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## Original Article

## Prevalence of palatally impacted canines

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## ABSTRACT

**Background:** Palatally impacted canines (PICs) are among dental anomalies with different prevalence in each region. This study was designed to investigate the prevalence of palatally impacted cuspids in Portuguese population, and to evaluate the possible relationships between PIC, gender, malocclusions, facial biotype, and morphological and occlusion features.

**Methods:** A descriptive, retrospective, and cross-sectional study was conducted. The sample consisted of 1333 patients (581 males and 752 females), 12–63 years old evaluated in a period between September 2003 and December 2010. The clinical records were studied for evidence of one or both canines palatally impacted. Collected data were analyzed using chi-square tests (decision rule was  $\alpha = 0.05$ ).

**Results:** The most frequent PIC was right cuspid. Females showed higher number of PIC. The prevalence of PICs in females was found approximately 5.2%.

**Conclusions:** The prevalence of PICs in Portuguese population was 4.5% (with 95% confidence interval: [3.5%, 5.8%]). The frequency is greater of impacted cuspids in females than in males.

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## 1. Introduction

Maxillary canine is the more interesting tooth from the developmental point of view. It develops in the most concentrated portion of the maxilla and takes nearly twice as long the first permanent molar to achieve complete eruption. That makes it more susceptible to environmental influences.

Maverna and Gracco,<sup>1</sup> defined impaction by the lack of eruption of a tooth into the oral cavity within the time and physiological limits of the normal eruption process. Impacted teeth are located inside the jaw, surrounded by their coronary bag, without communicating with the oral cavity.

Impacted maxillary canines can be palatally or buccally located or in a position within the dental arch. Several authors<sup>2–4</sup> reported that the canine is located palatally to the arch in 70–85% of canine displacements. Jacoby<sup>3</sup> found that the canine is buccally impacted in 15% of cases. Palatal impaction of upper canines occurs in 1 of 100 people.<sup>5,6</sup>

Scrutiny of the literature on palatally impacted maxillary canines revealed that the prevalence rate varies between 0.8 and 3.6%.<sup>6–14</sup>

It was stated that the most commonly impacted teeth were third molars, maxillary canines, maxillary central incisors and premolars.<sup>15</sup> According to Thilander and Jakobsson<sup>6</sup> apart

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from the mandibular third molars, the most commonly impacted tooth is the permanent maxillary canine.

The etiology of tooth impactions is frequently related to an arch-length deficiency. Buccal impaction of the maxillary canine is mostly caused by insufficient arch space, but palatal impaction of this tooth can occur, even when there is adequate space, or if an extra space is available in the maxilla.

Canines can be palatally impacted and show no symptoms, but in some situations they can cause complications such as root resorption of the adjacent teeth, malpositioning of other teeth, infection cysts, tumors, pain, jaw fractures, and marginal bone resorption.<sup>16,17</sup>

The aims of this study were to investigate the prevalence and to evaluate the possible relationships between palatally impacted cuspids, gender, malocclusions, facial biotype and morphological and occlusion features in Portuguese population.

## 2. Material and methods

This research was conducted on a Caucasian population of Portuguese patients who had been treated in an individual orthodontic practice.

Complete orthodontic records, including radiographs, of 1333 patients who seek treatment for malocclusion between September 2003 and December 2010 were retrieved for this study. In the initial panoramic radiograph, all patients presented for both maxillary canines stages of development compatible with scores 9 or 10 of the Nolla<sup>18</sup> table of classification (Fig. 1).

The canine was diagnosed as being palatally impacted if it failed to erupt into the oral cavity within the time and

**Table 1 – Summary statistics of the age according to the case.**

Age	Case		
	Non-impacted	Impacted	Total
Mean	20.43	21.93	20.50
Standard deviation	9.85	9.79	9.85
Median	16.00	18.00	16.00
Maximum	63.00	57.00	63.00
Minimum	12.00	13.00	12.00
Percentile 25	13.00	15.00	14.00
Percentile 75	25.00	25.50	25.00

physiological limits of the normal eruption process and the radiographs of the tooth and surgical records confirmed the palatal position.

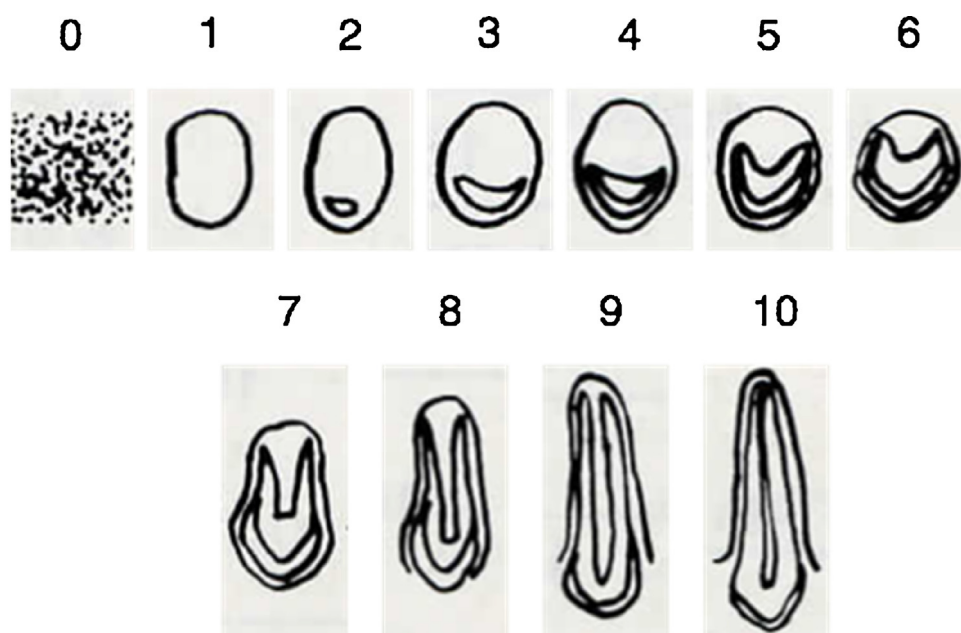
Only the patients in good general health, presenting non-syndromic craniofacial birth defects and no history of facial trauma were included.

The chronologic age of the subjects ranged from 12 to 63 years with a mean of 20.43 years (SD = 9.85 years), see Table 1 and Fig. 2.

The present study was part of research approved by the Ethics Committee of the Faculty of Dental Medicine at the University of Porto.

A data entry form was specifically prepared to record the status of impacted canines and subjects characteristics (Fig. 3).

All data were input into an Excel worksheet (version 2007; Microsoft, Redmond, Wash) and then transferred to the IBM® SPSS® Statistics Package (version 22.0; SPSS Inc., Chicago, IL).



**Fig. 1 – Nolla stages of development of the maxillary canine. Stage 0 – absence of crypt, Stage 1 – presence of crypt, Stage 2 – initial calcification, Stage 3 – 1/3rd crown completed, Stage 4 – 2/3rd crown completed, Stage 5 – crown almost completed, Stage 6 – crown completed, Stage 7 – 1/3rd root completed, Stage 8 – 2/3rd root completed, Stage 9 – root completed, apex open, Stage 10 – apical foramen closed.**

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