

Abstract of the PhD thesis:

Research regarding tooth agenesis: prevalence, etiology and morphological aspects

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Tooth agenesis is the most common developmental dental anomaly and patients often require complex treatment. The etiology and morphological aspects related to tooth agenesis are widely studied in the international scientific literature.

The prevalence of tooth agenesis depends on the studied population. Different variances of the teeth morphology may also appear in affected subjects. It is important to study these anomalies in our region because very few data are available. Every research in this field may contribute to the early identification of these anomalies and to the elaboration of a proper treatment plan.

In the first part of the thesis, the **general chapter**, different dental anomalies are presented, followed by the presentation of data from the dental literature regarding the prevalence of tooth agenesis, the genetic background of this anomaly and the tooth dimensions and shapes present in affected patients.

The second part, the **special chapter**, refers to the personal research based on the following objectives:

- determination of the prevalence of tooth agenesis among patients from Tîrgu-Mureş;
- determination of polymorphisms that may be involved in the development of tooth agenesis;
- study of different tooth dimensions from affected subjects' dental arches using a recently developed analysing method, preceded by a fidelity study.

The results were statistically evaluated in GraphPadPrism and SPSS 22. The findings of the research were presented in the conclusions of each chapter.

The *first study* is retrospective, descriptive, including 947 dental records, which form the base for the determination of the prevalence of tooth agenesis and the different characteristics of these anomalies. The findings of this study showed a 7.39% prevalence of tooth agenesis in the studied batch, the most affected teeth being the upper lateral

incisors and the lower second premolars. The most affected region was the frontal maxilar and lateral mandibular, with a high incidence of symmetric forms.

The second study incorporated 85 subjects from which biological samples have been collected for genotypisation. This study revealed the fact that the polymorphism of the gene FGFR1 T/C is a significant risk factor for non-syndromic tooth agenesis, especially in the case of premolar agenesis. The PAX9 and MSX1 genes may be linked with different syndromes including tooth agenesis. These findings are in agreement with published international scientific data.

The reliability study showed, that the 2D image analysis system is an adequate alternative for the measurements of tooth dimensions, allowing reliable, repeatable and exact measurements, which provide a standardised image database for future studies.

In the *last study* the method of image analysing in 2D was used to evaluate different tooth dimensions from the dental arches of affected subjects. This study included 30 dental stone casts and revealed that the morphology of permanent teeth is affected in subjects with hypodontia. The modified dimensions are varying depending on tooth type. Almost all tooth dimensions of affected subjects were smaller than the tooth dimensions of healthy subjects. The 2D image analysing system made possible the measuring of new dimensions, like the perimeter and the area of the tooth from different views, which are not possible using the manual method. The teeth, showing the largest decrease of vestibular dimensions, were: upper lateral incisors, upper central incisors, upper canines and the lower central incisors. From the occlusal view, the largest decrease in dimensions was found in: the lower second premolars, upper canines, first upper premolars and the lower central incisors. In the case group there was a change in the number of supplementary cusps: the Carabelli tuberculum often disappeared or it was very reduced.

The referenced literature is relevant, including 110 references, providing data from the national and international scientific literature.

The aim of these studies was to gather new informations in addition to the recent local and worldwide data regarding the etiology of tooth agenesis and the morphology related to these anomalies, making these aspects remarkable for the clinicians.

Keywords: tooth agenesis, prevalence, tooth morphology, etiology