8 show evidence of trauma and/or other significant pathology. Trauma of this nature and severity is often seen in farming populations. In a study conducted by Judd and Roberts (1999) on a medieval British village, the authors examine the type of injuries and trauma an individual could obtain from farming. Farming was a dangerous activity where both sexes could be injured frequently. A common cause of injury on the tibia came from threshing crops with a scythe or sickle. This activity put the blade at shin level (Judd and Roberts. 1999). Since many of the pilgrims who trekked to Santiago de Compostela sought

healing, it could be possible that GU8 was trekking there to be healed of their leg wound (Melczer 1993).

Monks were well known for hard work, as they farmed their own land. Peasants also would have been active farmers. The simple fact that these people survived their fractures is remarkable. GU2, who narrowly escaped paralysis or death with a fracture to the neck, and GU9, who suffered life threatening fractures to the pelvis and spine, could not have healed from these injuries without care. Both individuals would have required rest to heal, and would likely have been unable to move to feed or care for themselves. They may have been at the monastery for this assistance, as monasteries could function as places of healing (Berman 1986 ; Paxton 1992).

GU11 is an interesting individual in this mix because his bones appear to match with the fragments found in the reliquary. This could indicate that he was particularly revered, possibly even as a saint (Berman1986). He could have been the founder of St. Georges' cave church. This could also indicate nothing more than that GU11 was a secondary burial and was moved to accommodate another burial (Gervers 2018, Pearson 1999).

Juveniles

The three juveniles studied ranged in age from birth to about 3 or 4 years. There are no signs of trauma on any individual, but there is some pathology present. GU10 (aged 3years +/- 12 months) exhibited from cribra orbitalia (Aufderheide and Rodriguez Martin 1998 ; Ornter and Putshar 1981). This indicates that GU10 was suffering from some kind of anemia, possibly caused by dietary deficiency (Aufderheide and Rodriguez Martin 1998 ; Lewis 2007). This suggests that these juveniles were already experiencing stressful episodes in their lives even at their relatively young ages. If these infants were buried in 1390CE as the carbon dating suggests, their lives would have been affected by the Hundred Years War and the

chaos that reigned in France (Neillands 2001). GU4(5) was born elsewhere in France, GU10 was born outside of France entirely (Meijer 2018). This means that they travelled to the area, likely with their parents. These juveniles could have been the children of pilgrims, or the children of elites whose parents paid for them to be buried at St. Georges.

After analyzing the St. Georges individuals, it is clear that these people worked hard for the majority of their lives as indicated by the enthesophytes on their bones (Kennedy 1989). Individuals like GU2, GU7, and GU8 show well developed musculature and development of arthritis that appears to be from repeated activities (Kennedy 1989). These activities could be the result of farming, processing of goods or crops, building, or labour intensive cleaning. GU2, GU3, GU7, GU8, and GU9 show Harris lines on their tibiae which show that these individuals had stressful childhoods (Harris 1931; Roberts and Manchester 2007; Ortner and Putchar 1981). These activities suggest that these individuals were not elites, and may have been buried at St. Georges for other reasons. The majority of burials are adult males, which may support the idea that this was a monastic burial site.

I do not believe there is only single reason for how the thirteen individuals I examined ended up buried at St. Georges. It is entirely possible that these individuals represent a mix of all likely scenarios. Some could have been monks, some could have been pilgrims, some could have been peasants, and some could have even been elites. Using a combination of osteobiography and paleopathology, and the contributions of the stable isotope analyses, a picture is beginning to appear of the lives and situations of the individuals who were buried in the cave church St. Georges. We will never know their whole stories, but they are no longer completely anonymous or forgotten. In time there may be additional methods of analysis that can reveal more about

them, but for now we have a picture of a diverse group of travelers who came from various areas of France and Europe, who died and were buried in this small town on a major pilgrimage route.

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Figures:

Figure 1. Location of Gurat in France.
http://www.Map –France.com

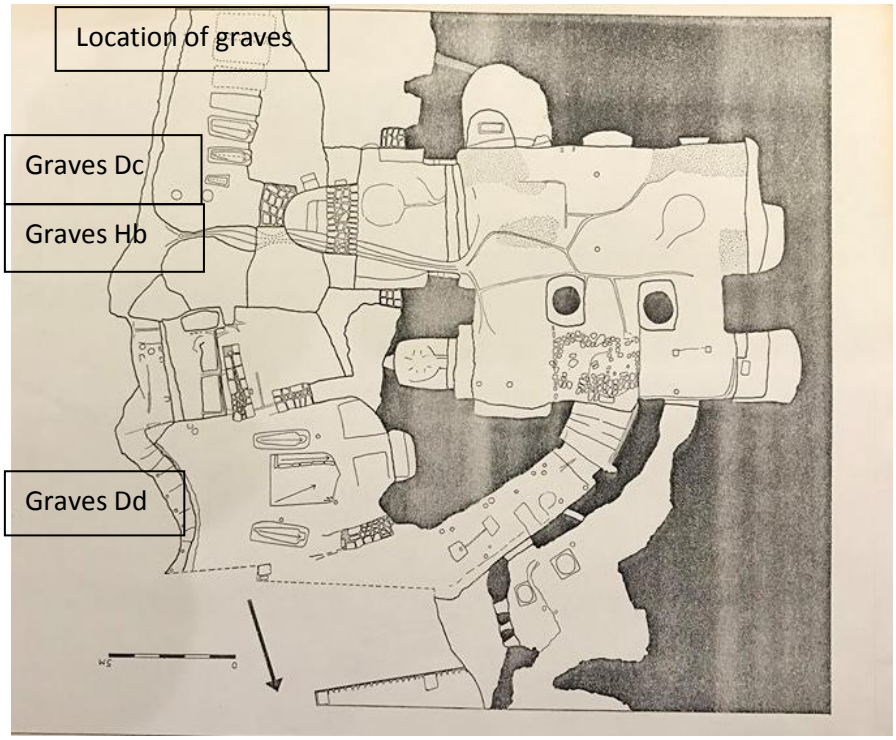

Figure 2. Location of the graves (modified image from M. Gervers)

Figure 3: GU 1, maxillary dental wear. (Photo: G. Seymour)

Figure 4: GU1, mandibular dental wear. (Photo: G. Seymour)

Figure 5: Gu 1, rib with an additional groove on the superior surface. (Photo: G. Seymour)

Figure 6: GU2, Mandibular dental wear, and dental caries (left molar). (Photo: G. Seymour)

Figure 7: GU 2, Superior view of the atlas and axis vertebrae. Note fractures and expanded facets on the right side of the vertebrae, and the resulting asymmetry. (Photo: G. Seymour).

Figure 8: GU2, Inferior view of the 6th cervical vertebra with healed fracture of the spinous process. (Photo: G.Seymour)

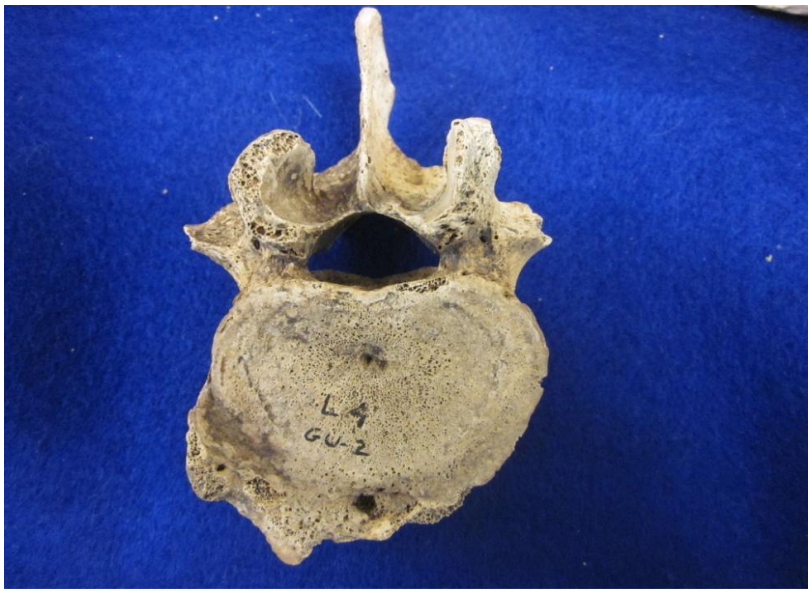

Figure 9: GU2, Superior view of lumbar vertebrae, with extensive marginal osteophytes. (Photo: G. Seymour)

Figure 10: GU 2, Inferior view of left talus, showing healed fracture(Photo: G. Seymour)

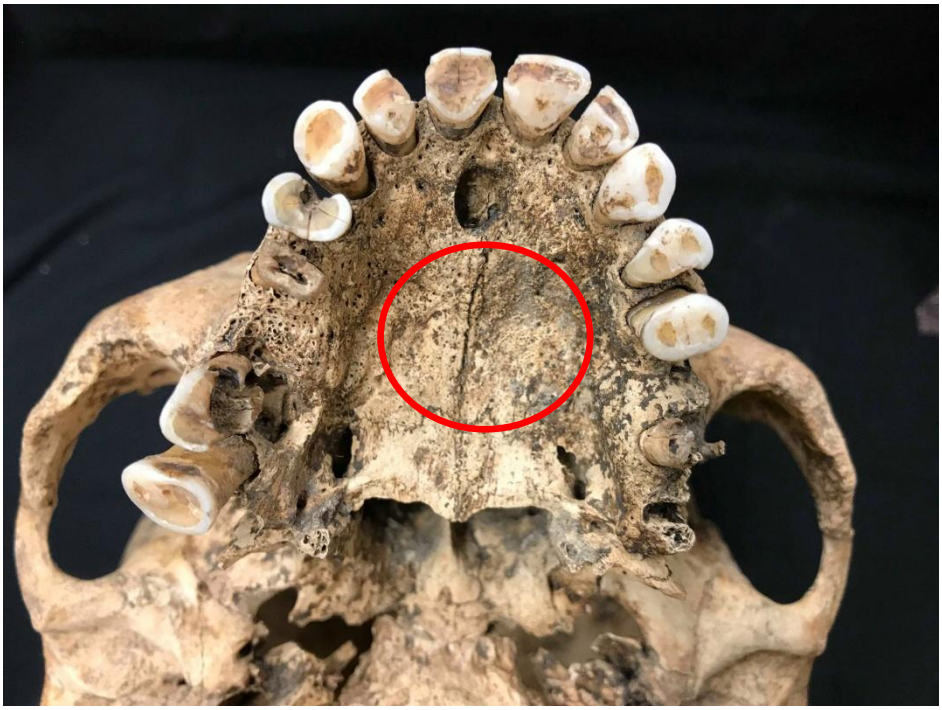

Figure 11: GU2, Maxillary dental wear and expanded incisive foramen.

(Photo: G. Seymour)

Figure 12: GU3, Inferior view of left and right clavicles showing pits at the sterno-clavicular ligament. (Photo: G. Seymour)

Figure 13: GU 3, Medial view of inverted rib, showing plaque indicative of a pleural cavity infection. (Photo: G. Seymour).

Figure 14: GU3, Right fibula, midshaft, with active periosteal bone. (Photo: G. Seymour)

Figure 15: GU6, Unfused epiphyses of juvenile skeleton. (Photo: G. Seymour)

Figure 16: GU 6, Right and left patellae (inverted) of juvenile with marginal lipping. (Photo: G. Seymour)

Figure 17: GU 6, Juvenile vertebral body with Schmorl's node. (Photo: G. Seymour).

Figure 18: GU 7, cranium with occipital bulge. (Photo: G. Seymour

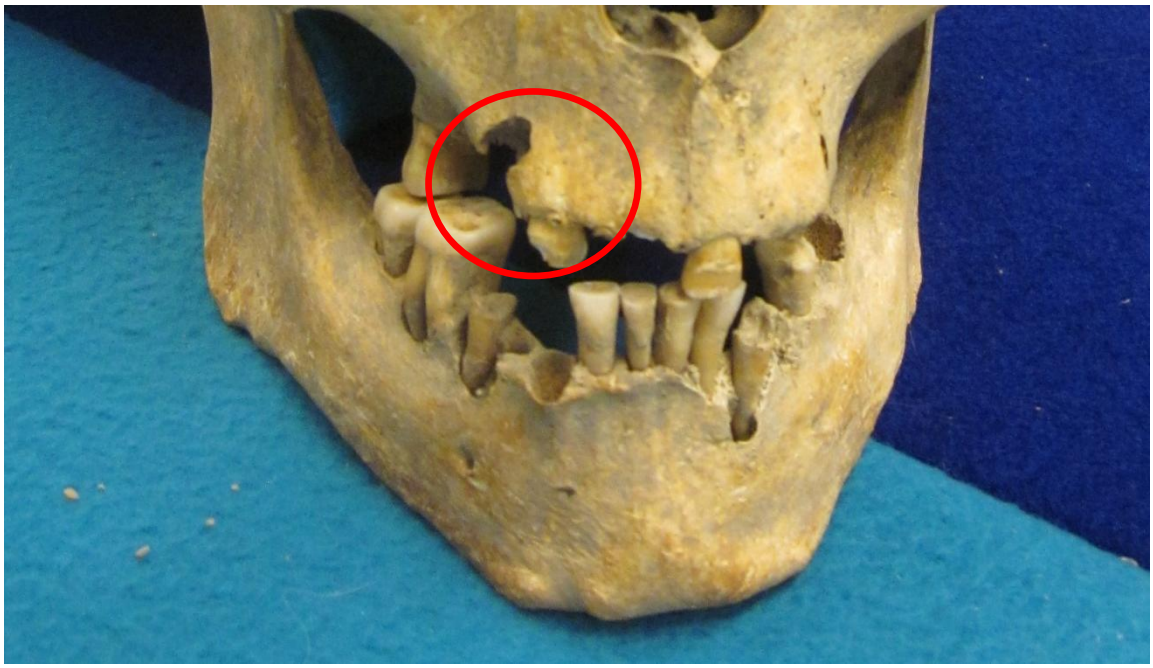

Figure 19: GU 7, maxilla and mandible, showing dental wear and abscess. (Photo: G. Seymour).

Figure 20: GU 7, left humerus (top) and right humerus (bottom) showing robust enthesophytes of the deltoid muscle. (Photo: G. Seymour).

Figure 21: GU7, right and left patellae (inverted) with lipping and enthesophytes at the quadriceps tendon insertion. (Photo: G. Seymour).

Figure 22: GU 7, left (above) and right (below) fibulae with enthesophytes and bilateral bowing. (Photo: G. Seymour).

Figure 23: GU8, left tibia, anterior surface. Localized periosteal reaction. Postmortem damage to right of the lesion. (Photo: G. Seymour).

Figure 24: GU9, superior oblique view of lumbar vertebrae, showing marginal lipping and compression of the bodies. (Photo: G. Seymour).

Figure 25: GU9: anterior surface of sacrum, showing healed fracture of the first segment. (Photo: G. Seymour).

Figure 26: GU9: Posterior view of innominates with sides reversed. Note the extensive bony outgrowths on the left ischium (circled). (Photo: G. Seymour).