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New Technique To Determine The Age Of Immigrant Minors Through Ribs And Teeth

ScienceDaily (Nov. 7, 2007) — University of Granada (UGR) researchers at the Laboratory of Anthropology have devised a new technique to determine the age of living subjects using chest and dental x-rays. This is of special interest in the case of alleged illegal minors, since this technique will make it possible to determine the age of an individual by analysing the x-rays of their bones, when used in legal medicine.

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For the study, UGR researchers conducted a comprehensive analysis of 123 digital postero-anterior chest x-rays and 742 digital orthopantomographies, using the "Image J" computer programme, which analyzes digital x-rays.

In radiology, what is the maturation rate of specific anatomical bone structures? The research carried out at the UGR aimed at answering this question. "In this particular case we have focused on the hyoid bone, the proximal clavicular epiphysis, the costal cartilage of the first rib, degenerative parameters of clavicle joints, certain abnormalities of the clavicle (conoid tubercle and the floor of the fourth ventricle) and cortical calvicular indicators," stated Pedro Manuel Garamendi González. The study was carried out by Dr. Pedro Manuel Garamendi González and directed by professors Miguel Botella López, and Inmaculada Alemán Aguilera.

Better than other techniques

The results of the project are of great interest for the legal medical practice, since they show the relative limits of current methods, nonetheless widely used and acknowledged by international study groups, such as the AGFAD (German group on age diagnostics). For instance, the fusion of the proximal epiphysis of the clavicle to diagnose ages of up to 21 years or the fusion of the greater horn of the hyoid to determine ages over 30 years are some of the methods applied by professionals.

The conclusions of the research carried out by the UGR suggest that it is impossible to establish the age of a subject by solely looking at the greater horn of the hyoid bone because it may or may not be fused (as part of the normal ageing process). When dealing with autopsy cases of strangulation and hanging (where hyoid bone fractures are likely to appear), it is advisable to always carry out a cervical x-ray in order to avoid errors in the differential diagnosis with pre-mortem and post-mortem fractures and non-fusion states.

More criteria for diagnosis

In the diagnosis of age in living subjects, the project considers new criteria with a sound scientific base and legal certainty. For instance, the use of the costal cartilage of the first rib has been suggested as a key factor in determining the age of individuals over 21 years.

The study opens the door to new research lines on age diagnosis based on the analysis of both the acromioclavicular and sternoclavicular joints using more appropriate image techniques.

A general assessment of the research parameters shows that, due to their technical features, the use of digital x-rays is not the most adequate method to be applied in Anthropologic research which will be based on metric measures. "Nevertheless, digital x-rays are appropriate for determining osteologic features of important bone areas in x-ray studies within the field of Physical Anthropology," conclude the authors of the study.

Some of the research results have already been published in the magazine Notes on Forensic Medicine.

Adapted from materials provided by [Universidad de Granada](#).

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