

## Multiple dental anomalies in the maxillary incisor region

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**Abstract:** A patient with multiple anomalies of the maxillary teeth, including shovel-shaped incisors, talon cusp, bilateral dens invaginatus and bilateral peg-shaped supernumerary incisors is reported. The patient also exhibited Carabelli's cusp on both maxillary first molars. No developmental syndrome was identified. This very unusual combination of anomalies has not been reported previously. (*J. Oral Sci.* 45, 47-50, 2003)

Key words: tooth abnormalities, dens in dente, supernumerary tooth

### Introduction

Morphological dental anomalies of the permanent teeth are relatively common. The simultaneous occurrence of multiple abnormalities involving groups of teeth or the entire dentition may be genetically determined and can be associated with specific syndromes (1,2). However, most arise sporadically and some, including shape and size, may be affected by environmental factors acting during the morphodifferentiation stage of tooth formation (3).

This report describes an unusual case of multiple dental anomalies in the maxillary anterior region associated with Carabelli's cusp on the maxillary permanent first molars.

### Case Report

A 21-year-old second-generation Japanese-Brazilian, was referred to the Bauru Dental School, University of São Paulo for a routine dental examination. His medical and dental

history was unremarkable and facial appearance was normal. Family history did not reveal any evidence for hereditary dental anomalies, his parents were edentulous and no developmental anomalies were present in his three siblings.

Intraorally the maxillary incisors had a shovel-shaped lingual surface and a grooved or 'bifid' cingulum with a prominent talon cusp on the lingual surface of the maxillary left lateral incisor (Fig. 1). The accessory cusp was well-delineated by grooves, standing away from the tooth crown and extending half of the height of the crown (true talon or type I) (4). The talon cusp neither irritated the tongue during speech and mastication nor interfered with occlusion.

Radiographs of the maxillary left lateral incisor showed the talon cusp as a typical inverted cone with enamel and dentine layers and a pulp horn extending only into the base of the cusp. In addition, bilateral dens invaginatus involving both maxillary lateral incisors was revealed (Fig. 2). The invaginations extended beyond the level of the cemento-enamel junction but were limited to the roots of the teeth, whose apices were of normal morphology. Two small conical or peg-shaped inverted supernumerary teeth lay palatal to the roots of the maxillary central incisors, and the left central incisor appeared to have a slightly shorter root than normal (Fig. 2).

The patient also exhibited a large Carabelli's cusp on both maxillary first molars (Fig. 3). None of the anomalies were associated with caries or gingivitis and there was no evidence of loss of vitality of the incisors. The anomalies are summarized in Table 1.

### Discussion

Simultaneous occurrence of multiple dental abnormalities is relatively common. Anomalies of the talon cusp, dens invaginatus, and palato-gingival groove predominantly affect the maxillary incisor region, which is also the most frequent site for supernumerary teeth. Individually, the

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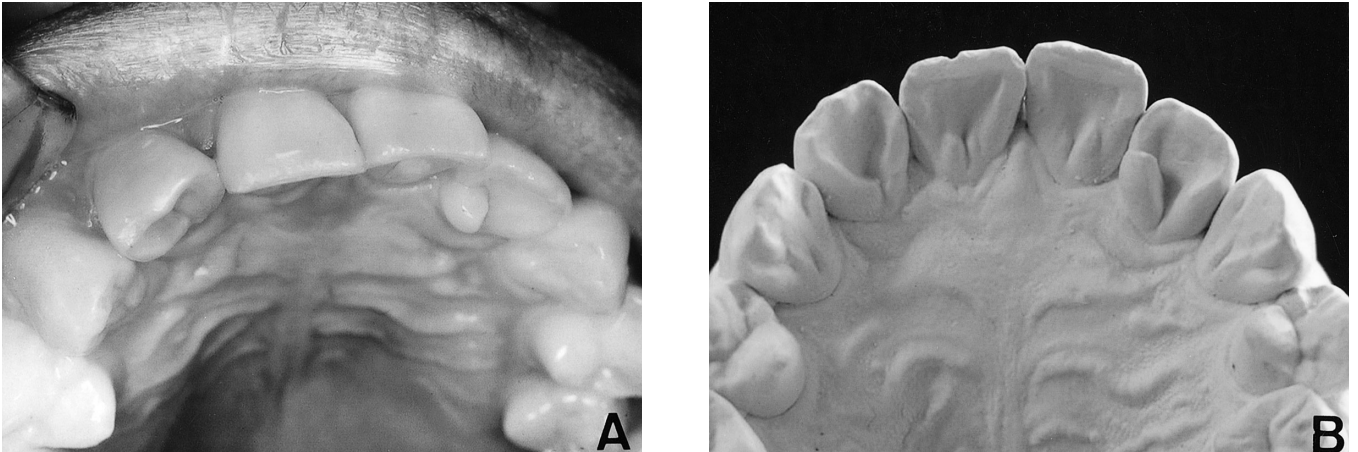


Fig. 1 Occlusal view showing shovel-shaped incisors, grooved or 'bifid' cingula and talon cusp in the maxillary left lateral incisor (A and B).

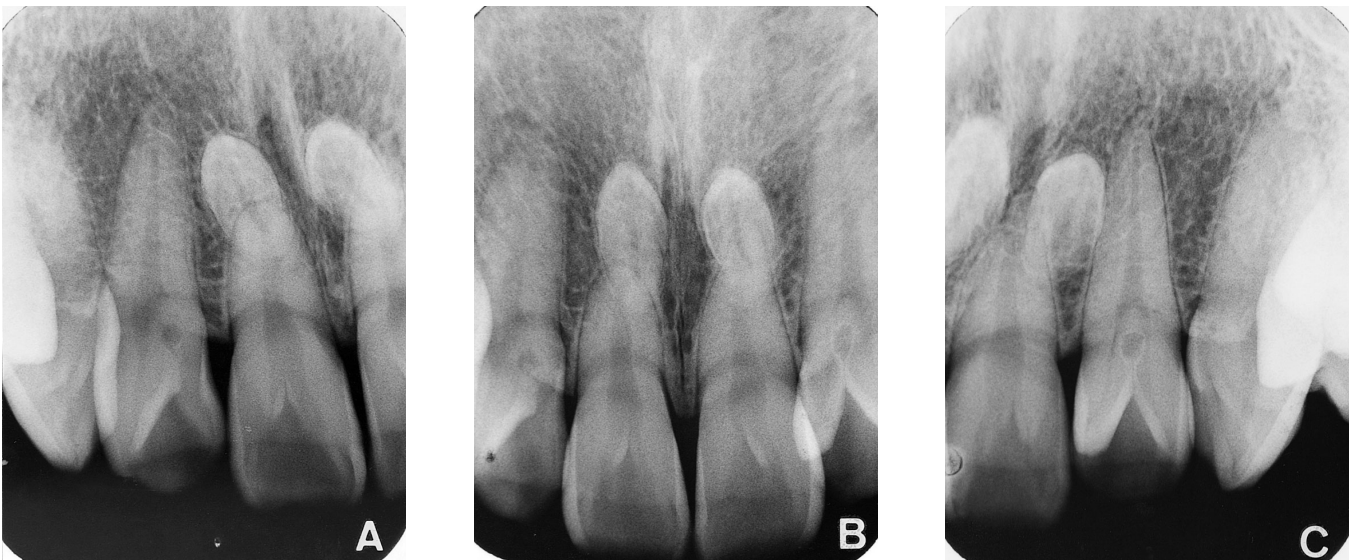


Fig. 2 Periapical radiograph of the maxillary anterior region showing dens invaginatus and shovel-shaped morphology in 12 (A), shovel-shaped central incisors, peg-shaped inverted supernumerary germ teeth (B) and 22 showing dens invaginatus and talon cusp (C).

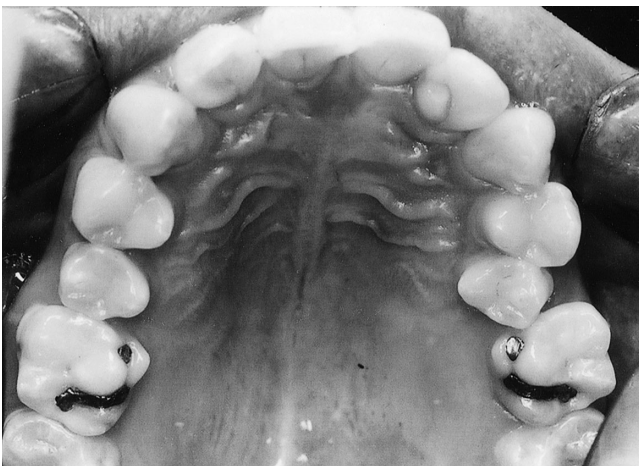


Fig. 3 Talon cusp in the maxillary left lateral incisor and Carabelli's cusp in both upper first molars.

Table 1 Dental anomalies present in the anterior maxillary region.

<i>TOOTH</i>	<i>DENTAL ANOMALIES</i>
11 and 21	Shovel-shaped, bifid cingulum
12	Shovel-shaped, dens invaginatus
22	Talon cusp, dens invaginatus
16 and 26	Carabelli's cusp
11S and 21S	Bilateral inverted conical supernumerary teeth

developmental dental abnormalities affecting lateral incisors are well characterized (2,4-8) but their cause(s) remain unknown.

It has been proposed that the relatively small lateral incisor tooth germ may be directly affected by forces generated by the tooth germs of the central incisor and canine, which develop seven months earlier (4,7,9). Localized pressure on a tooth germ during morpho-differentiation might cause buckling, with either outfolding or infolding of the dental lamina (7). However, it seems more likely that these malformations are genetically determined because they are highly reproducible in shape, show predilection for some racial groups (1) and often occur together. The genetic basis of tooth shape and size is being elucidated (10-12) and is very complex but tightly controlled. It seems likely that these anomalies will turn out to be primarily under genetic control even though not strongly heritable.

Dens invaginatus most frequently affects the permanent maxillary lateral incisors and is commonly bilateral (1,13-14). The morphology of the invagination ranges from a short pit confined to the crown to a deep invagination into the root, in severe cases extending to or beyond the root apex. The most severe forms are odontome-like and are often termed invaginated odontomes (14). While these anomalies may sometimes compromise pulp vitality they are often asymptomatic incidental findings during routine clinical or radiographic examination, as in the current case. If this condition is not recognized early, premature tooth loss may result from communication with the pulp or predisposition to caries, resulting in pulp necrosis and periapical pathosis (13). Dens invaginatus is more frequent in shovel-shaped crowns and in teeth with talon cusps or lingual tubercles (14), as seen in the present case. Shovel-shaped incisors (incisors with thick marginal ridges surrounding a deep lingual fossa) are often considered an anatomical variant rather than a morphological defect because of their high prevalence in Mongolian, Chinese and Japanese racial groups (1). Nevertheless, shovel shaped incisors with prominent cingula are associated with dens invaginatus, indicating a relationship between this milder anatomical variant and more severe malformations.

Talon cusp is an uncommon anomaly of primary and permanent upper incisors. The accessory cusp varies in size, shape, length and mode of attachment to the crown (2,15-16). Clinically, it ranges from an enlarged cingulum to a large, well-delineated cusp extending beyond the incisal edge of the tooth (2,15). The term is usually reserved for a cusp which is well delineated and half the height of the crown or more (5) and a classification system has been proposed (4).

The present case meets the criteria for talon cusp and similar associations with other anomalies have been reported occasionally: talon cusp with mesiodens (15), with odontomes (17), with dens invaginatus (2,4), with supernumerary teeth (2), with dens evaginatus of posterior teeth with palatal invagination (16), with shovel-shaped incisors (2,4,18), with congenitally missing teeth and large Carabelli's cusps (2,4,7). The presence of talon cusp and dens invaginatus in the same tooth, associated with supernumerary teeth, as here, appears extremely rare, if reported. Mader (5) and Acs, Pokala and Cozzi (18) have described concomitant talon cusp and supernumerary mesiodens but not bilateral supernumerary incisors as in the present case. A possible association between dens invaginatus and Carabelli's cusps has been reported previously (19).

Clinical management of these anomalies varies from case to case. Treatment of dens invaginatus ranges from conservative restoration of the opening to endodontic treatment or extraction. The invagination is typically lined with defective or discontinuous enamel and dentine allowing direct communication to the pulp (20). Talon cusp may cause occlusal interference and trap plaque, predisposing to caries, periodontitis and trauma to the tongue. The cusp may also be visible. Attrition may expose the central pulp horn, so that conservative management, reduction, coverage and endodontic treatment may all play a role (2,4,5,7,16). No problems affected the present case and conservative management with regular review was appropriate.

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