Childhood stress in medieval Portugal: Dental Enamel Hypoplasia in a sample from Coimbra and possible aetiologies

Liliana Matias de Carvalho¹ and Sofia N. Wasterlain²

¹Centro de Investigación em Antropologia e Saúde, Departamento de Life Sciences, University of Coimbra (liliana_m_carvalho@yahoo.com.br)
²Centro de Investigación em Antropologia e Saúde, Departamento de Life Sciences, University of Coimbra (sofiawas@antrop.uc.pt)

Introduction

Dental enamel hypoplasia (DEH) is a defect affecting the enamel (usually the bucal or labial surfaces) occurring when there is an interruption or disturbance over a band of ameloblasts in the developmental phase of the dental crown (Goodman and Arriaga, 1986). It records the physiological stress that occurred between the 5th month of intrauterine life and 12/15 years of age. There are several causes and sometimes they can relate to each other, diet, disease, allergic or metabolic and hormonal factors (Hillson, 2005). Usually the anterior dentition (especially the upper central incisors and the lower canines) is more hypoplastic than the posterior (Lukacs, 1989).

Objectives

1) To know the expression of DEH in a medieval Portuguese sample and what their possible causes are.
2) To understand the frequency of DEH by sex and age group.
3) To realize what types of defects and which locations are more common.

Material and Methods

Sample

We have studied 58 adult individuals (28 males, 20 females, 10 of unknown sex) divided into three age classes (young adults, adults and old adults) from the medieval site of São João de Almedina (12th-14th 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

Since this study was part of a larger investigation on medieval dental pathology, Hillson (2005) recommendations were followed. All present teeth were observed under a strong direct light with the help of a magnifying glass. Localized horizontal enamel depressions on the labial surface of the teeth were classified as one of the three types of hypoplasia (groove, pit or plane). The location of each defect (cervical, contact region or occlusal) was also recorded. The data regarding the age of the defects' formation were assessed by Cunha (1994).

Results

Thirty four individuals (58.6 %) and 180 (33%) teeth were affected by DEH. Grooves were the most common type of defect (31.4%, n 171), involving mostly the cervical crown (23%, n 122). Canines (53.2 %, n 41) and premolars (16.4%, n 48; 16.4%, n 22) were the most affected teeth. Groove defects occurred more often on upper teeth (36.3%, n 73), women (37.6%, n 58) and some adults (38.6%, n 45).

Discussion

DEH affect about 58.6 % of the individuals and 33% of the observed teeth. There is an average of 5.4 defects per individual. It can be said that more than half of the analysed sample – a middle class group – has suffered some period of stress during childhood or adolescence. The majority of the individuals (58.6%) with this condition had more than one tooth affected and most of the defects were located in the cervical region (23%). The most common defect was the groove. The defect type pit was rare and no plane defect was found. The groove type defects reached 16.4% of the observed teeth and the canine is the more affected tooth (53.2%). By opposition, the least affected teeth were the molars. These seem to be an inverse relationship with age, i.e. the number of defects decreases as the age group increases, which can be related to the action of wear which eliminates the dental crown and together the traces of the stress episodes. In the Coimbra sample women were more affected by DEH. This could be related to a greater vulnerability of females, differential parenting, or diet in comparison to the boys. Boys could also have had more physically-demanding activities (carrying away loads from crops, help lifting objects, be apprentices) and therefore receiving a more substantial diet than girls, who usually stayed at home to help their mothers in small tasks (Oliveira, 2010). The fact came to the DEH could be wearing children without them to be physiologically prepared or with no suitable replacement diet. Such practices probably would result in malnutrition. The replacement foods in medieval times - flour poedge, semi-liquid foods at first – mashed bread crumbs, honey, milk and a little wine in a second moment – were not satisfactory. The breast milk itself, or sheep’s milk could also create multiple intestinal or nutrient absorption problems (Oliveira, 2010). All these replacement practices are mentioned in the Portuguese medieval literature. Apart from the diet itself, a non-consolidated dentition could also have made it difficult to chew more solid foods (Oliveira, 2010). Cunha (1994), who has studied the same skeletal material, found that in 53.3% of the individuals with DEH the physiological stress had occurred between 4 and 6.5 years of age. This could mean a late weaning or another stress cause, continuous nutritional needs, disease or lack of hygiene. This could also contribute to the invisibility of children in the Portuguese medieval society.

Conclusions

More than half of the analyzed sample was affected by hypoplasia revealing episodes of stress occurring during childhood. A decrease in groove type defects was observed with age; maybe because of the increasing wear rates. There was a tendency to find that the anterior hypoplastic teeth in the population in this period were much more the buccal surface of the canine. Data suggests a slightly different diet between the sexes: Children may have undergone nutritional difficulties (perhaps around the time of weaning) but it is difficult to give a direct conclusion about the causes and epidemiological material. The results should be, to the possible extent, confronted with historical data.

Acknowledgments

This work was financed by national funds by FCT – Fundação para a Ciência e Tecnologia, under the project with the reference UID/ANT/00283/2013.

References


