

The odontological collection at the Royal College of Surgeons of England: a short review

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Abstract

This short article will present an overview of the contents of the Odontological Collection based at The Royal College of Surgeons of England, London. This dentally relevant research source has been accrued over the past two centuries and contains both human and animal cranial material that place a focus on the development of the teeth and jaws. Currently used by a range of researchers in a variety of fields, it is hoped that this brief review will encourage those with a palaeodontological interest to consider the Odontological Collection in data collection or for more general dental investigation.

Keywords: Odontological Collection; Dental Research; Maxillofacial Development and Pathology

The Royal College of Surgeons of England holds several historical and medical collections and contains two museums; the Hunterian Museum and the Wellcome Museum of Anatomy and Pathology. The Odontological Collection forms part of this vast scope of material, containing just over 11,000 skulls and teeth. Two themes are covered by the collection; specimens displaying variations in pathology of the teeth and jaws, and material showing dental development and growth. Two thirds of the collection is animal and one third is human. A museum was first established to house this collection in the mid nineteenth century. From its conception a range of specimens have been donated that relate, in some way, to development or pathology of the maxilla and mandible. This influx of material lasted two centuries and resulted in the establishment of a collection that is internationally unique, given both the range of specimens and the essentially odontological focus of each one. A brief

overview of the collection's contents and details concerning access will be reviewed here.

Those specimens displaying pathological conditions include a range of congenital, metabolic and infectious diseases in addition to examples of maxillofacial trauma. All of the common dental pathologies, such as dental caries, periodontitis and various forms of abscesses (Figure 1), are represented in the collection alongside those which could be considered exceptional examples of pathology, such as hypoplasia of the mandibular ramus. Of the human developmental material a range of complete skulls and preparations are included which reveal the dental stages from foetus to adult. The animal aspect of the collection contains an array of mammalian, avian, reptilian and amphibian species. The most extensive part of the animal material is the collection of primate skulls which covers over 80 species from the largest on the planet, the gorilla, to one of the smallest, the dwarf lemur. A significant number of these specimens were donated by the late primatologist Sir William Osman Hill (1901-1975). All of this material is held at the College to facilitate further research into areas as diverse as osteoarchaeology to modern veterinary science.



Figure 1. Male cranium showing a periapical abscess in the right maxilla. This specimen also showed evidence of dental caries.

Material of relevance to any palaeodontologists includes the over 400 human cranial remains excavated from a variety of sites which cover a wide geographic and temporal scale. Examples from the archaeological collection include three Egyptian mummy skulls and four Guanche mandibles (indigenous inhabitants of the Canary Islands). The collection also holds complete skulls from the Iron Age Camp site of Breedon-upon-Hill in Leicestershire, England. The dentitions of these skulls show a complete scale of dental wear owing to the age ranges within the assemblage. As a result, these skulls were used by AEW Miles in the 1960s to form his widely recognised dental ageing atlas based on tooth wear, which remains in use to date (1). A variety of British sites are represented by the collection. This includes seven Romano-British sites the large majority of which contain specimens that have complete dental arcades and generally show little dental displacement or pathology.

However, the change in diet through the centuries is evident in the over 100 cranial specimens from two post-medieval London sites which show diseases that generally correlate with poor oral hygiene and a high sugar intake.

Both the archaeological and more recent crania show a range of non-metric traits including the presence of supernumerary or geminated teeth, microdontia and supernumerary cusps. Furthermore a few specimens show near extinct diseases or pathological conditions associated with social history such as dentitions displaying congenital syphilis (Hutchinson's Incisors (2) and Moon's Molars (3)) along with examples of phosphorus necrosis of the mandible, as commonly suffered by matchstick makers in the nineteenth century. Other material shows abnormalities in dental placement and eruption, from simple transpositions of teeth to eruption into the nasal fossa or in the direction of the zygomatics (Figure 2).



Figure 2. Two male crania showing misplaced maxillary canines.

Those with a more anthropological interest may be intrigued by the material demonstrating both intentional and unintentional modification of the dentition. A selection of skulls was donated to the collection in the late nineteenth century by the anthropologist Joseph Barnard Davis (1801-1881). These specimens show variations in the intentional modification of the anterior teeth for aesthetic reasons, from regions as varied as Indonesia to west Africa (Figure 3). Some of this modification has been caused by a non-invasive staining of the teeth through betel nut chewing, other examples show a rare form of filing, chipping or ablation of the central maxillary incisors (Figure 3). The effect of occupational or habitual activities on the dentition is a related theme. The unintentional modification of the teeth can be viewed in the dental casts of Greenlanders who used their teeth to soften leather through mastication, or the variety of pipe-smoking facets amongst western populations. In addition to the skeletal and dental specimens, the large collection of dental casts illustrates a range of diseases, injuries and abnormalities from congenital abnormalities such as cleft palates in their respective stages of repair, to maxillofacial gun-shot injuries of soldiers from the First and Second World wars.



Figure 3. Male cranium showing intentional modification of the incisors. The labial surfaces have been filed to leave quadrilateral reliefs on the enamel surface.

The diversity and ready availability of the Odontological Collection have made the material useful to a broad range of disciplines. The over 200 sets of perinatal dentitions, which were collected during the 1950s, were used for PhD research in 2009 to form a new Dental Ageing Atlas which is now available through Queen Mary's University of London website (4). Over the past year the human material has formed the crux of several dissertations in a variety of disciplines. Recent themes researched from the human collection have included dental wear and its use in age estimation, the implementation of craniometry in elucidating provenance and the assessment of links between cribra orbitalia and porotic hyperostosis. Analysis of the animal material was applied to a range of studies that largely focused on evolutionary anthropology.

Details of every specimen are freely available to all on our online catalogue 'Surgicat' (<http://surgicat.rcseng.ac.uk/>). Surgicat contains complete information on all of the human material and more basic information on every animal specimen, the latter of which are in the process of being examined and recatalogued, enabling a more thorough description to be attached. The 'free search' box can be used to perform a general search, for example 'Pan troglodytes', or by a more specific term such as 'Dental Enamel Hypoplasia'. Interest in viewing the material can be arranged in advance. Please email the correspondence address for more information. The Odontological Collection is an unparalleled source of dental information, the potential of which is yet to be fully realised. It is hoped that this brief paper has provided some insight into the sheer scope of the odontological material stored at The Royal College of Surgeons of England, the large proportion of which may be particularly relevant to those in the palaeodontological field.

For details on accessing The Odontological Collection, or for any further help with performing surgical searches, please contact Milly Farrell (mfarrell@rcseng.ac.uk).

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