# A dental approach to salvage excavated and commingled burials

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## Introduction

The commingling of human remains, coupled with the destructive effects of taphonomy, presents a significant obstacle to osteological research that investigates MNI, age distributions, and health. While bioarchaeologists have recently begun to untangle the methods and theory that underlie approaches to commingled remains (Osterholtz et al., 2013), further obstacles are presented by collections produced by salvage archaeology, where the pace and magnitude of excavations prohibits the collection of the fine-grained spatial data necessary to identify individual skeletons. In such cases, particularly where the volume of human remains is high, bioarchaeologists must develop new strategies to maximize the efficient recovery of bioarchaeological information. One potentially pertinent strategy is through the examination of recovered dentition.

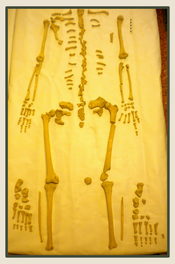
## Materials

Marroquíes Bajos is a 113 hectare Copper Age center (c. 3200-2250 BC) salvage excavated over the course of the past two decades::

- **N1:** Mixed primary and secondary burials. MNI = 42.
- **N2:** Fragmentary secondary burials. MNI = 33.
- **N4:** Artificial cave containing a large number of commingled individuals. Adult MN I = 148.

**Figure 1:** Map of examined necropolises at Marroquíes Bajos.

## Methods



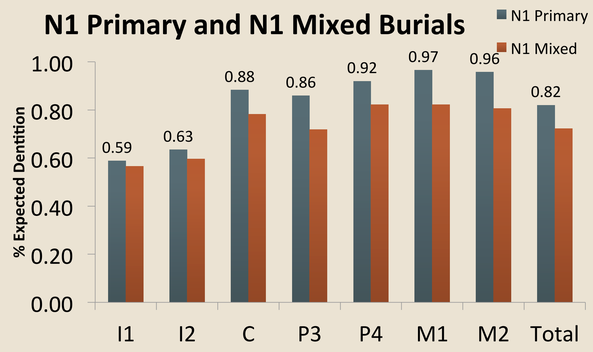
- Full dental and skeletal analyses were conducted for N1 and N2.

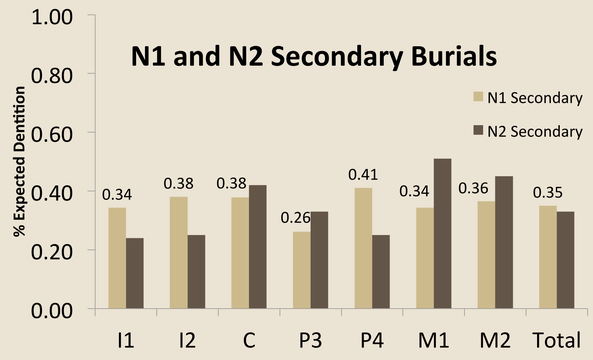
- All N4 remains were screened, and a dental analysis was conducted for N4.

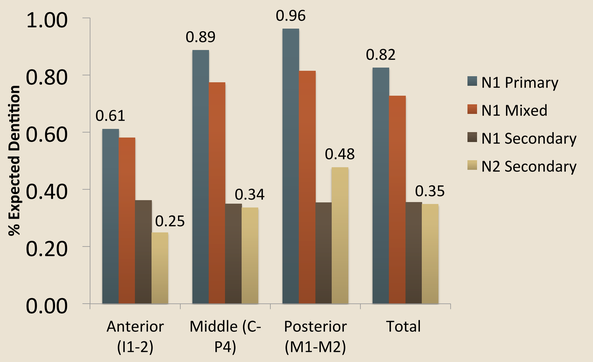
- Dental MNI and AMTL frequency were used to calculated expected counts for each tooth type.
- Only adult teeth (permanent, Ac) were used in this analysis.

## 1. What are the dental signatures of primary, secondary and mixed burials?

### 1. Dental Signatures N1 and N2

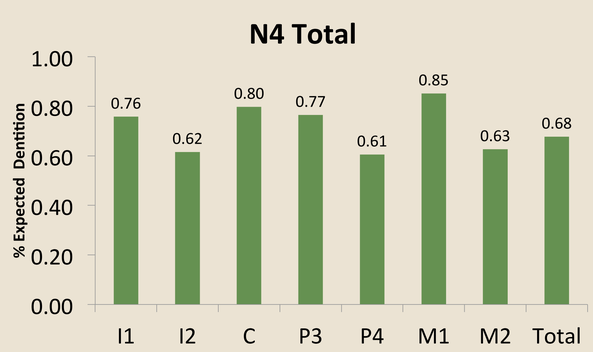


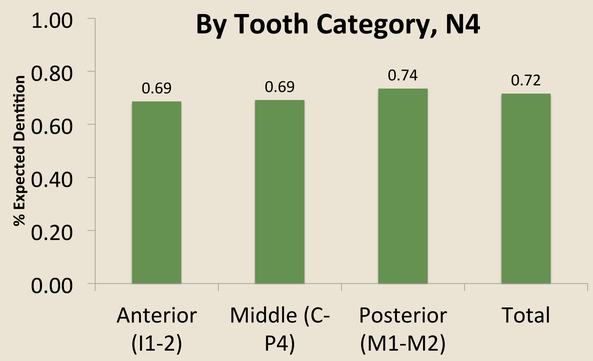



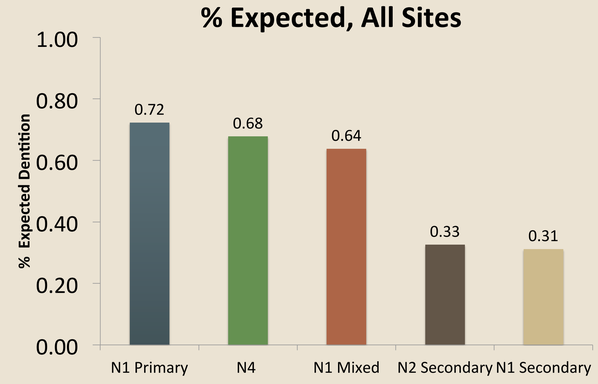




## 2. What form of burial is indicated by the dental signature of N4?

### 2. Dental Signature N4

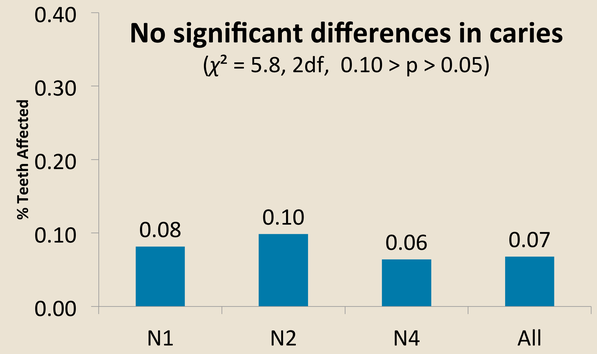


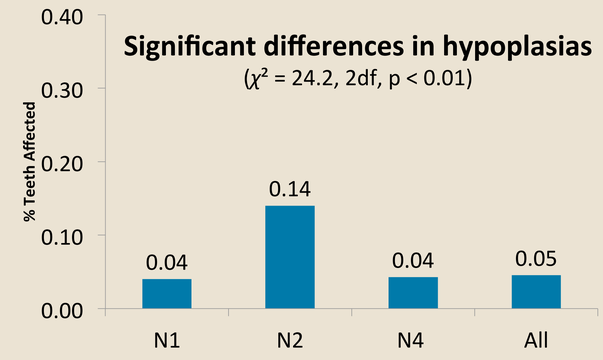



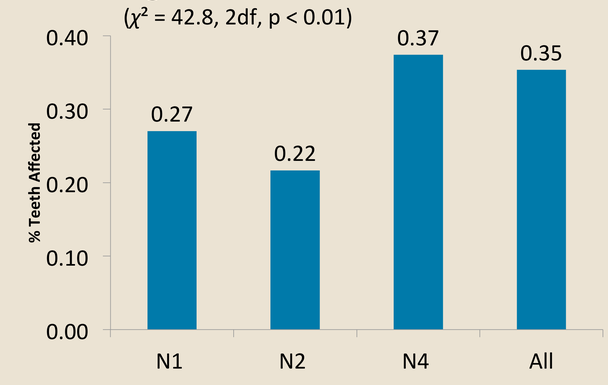




## 3. How do the necropolises vary in regards to proportion of dental pathologies?

### 3. Proportion of Dental Pathologies




## Differences in Dental Completion

- Clear quantitative differences in dental completion between primary, secondary and mixed burials.
- Primary burials have highest levels of dental completion.
- Secondary burials have lowest levels of dental completion.
- Primary and mixed burials show > % of preservation of anterior dentition.
- In contrast to the pattern described by Haglund (1995), where incisors always show the lowest levels of preservation, patterning seems to be varied between the different types of teeth in secondary burials.

## N4 Shows Primary Signature

- The overall N4 completion signature most closely matches a program of mixed or primary burials.
- There is little variability between anterior, middle and posterior representation at N4.
- The most poorly represented categories of teeth at N4 are lateral incisors and fourth premolars.
- The highest levels of representation at N4 are for first molars and canines.
- Examining the proportion of expected to observed dentition for the total dental sample is most informative about burial practices.

## Differences in Pathology

- Chi-square tests examined whether individual mortuary areas differed from the total observable dental sample (which combined all teeth from N1, N2 and N4).
- There are no significant differences in the frequency of caries between the mortuary areas.
- N2 has a significantly higher proportion of teeth with hypoplasias than the total mortuary sample.
- N4 has a significantly higher proportion of teeth with caries than either N1 or N2.
- These differences in dental pathologies may be related to dietary differences between these mortuary populations

## References

- Osterholtz, A.J., K.M Baustian and D.L. Martin. 2013 *Commingled and Disarticulated Human Remains: Working Toward Improved Theory, Method and Data*. Springer, New York.
- Haglund, W.D. 1997 Scattered Skeletal Human Remains: Search Strategy Considerations for Locating Missing Teeth. In *Forensic Taphonomy: The Postmortem Fate of Human Remains*, edited by W.D. Haglund and M.H.Sorg, pp.383-394. CRC Press, Boca Raton.

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## Further Information

All statistical analyses were performed in Microsoft Excel. Additional figures were created in ArcGIS. All photographs were taken by Jess Beck, and permission to use them was granted by the Museo de Jaén.

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