

## Mini Review

# Age Estimation of Unaccompanied Minors: A Portuguese Overview

Cristiana Palmela Pereira<sup>1,4,5\*</sup>, Catarina Pereira Escobar<sup>2</sup> and Jorge Costa Santos<sup>3,4</sup>

<sup>1</sup>Assistant Professor at the Dental Faculty, University of Lisbon, Scientific Consultant of Forensic Dentistry, South Branch of the Portuguese National Institute of Legal Medicine and Forensic Science, Portugal

<sup>2</sup>Trainee Lawyer at GAP Lawyers, Master Student at the ISCTE-IUL, Portugal

<sup>3</sup>Professor at the Faculty of Medicine, University of Lisbon, Director of the Forensic Clinical and Pathology Department at the South Branch of the Portuguese National Institute of Legal Medicine and Forensic Sciences, Portugal

<sup>4</sup>Researchers at the CENCIFOR, Centre for Forensic Sciences, Portugal

<sup>5</sup>Researcher at the Centre of Statistics and Applications of University of Lisbon (CEAUL), Portugal

**\*Corresponding author**

Cristiana Palmela Pereira, Assistant Professor at the Dental Faculty, University of Lisbon, Scientific Consultant of Forensic Dentistry, South Branch of the Portuguese National Institute of Legal Medicine and Forensic Science, Researchers at the CENCIFOR, Centre for Forensic Sciences, Researcher at the Centre of Statistics and Applications of University of Lisbon (CEAUL), Portugal, Email: cristiana.pereira@fmd.ul.pt

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**Abstract**

In the past decade there has been a considerable increase in the number of unaccompanied asylum seeking children, many of whom appeared to be older than their given age. Dental age assessment has been included as part of the asylum seeking process in Portugal since the Law n.º 27/2008 dated 30 June (the "Asylum Law"). The legal framework of the forensic examination is based in biomedical ethics. The aim is to find the frequency of unaccompanied asylum seeking children with dental evidence of being older 18 years during the period between 2009 and 2013. In this period age estimations have been performed on 82 unaccompanied asylum seeking children whose given ages were queried by the Aliens and Bored Service – SEF, to the South Branch of National Institute of Legal Medicine and Forensic Sciences from Portugal. The dental development was studied on ortopantomographic radiographs and the developing teeth staged from the tables according to Liversidge (2008), Mincer et al. (1993), Kullman et al. (1992) and Haavikko (1970). If the dental development was complete, the dental age was estimated from Kvaal et al. (1995). The majority of the unaccompanied asylum seeking children claimed to come from Guinea Conakry, Nigeria, Guinea Bissau, Syria, Congo, Morocco and other African countries and non-African countries. There was no statistical significant difference between sexes. The majority gave the age as being 14 or 15 years (70%). Forty percent were found to be 18 years or older by the dental methods. Fifty percent were in need of dental treatment.

**INTRODUCTION**

Age generally refers to a period of existence and is generally used in the context of the length of time a person has lived. The term chronological age is frequently employed to differentiate from skeletal age which indicate the stage of the skeletal maturation or from dental age which indicate the stage of dental development [1]. The changes which occur in skeletal and dental tissues in the course of time are indications of the biological development of the individual. In forensic work this development is measured as an indicator of age, biological age, but may differ from the chronological age [2]. The earliest known record of changes in teeth being used as an indicator of biological age originates from

England in the early 19<sup>th</sup> century. At this time seven years of age was the limit for criminal responsibility, but without a register of births the child's age could on occasion be disputed [3]. In 1836 Thomson who was one of the pioneers of medical jurisprudence, stated "It is at this period that the third molar tooth...appears... you can have no hesitation in affirming that the culprit has not passed his seventh year". By the third molar he meant the first permanent molar erupting after the two deciduous molars. Early English social legislation provided that no child under nine years of age should be employed in cotton, woollen and flax mills and that children under thirteen years should not work more than nine hours a day [4]. In 1837 Saunders, who became a leading dentist, laid before the parliament a pamphlet, "The Teeth a Test

of Age, Considered with reference to Factory children” in which he points out the value of the dentitions for assessment of age [5]. Beside the physiological process of dental mineralization and dental eruption, one of the first observations of changes with age in the permanent dentition was made by Wedl, who in 1872 described fatty degeneration, calcification, colloid deposits, netlike atrophy and pigments deposits in the pulp cavity due to continued deposits of new dentine layers [6]. After this historic mark in dental age estimation, several different tables and diagrams have been presented to the present. In 1933 Logan and Kronfeld made a schedule “Chronology of the Human Dentition” employing both radiographic and histological techniques [7]. Shour and Massler’s table “Chronology of Growth of Human Teeth” from 1941 is modified from Logan and Kronfeld [7]. This table has been widely reprinted in textbooks and articles and is still in frequent use [8]. Since then several studies have been carried out both longitudinal and cross-sectional on dental radiographs of children [9-12]. The last improvement was done by the Atlas of London [13-15]. After the last tooth, the third molar, finalizes the process of eruption, the age estimation is based on age-related changes in the teeth. The first systematic and statistical approach to the use of age-related change in the adult teeth as a method of age estimation was made by Gustafson in 1950. After studying ground sections of adult human teeth he designed diagrams for scoring six age-related regressive changes. In forensic work Gustafson’s method age estimation is the best known and most commonly referred to [9]. The method has been improved by Johanson in 1971 [3] and Maples in 1978 [5]. The increase in length of apical translucency is one of these regressive changes and age can be estimated from this single feature, used for the first time by Bang and Ramm in 1970 [2]. This is a simple method and easy to perform on single-rooted teeth intact or sectioned. Most of these changes can be assessed on extracted teeth but in living persons the changes can only be observed by a clinical examination or measured on dental radiograph. This was a limitation factor for age estimation of living adult person and a consequence for the improvement of other indirect methods for age estimation in adults. One of the indirect radiographic methods for age estimation in adults is from Kvaal *et al.* and is used in presented [16].

### The Legal Framework of age Estimation of Unaccompanied Asylum Seeking Children in Portugal

Since the application of Law n. º 27/2008 dated 30 June (the “Asylum Law”) (\*1) and with the increased number of unaccompanied minors applied for asylum the forensic clinical examination for age estimation queried by the Aliens and Border Service – SEF (\*2). In 2012, 230 people applied for asylum in Portugal and in the last quarter trimester of 2013 the number increase near the total of 2012 with 190 people applied for asylum in Portugal (\*3). Some of these are children travelling on their own without or with poorly documented. Under the EU directive, “unaccompanied minors” refers to third country national or stateless persons below the age of age 18 who arrive in the territory of the member states unaccompanied by an adult responsible for them whether by law or custom, and for as long as they are not effectively taken into the care of such person, or minors who are left unaccompanied after they have entered the territory of the member states [17-20].

The unaccompanied minors are a vulnerable group who need protection and therefore special provisions are made by the government of the first EU country they enter and apply for asylum, such as appointing a legal guardian who is legal responsible for the care and well-being of the minor. According to the directives of the EU all individuals claim minority of age, have the fundamental children rights to protection, health care and education stated in UN convention of Children’s Rights [17-20]. To prevent abuse of the legal system and to protect the children many countries from EU have introduced forensic age estimation examinations in cases where the given age is questioned by the authorities [21]. Since most age estimation investigations are based on medical examination, such as performed in Portugal, the four basic principles of biomedical ethics are respect during the forensic dental examinations in living individuals, namely autonomy, beneficence, non-malevolence and justice [21,22].

(\*1) Law n. º 27/2008 dated 30 June (the “Asylum Law”). Accessible at: <https://dre.pt/application/dir/pdf1s/2008/06/12400/0400304018.pdf>

(\*2) The Organisation of Asylum and Immigration Policies in Portugal. European Migration Network, Report, Aliens and Border Service, Portugal 2008 Accessible at: <http://www.sef.pt/documentos/56/PTHowpolicieareorganized.pdf>

(\*3) European Migration Network Bulletins (2012, 2013 and 2014) Accessible at: <https://emn.gov.pl/ese/publications/european-migration-net>

### THE FORENSIC EXAMINATION OF AGE ESTIMATION OF UNACCOMPANIED ASYLUM SEEKING CHILDREN IN PORTUGAL

#### South Branch from the National Institute of Legal Medicine and Forensic Sciences from Portugal – Results from 2009 to 2013

When we have absence of international consensus concern to protocols, the age estimation should ensure respect for the principle of equity among all unaccompanied minors applying the scientific best age estimation method [21,23]. This provides the smallest difference between estimated and chronological age and mainly depends on the expertise of the forensic examiner [21,23].

Currently best age estimation methods use combinations of related age estimation methods and the age is reported together with related measure of uncertainty “Likelihood...” However, when the final estimate excludes the age, the report provides the result with “Exclude and final estimate likelihood approximately...” The final report contains all relevant facts of the age estimation including the outcomes and the interpretation of the results [1,2].

Between 2009 and 2013 age estimations have been performed on 82 unaccompanied asylum seeking children whose given ages were queried by the Aliens and Bored Service - SEF. The majority of the unaccompanied asylum seeking children claimed to come from Guinea Conakry, Nigeria, Guinea Bissau, Syria, Congo, Morocco and other African countries and non-African countries. There was no statistical significant difference between sexes. The dental development was studied on ortopantomographic

radiographs and the developing teeth staged from the tables according to Liver side [24], Kullman *et al.* [25], Mincer *et al.* [26] and Haavikko [27]. If the dental development was complete, the dental age was estimated from Kvaal *et al.* [16]. The majority gave the age as being 14 or 15 years (70%). Fifty percent were in need of dental treatment. Forty percent were found to be 18 years or older by the dental methods.

## CONCLUSIONS

At the South Branch of National Institute of Legal Medicine and Forensic Sciences from Portugal the frequency of unaccompanied asylum seeking children with dental evidence of being 18 years or older during the period between 2009 and 2013 was forty percent. The consequences of the age legal investigation are that the applicant will be treated either as an adult or will receive a protected status as a child. In this legal framework there is a need for further international discussions in order to obtain a protocol for uniform ethically acceptable age estimations procedures.

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