Filling the Gaps: The History of Dental Pathology and Restoration in 19th-century Washington, DC.
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In order to understand historical dental health and treatment in the 19th century, the remains of several high status individuals from seven burial vaults in Historic Congressional Cemetery were examined. This study is a report on the frequency of dental pathology in this series, as well as the occurrence and type of dental restorations, including their elemental compositions. Interpretation of these data were informed by historic documents related to the dental profession in the 19th century.

Background

Congressional Cemetery in Washington, DC first opened in 1807 to replace an earlier lot which frequently flooded. The cemetery flourished throughout the 19th century, containing the graves and burial vaults of congressmen and other government officials, decorated military personnel, and some of the wealthiest families in Washington. Throughout the 20th century the cemetery fell into disuse, decay, and was often the site of illicit activity. Efforts to restore the cemetery began in 1997 and continue to this day.

As part of these efforts to restore deteriorating and vandalized 19th-century brick burial vaults, the cemetery entered into a research partnership with the National Museum of Natural History. All-risk vaults were selected for repair and Smithsonian scientists worked with cemetery staff to systematically remove the badly deteriorated vault contents, allowing access to the crypt for renovation. To date, seven vaults have been repaired and their contents studied.

Materials and Methods

A total of 82 individuals were analyzed. Nearly all were recovered from badly degraded burial containers and in most cases their identity was unknown. Age, sex, and pathology data were recorded and paired with genealogical research in an attempt to identify the unknown individuals. Of the 82 individuals studied, 60 have currently been matched with burial record data and names assigned.

Dental pathology, including the number of teeth lost in life, the frequency of cavities, the incidence of gold or other metal restorations, and the number of individuals with partial/complete dentures was documented for the total series (Table 1). A number of fillings were analyzed using X-ray Fluorescence and Energy Dispersive X-ray Spectroscopy to determine their component materials. Results of these analyses were used to assess differences in material use over time, and differences in restorations relative to age and sex.

When dental pathology is analyzed by sex and age (Table 1), there is a slight difference between males and females, with females showing a higher percentage of antemortem tooth loss, and slightly lower rates of abscesses and decay. Age is a factor in the frequency of these conditions: individuals age 35 years and older generally show more pathology, with the exception of dental caries, which are more common in young adult males.

Results

The occurrence of dental restorations by family vault (Table 3) shows that the Causten family received the greatest degree of dental care, with 47.4% of individuals exhibiting some form of dental restoration. The White family has a lower number of individuals with restorations, but the greatest number of gold fillings (57). Data are skewed by specific individuals who received extensive dental care (Figure 6).

Composition

The composition of metal restorations was determined by X-ray Fluorescence and Energy Dispersive X-ray Spectroscopy. Both methods work by bombarding the sample with electromagnetic energy causing the elements to emit secondary x-rays. These x-rays are then measured and identified by a spectrometer to determine the type of metal present in the filling.

This information was used to determine the types of fillings used in the different historical periods, and how these periods reflected changing material use practices.

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References