Background: many papers investigate the role of the cranial base in facial development, but the results are not in agreement. This can be due to a difference between the central and lateral parts of the cranial base. The aim of the present study is to evaluate the relationship between the central and the lateral cranial base and the facial skeleton in pre-pubertal peak subjects and at the end of growth. Material/Methods: a total sample of 52 latero-lateral cranial teleradiographs were analyzed. To test the correlation between structures, the “Partial Least Square” analysis was performed. Geometric morphometric analysis were applied and partial least square analysis was used to test correlation. Integration was studied removing the effect of allometry. Results: facial skeleton has no significant relation with central cranial base. Facial skeleton has significant relationships with the lateral portion of the cranial base. This relationship is higher in the post-peak phase of growth.

Conclusion: the Integration between facial structures and cranial base is significant. The Spatial orientation and shape of the facial structures are both influenced by cranial base. This is mainly due to the lateral portion of cranial base.

The age of a living subject can be determined by applying a number of different methods. The most utilized are skeletal and dental methods, most of which are based on X-rays examinations. According to the clinically estimated age of the subject, a particular set of methods is selected. Some methods could be employed only when evaluating a restricted age span, while other methods have a different degree of precision according to the different age of the analyzed subject. Furthermore, each method is characterized by a different degree of accuracy, i.e., the difference between estimated dental age (DA) and chronological age (CA), reliability, which is defined as its ability to produce stable and consistent results when the same subject is evaluated by different evaluators, and invasiveness. For these reasons, sometimes different methods are normally combined, in order to obtain a more accurate age estimation.

Age estimation is a relevant issue in different public health situations, especially when dealing with young subjects because of the important consequences at the juridical level related with different particular turning-point age, which could vary according to different national legislations. For example, in the recent years, refugee, asylum seeker, and migrant flow towards the Mediterranean Sea and Eastern European countries increased the need for a standardized, reliable and sustainable—in terms of time, instrumentations needed, and costs—method for age estimation over or under the limit of 18 years. Being an adult entails important implication in determining the administrative procedures to be followed, in particular with economic migrants. Another common issue is related with young criminals, who could not be considered imputable or could go to a juvenile instead of an adult detention center, according to their particular age and depending on the legislation of the country where the crime is perpetrated.

Dental age estimation methods utilized with young subjects are fundamentally based on the analysis of teeth anatomy, evaluated by means of pre-defined stages or with special algorithms specifically ideated for this aim. Teeth maturation is frequently studied using panoramic X-rays that allow the simultaneous visualization of all teeth, despite not erupted yet, with their respective roots, if already formed. One limitation of this radiologic technique is the image deformation that occurs when a tooth is malpositioned, leading sometimes to some incertitude in the developmental stage definition or even to the impossibility to evaluate it.

Cone Beam Computed Tomography (CBCT) is a three-dimensional (3D) radiological technique recently introduced in dentistry for the study of the maxillofacial region for surgical and orthodontic reasons, especially in cases when two-dimensional (2D) radiological techniques are not able to provide enough information in order to establish a correct diagnosis. CBCT employs a reduced dose of radiations compared to the traditional Multi Slice Computed Tomography (MSCT), but higher if compared to classic 2D exams. Consequently, a careful clinical exam and a well-pondered risk-benefit assessment are necessary before opting for this kind of 3D radiological imaging.

The aim of this systematic review was to compare the accuracy and reliability of CBCT vs. Panoramic radiography in age determination, considering also ethical aspects.
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Keywords

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