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Root lengths in the permanent teeth of 45,X females

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Abstract

Objective. Studies in permanent and deciduous tooth crowns and permanent tooth roots in individuals with sex chromosome anomalies and in their relatives have given proof that the X chromosome affects enamel formation, root length and crown and root morphology. The present research studies the effects of sex chromosome deficiency on the development of permanent tooth root. ***Materials and methods.*** This research investigated tooth root lengths in a group of 97 45,X females. As controls there were 32 sisters and 28 mothers of the 45,X females, 45 female and 42 male population controls and 15 45,X/46,XX females from the KVANTTI research project. Tooth root lengths on both sides of the jaws were measured from panoramic radiographs in each acceptable instance. ***Results.*** The results showed significantly shorter tooth root lengths in the 45,X females than in the female and male controls in all teeth measured, whereas in the female relatives tooth root lengths were shifted towards the aneuploids in relation to that in the general population. The tooth root lengths in the 45,X females differed more from those found in their sisters than in their mothers. ***Conclusions.*** These results with the large pure sample size of the whole dentitions in patients with monosomy X confirm the earlier findings of short tooth roots in 45,X females. The fact that in most instances there were no significant differences in tooth root lengths between 45,X and 45,X/46,XX females comes close to the earlier findings regarding mesio-distal tooth crown sizes.

Key Words: *chromosomes, human, X, sex chromosome, tooth root, Turner syndrome*

Introduction

Turner syndrome is a condition in which the human sex chromosomes deviate from normal (46,XX in women and 46,XY in men) and this syndrome is found in 1/2500–1/3000 female infants at birth [1]. The most common karyotype is 45,X (~45%) and the second common karyotype is 45,X/46,XX (~13%) [1], in which two cases the phenotype is female, whereas, for example, 45,X/46,XY individuals (i.e. gonadal dysgenesis) are found with variable phenotype (male or female) [2]. The growth hormone level is normal in 45,X females, but the oestrogen level is low. Bone development is delayed by an average of 2.4 years [3] and in the earlier research performed by Varrela et al. [4] 45,X females had a mean body height of 146.9 cm, which was 14.2 cm less than for normal females in Finland. Growth deficiency for Turner patients is greatest in stature, but also various body measurements deviate from those found in normal populations, especially longitudal measurements of the body (sitting height, arm lengths), whereas width measurements (biacromial and biliac widths) and head circumference show the smallest deviations [5,6].

One of the most deviant measurements in 45,X females are to be found in the base of the skull, with the consequence that retrognathic facial features are common. The lower jaw is short, while the upper jaw is of a normal length; furthermore, palate height is normal, but the palate is narrower than in the general population [7,8]. Class II occlusions, lateral crossbites and anterior open bite are more common than usual in Turner patients such as 45,X and 45,X/46,XX females [9–12]. The roots of the permanent incisors and canines are shorter in 45,X and 45,X/46,XX females than in normal women [13,14]. The roots of premolars and molars are found also to be shorter in 45,X females than in 45,X/46,XX females [14]. Individuals with one extra sex chromosome such

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Table I. Mean ages, standard deviation, age ranges and number of the study subjects.

Study group	Mean age (years)	SD (years)	Age range (years)	*n*
45,X females	18.9	7.4	6.2–46.4	97
Population control females*	32.0	11.5	9.7–59.1	45
Population control males*	34.8	15.4	11.9–67.5	42
45,X/46,XX females**	23.4	8.4	7.1–41.0	15
45,X females with a female relative	17.1	6.3	6.2–37.8	60
Sisters	21.0	7.2	10.9–39.6	32
Mothers	36.9	8.6	23.7–53.6	28

Mean tooth root lengths of population control females, population control males and 45,X/46,X females have been published earlier in the thesis of Raija Lähdesmäki [29].

as 47,XYY and 47,XXY males [15,16] and 47,XXX females [17] have longer tooth roots than normal, which is the case also with tooth roots in 46,XY females [18]. Furthermore, 47,XYY and 47,XXY males and also 47,XXX females have larger than normal permanent tooth crowns [19–22], while the tooth crowns of 45,X and 45,X/46,XX patients are smaller than normal [5,23–27]. Research has shown that both X and Y chromosomes promote tooth crown growth by increasing enamel thickness [20,28]. The Y chromosome increases dentin accumulation, while the X chromosome has little or no impact on dentin formation in tooth crowns being different from root growth, where the X chromosome seems to increase dentin seen as root length [29]. The aim of the present work was to obtain additional information of the effects of sex chromosome deficiency on the development of the permanent dentition in humans, particularly with respect to tooth root lengths.

Materials and methods

Use was made of the data on persons with sex chromosome deviations and their first-degree relatives compiled for Professor Lassi Alvesalo's KVANTTI research project mainly in 1974–1987. The subjects concerned were of Finnish origin and living in various parts of Finland and all had a cytogenetic diagnosis performed primarily on medical grounds. The protocol for the research had been reviewed and approved by the Ethical Committee of the Faculty of Medicine at the University of Turku, which established that the patients and their relatives had received appropriate information on the research and had not been exposed to any risk in connection with it. In this research there were 97 45,X females and controls were 32 sisters and 28 mothers of these, 45 female and 42 male population controls and also 15 45,X/46,XX females from the KVANTTI research project. The population controls and 45,X/46,XX females were from the earlier study performed by Lähdesmäki [29] (Table I). The preferred relative was the sister, followed by the mother and, if there were more than one orthopantomogram, the choice being made in favour of the most successful orthopantomogram with the most complete and healthiest dentition. Anamnestic data indicated that these patients had not received any orthodontic treatment with fixed appliances. According to the obtained anamnestic information, part of the 45,X females group at the present study had received hormone therapy with oestrogen or growth hormone substitute after the age of 15 years. Taking into account accelerated dental maturity of permanent teeth in Turner patients [5,30], the achieved hormone therapy happened so late that the impact of this treatment on tooth root growth can be considered insignificant.

Measurements

The measurements were made on orthopantomograms according the procedure detailed by Lähdesmäki and Alvesalo [14,16], who had previously also performed double determinations of tooth root lengths on a sample of 45 patients from the KVANTTI material (15 45,X females, 15 first-degree female relatives and 15 first-degree male relatives of these). Further duplicate measurements were made on these for the present purposes in order to check reliability of measurements. These measurements

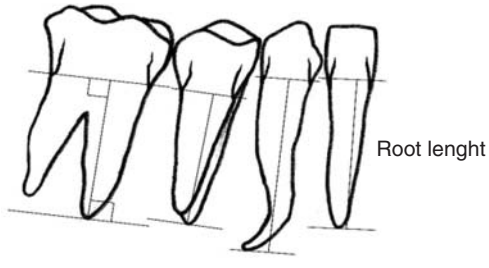

Figure 1. In the measurement, tooth root length was the perpendicular distance between two parallel lines, one tangential to the outer edge of the root and the other running between the mesial and distal cemento-enamel junctions. This picture has been published earlier by Lähdesmäki and Alvesalo [16] and in the thesis of Lähdesmäki [29].

applied to all the permanent teeth except for the third molars and the longest mesial root was measured in each of the maxillary and mandibular molars. Where two roots overlapped in the image, as in the premolars, for example, the longer one was measured. The measurement was the perpendicular distance between two parallel lines, one tangential to the outer edge of the root and the other that running between the mesial and distal cemento-enamel junctions, as shown in Figure 1.

In the second measurement of the double determinations the previous line joining the mesial and distal cemento-enamel junctions was erased and a new line drawn in its place, whereas the outlines of the root tips as marked out on the first occasion were retained. Estimates of both intra-examiner and inter-examiner accuracy were made with two of the writers, Raija Lähdesmäki (RL) and Raija Pentinpuro (RP), calibrating their measurements in order to achieve the maximum consistency and be able to compare the tooth root lengths in the 45,X females and in their female relatives performed by RP with previous measurements in the population control females and males, and in the 45,X/46,XX females performed by Lähdesmäki [29]. Adequate conformity was observed between the measurements made by RL and RP, although determination of the root lengths, for example, of the first molars in the upper jaw proved challenging partly due to the morphologic alterations of tooth root morphology found in the premolars and molars in Turner syndrome [13].

Statistical methods

RP performed double determinations of the tooth root lengths on a total of 45 panoramic radiographs, achieving coefficients of intra-class correlation (ICC) for these measurements that ranged from 0.768–0.987. The ICCs for (RL) ranged from 0.884-0.981 (see Appendix), as tested earlier and reported by Lähdesmäki and Alvesalo [14]. Between the second measurements of the double determinations performed by RP and RL, ICC values ranged from 0.357–0.853 and the average difference between the mean tooth root lengths in these determinations was in the upper jaw (0.84 mm; ranged from 0.04–1.58 mm), and in the lower jaw (0.66 mm; ranged from 0.02–1.07 mm). In the upper jaw the largest difference between these two measurements were in the first molars and in the lower jaw in the second molars, whereas the smallest differences were in the upper jaw in tooth 15 and tooth 27 and in the lower jaw in the incisal region. SPSS package 18.0 (Statistical Package for the Social Sciences, California, USA) was used for the statistical analyses. The mean tooth root lengths were calculated and tested using the two-tailed *t*-test to compare the 45,X females with the population control females and males and with the 45,X/46,XX females and the paired samples *t*-test was used in comparing 45,X females with their sisters and mothers. Results were considered statistically significant at $p < 0.05$.

In addition, relative tooth root length, RRL, was determined for each tooth. $RRL = RL^s : RL^c \times 100\%$ (where RRL = relative tooth root length in the study subjects, RL^s = mean tooth root length in the study subjects and RL^c = mean tooth root length in the female population controls). To detect percentage size reduction (or increase) in the tooth root length in a study group relative to that for the female controls, relative tooth root difference, RRD, was determined: $RRD = RRL^c - RRL^s$ (where RRD = relative tooth root difference, RRL^c = relative tooth root length in the female population controls and RRL^s = relative tooth root length in the study subjects).

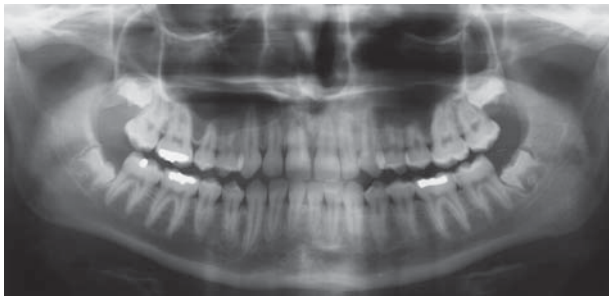

Figure 2. An orthopantomogram of a 45,X female aged 15 years. The tooth roots are shorter in 45,X females than in population control females.

Results

The roots of all the teeth were shorter in the 45,X females (Figure II) than in the control females and the differences were statistically highly significant ($p \leq 0.001$) in all the teeth except for a few teeth in the premolar and molar region in the upper jaw and tooth 36 in the lower jaw, where the differences between the groups were statistically significant ($p < 0.05$) (Table II). The tooth roots in the 45,X females were shorter than that in the population male controls in all cases and the differences were statistically highly significant throughout. Comparison of the tooth lengths of the present 45,X females with those quoted for 45,X/46,XX females [14] suggests that the difference between the groups was statistically significant only in the case of the second mandibular premolar on the left side ($p < 0.05$). RRL (relative tooth root length) in the 45,X females varied between 84–94%, in population control males 100–115% and in 45,X/46,XX females 85–94%. The most pronounced percentage size reduction for tooth root lengths in the 45,X females compared to the control females were in premolar and incisor areas (RRD was from 10–16%), whereas the size reductions were smallest in the molar area in the whole dentition.

Table II. Mean permanent tooth root lenghts (mm) in the 45,X females, control females, control males and 45,X/46,XX females.

	45,X females		Population control females			Population control males			45,X/46,XX females		
Tooth	Mean (SD)	*n*	Mean (SD)	*n*	p^a	Mean (SD)	*n*	p^b	Mean (SD)	*n*	p^c
Maxillary											
Right second molar	13.4 (1.8)	73	14.6 (2.0)	34	0.004**	15.8 (2.2)	30	0.000***	13.7 (1.6)	13	0.628
First molar	12.9 (1.7)	87	14.5 (1.7)	31	0.000***	15.4 (1.7)	26	0.000***	13.0 (1.3)	14	0.783
Second premolar	14.3 (1.9)	81	17.0 (2.2)	31	0.000***	17.4 (2.7)	27	0.000***	14.8 (2.3)	14	0.402
First premolar	15.4 (1.9)	76	17.3 (2.0)	29	0.000***	18.8 (2.3)	23	0.000***	15.5 (1.7)	13	0.967
Canine	19.8 (2.1)	86	21.7 (2.0)	38	0.000***	24.2 (2.0)	28	0.000***	19.5 (2.5)	14	0.608
Lateral incisor	16.4 (1.8)	84	18.1 (1.8)	34	0.000***	19.5 (2.5)	25	0.000***	16.0 (2.5)	14	0.506
Central incisor	16.4 (2.1)	87	18.7 (1.5)	37	0.000***	20.2 (2.4)	32	0.000***	15.9 (3.2)	15	0.480
Left central incisor	16.5 (2.1)	88	18.9 (1.4)	36	0.000***	20.3 (2.4)	29	0.000***	16.4 (2.9)	15	0.788
Lateral incisor	16.3 (1.9)	86	18.2 (1.9)	34	0.000***	19.2 (1.6)	30	0.000***	16.4 (2.4)	15	0.806
Canine	19.7 (2.3)	88	21.7 (2.2)	36	0.000***	24.2 (1.9)	31	0.000***	19.7 (1.6)	14	0.878
First premolar	15.9 (2.1)	78	16.9 (2.1)	31	0.027*	19.3 (2.4)	24	0.000***	15.0 (2.4)	11	0.186
Second premolar	15.0 (2.1)	80	16.9 (1.6)	31	0.000***	18.0 (2.6)	25	0.000***	14.7 (2.9)	12	0.617
First molar	13.4 (1.8)	86	14.2 (1.8)	30	0.026*	15.2 (2.1)	25	0.000***	13.1 (1.1)	13	0.650
Second molar	13.4 (1.7)	76	14.7 (2.0)	27	0.002**	15.1 (2.5)	27	0.000***	13.5 (1.4)	14	0.767
Mandibular											
Right second molar	15.3 (1.8)	74	17.3 (1.6)	28	0.000***	17.3 (2.6)	21	0.000***	16.0 (2.0)	13	0.219
First molar	16.6 (1.6)	77	17.8 (1.5)	23	0.002**	19.1 (2.1)	20	0.000***	16.4 (2.5)	9	0.826
Second premolar	16.0 (2.2)	80	18.2 (2.0)	33	0.000***	19.6 (3.0)	30	0.000***	16.5 (2.9)	11	0.516
First premolar	15.6 (1.8)	86	17.7 (2.0)	38	0.000***	19.1 (2.6)	39	0.000***	16.2 (1.3)	14	0.303
Canine	17.4 (2.1)	86	19.8 (2.3)	40	0.000***	21.8 (2.8)	41	0.000***	17.6 (1.6)	13	0.856
Lateral incisor	13.6 (1.5)	88	16.0 (1.8)	43	0.000***	17.6 (2.3)	41	0.000***	14.0 (1.1)	14	0.389
Central incisor	13.1 (1.5)	90	15.0 (1.8)	44	0.000***	15.9 (2.0)	37	0.000***	13.5 (1.7)	13	0.366
Left central incisor	13.1 (1.5)	90	14.9 (1.8)	41	0.000***	16.6 (2.1)	37	0.000***	13.8 (1.7)	14	0.117
Lateral incisor	13.9 (1.6)	89	15.9 (2.0)	42	0.000***	17.8 (2.2)	41	0.000***	14.2 (1.4)	14	0.579
Canine	17.6 (2.0)	85	19.7 (2.0)	39	0.000***	22.6 (2.6)	40	0.000***	17.7 (2.2)	14	0.840
First premolar	15.8 (1.7)	84	17.7 (2.0)	40	0.000***	19.0 (2.7)	37	0.000***	16.6 (2.0)	13	0.105
Second premolar	16.0 (2.0)	82	18.3 (1.8)	36	0.000***	19.5 (2.8)	29	0.000***	17.2 (2.0)	13	0.044*
First molar	16.4 (1.6)	80	17.6 (1.6)	24	0.001***	19.0 (2.1)	21	0.000***	16.2 (1.3)	12	0.607
Second molar	15.6 (1.7)	75	17.0 (2.0)	28	0.000***	18.1 (2.4)	22	0.000***	15.6 (1.8)	13	0.864

p: statistical evaluation with the two-tailed t-test: ¶$p < 0.1$; *$p < 0.05$; **$p < 0.01$; ***$p \leq 0.001$. Mean tooth root lengths of population control females, population control males and 45,X/46,X females have been published earlier in the thesis of Raija Lähdesmäki [29].
[a]45,X females vs population control females.
[b]45,X females vs population control males.
[c]45,X females vs 45,X/46,XX females.

The largest differences (RRD) between the control females and males were in the canines and some teeth next to them, such as maxillary first premolars and mandibular lateral incisors. RRD values for tooth root lengths in the 45,X/46,XX females were the largest in the maxillary premolar and incisor areas, and in the mandibular canine and incisor areas, while it was the smallest in the molar area throughout the dentition.

The differences between 45,X females and their sisters were significant ($p < 0.05$) or highly significant in all the teeth except for some posterior teeth and one canine, where the differences were not statistically significant (Table III). The mothers of the 45,X females had longer tooth roots than their 45,X daughters, but the differences between the groups were not statistically significant in the upper jaw, whereas the differences were statistically significant ($p < 0.05$) in the lower jaw except in the molar region and tooth 43, where the differences were not statistically significant. In the female relatives (mothers and sisters) RRL varied between 86–100% and the largest

Table III. Mean permanent tooth root lenghts in the 45,X females, in their sisters and their mothers.

	45,X females[a]		Sisters			45,X females[b]		Mothers		
Tooth	Mean (SD)	n^a	Mean (SD)	n	p	Mean (SD)	n^b	Mean (SD)	n	p
Maxilla										
Right second molar	13.4 (1.8)	24	14.7 (1.7)	24	0.016*	14.6 (1.7)	5	15.4 (2.8)	5	0.411
First molar	13.0 (1.8)	27	13.8 (1.6)	27	0.046*	13.2 (1.6)	11	13.7 ((2.0)	11	0.335
Second premolar	14.3 (1.5)	22	16.8 (1.5)	22	0.000***	14.0 (3.7)	3	15.7 (1.4)	3	0.401
First premolar	15.3 (2.1)	23	17.8 (2.5)	23	0.001***	15.8 (2.5)	6	16.1 (1.2)	6	0.761
Canine	20.0 (2.1)	29	21.6 (2.7)	29	0.033*	19.9 (1.3)	12	20.0 (2.6)	12	0.979
Lateral incisor	16.2 (2.1)	29	17.6 (1.7)	29	0.005**	16.5 (1.2)	13	17.4 (1.0)	13	0.093
Central incisor	16.4 (1.7)	29	18.4 (1.7)	29	0.000***	16.7 (1.7)	14	17.2 (1.9)	14	0.445
Left central incisor	16.7 (1.9)	28	18.3 (1.8)	28	0.001***	16.7 (1.7)	17	17.2 (2.0)	17	0.453
Lateral incisor	16.4 (1.7)	27	17.6 (2.0)	27	0.020*	15.9 (1.5)	12	17.0 (1.5)	12	0.062
Canine	19.7 (2.1)	29	21.3 (2.5)	29	0.009**	20.2 (1.9)	12	20.2 (2.4)	12	0.931
First premolar	16.2 (1.9)	23	17.4 (2.3)	23	0.081	15.3 (2.4)	9	17.1 (1.2)	9	0.094
Second premolar	14.8 (2.2)	22	16.7 (2.3)	22	0.009**	14.8 (3.6)	4	17.1 (1.6)	4	0.207
First molar	13.2 (2.1)	25	14.0 (1.9)	25	0.111	13.5 (1.5)	9	14.6 (2.6)	9	0.248
Second molar	13.7 (1.9)	24	14.3 (1.5)	24	0.101	14.3 (1.4)	4	14.3 (2.0)	4	0.974
Mandibular										
Right second molar	15.8 (1.6)	22	15.8 (2.2)	22	0.934	14.5 (1.8)	7	15.3 (1.8)	7	0.374
First molar	16.0 (1.5)	25	17.8 (1.7)	25	0.000***	16.3 (0.6)	9	16.6 (1.6)	9	0.609
Second premolar	15.5 (2.1)	26	18.7 (1.9)	26	0.000***	15.8 (2.7)	10	18.0 (2.1)	10	0.008**
First premolar	15.5 (1.8)	26	17.3 (1.5)	26	0.003**	15.2 (1.6)	15	17.3 (1.8)	15	0.001***
Canine	17.5 (2.0)	28	18.6 (2.1)	28	0.069	17.9 (2.5)	18	18.5 (2.2)	18	0.523
Lateral incisor	13.7 (1.4)	31	16.0 (1.6)	31	0.000***	13.8 (1.4)	23	16.4 (2.2)	23	0.000***
Central incisor	12.8 (1.6)	31	13.9 (1.8)	31	0.019*	13.2 (1.6)	24	14.5 (2.3)	24	0.026*
Left central incisor	13.0 (1.5)	31	14.1 (1.9)	31	0.006**	13.2 (1.4)	24	14.8 (2.3)	24	0.005**
Lateral incisor	13.3 (1.4)	30	15.7 (1.7)	30	0.000***	13.2 (1.3)	23	16.0 (1.9)	23	0.000***
Canine	17.5 (1.9)	27	19.0 (2.4)	27	0.006**	17.6 (1.9)	18	19.3 (2.5)	18	0.013*
First premolar	14.8 (1.7)	24	17.2 (1.7)	24	0.000***	14.7 (1.6)	14	16.9 (1.3)	14	0.000***
Second premolar	15.6 (2.3)	22	18.6 (1.9)	22	0.000***	15.7 (1.9)	9	18.4 (1.3)	9	0.008**
First molar	16.0 (1.7)	23	17.8 (1.9)	23	0.002**	16.4 (1.5)	7	17.8 (1.7)	7	0.057
Second molar	15.3 (1.8)	23	16.1 (2.3)	23	0.164	15.4 (2.1)	7	16.2 (2.0)	7	0.201

p: statistical evaluation with the paired samples t-test: $^{¶}p < 0.1$; $^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p \leq 0.001$.
[a]The 45,X females, which have the sister in the present study.
[b]The 45,X females, which have the mother in the present study.

maxillary and mandibular RRD values were found in the incisor area and in the right maxillary first molar and premolar.

Discussion

The X and Y chromosomes have been found in many earlier investigations to have a promoting effect on tooth root growth, an effect which was more pronounced in the case of Y than X chromosome [29]. It has also been shown that a deficiency in sex chromosome material reduces tooth root length [13,14]. Furthermore, an additional X chromosome in 47, XXX females enhances permanent tooth root lengths more in the mandible than in the maxilla [17]. There are numerous genes that influence tooth development [31], which may thus be looked on as a long complicated process that involves interactions between genetic, epigenetic and environmental factors [31–35]. It is known that the improvement in nutrition brought about by the rise in standards of living has increased height growth, but no consensus has yet been reached on the implications of this for tooth size [36,37]. If we suppose that the rise in standards of living increases height growth (i.e. secular trend), the height and probably the shortened tooth root lengths

in 45,X females are generally more close to their mothers than to their sisters.

One explanation to the differences between the mothers and the sisters of the 45,X females should be the origin of the X chromosomes in the study subjects [38–40]. Microsatellite analyses revealed that 72% of 45,X subjects retained an X chromosome of maternal origin. At the birth, height of females with maternal and paternal X was comparable, but in adulthood 50% of the maternal X subjects had attained an adult height of at least the 90th percentile vs only 33% of the paternal X subjects [38]. In contrast, in the research performed by Jung et al. [40] there was no significant impact of parental origin of the X chromosome on several phenotypic traits in patients with Turner syndrome, but a maternal imprinting effect on stature was suggested at least in patients with 45,X.

This is the first research on tooth root size with a pure and large group of patients with 45,X karyotype and the results of the present study confirm the earlier findings of short tooth roots in 45,X females. Percentage size reduction in the tooth root lengths compared to that for the female controls were in the 45,X females, in their mothers and sisters relatively large in the incisor area. It was noteworthy that, especially in the upper jaw, the tooth root lengths in the 45,X females differed more from those found in their sisters than from that in their mothers. When comparing tooth root lengths in the 45,X females to that in the 45,X/46,XX females, we noticed that the difference between the groups was statistically significant only in the case of the second mandibular premolar on the left side. The differences between the parts of the jaws are conceivably due to different effects of sex and/or autosomal chromosomes in the tooth root lengths in the different parts of the jaws. The present findings show that the reduction in size found in several body measurements in Turner syndrome patients also can be seen as the early irreversible growth reduction in permanent tooth roots.

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Appendix

Appendix. Coefficients of intra-class correlation (ICCs) for double determinations of the tooth root lengths performed by Raija Pentinpuro in 2008.

Tooth	ICC
Maxillary	
Right second molar	0.897
First molar	0.528
Second premolar	0.802
First premolar	0.685
Canine	0.935
Lateral incisor	0.887
Central incisor	0.891
Maxillary	
Left central incisor	0.917
Lateral incisor	0.897
Canine	0.936
First premolar	0.526
Second premolar	0.767
First molar	0.872
Second molar	0.847
Mandibular	
Right second molar	0.655
First molar	0.613
Second premolar	0.718
First premolar	0.711
Canine	0.678
Lateral incisor	0.500
Central incisor	0.722
Mandibular	
Left central incisor	0.820
Lateral incisor	0.864
Canine	0.915
First premolar	0.926
Second premolar	0.868
First molar	0.926
Second molar	0.939