Is Partial Anodontia a Syndrome of Black Americans?

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Reduction in tooth number is often accompanied by reduced size and peg formation of the crowns of other teeth in the jaws of affected individuals. Peg-shaped teeth are most commonly found in the maxillary arch involving the lateral incisors and third molars; however, other teeth may be affected. Crowns reduced in this fashion may be regarded as micromanifestations of tooth agenesis.[1,2,3]

Missing teeth can be described in numerous ways; hypodontia, a few missing teeth; oligodontia, a large number of missing teeth as an isolated abnormality but not a common problem; and anodontia, complete absence of all teeth, an extremely rare condition.

Congenital absence of one or more permanent teeth, a condition referred to as hypodontia, has interested dental clinicians and researchers for many years. Hypodontia is of particular significance in orthodontics and is listed in many orthodontic textbooks as an intrinsic or local etiologic factor in the development of a malocclusion. Numerous articles have appeared in the literature relating etiology of hypodontia to irradiation, tumors, or genetic dominant or recessive as well as x-linked traits.

The cause of hypodontia has thus generated much debate. Probably the best method of evaluating its etiology would be to examine families affected by hypodontia or by twin studies to determine concordance.

Genetic studies reporting conflicting results are numerous in the literature. Alvesalo and Portin[4] suggest it is due to a single dominant gene. Thomsen[5] believes it is due to a recessive gene, while Huskins[6] says it is x-linked. Suarez and Spence[7] concluded that the single-locus hypothesis should be rejected based upon 171 families they evaluated. Their results show the problem to be more in favor of a polygenic trait than a single gene.

In 305 probands randomly selected from a prevalence study in Israeli Jewish children, 10%-30% showed the effects of hypodontia; it is believed to be a polygenic inheritance mode of transmission.[8]

One of the best studies on genetic potential for hypodontia was carried out at the State University of New York at Buffalo by Boruchov and Green.[9] They examined 369 pairs of twins taken from the department of orthodontics twin growth study. The ages ranged from 5-18 years. Results showed 42 or 5.7% of the 738 twins to have one or more congenitally missing teeth; of this total, 23 or 6.1% were females and 19 or 5.3% were males. The incidence of hypodontia in the monozygotic twins was 4.1% and 7.3% in the dizygotic twins. The tooth most commonly missing was the mandibular second premolar (55.7%). The second most common missing tooth was the mandibular central incisor at 15.2%; and, thirdly, the maxillary lateral incisor 13.9 percent.

Absence of teeth has not been restricted to Homo sapiens, however. Studies carried out by Grüienberg[10] showed the CBA mouse has a single gene incidence producing congenitally absent third molars.

Hypodontia has been reported in at least ten different population samples.

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TABLE I

	With	Without	Incidence (95% Confidence Limits)	
Male				
Pedodontic	1	136	.007 (.000-.044)	
Orthodontic	2	62	.031 (.004-.110)	
			$x^2 = 1.702$	$p > .05$
Female				
Pedodontic	7	146	.046 (.020-.101)	
Orthodontic	2	111	.018 (.002-.005)	
			$x^2 = 1.565$	$p > .05$
Male	3	198	.015 (.003-.043)	
Female	9	257	.034 (.017-.070)	
			$x^2 = 1.593$	$p > .05$

They are taken from the United States, Austria, Germany, Hungary, Greenland, Sweden, Switzerland, Israeli Jews, and Japanese. There are 128 references dealing with hypodontia listed in *Thoma's Oral Pathology,* edited by Gorlin and Goldman. To the best of my knowledge, not one of them or any other reference I could find deals with the Black American and the incidence of hypodontia.

The purpose of this study is to determine the incidence of congenital absence of teeth in a Black American population and to determine the most commonly missing tooth or teeth.

Materials and Methods

There were two samples involved in this study taken from my private practice of orthodontics and the undergraduate pedodontic clinic at Indiana University School of Dentistry.

The samples were randomly selected with the ages ranging from 3 to 18 years. The pedodontic sample (Group A) consisted of 137 males and 153 females. In the orthodontic sample (Group B) were 64 males and 113 females.

All patients were given complete dental examinations and medical histories taken. All were ruled healthy. All primary and permanent teeth in the oral cavity were recorded on a clinical examination form. Full mouth radiographs, panorex, or panolipse films were used for roentgenographic determination of congenital absence of teeth. The dental history was checked closely to ascertain if teeth, either permanent or deciduous, had been prematurely extracted or exfoliated.

All permanent teeth were included in the survey except third molars. The presence or absence of these teeth was ascertained from the roentgenographs, if not present orally. This method of establishing the presence or absence of teeth in children between the ages of 4 and 5 years has been reported by numerous authors.

Statistical analyses were done comparing the differences of incidence of absence between the samples, within each sex, and between the two sexes. The Black American samples were then compared with the Caucasian pedodontic sample of Glenn.[11]

Results

The first statistical analysis (Table I) tested the difference between samples within the same sex. In the pedodontic male sample, the incidence of congenital absence of teeth was 1 of 137

TABLE II

		With Missing Teeth	Unaffected	Total Individuals	P (95% CL)	x^2
Glenn's C	♂	20	385	405	.0494 (.037-.089)	.076
Sample	♀	20	352	372	.0538 (.040-.097)	N.S.
Pedo & Ortho	♂	3	198	201	.0149 (.003-.043)	1.593
Sample	♀	9	257	266	.0338 (.017-.070)	N.S.

individuals giving an incidence of .007 or 0.7%. In the orthodontic male sample, there were 2 of 64 individuals affected, an incidence of .031 or 3.1%. The chi square test between two samples was 1.702 and not significant since "p" was greater than .05.

In the female pedodontic sample, there were 7 of 153 affected with a total of 17 missing teeth. The incidence was .046 or 4.6%. The orthodontic sample, on the other hand, showed 2 of 113 affected with an incidence of .018 or 1.8%. Again, a chi square test revealed no significant difference.

When viewing these results, it becomes apparent that slight differences in incidence occurred between the pedodontic and orthodontic samples; yet, they were randomly selected and made as homogenous as possible. The slight differences are not statistically significant.

When the two samples were combined, 3 of 201 males were affected with a total of 4 teeth, an incidence of .015; females had an incidence of congenital absence of 9 in 266 or a total of 25 missing teeth and an incidence of .034. Chi square was 1.593 and not significant with "p" being greater than .05. Since the two samples show no significant differences between samples and between sexes, the combined incidence for the Black American population is estimated as .026 (12/467) and the 95% confidence interval is .015-.050.

The next comparison was carried out by taking the combined samples of Black American children and comparing them with the Caucasian sample of Glenn[11] as seen in Table II.

The Caucasian sample consisted of 777 individuals, 405 males and 372 females of similar ages as the Black Americans (3-17 years). Each group of the Caucasian sample (male and female) exhibited 20 missing teeth. The incidence of absences was 4.94% for males and 5.38% for females. Chi square was .076 for these samples and not significant.

In Table III is shown the combined males and females for both the Caucasian and Black American groups. The incidence of missing teeth in the Caucasians was 5.15% with the 95% confidence interval of .038-.075. The incidence of missing teeth for Black Americans was 2.57% with 95% confidence intervals of .015-.050. In comparing these two incidences, a chi square value of 4.219 was obtained and is significant at the .05 level. There is a significantly higher incidence of congenitally missing teeth in Caucasians than in Black Americans, almost twice as much; and the implication of the sample size is also about half as large. We are informed by a statistician that even if the sample sizes were identical, the differences would probably still be significant.

The last information gained from the study of the Black sample was a recording of the most prevalent incidence

TABLE III

	With Missing Teeth	Unaffected	Total Individuals	P (95% CL)	x^2
Combination C. ♂+♀	40	737	777	.0515 (.038-.075)	4.219
Pedo & Ortho ♂+♀	12	455	467	.0257 (.015-.050)	

in missing teeth. The most common congenitally missing tooth was the mandibular right second premolar followed by the maxillary left second premolar, mandibular right first premolar and the maxillary lateral incisors.

An evaluation of hypoplasia and peg-shaped teeth disclosed 9 teeth exhibiting hypoplasia in the females: 5 central incisors, 3 laterals, and 1 cuspid. The male sample had 6 hypoplastic teeth: 2 central incisors, 2 laterals, and 2 canines for a total of 15 of 477 individuals, an incidence of 0.17 percent.

Summary

A study was designed to test the prevalence of congenitally missing permanent teeth in two Black American samples of children, ages 3-18 years. When combined, male with female, and compared with the Caucasian sample, the incidence of congenital absence is 2.57% and 5.15% for Caucasians.

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