

# A palimpsest of diseases:

the relation of temporomandibular joint osteoarthritis and *ante mortem* tooth loss on a medieval sample from Coimbra, Portugal

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## Introduction

Temporomandibular joint osteoarthritis (TMJO) is a pathological condition characterized by the wear of the articular disc, which is a masticatory stress absorbent. Such condition originates the fragmentation and loss of the articular surface, formation of new bone and also loss of contour (Rando and Waldron, 2012). TMJO may have multiple causes but is usually associated with high rates of dental wear (osteological samples) and old age (histological samples) (Hodges, 1991; Richards, 1990). However, some studies have found some significant correspondence with sex and *ante mortem* tooth loss (AMTL) (Hodges, 1991; Sheridan et al., 1991). Although TMJO can be asymptomatic, it may cause the limitation of opening, stiffness, crepitus, pain and tenderness on biting (Soames and Southam, 2005).

The aim of this presentation is to analyze the relationship between TMJO and AMTL in 44 adult dentitions, from São João de Almedina (SJA) medieval/modern urban population (Coimbra, Portugal).

## Material and Methods

### Sample:

The sample is comprised by 24 males, 14 females and 6 individuals of unknown sex, divided into three age classes (young adults, adults and old adults), from the 12<sup>th</sup>-16<sup>th</sup> centuries burial ground of São João de Almedina (Coimbra, Portugal). The analysed sample can be described as belonging to an urban middle class population who lived inside the walls of the city.

### Methodology

For the registration of AMTL, the recommendations of Hillson (2001) were followed. All alveoli were seen under a strong direct light with a magnifying glass and classified under *ante* or *post mortem* tooth loss or in remodeling process. Regarding the TMJO, the Rando and Waldron (2012) recommendations were considered when recording eburnation, osteophytes, porosity, and alteration of joint contour, both in the mandibular condyle and in the articular eminence. TMJO was only diagnosed when eburnation or at least two of the last three conditions were present.

## Results

Approximately 73% (n=32) individuals and 18% (n=218) alveoli were affected by AMTL. This condition affected mostly older adult men and the lower dentition. TMJO was present in 59.1% (n=26) individuals and 34.8% (n=39) of the observable *loci*. This condition mimics the AMTL as it is more visible on old aged individuals and the lower jaw (mandibular condyle) but it differs by affecting more women than men.

## Discussion

The results obtained for this sample express an increase of TMJO over life, being the elderly adults the most affected by this condition. Similar results have already been described in other studies on historical or contemporary material (Hodges, 1991; Sheridan et al., 1990). The increase in TMJO may reflect inability to compensate the masticatory stress imposed by the absence of teeth that were lost *ante mortem*. This conclusion is partly supported by the confrontation between AMTL and TMJO patterns which are equally expressed in the frequency by age and by maxilla. In this sample, the AMTL was particularly associated to the occurrence of dental caries and periodontal disease, which could be indirectly responsible for the rates of TMJO (Carvalho, 2013). In turn, dental wear was not severe (Carvalho and Wasterlain, 2017) so that it hardly explains the frequencies of TMJO found (Richards, 1990).

## Conclusion

The present data suggest that the oral pathologies at the origin of the AMTL may be indirectly related to the later emergence of TMJO and may have had a negative impact in the quality of the chewing process of this medieval population. It is worthwhile highlighting that TMJO may affect the quality of life of the individuals by causing discomfort, pain, and by creating difficulties in the function of the maxillofacial system (Soames and Southam, 2005). Therefore, and given that oral health ends up reflecting much of the lifestyle of the individuals and of the societies to which they belong, the relationship between TMJO and other oral pathologies should be further investigated in the future.

In sum, this study highlights the need to investigate the interrelation between distinct oral conditions which is particularly clear when we look at the biomechanical aspects of the masticatory process and to the degree of completeness of the dentition.

## References

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Figure 1. AMTL by individual (%)

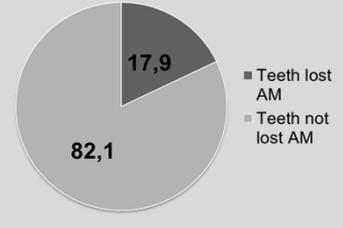


Figure 2. AMTL by alveoli (%)

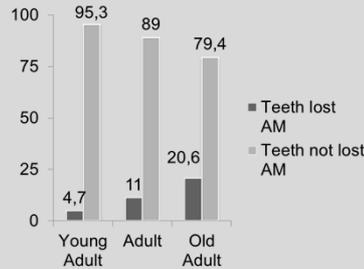


Figure 3. AMTL by alveoli and by age at death (%)

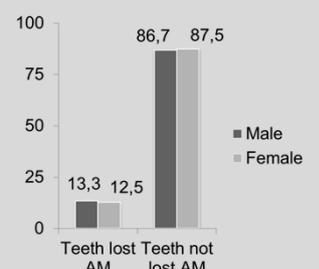


Figure 4. AMTL by alveoli and by sex (%)

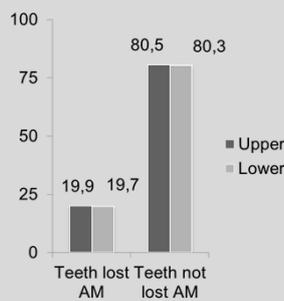


Figure 5. AMTL by alveoli and by maxilla (%)

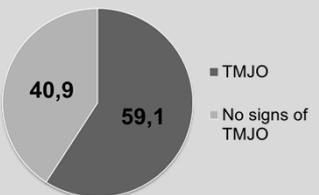


Figure 6. TMJO by individual (%)

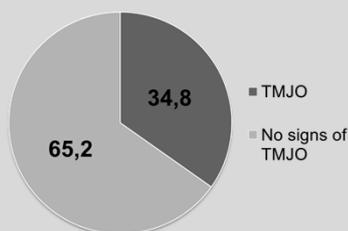


Figure 7. TMJO by loci (%)

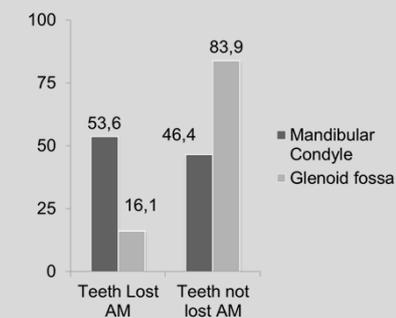


Figure 8. TMJO by maxilla (%)

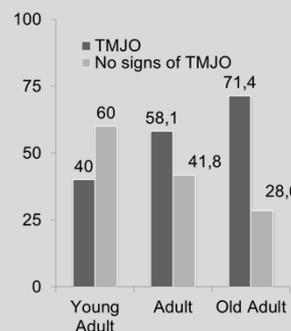


Figure 9. TMJO by age at death (%)

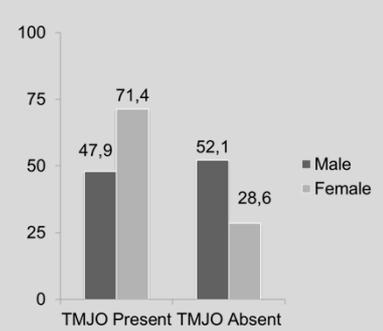


Figure 10. TMJO by sex (%)

## Acknowledgments

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