

## Origins of the Odd Fellows Skeletal Collection: Exploring Links to Early Medical Training

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For my Master's thesis research I was confronted with the task of ascertaining the origin and identity of an unknown collection of skeletal remains. My supervisor, Dr. Michael Spence, offered me the opportunity to analyze a very unique and interesting unprovenanced collection of skeletal remains that were donated in 1999 to the Anthropology department at the University of Western Ontario by the Independent Order of Odd Fellows (IOOF) of Ontario. The IOOF is a men's fraternal organization, or more popularly regarded as a secret society, that was established in England as a benevolent organization during the Industrial Revolution (Stevens 1907). Each IOOF lodge kept human skeletal remains, which they used for symbolic purposes in their initiation ceremonies (Ross 1890). This little known fact was revealed in 1999 when John Nichols, the Grand Secretary of the Grand Lodge of the Ontario IOOF contacted Dr. Spence about donating the skeletal remains from lodges that were no longer in operation due to declining membership. Unfortunately, when the skeletal remains were collected from the defunct lodges thought was not given to their future research potential. Details connecting each lodge with its skeletal remains were only available for a small portion of the collection, and other details such as the origin and time period of the skeletal remains were unavailable. The lack of contextual information demanded that this research be expanded beyond a traditional osteological analysis and incorporate multiple lines of evidence in order to explore the socio-cultural and historical issues surrounding the use and procurement of human remains. Thus, the goal of this research was to attempt to determine the background, origin, and the processes through

which these skeletal remains came to be in the possession of the IOOF by using as many different sources of information as possible. This paper is meant to demonstrate the rewards of interdisciplinary and non-traditional skeletal analyses.

### Methods and Approach

The first step in establishing the origin of the Odd Fellows skeletal collection was to identify the sources and methods of procuring human skeletal material during the period that the Odd Fellows remains were acquired. Although contextual information was lacking for the some of the collection roughly half of the skeletons could be matched with their donating lodges. The known lodges had been established between 1857 and 1940 (John Nichols, personal communication, 2000), so the year that each lodge was instituted was used as a proxy for the date that the skeletons were acquired. The skeletons that could not be associated with their donating lodges may predate or postdate the known lodges. This approach to temporal assignment is justified because each lodge would have had to acquire its skeletal remains at the time it was established in order to initiate new members. Various sources of information were consulted, including Anatomy Acts, newspaper articles, archival documents, historical accounts of early Canadian medical practice, and North American cadaveral skeletal collections, in order to identify the sources of human skeletal remains and their uses during the late nineteenth and early twentieth centuries.

The next step was then to determine the age, sex, ethnicity and health status of each individual in order to create a demographic profile for the collection as a whole. This profile was then compared with information from the archival documents and cadaveral skeletal collections in order to infer the social origin and identity of the Odd Fellows collection. The paucity of background information made it difficult to select the most appropriate osteological methods of analysis. Because patterns of sexual dimorphism, rates of development, and ageing trajectory are population specific and the population origins of the Odd Fellows skeletons are unknown, multiple morphological and metric methods of skeletal identification were employed.

#### *Sex*

Sex was estimated using a number of morphological and metric techniques. Sexual dimorphism of cranial (Buikstra and Ubelaker 1994) and pelvic (Buikstra and Ubelaker 1994; Krogman and Iscan 1986; Phenice 1969) morphological features was assessed in order to estimate sex. Sex estimation methods based on the measurement the cranium (Giles and Elliot 1963) and femora (Pearson and Bell 1917-1919; Taylor and DiBennardo 1982) were also incorporated in an effort to achieve the most accurate assessment of sex for each individual.

#### *Age*

Methods of age estimation were employed that focused on morphological changes of the pelvis, the auricular surface (Lovejoy et al. 1985), pubic symphysis (Suchey and Katz 1986), the sternal ends of the ribs (Iscan et al. 1984, 1985), as well as the cranial sutures (Meindl and Lovejoy 1985; Nawrocki 1998). Epiphyseal fusion as a reflection of maturity was assessed for all skeletal elements (Buikstra and Ubelaker 1994; Flecker 1932, 1942; Webb and Suchey 1985).

#### *Ancestry*

Ancestry, as most recognize it, is a social construct involving the affiliation of an individual with a larger group based on phenotypic similarities. The utility of the designation of ancestral

affiliation and the ability to estimate ancestry from human skeletal remains has been challenged. However, general differences in skeletal morphology (e.g. body proportions, and body size and shape) exist that correlate with environmental and geographic factors allowing for some insight into group affiliation. Therefore, the ancestral background of each individual was estimated in hopes that the identification of general differences or similarities may help to establish the origin of the Odd Fellows collection. The variable nature of this collection necessitated the application of a variety of ancestry estimation methods. To assess ancestry, traditional morphological and metric techniques based on the cranium (Brues 1990; Ousley and Jantz 1996; Giles and Elliot 1962; Gill 1998; Gill et al. 1988; Gill et al. 1990; Rhine 1990), and femur (Baker et al. 1990) were used.

#### *Health and Socio-Economic Status*

The skeletal remains were examined for the presence of pathological and traumatic conditions that could be used to ascertain the health and socio-economic status of the individuals. Because individuals of lower socio-economic status tend to have poorer health than individuals of higher socio-economic status, skeletal health was used as a proxy for socio-economic status. Making this sort of assumption requires that all indicators of health, including the age at death, are considered in the health assessment. The entire skeleton was closely examined for evidence of pathology and trauma following the approach outlined by Buikstra and Ubelaker (1994). Traumatic and pathological conditions were recorded and described. Any measures of health for the Odd Fellows collection will be underestimated since the entire suite of skeletal elements are not present for each individual.

#### *Skeletal Evidence of Post Mortem Treatment*

The skeletal remains themselves were also examined for any evidence of post mortem treatment that may provide any indication of their origin or background, how the remains were obtained, and their subsequent post mortem use.

### **Materials: The Odd Fellows Skeletal Sample**

The sample was received in twenty-two packages of mostly professionally articulated and complete skeletal remains representing what appeared to be 26 individuals. Most Odd Fellows' handbooks discuss the symbolism of the skull and cross bones, but only three sets of skulls and cross bones are present in this collection. In some cases additional skeletal elements were included with the remains, such as an extra cranium, postcranial bone, or in one case an animal bone.

Although it appeared that each articulated skeleton represented the remains of one individual, closer examination revealed that many of the articulated skeletons and skull and cross bone sets incorporated the remains of more than one individual. Discrepancies in the size, color, and manner of articulation of the skeletal elements, as well as differences in the skeletal expressions of sex and age were used to determine that more than one individual was represented in a skeleton. The most common pattern of co-mingling observed in the articulated skeletons consisted of the cranial remains belonging to one individual, while the postcranial remains, from the first cervical vertebra downward, belonged to another individual. In a few cases, one or more postcranial bones were substituted for those of the more complete individual. After carefully examining all of the skeletal remains, the minimum number of individuals represented in this collection increased substantially from the initial estimate of twenty-six to forty-seven individuals.

The co-mingled nature of many of the skeletons in this collection helped to direct my research into the possible origins of these individuals. Instances of mixing skeletal remains appear to be somewhat common in situations where the remains are intended for display or teaching purposes. Based on my own experience mixing skeletal elements is common in teaching skeletal collections of East Asian origin where it is likely that pre- or post mortem damage to one or more skeletal elements necessitated replacement with undamaged elements from another individual. The skeletal collection curated by the National Museum of Natural History in Washington, D.C also includes

a number of assembled skeletons that are made up of the combined remains of multiple individuals (David Hunt, personal communication, 2001). Articulated skeletons from medical schools have also been found to occasionally contain skeletal elements from more than one individual (David Hunt, personal communication, 2001). Cases of intentional and inadvertent mixing of skeletal elements from different individuals in the Grant Collection have also been reported (Albanese 2005). Although the evidence is circumstantial and indirect, co-mingling suggests two potential sources of human skeletal remains: medical supply and medical training.

### **Sources of Human Skeletal Remains in Nineteenth Century Ontario: Links to Dissection and Early Medical Training**

The inventory and condition of the Odd Fellows skeletal remains, as well as their limited temporal information helped to direct my investigation into sources of availability in Ontario during the late nineteenth and early twentieth centuries. The by-products of early medical training and medical supply companies were the main avenues for the procurement of skeletal remains during this time. John Nichols, the Grand Secretary of the IOOF of Ontario, suggested that a number of the lodges may have purchased their skeletons from Dominion Regalia, a company founded by the IOOF to supply the lodges with regalia and other related items (personal communication, 2000). A current employee of the Dominion Regalia informed me that the company would probably have obtained skeletons from medical supply houses in the Toronto area, but could not provide specific details about this connection. I searched the Toronto Directories archive for medical supply houses that were in operation between the mid nineteenth and early twentieth centuries, but was unable to find any record that such companies existed.

I then focused my research on the role that early medical training and dissection may have played in the production and supply of human skeletal remains. Sources documenting the history of

medical training and practice in Canada were consulted in an effort to discover information about the practices employed by early medical schools to procure cadavers for anatomical study and ways in which the remains were dealt with after dissection. Unlike Britain and the United States, written records documenting the procurement of cadavers and the production of human skeletons are not widely available in Canada and Ontario. Fortunately, I was able to connect a number of individuals with interests in the history of Canadian medical practice and related topics. These informants provided valuable suggestions, insights and illusive pieces of information that enabled me to create a picture of the social factors involved in the procurement, use and production of human remains in Ontario during the late nineteenth and early twentieth centuries.

#### *Early Sources of Dissection Subjects*

The initial source of cadavers for dissection and medical training in Canada were criminals. It was common practice for the bodies of executed criminals and inmates who died while incarcerated to be given to local doctors for dissection and anatomical study (Spence 2000). During the late eighteenth and early nineteenth centuries medical training was received through an apprenticeship system where one or two aspiring doctors trained with a practicing physician (Lawrence 1958). As a result of the structure and magnitude of medical training during this time, the demand for cadavers for anatomical study was low. However, as the approach to medical training changed during the early nineteenth century with the establishment of organized medical schools in Ontario and Quebec, the supply of bodies provided by the penal system was no longer sufficient to fill the demand. The first medical faculty in the country was established in 1823 at McGill University, known then as the University of Montreal (Swan 1968). The University of Toronto established its medical school in 1843, yet would-be doctors in Toronto are believed to have received instruction in human anatomy as early as the 1830s (MacGillivray 1988).

Legislation was not fully in place during the early part of the nineteenth century to govern the practice of dissection and autopsy, or the acquisition of cadavers. Anatomists and medical students often resorted to grave robbing in order to obtain fresh cadavers for dissection, or they solicited the help of resurrectionists who made a living of exhuming recently buried bodies and selling them to medical schools. Typically, the graves of the poor and lower classes were targeted, as these segments of the population did not have the economic or social means to protect their graves, but middle and upper class graves were not beyond the reach of grave robbers (Gidney and Millar 1994; Harrington and Blakely 1995).

#### *The Procurement of Corpses and Nineteenth Century Medical Training*

Grave robbing became such a problem in areas surrounding the newly established medical schools that government, feeling pressure from all levels of society, had to step in. The first Anatomy Act of Canada, legislated in 1843, was created in an effort to curb the activity by providing a legal supply of human cadavers for medical training and establishing a structured system of distribution. While almost all segments of society were affected by grave robbing, the first Anatomy Act made only the disadvantaged and disenfranchised segments of society, mainly the poor, indigents, criminals, and immigrants, available for dissection and medical training (Statutes of Canada 1843). The Act stated that:

[T]he body of any person found dead publicly exposed, or who immediately before death had been supported in and by any Public Institution, shall unless the person dying otherwise directs be delivered to persons qualified, but if such body be claimed within the usual periods for interment by *bona fide* friends or relatives, the body shall be delivered to them, or if the person otherwise directed as aforesaid before death, the body shall be decently interred (Consolidated Statues of Canada 1859:860).

The establishment of additional medical schools at Queens University, Kingston, in 1855 and the University of Western Ontario, London, in 1882 (Swan 1968), created a greater demand for human cadavers. Grave robbing continued even after the passage of the first Anatomy Act in some parts of Ontario, especially in Kingston and the surrounding area (MacGillivray 1988) where Queens medical students were notorious for taking the matter of acquiring dissection subjects into their own hands in order to avoid the middleman costs of the professional resurrectionists (Duffin 1999). Stories published in local Ontario newspapers confirm the ongoing problem of grave robbing after 1843. Kingston's *British Whig* and Kitchener's *Berlin Daily Telegraph* covered the 1859 trial of a doctor from Waterloo who was accused of robbing graves for the purpose of producing and subsequently selling human skeletons (Campbell 1989; *Berlin Daily Telegraph* [BDT], 16 September 1859; *British Whig* [BW], 21 September 1859: [2]). An article published in Kingston's *Daily News* on October 2, 1891 that chronicled the robbing of graves in an old cemetery in Kincardine, Ontario, speculated that the skeletal remains were stolen for "the likely purpose of fastening them together for scientific purposes" (*Daily News* [DN], 2 October 1891:[1]).

These incidents suggest that the Act did not meet its intended purpose of creating an adequate supply of cadavers to meet the demands of medical schools. It is possible that the shortage of cadavers was partially due to the rights that the early Anatomy Act afforded individuals to refuse dissection, although this right would later be revoked in 1885 (Statutes of Ontario 1985). The Ontario Anatomy Act was revised in 1877 adding two more categories to the list of candidates available for dissection: "any lunatic dying in any Provincial Asylum for the Insane," and "any inmate dying in a Public Institution who is not known to have any friends or relatives entitled to claim the body" (Revised Statutes of Ontario 1877). The inclusion of patients from Provincial Asylums was short lived, as this was the only group named in the Act which might be drawn from any class in the community, as

middle and upper class women diagnosed with hysteria were sent to asylums for the insane (Smith-Rosenberg 1985). An amendment made to the Ontario Act in 1911 excluded the use of the bodies of lunatics dying in a Provincial Asylum, thus protecting the advantaged segments of society from dissection. Although these instances of grave robbing indicate that the practice persisted into the late nineteenth century, reports of grave robbing were few and far between, demonstrating that the Anatomy Act legislation eventually did succeed in providing a sufficient supply of cadavers for dissection and bringing an end to grave robbing.

The Anatomy Act also dictated how cadavers were to be dealt with after having been dissected, yet it seems that these guidelines were not always followed. The Anatomy Act specified that corpses were supposed to receive a decent interment after they served the required purpose. The editor of the *Canada Lancet* wrote in 1895 that "after having been used for purposes of science, the remains shall be interred, and we from our own personal knowledge certify that at considerable cost, this is regularly done" (Gidney and Millar 1994:230). Yet, it was common in medical schools to process cadavers into articulated skeletons for study purposes and for medical students to take a part or the entire cadaver home after graduation (Gidney and Millar, 1994). Nineteenth century newspaper articles provide further evidence of the post dissection fate of human cadavers. An article published in Toronto's *British Colonist* on May 3 1844 describes the discovery of a dissected body of a woman packed in a barrel found floating in the one of the ponds on Toronto Island by a fisherman in May 1844. The article reports that the body was placed in the pond for the purpose of maceration, necessary for the preparation of the skeleton (*British Colonist* [BC] 3 May 1844: [2]). A story of a box containing a dissected body found floating in the St. Lawrence River reported in the April 22, 1834 issue of Montreal's *Quebec Gazette* suggests this practice was not isolated to Ontario. The article states that several similar occurrences had been discovered in Montreal that same year (*Quebec Gazette* [QG], 22 April 1834: [2]).

### Cadaveral Skeletal Collections

Insights into the groups exploited for dissection can also be gained by examining the composition of North American cadaveral skeletal collections such as Terry (St. Louis, Missouri), Hamman-Todd (Cleveland, Ohio), and JCB Grant (Toronto, Canada). These collections consist of the skeletal remains of cadavers of known identity that were used in dissection and the study of anatomy during the early to mid twentieth century.

Most dissection subjects were drawn from disadvantaged segments of society. During the period in question African Americans were among the most socially disadvantaged groups in North America. It has been estimated that African Americans formed two thirds of the cadaveral population used by medical schools across the United States during the late nineteenth century (Humphrey 1973). This appears to be the case in the American South as African Americans constituted 77% of the Medical College of Georgia's cadaveral collection (Blakely and Harrington 1997). Yet, cadaveral collections in the North include greater numbers of individuals of European ancestry. Over half (61%) of the individuals in the Hamman-Todd collection are of European ancestry (Lyman Jellema, personal communication 2006) while in the Terry collection individuals of European ancestry (46%) and African American ancestry (54%) are almost equally represented (Hunt and Albanese 2005). Unlike the American collections, information about the ethnic background of cadaveral subjects was not recorded for the JCB Grant collection. However, it is likely that the Grant collection is comprised of largely of individuals of European ancestry considering that Toronto was a major entry and settlement point for immigrants to North America (Albanese 2005:11).

Skeletal collections derived from cadaveral sources during the first half of the twentieth century contain a disproportionate number of older individuals (Albanese 2005; Hunt and Albanese 2005). The mean age at death for males in the Terry collection is 53 years, and 58 years for females (Hunt and Albanese 2005). The majority of individuals in the Grant collection are over the age of 50 years (Albanese 2005). In comparison,

the mean age at death in the Hamman-Todd collection is slightly younger at 49 years for males and 44 years for females (Lyman Jellema, personal communication, 2006).

Males far outweigh females in the all North American cadaveral collections with the exception of the Terry Collection. The proportions of males to females is more equal in the Terry collection due to a concerted effort by Mildred Trotter to balance the demographic composition of the collection after Terry's retirement in 1941; almost half of the females in the collection were added after 1941 (Hunt and Albanese 2005). Although a number of factors including anatomist's preference for male cadavers for the study of anatomy, the attitudes of the medical community towards women, and public views toward dissection may have contributed to the gender disparity in North American cadaveral collections, the underrepresentation of females in these collections appears to be largely due to the availability of cadavers (Hunt and Albanese 2005). Females would have been included in the disadvantaged groups typically exploited for dissection during this period – indigents, the poor, transients, and recent immigrants – yet these groups would have been comprised mainly of males.

Disadvantaged segments of society tend to experience poor health as a whole (Grauer and McNamara 1995; Sirianni and Higgins 1995). Cadaveral collections being drawn largely from disadvantaged segments of the population frequently exhibit skeletal evidence of lifestyle stress and poor health. The physically challenging lifestyle, crowded and unsanitary living conditions and limited access to nutritious food and health care put disadvantaged segments of society at a higher risk of developing illnesses, contracting infectious diseases like tuberculosis and cholera, poor dental health and degenerative joint disease. Nineteenth century pauper skeletal collections like the Monroe County Almshouse cemetery in Rochester New York confirm that the urban poor who sought assistance from the almshouse experienced low levels of health (Higgins et al. 2003). Death records and skeletal pathology confirm that the cadaveral individuals were in poor health at the time of death with large numbers of individuals in the Terry (Roberts et al.

1994), Hamman-Todd (Jones-Kern and Latimer 1996; Kelly and Micozzi 1984) and Grant collections (Albanese 2005; Heathcote 1979) suffering from tuberculosis among other diseases.

This information, in conjunction with Canadian Anatomy Act legislation and 19th century newspaper reports of clandestine activity, can be used to construct a demographic profile of the subjects used in dissection and early medical training. This cadaveral profile will then be compared to the Odd Fellows skeletal profile in order to ascertain if the Odd Fellows individuals may have been members of the same social groups that were exploited for use in early medical training.

### The Odd Fellows Skeletal Profile

#### *Sex and Age*

The majority of the individuals in this collection are male (n=27), while females are less represented (n=15). Sex could not be confidently ascertained for 5 individuals (Table 1).

Each individual was assigned to one of 5 age categories: adolescent (15-19), young adult (20-29), middle adult (30-45), older adult (45+), and over 20 years if the individual was represented by a single skeletal element exhibiting fused epiphyses. The individuals in the Odd Fellows collection range in age from the late teens to the late 60s. The greatest number of individuals (n=15) fall within the young adult age category, followed closely by the older adult category (n=10), the middle adult category (n=8) and finally the adolescent category (n=3). The remaining eleven individuals could only be assigned to the over 20 years category because formal morphological age estimation methods could not be applied to the existing remains (Table 1).

#### *Ancestry*

In total 23 individuals were estimated to be of European ancestry, 10 individuals were of African ancestry, three individuals were of Aboriginal ancestry, two individuals were of South Asian (Indian) ancestry, and 10 individuals were of undetermined ancestry.

#### *Health and Socio-Economic Status*

Aside from normal wear and tear that is exerted on the skeleton during life, most of the individuals do not display evidence of extreme trauma or pathology. Dental health is adequate considering that a small proportion of teeth were lost ante-mortem; only 26 percent of the teeth present display evidence of carious lesions and no fillings or restorations are present. The incidence of trauma is low. Five individuals displayed evidence of nasal fracture, one individual exhibited a healed rib fracture, one individual presented a healed wrist fracture and one individual suffered from a healed cranial depression fracture. Skeletal evidence of infectious disease is almost nonexistent. Six percent of the Odd Fellows individuals display lesions consistent with tuberculosis, but the actual prevalence of tuberculosis in this sample is likely underestimated considering that not all individuals were represented by the entire compliment of skeletal elements. Most of the individuals display some degree of arthritic degeneration of the spinal column and articular joint surfaces, but even this is slight and consistent with the age of the individual.

#### *Skeletal Evidence of Post Mortem Treatment*

The skeletal remains were also examined for evidence post mortem treatment that could serve as a direct link to early medical training. Twenty-four individuals displayed evidence of post mortem treatment. Five different forms of post mortem treatment were observed on the skeletal remains: 1) the calvarium was separated from the rest of the

**Table 1.** *Distribution of individuals in the Odd Fellows collection.*

	Adolescent (15-19)	Young Adult (20-30)	Adult (30-45)	Older Adult (45+)	+20 years	Total
Males	3	9	4	9	2	27
Females	-	6	4	1	4	15
Indeterminate	-	-	-	-	5	5
Total	3	15	8	10	11	47

cranium; 2) the separation of the sternum along the midline; 3) cut marks along the shafts or articular surfaces of the long bones; 4) labeling of muscle attachment sites on skeletal elements; and 5) skeletal elements displaying specimen numbers usually written in India ink. Cut marks constitute the most common form of post mortem treatment observed in the Odd Fellows collection (n=12). The remaining expressions of post mortem treatment were less widespread in the collection. Five individuals had their crania transversely sectioned, five individuals were observed to have had their sterna longitudinally cut down the midline, the names of muscles were labeled at their attachment sites on the remains belonging to five individuals, and skeletal elements belonging to six individuals had been assigned specimen numbers.

### Similarities between the Cadaveral and Odd Fellows Skeletal Profiles

#### Sex

The majority of individuals in the Odd Fellows skeletal collection are male. This is as expected given the fact that males constituted the majority of individuals in the groups made available for dissection by the Anatomy Acts—convicts, immigrants, indigents and those receiving public aid. The demographic composition of cadavers was mainly a result of availability, but may have been influenced by physician preference and social attitudes. Early physician's preference for male dissection subjects was rooted in practical considerations based on anatomy as well as beliefs about the superiority of the male form. The male form was viewed by early anatomists as ideal not only because bodily structures are more accessible

in the male cadaver (Blakely and Harrington 1997), but also because many held the common misconception that male and female differences were not limited to size, but rather extended to the composition of bones, muscles, nerves and skulls (Schiebinger 1987).

Temporal, spatial, and sample size differences between the Odd Fellows collection and North American cadaveral skeletal samples do not allow for direct comparison, yet meaningful comparisons can be made between the skeletal profile of the Odd Fellows collection and the general cadaveral profiles of North American dissection samples. The trend of male prevalence is also represented in the demographic composition of cadaveral skeletal collections such as the Grant, Terry, and Hamman-Todd collections, as well as the Medical College of Georgia (MCG) sample (Table 2). This trend of male prevalence has continued into modern medical training as the ratio of male to female cadavers is estimated to be about 15 to 1 (Krogman and Iscan 1986:189).

#### Age

A large proportion of the Odd Fellows individuals cluster in the young adult category, and a slightly smaller proportion of individuals cluster in the older adult category (Table 1). The age profile is consistent with the expected general age at death for the segments of society typically exploited for dissection and medical training. When the age of the individuals in this collection is examined in conjunction with their health it becomes apparent that the majority fit the profile of those who would have been used in dissection. Yet, the Odd Fellows age profile differs from North American cadaveral skeletal collections, as the majority of the individuals in these later collections were over the

Sample	Size	Date Collected	Sex Breakdown
Terry <sup>a</sup>	1,719	1920–1965	M=59% F=41%
JCB Grant <sup>b</sup>	202	1930–1953	M= 87% F=13%
Hamman-Todd <sup>c</sup>	3,379	1912–1938	M=82% F=18%
Medical College of Georgia <sup>d</sup>	24	1835-1912	M=79% F=21%
Odd Fellows	47	1857–1940 <sup>+</sup>	M=64% F=36%

**Table 2.** Comparison of cadaveral skeletal collections with the Odd Fellows collection.

Sources: <sup>a</sup> Hunt 2001; <sup>b</sup> Albanese 2005; Heathcote 1979; <sup>c</sup> Lyman Jellema 2005, personal communication; <sup>d</sup> Blakely and Harrington 1997; <sup>+</sup>Based on lodge institution dates known for part of the collection.

age of 50 years at death (Albanese 2005, Hunt and Albanese 2005, Hunt 2001, Heathcote 1979). Terry, Todd and Grant did not begin to collect cadaveral skeletal remains for their collections until the first half of the twentieth century; it is during this time that a disproportionate number of older individuals were collected (Albanese 2005, Hunt and Albanese 2005). Since at least some of the individuals in the Odd Fellows collection predate these cadaveral skeletal collections by upwards of 50 years it is likely that shifts in the composition of those segments of society exploited for dissection occurred over time, an idea which is corroborated by the supporting historic information.

### *Ancestry*

The Odd Fellows collection is mainly comprised of individuals of European ancestry. Although this is consistent with what would be expected as members of disadvantaged segments of the population living in Ontario during the late nineteenth and early twentieth centuries, individuals from other ancestral backgrounds constituted a larger portion the Odd Fellows collection than had been predicted, particularly individuals of African and South Asian ancestry. In the United States during this time, free and slave African Americans were the most socially disadvantaged and powerless groups, and routinely exploited for dissection and surgical experimentation (Blakely and Harrington 1997; Breeden 1975; Humphrey 1973; Jackson 1997; Savitt 1978). In Canada one might expect that First Nations individuals would have been subject to much discrimination and, therefore, constituted a similarly large proportion of cadavers. Even though second hand accounts of grave robbing on a Mohawk reservation outside of Kingston suggest that, in some cases, First Nations cemeteries were robbed for dissection subjects (David Maracle, personal communication, 2000), First Nations individuals make up a very small portion of the Odd Fellows collection.

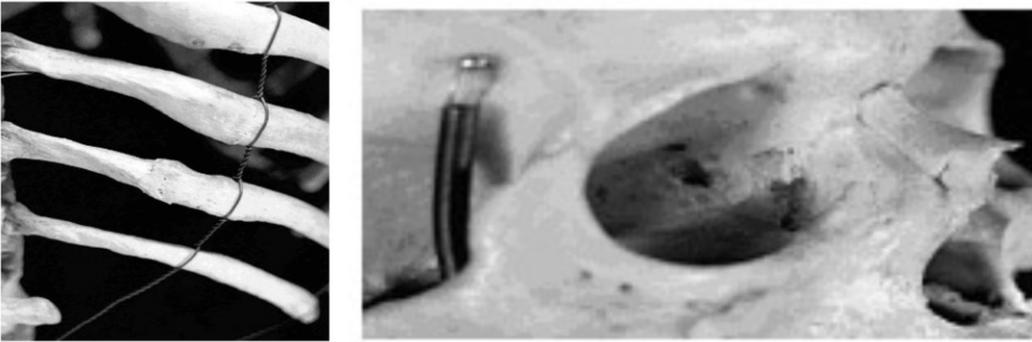
The presence of an articulated skeleton consisting of the remains of two individuals of probable South Asian (Indian) ancestry in the Odd Fellows collection is also surprising given the time period that the Odd Fellows remains were

attributed. Although India was the main exporter of human remains to universities and medical institutions in North America until 1985, when the practice was stopped (Sappol 2002), it seems unlikely that it supplied human skeletal remains during the time period in question.

### *Health*

It is often the case that the poorest, and least healthy, segments of society provide the majority of skeletons for medical research (Blakely and Harrington 1997). This statement holds true for the Odd Fellows collection as well, yet this skeletal collection serves as a prime example of the Osteological Paradox (Wood et al. 1994), which challenged conventional interpretations of skeletal health by asserting that skeletons that do not display evidence of disease or trauma were, in actual fact, acutely unhealthy because death occurred before skeletal changes could occur. Even though a small portion of the Odd Fellows skeletons displayed evidence of trauma and hardship consistent with a difficult life (Figure 1), health based on the overall condition of the skeleton, is good. The relatively young average age at death of this collection, coupled with the general lack of skeletal evidence of disease or illness, suggests that the individuals in this collection may have died of acute conditions or illnesses that do not impact the skeleton.

Generally speaking, dental health is adequate. All of the individuals with teeth display at least one carious lesion, yet there is no evidence of dental intervention or restoration. The existence of eighteen individuals with dental restorations in the St. Thomas Anglican Church cemetery skeletal sample, confirms that dental intervention was available in Ontario as early as 1843 (Saunders et al. 1997). The presence of dental restorations in the St. Thomas Anglican Cemetery, and in the middle and upper class individuals in the skeletal sample from the Oneida County Asylum in New York State (Phillips 2003), also confirms that dental work was available mostly to individuals of higher social and economic status during the nineteenth century. The absence of dental intervention in the Odd Fellows collection reinforces the likelihood that these individuals were of low social and economic status.



**Figure 1.** *Individual 15. Examples of traumatic lesions found in the Odd Fellows collection. Healed fracture of left rib 11 (left) and healed fracture of right nasal (right).*

The incidence of non-life threatening skeletal trauma is lower than one would expect for the disadvantaged segments of society, yet the type and pattern of traumatic lesions observed in the Odd Fellows collection are consistent with a challenging and physically demanding lifestyle. Skeletal evidence of tuberculosis was also lower than expected for this collection as tuberculosis was one of the leading causes of death among individuals from disadvantaged segments of society in North America during the latter half of the 19<sup>th</sup> century (Sirianni and Higgins 1995). A similar proportion of the individuals in the Hamman-Todd collection (8.8 percent) with documented diagnoses of pulmonary TB also displayed skeletal lesions associated with the disease. This, coupled with the fact that only about 16 percent of individuals who die from tuberculosis display tuberculosis lesions (Kelly and Micozzi 1984), suggests that it is probable that the frequency of TB is underestimated in the Odd Fellows collection. The pattern of arthritis observed in this collection (e.g., involvement of mainly vertebrae, shoulder and hip joints, fingers, and toes), suggests physical labor and is consistent with a disadvantaged lifestyle.

The general findings about the sex, age, health, and ancestry of this collection strongly suggest that the Odd Fellows individuals were likely members of the disadvantaged segments of society, and were used for dissection during the late nineteenth and early twentieth centuries.

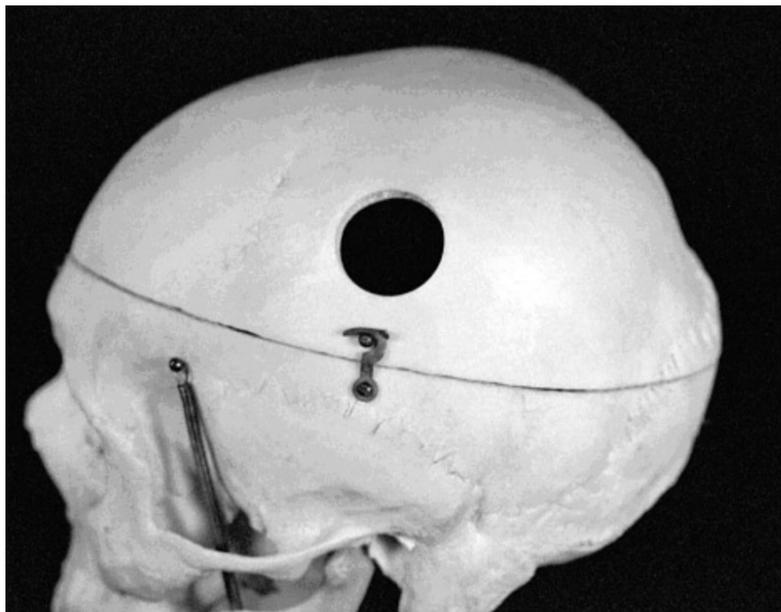
### **Direct Evidence of Early Medical Training: Skeletal Evidence of Dissection**

According to Owsley (1995:135), skeletons displaying evidence of sawing and cutting can be connected to the practices of autopsy, surgical training and dissection. Although evidence of autopsy and dissection is rare in historic North American skeletal samples, nearly half of the Odd Fellows skeletons display evidence of various forms of this treatment.

Nineteen percent of the crania in the Odd Fellows collection have had their calvaria surgically removed (Figure 2). The removal of the calvaria from the cranium allowed for access to the brain for further study, and was an integral part of dissection in nineteenth century medical training (Albanese 2005; Hunt and Albanese 2005). Direct evidence of dissection and medical training has been observed on other skeletal collections of cadaveral origin, e.g. collections from the Charity Hospital Cemetery (CHC) in New Orleans, Louisiana (Owsley 1995) and the Medical College of Georgia (MCG) in Augusta (Blakely and Harrington 1997; McFarlin and Wineski 1997). All of the crania in the MCG collection displayed severed calvaria (McFarlin and Wineski 1997) while 35 percent to 40 percent of the CHC crania had been separated from the calvaria (Owsley 1995). Crania from a number of skeletons from the Terry and Grant collections have also been transversely sectioned (Albanese 2005; Hunt and Albanese 2005).

The procedure of transversely sectioning the sternum in order to allow access to the organs of the

**Figure 2.** *Individual 5i.*  
Examples of direct evidence of autopsy found in the Odd Fellows collection.



chest cavity was common in early medical training and continues to be practiced in medical training today. Cut sternae are present in both the CHC collection and the MCG sample. Nineteen percent of the Odd Fellows sternae have been transversely sectioned. McFarlin and Wineski (1997) suggest that sectioned sterna indicate that medical students were also practicing surgical techniques used to open the chest in addition to primary anatomical study (1997:156).

Cut marks constitute the most common form of post mortem treatment observed in the Odd Fellows collection. The nature of the cut marks is consistent with a scalpel or sharp blade. They are most common on the shafts of the long bones, heads of the femur and humerus, on the exterior cranial vault, and on the posterior vertebrae and vertebral ends of the ribs. Cut marks were also observed on the humeral and femoral heads and along the shafts of long bones in the MCG sample. Some individuals in the Grant and Terry collection also exhibit cut marks (Albanese 2005; Hunt and Albanese 2005). McFarlin and Wineski (1997) suggest that the presence of cut marks in these locations is evidence of the dismemberment of the limbs from the body and extensive dissection of the limbs, practices that are not part of standard modern dissection procedures. Two

individuals in particular exhibit extensive cut marks on the posterior vertebrae and the vertebral rib ends. This pattern of cut marks is consistent with a modern dissection procedure involving the exposure of the intervertebral joints and spinal column (McFarlin and Wineski 1997).

Although the Odd Fellows collection appears to be the only one of its kind in Canada, a small collection of skeletons originating from Odd Fellows lodges in Kentucky also exists. The skeletal remains from Kentucky Odd Fellows were initially acquired from medical schools and also exhibit cut marks indicative of dissection and defleshing (Philip DiBlasi, personal communication, 2001). This connection adds further evidence to the supposition that the Ontario Odd Fellows skeletons may have also been obtained from medical schools.

Another interesting practice that may support the link to medical training was the labeling of muscle and ligament attachment sites on some of the Odd Fellows remains. In most cases the bones were labeled with the traditional Latin anatomical terms that were in use during the nineteenth century, adding further support to the link to early medical training. This sort of practice was not documented for the CHC or the MCG collection or noted for the other cadaveral skeletal

collections. However, most medical schools and anthropology teaching collections possess a skull or skeleton that has the muscle attachment sites identified and labeled. It is likely that medical students or the physicians themselves may have added the labels as a study tool.

It is likely that the specimen numbers were assigned to the six Odd Fellows individuals after they were processed into skeletons in order to keep track of the remains. The assignment of specimen numbers to skeletal remains is typically a practice associated with curated skeletal collections like the Grant, Terry, and Hamman-Todd collections (Albanese 2005; Hunt and Albanese 2005; Jones-Kern and Latimer 1996). One individual from the MCG sample had a specimen number written on the endocranial surface of a parietal (Blakely and Harrington 1997), but this practice was not observed in the CHC collection. Numbers are typically assigned to specimens that are part of a collection for purposes of organization. Thus, it is possible that the Odd Fellows skeletons with specimen numbers may have at one point been intended to be part of a medical school teaching collection.

The fact that a significant proportion of the Odd Fellows skeletons display evidence of dissection and medical training consistent with those observed in other known cadaveral skeletal collections serves as strong evidence for a link between the Odd Fellows skeletons and early medical training. The proportion of the sample directly associated with medical training may actually be underestimated considering that many of the individuals in the Odd Fellows collection are represented by as few as one element from areas of the body that do not tend to be as directly affected by the practice of dissection, like the hands, feet and some of the smaller limb bones.

#### **Alternative Sources of Skeletal Remains: Grave Robbing**

In general, the Odd Fellows demographic profile is consistent with the groups specified by the Anatomy Acts for use in medical training, yet at least four individuals in this collection display indications of having been grave robbed. The condition, color and

the presence of traces of soil on the remains suggests that these individuals had been interred for a significant period of time before their remains were exhumed. Thus, the remains would not have been suitable for use as dissection subjects. The skeletal remains of these individuals were well preserved and not brittle, unlike some of the other individuals in this collection that appear to have been subject to some type of maceration process. The remains were also similar in color to skeletal remains from archaeological contexts, and do not exhibit any post mortem alterations that are characteristic of dissection and autopsy. Furthermore, they were not part of complete articulated skeletons, but rather consisted of "skulls and cross bones". The condition of the remains belonging to three individuals thought to be of First Nations ancestry indicates that they may have originated from an archaeological context. The presence of fragments of coffin wood adhering to the forehead of one individual (Figure 3) indicates that the individual had been interred between 50 and 100 years prior to exhumation to allow for the decomposition of the tissue and the coffin wood and the infiltration of the cranium with soil resulting from taphonomic processes (Michael Spence, personal communication, 2001). All of these pieces of evidence suggest that these remains may have undergone different processes than the rest of the Odd Fellows skeletal collection before ending up in the hands of the IOOF.

#### **Conclusion**

This study has identified sufficient direct and indirect evidence to link the Odd Fellows individuals to medical practice, dissection and the study of anatomy. Similarities between the Odd Fellows skeletal profile and the North American cadaveral collections strongly suggest that the Odd Fellows individuals were members of the disadvantaged segments of society that were routinely used for dissection during the late 19th and early 20<sup>th</sup> centuries. While some demographic differences relating to age and health were identified between the Odd Fellows and cadaveral demographic profiles, this may be a product of the fact that the Odd Fellows collection likely



**Figure 3.** *Coffin wood adhering to right brow of individual.*

predates the cadaveral collections. Before the advent of the Anatomy Act legislation the collection of medical specimens for dissection and the study of anatomy may have been more opportunistic, drawing from the wider population rather than disadvantaged segments of society. Direct skeletal evidence of dissection and autopsy in nearly half of the Odd Fellows individuals further reinforces the connection to early medical training. The results of this investigation demonstrate that, in the absence of solid contextual information, drawing on multiple lines of evidence can help to determine a probable origin for an otherwise unknown skeletal collection.

Even though the evidence suggest that the Odd Fellows individuals fit the profile of dissection subjects used during the nineteenth century in Ontario, the mechanisms through which the skeletal remains came to be in the possession of the Odd Fellows remains unclear. Each lodge typically had a physician who would tend to the medical needs of the members and their families. It was common practice for medical graduates to take their cadavers, typically skeletonized, for use in their future practices. Physician members

could, therefore, have facilitated the acquisition of human skeletal remains. Questions about the extent of the involvement of Dominion Regalia in the acquisition of Odd Fellows skeletons remain, as well as the existence and possible role of medical supply companies.

This exercise turned out to be a very rewarding and academically enriching experience, which led me to investigate avenues that I would have never considered if the remains had had a solid contextual base. Such challenges can require one to think outside of their own discipline and explore a greater range of investigative methods. In the end, this turned out to be a perfect Master's project. It taught me that there is not one true answer, but many interpretations, allowed me to challenge and test myself, gave me the latitude for self exploration, and enabled me to learn and hone skills essential to a bioarchaeologist.

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