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Tooth size in dentitions with buccal canine ectopia

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SUMMARY Much interest has been expressed in recent years regarding various features common to dentitions with palatally displaced canines (PDC), particularly in relation to delayed dental development and reduced tooth size. The aims of the present study were to determine whether dentitions with buccally displaced canines (BDC) have features in common, which may be specific for the condition, when compared with PDC dentitions and those with normally erupting canines. Mesiodistal and buccolingual tooth dimensions were determined for 41 subjects with BDC (21 females and 20 males) aged between 11 and 15 years, who formed the experimental sample. The PDC sample was made up of 58 individuals (37 females and 21 males) and the control group comprised 40 age-matched and consecutively treated subjects (20 males and 20 females), exhibiting normally erupted and undisplaced maxillary canines.

The results revealed marked sexual dimorphism. Larger-than-average teeth were present in BDC females, whereas the teeth in BDC males were normally sized. Unilaterally affected females had smaller teeth than bilaterally affected females. Tooth size in BDC was consistently larger than in PDC subjects, although the reason was different between the sexes. In females the PDC teeth were normally sized versus large BDC teeth, whereas in the males, the PDC teeth were small and the BDC teeth normal. It is concluded that combining male and female subjects into an overall BDC group obscures important differences that exist between the two sexes.

Introduction

Although the incidence of palatal canine impaction is low (from less than 1 to 3%) (Dachi and Howell, 1961; Kramer and Williams, 1970; Grover and Lorton, 1985; Brin *et al*., 1986) it exceeds that of buccal impaction by a ratio of 2:1 or 3:1 (Nordenram and Stromberg, 1966; Fournier *et al.*, 1982). Ectopic buccal eruption of maxillary canines, on the other hand, is one of the most frequently encountered conditions in orthodontic practice. When dentitions with palatally displaced canines (PDC), erupted and unerupted, are compared with dentitions with buccally displaced canines (BDC), erupted and unerupted, the main difference between these two conditions is an altered tooth size–arch length relationship. Crowding is found in a minority of PDC cases and most of the palatally impacted canines occur when excess space is available in the dental arch (Jacoby, 1983; Zilberman *et al*., 1990; Peck *et al.*, 1996). In contrast, buccal displacement of the maxillary canines has been strongly associated with crowding (Jacoby, 1983; Becker, 1984). Jacoby (1983) reported that only 17 per cent of BDC subjects presented sufficient space for eruption in the maxilla. Oliver *et al.* (1989) found that BDC were more frequent in Orientals who also displayed more crowding, whereas PDC was more frequent among Caucasians. Since the normal eruption path of the permanent canine is slightly buccal to the line of the arch, reduced space in the canine area together with the close proximity of the adjacent teeth will prevent the canine from taking up its normal position in the arch and it will remain buccally displaced (Becker, 1998).

Another important difference relates to the timing of development of the dentition. It has recently been reported that PDC cases display an equal distribution of either late or normal, but not accelerated, dental development, whereas BDC subjects show a normal distribution of timely, early and late development of the dentition (Becker and Chaushu, 2000).

Buccally ectopic canine eruption occasionally occurs in spite of adequate space in the dental arch. This condition has been defined as 'primary tooth germ displacement' (Becker, 1998), meaning that the tooth develops in an aberrant site or with an unusual orientation, presumably due to an abnormal genetic pattern. No specific dental features of the dentition have been associated with these canines.

Whether the presence of sufficient space and a 'non-extraction' appearance of the PDC cases is due to small teeth or to large jaw size has been addressed only recently. Langberg and Peck (2000) found significant reductions in mesio-distal (M-D) measurements of the maxillary and mandibular incisors of subjects with PDC. Becker *et al*. (2002) reported reductions in bucco-lingual (B-L) and M-D tooth sizes of males with PDC, compared with male controls, whereas the teeth of females were similar in size to the female controls. The only measurement that was significantly smaller than the controls in both sexes was the B-L dimension of the maxillary lateral incisor. This was not surprising since anomalous lateral incisors have long been known to be associated with PDC (Becker *et al.*, 1981; Brin *et al.*, 1986; Baccetti, 1998).

Tooth size and dental arch dimensions are determining factors in dental crowding, but no reported attempts have so far been made to study the specific reason for the dentoalveolar disproportion (lack of space) found in the majority of subjects with BDC. Accordingly, the present study was initiated to measure the size of the maxillary teeth in BDC dentitions and to determine: (1) whether there was any difference between them and a sample of patients in whom the canine erupted normally; (2) whether there was any difference between them and a sample of patients with PDC; and (3) whether there was a difference between male and female subjects.

Materials and methods

The treatment records of 41 subjects with BDC were selected from a large number of consecutively treated cases in three orthodontic practices in Jerusalem and Tel Aviv. This experimental sample, aged between 11 and 15 years, was made up of 21 males and 20 females. The PDC group comprised 58 consecutively treated subjects, aged between 11 and 15 years and divided into 21 males and 37 females. The BDC and PDC diagnosis was made on the basis of a clinical examination and diagnostic radiographs, according to established standardized techniques (Seward, 1963; Hunter, 1981; Becker, 1998). In those cases where the canines were initially unerupted and surgical exposure was required as an integral part of their treatment, this was always performed in the presence of the orthodontist, for objective treatment reasons, and included visual confirmation of the radiographic diagnosis.

The control group comprised 40 age-matched and consecutively treated cases (20 males and 20 females), exhibiting normally erupted and undisplaced maxillary canines, as diagnosed from pre-treatment plaster casts.

Measurement of the maximum M-D and B-L widths of all the erupted maxillary permanent teeth, from the first molars forward, was performed directly on the plaster casts, to an accuracy of 0.01 mm, using a dial calliper with ground tips. Partially erupted, carious and restored teeth were excluded and measurements were not recorded where obvious calculus or plaque obscured the true contour of the tooth. Since several of the cases exhibited unerupted second premolars, both the number of subjects included in each group (NS) and the actual number of teeth measured (NT) are shown in Tables 1–4. In the control and PDC groups, teeth were measured on both sides of the dental arch and the results averaged, on the basis of previous work which showed strong right–left metric concordance between homologous human teeth of normal dentitions (Garn and Bailey, 1977) and no tooth size difference between affected (with PDC) and unaffected sides in PDC subjects (Becker *et al.*, 2002). The only exceptions were subjects in which one tooth could not be measured, in which case only the homologous tooth dimensions were recorded. In the BDC group, both sides were recorded and the affected side was compared with the unaffected side. Recordings were made for males and females separately.

Anomalies of the maxillary lateral incisor, i.e. peg-shaped and missing, were identified by direct observation in the three groups. The incisors were defined as peg-shaped using established criteria (Becker *et al.*, 1981).

The significance of differences between the mean tooth measurements in the examined groups was tested by Student's *t*-tests. Chi-squared contingency tests were used to compare the prevalence of the lateral incisor anomalies in each group.

In order to test the reproducibility of the measurements, 10 casts were randomly selected and measured on two separate occasions. Experimental error was analysed and assessed using a Student's *t*-test to determine the significance of the differences in the measurements. The experimental error was determined by calculating the standard deviation of a single parameter (Dahlberg, 1940). Measurement errors ranged from 0.08 to 0.13 mm

Table 1 Tooth dimensions in females with buccally displaced canines (BDC), compared with females with palatally displaced canines (PDC) and the control group (C).

Tooth NS		BDC NS = 20 mean ± SD	NT	PDC NS = 37 mean ± SD	NT	Control NS = 20 mean ± SD	NT	*P* BDC/C	*P* PDC/C	*P* BDC/PDC
1	M-D	8.8 ± 0.48	40	8.43 ± 0.82	73	8.22 ± 0.32	40	**<0.001**	NS	**0.05**
	B-L	6.74 ± 0.95	40	6.58 ± 0.91	73	6.8 ± 0.64	40	NS	NS	**NS**
2	M-D	6.81 ± 0.59	38	6.55 ± 0.61	70	6.42 ± 0.54	40	**<0.05**	NS	**0.05**
	B-L	5.7 ± 0.82	37	5.31 ± 0.7	70	5.82 ± 0.75	40	NS	**<0.01**	**0.05**
4	M-D	6.81 ± 0.53	38	6.64 ± 0.68	67	6.61 ± 0.37	39	NS	NS	NS
	B-L	9.04 ± 0.61	39	8.73 ± 0.65	68	8.89 ± 0.66	39	NS	NS	**<0.05**
5	M-D	6.45 ± 0.37	37	6.5 ± 0.65	65	6.34 ± 0.31	38	NS	NS	NS
	B-L	9.27 ± 0.52	38	9.2 ± 0.45	65	9.25 ± 0.52	38	NS	NS	NS
6	M-D	10.38 ± 0.54	42	10.05 ± 0.88	74	9.86 ± 0.45	40	**0.001**	NS	**<0.05**
	B-L	10.75 ± 0.75	42	10.52 ± 0.56	74	10.42 ± 0.43	40	**<0.05**	NS	NS

Mesio-distal (M-D); bucco-lingual (B-L); NS, number of subjects in each group; NT, number of teeth measured.

and the 0.1 mm weighted average standard deviation of a single determination for both M-D and B-L dimensions was not considered significant. On this basis, it was considered that the experimental error was unlikely to bias the accuracy of tooth measurement.

Results

Bilateral occurrence of BDC was present in 35 per cent of the BDC females and 75 per cent of the males. Tables 1 and 2 show the mean M-D and B-L tooth measurements in subjects with BDC, PDC and normally erupting canines, according to sex. Tables 3 and 4 compare M-D and B-L dimensions of the central and lateral incisors in unilateral and bilateral BDC cases.

Mesiodistal measurements

1. In unilateral BDC cases, measurement of the M-D width of the central and lateral incisors yielded

Table 2 Tooth dimensions in males with buccally displaced canines (BDC), compared with females with palatally displaced canines (PDC) and the control group (C).

Tooth NS		BDC NS = 21 mean ± SD	NT	PDC NS = 21 mean ± SD	NT	Control NS = 20 mean ± SD	NT	*P* BDC/C	*P* PDC/C	*P* BDC/PDC
1	M-D	8.9 ± 0.55	42	8.42 ± 0.78	42	8.69 ± 0.47	40	NS	NS	**<0.05**
	B-L	6.57 ± 0.72	42	6.41 ± 0.65	42	6.85 ± 0.54	40	NS	**<0.05**	NS
2	M-D	6.83 ± 0.73	39	6.5 ± 1	40	6.75 ± 0.38	40	NS	NS	**0.05**
	B-L	5.66 ± 0.8	39	5.32 ± 0.62	40	5.88 ± 0.68	40	NS	**<0.01**	**0.06**
4	M-D	6.98 ± 0.64	41	6.57 ± 0.51	38	7.06 ± 0.52	40	NS	**<0.01**	**<0.05**
	B-L	9.11 ± 0.8	40	8.76 ± 0.69	38	9.39 ± 0.59	40	NS	**<0.01**	**0.05**
5	M-D	6.58 ± 0.59	37	6.42 ± 0.52	35	6.64 ± 0.58	39	NS	NS	NS
	B-L	9.44 ± 0.59	37	8.99 ± 0.65	34	9.54 ± 0.8	39	NS	**<0.01**	**<0.05**
6	M-D	10.44 ± 0.44	42	10.13 ± 0.73	42	10.58 ± 0.81	40	NS	**<0.05**	**0.05**
	B-L	11.16 ± 0.61	42	10.63 ± 0.54	42	10.93 ± 0.57	40	NS	**<0.05**	**<0.001**

Mesio-distal (M-D); bucco-lingual (B-L); NS, number of subjects in each group; NT, number of teeth measured.

Table 3 Tooth dimensions in females with buccally displaced canines (BDC), total (T), unilateral (U), or bilateral (B), compared with the control group (C).

Tooth NS		BDC-T NS = 20 mean ± SD	NT	Unilateral NS = 13 mean ± SD	NT	Bilateral NS = 7 mean ± SD	NT	Controls NS = 20 mean ± SD	NT	*P* U/C	*P* B/C	*P* U/B
1	M-D	8.8 ± 0.48	40	8.68 ± 0.3	26	9.04 ± 0. 6	14	8.22 ± 0.32	40	**<0.01**	**<0.001**	NS
	B-L	6.74 ± 0.95	40	6.59 ± 0.7	26	7.01 ± 0.8	14	6.8 ± 0.64	40	NS	NS	NS
2	M-D	6.79 ± 0.59	38	6.6 ± 0.3	24	7.22 ± 0.7	13	6.42 ± 0.54	40	NS	**<0.01**	**<0.01**
	B-L	5.7 ± 0.82	37	5.5 ± 0.6	22	6 ± 0.52	14	5.82 ± 0.75	40	NS	NS	**<0.05**

Mesio-distal (M-D); bucco-lingual (B-L); NS, number of subjects in each group; NT, number of teeth measured.

Table 4 Tooth dimensions in males with buccally displaced canines (BDC), total (T), unilateral (U), or bilateral (B), compared with the control group (C).

Tooth NS		BDC-T NS = 21 mean ± SD	NT	Unilateral NS = 6 mean ± SD	NT	Bilateral NS = 15 mean ± SD	NT	Controls NS = 20 mean ± SD	NT	*P* U/C	*P* B/C	*P* U/B
1	M-D	8.9 ± 0.55	42	8.97 ± 0.7	12	8.87 ± 0.47	30	8.69 ± 0.47	40	NS	NS	NS
	B-L	6.57 ± 0.72	42	6.84 ± 0.65	12	6.45 ± 0.54	30	6.85 ± 0.54	40	NS	NS	NS
2	M-D	6.83 ± 0.73	39	6.96 ± 0.7	11	6.77 ± 0.6	28	6.75 ± 0.38	40	NS	NS	NS
	B-L	5.66 ± 0.8	39	6 ± 0.7	11	5.5 ± 0.7	28	5.88 ± 0.68	40	NS	NS	**<0.05**

Mesio-distal (M-D); bucco-lingual (B-L); NS, number of subjects in each group; NT, number of teeth measured.

similar results for the affected (BDC) and unaffected side for both males (8.9 ± 0.7 and 7.05 ± 0.6 versus 9.03 ± 0.8 and 6.88 ± 0.7, respectively) and females (8.7 ± 0.39 and 6.68 ± 0.38 versus 8.65 ± 0.38 and 6.42 ± 0.44 mm, respectively). Accordingly, these were combined for further comparisons.

2. BDC females had larger teeth than the female controls (Table 1). The discrepancy was statistically significant for the central and lateral incisors and the first molars, whereas in the premolar region a trend towards larger M-D width was observed, although the differences were less pronounced and were not statistically significant. In contrast, the differences in mean M-D tooth width of males with BDC and the male control group did not reach statistical significance (Table 2).
3. For females, with bilateral BDC the incisors were significantly larger than those in the female controls. The M-D width of teeth in subjects with bilateral BDC was also larger than the M-D width with unilateral BDC, although statistical significance was reached only for the lateral incisors ($P < 0.01$) (Table 3). Accordingly, only the measurements of the incisors are presented. In BDC males, tooth measurements in bilateral and unilateral cases were found to be similar (Table 4).
4. The mean M-D width of teeth in both males and females with BDC was larger than in the PDC sex-matched groups. These differences were significant for all teeth examined, except the second premolar in both sexes and the first premolar in females.

Bucco-lingual measurements

1. In unilateral female BDC cases, B-L widths of the central and lateral incisors were similar for the affected side (with the ectopic canine) and the unaffected side (6.5 ± 1 and 5.36 ± 0.9 mm versus 6.69 ± 0.9 and 5.7 ± 0.7 mm, respectively). The same was true for male BDC cases (7 ± 0.8 and 6.44 ± 0.5 versus 7 ± 0.8 and 6.2 ± 0.6 mm, respectively). Accordingly, the B-L width of the affected and unaffected sizes in unilateral cases was combined for further comparisons.
2. The mean B-L width of all maxillary teeth in BDC males and females was notably similar to that of their sex-matched controls (except the first molar in females) (Tables 1 and 2).
3. In females, the B-L tooth width in bilaterally affected BDC was larger than among the unilaterally affected (Table 3). The lateral incisor in unilateral cases was smaller than in the female controls, although not statistically significant. In contrast, the bilateral male BDC cases showed similar B-L dimensions to their unilateral counterparts and with the controls (except for the lateral incisor that was smaller in the bilateral than unilateral BDC cases) (Table 4).
4. In males, most teeth showed a significantly smaller B-L width in PDC subjects than in those with BDC. The only teeth that showed a statistically significant difference in the BDC versus PDC females were the lateral incisors and first premolars. This was the result of the significant reduction in B-L width of the lateral incisor in the PDC group, and of aggregating the marginally non-significant enlargement of the premolar in the BDC group with its slight reduction in the PDC group.

Anomalous lateral incisors

Taking the total male/female BDC sample together, peg-shaped and missing lateral incisors were five times more frequent in the BDC group than in the controls (Table 5), although the difference was not statistically significant due to the small numbers. This difference was principally attributable to the increase in the prevalence of peg-shaped teeth in the BDC group (four cases) versus the controls. The increased, but nevertheless small, number of peg-shaped teeth in BDC cases may be attributed almost exclusively to their more frequent appearance in males (Table 6). The difference between the prevalence of a lateral incisor anomaly in the BDC and PDC male groups did not reach statistical significance, also due to the small numbers. This is notwithstanding the difference between the PDC group and the controls, which was highly statistically significant, as has been reported in earlier studies (Becker

Table 5 The prevalence of anomalous lateral incisors in the buccally displaced canine (BDC) sample, versus the palatally displaced canines (PDC) and the controls (females and males together).

Type of anomaly	Total PDC n = 116		BDC n = 82		Controls n = 80		P PDC/C	P BDC/C	P PDC/BDC
Peg-shaped	17	14.6%	4	4.8%	1	1.2%	<0.05	NS	NS
Missing	4	3.5%	1	1.2%	0	0	NS	NS	NS
Total	21	18.1%	5	6%	1	1.2%	0.01	NS	NS

n, number of arch sides examined.

Table 6 The prevalence of anomalous lateral incisors in the buccally displaced canine (BDC) males, versus the palatally displaced canine (PDC) males and the controls.

Type of anomaly	Total PDC $n = 42$		BDC $n = 42$		Controls $n = 80$		*P* PDC/C	*P* BDC/C	*P* PDC/BDC
Peg-shaped	7	16.6%	3	7.1	1	1.2%	<0.05	NS	NS
Missing	3	7.1%	1	2.4	0	0	NS	NS	NS
Total	10	23.8%	4	9.5	1	1.2%	0.001	NS	NS

n, number of arch sides examined.

et al., 1981; Brin *et al.*, 1986; Mossey *et al.*, 1994; Peck *et al.*, 1996).

Discussion

In earlier work regarding canine impaction, the use of the terms 'large' and 'small' teeth has been based on clinical observation and on the presence of dental crowding and dental spacing (Jacoby, 1983; Becker, 1984; Zilberman *et al.*, 1990), rather than quantitative measurement. Actual tooth measurements in dentitions with PDC have been reported only recently (Langberg and Peck, 2000; Becker *et al.*, 2002). To our knowledge, no biometric study has compared tooth size in BDC cases versus normal controls. The biometric findings of the present study show that BDC in females is associated with significantly larger M-D width of the maxillary incisors and first molars, whereas the premolar size is more akin to the female controls. Calcification of the crowns of the upper incisors and first molars is completed at 4–5 years (Scott and Symons, 1974), and these are also the first permanent teeth to erupt in the upper arch. Essentially, arch length is only determined following their eruption. The distal surface of the primary second molar limits the mesial migration of the first molar and determines its final anteroposterior position in the primary dentition. Similarly, the mesial surface of the primary canine on each side determines the amount of space available for the incisor teeth. Should this space be insufficient, the incisors will be crowded. The space available for the canine and premolars is guarded by the continued presence of their primary predecessors and not usually affected by the eruption of either the first permanent molar or the permanent incisors, until the primary teeth are exfoliated. Among the maxillary teeth mesial to the first molar, in the most common sequence of eruption, the permanent canine is the last to erupt, at a point in time after the permanent lateral incisor and first premolar have found their place in the dental arch. Should the dental arch be crowded, therefore, it is the canine that will be displaced, typically into a buccally ectopic position.

The present findings show that, among females, bilateral BDC cases had larger incisors than unilateral cases (statistical significance reached for the upper lateral incisors only). It follows that bilaterally occurring BDC in females is associated with a more severe degree of crowding and significantly larger teeth, whereas a unilateral canine erupts ectopically when there is less severe general crowding, and it may be aetiologically associated with a localized loss of space.

In contrast to females, tooth sizes in males with BDC were similar to the male controls. Also, bilateral BDC cases in males presented similar incisor widths in comparison with unilateral BDC males.

Typical of the findings in random population samples (Horowitz *et al.*, 1958; Goose, 1967; Alvesalo, 1971; Garn *et al.*, 1971), males in the present control group displayed larger teeth than those of the female control group. For BDC cases in the present study (Tables 1 and 2), however, M-D tooth size figures were remarkably similar between the sexes and were close in size to the male controls.

On the basis of these results, it appears that tooth size may be a more critical factor in BDC among females, particularly in cases with bilateral occurrence, whereas arch length may be more crucial among males.

Langberg and Peck (2000) have shown that the upper central and lateral and the lower lateral incisors are smaller in PDC cases than in controls. In a recent study of tooth size dimensions in a group of 58 PDC cases it was reported that significant B-L tooth size reductions were present in all maxillary teeth in PDC males compared with the male controls, whereas most of the teeth in PDC females were similar in size to the female controls (Becker *et al.*, 2002). The only tooth that showed significant reduction in B-L dimensions in both sexes was the upper lateral incisor. When tooth size in the present BDC sample was compared with the previously studied PDC group, significant differences were observed. The M-D tooth dimensions in BDC subjects were larger than in PDC cases, particularly for the incisors and first molars. Differences in the premolar region did not reach statistical significance, except for the first premolar in males only. In females this discrepancy was the result of the larger teeth in the BDC cases and normal-sized teeth in the PDC cases. In males, this discrepancy was due to the presence of smaller teeth in the PDC cases versus normally sized teeth in the BDC cases.

In the B-L plane, there was no difference in the size of the teeth in the dentitions of females in the BDC and PDC groups, except for the lateral incisors that were significantly smaller in the PDC group. In contrast, all teeth of males with PDC presented significantly smaller dimensions than those with BDC.

The following observations are considered appropriate to the comparison of specific morphological characteristics of BDC dentitions to those exhibiting normally erupting canines and those with PDC, in the present and in earlier investigations (Langberg and Peck, 2000; Becker *et al.*, 2002).

1. The findings appear to indicate that the relative arch-length deficiency in females is caused by larger-than-average teeth and that this is aetiologically related to the buccal eruption of the canine, whereas excess space in the canine area, caused by smaller-than-average teeth in males, appears to be associated with PDC (Jacoby, 1983). Unilateral occurrence might be associated with more localized loss of space, rather than generalized crowding in females.
2. These features may provide additional clinical signs for the early detection of canine ectopia and provide clinical evidence in the early differential diagnosis of buccal versus palatal impaction. The fact that significant differences were observed in the size of the first permanent teeth to erupt may, where appropriate, contribute to early initiation of preventive measures (Ericson and Kurol, 1988).

Based on the greatly increased prevalence of anomalous, particularly peg-shaped, lateral incisors in PDC cases, the guidance theory hypothesizes that inadequate guidance from peg-shaped lateral incisors causes palatal displacement of the adjacent canine (Becker, 1995, 1998). In the present study, four cases of BDC were found with an adequacy of space in the dental arch, in the presence of peg-shaped lateral incisors (Figure 1). Whether the guidance theory may be extended to cover the aetiology of these buccal canines has yet to be examined in future studies performed on a larger number of BDC cases that display no obvious dental crowding. It has been suggested that buccal displacement of these canines may be due to a genetic 'primary tooth germ displacement' (Becker, 1998).

The current investigation has revealed the presence of significant sexual dimorphism in the morphological traits of BDC dentitions, just as there was sexual dimorphism found in the morphological traits of dentitions with PDC (Becker *et al.*, 2002). This important finding emphasizes the need to investigate male and female BDC and PDC subjects separately and not as a combined group. When male and female groups are combined and studied as a whole, without subdividing them by gender, important and contrasting features of the dentitions are likely to be obscured.

Conclusions

An examination of tooth size in the BDC subjects in this sample of patients has revealed that:

1. a significant degree of sexual dimorphism exists in the morphological traits of BDC-associated dentitions;
2. BDC female subjects express a tendency for M-D larger maxillary incisors and first molars than female controls;
3. bilaterally affected BDC females have a tendency for M-D and B-L larger lateral incisors than unilaterally affected females;
4. male BDC subjects have teeth of normal M-D width;
5. tooth width in BDC cases was greater than in PDC cases. In females this was due to larger-than-normal teeth in the BDC group and normally-sized teeth in the PDC group, whereas in the males the BDC group had normally-sized teeth and the PDC group had smaller-than-normal teeth;
6. when compared with BDC dentitions, B-L width reduction of the teeth in PDC dentitions was present for males in all teeth, and for females only for the lateral incisors.

Figure 1 Buccal ectopic canines occurring in a non-crowded dentition, adjacent to peg-shaped lateral incisors.

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