

The Influence Of Premature Loss Of Deciduous Molars And The Eruption Of Their Successors

C. G. SLEICHTER, D.D.S., M.S.
Iowa City, Iowa

There are several suppositions regarding the rate of eruption of the succedaneous teeth when the overlying deciduous teeth have been removed. In fact, however, there is little documented evidence that permanent teeth erupt either more or less rapidly when the corresponding deciduous teeth are removed prior to the normal time of shedding. In addition, complicating factors may enter the field thus changing the entire pattern in certain cases.

Therapeutic removal of deciduous teeth to hasten eruption of their successors is of considerable importance in dentistry. It involves mental and physical pain for the patient as well as a financial expenditure. Possibly premature extraction may even retard the normal rate of eruption of the succedaneous teeth.

The practice of therapeutic extraction of deciduous teeth is fairly common. Since the literature contains little real evidence of the value of the procedure, a method of determining the changes affected is outlined and will be used to study the rates of eruption of the permanent teeth when the overlying deciduous tooth has been prematurely removed.

Periapical x-rays of children accepted by the Department of Pedodontics at the State University of Iowa, College of Dentistry were the source of data for measurements of tooth eruption.

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A review of several hundred full survey x-ray films in the files of the active treatment groups revealed that few of these children lost deciduous teeth prematurely. Therefore, it was necessary to resort to the records of children who had been examined but were not under routine care. Periapical, full survey x-ray films were available for several thousand children. Out of approximately 500 surveys examined, thirty-nine were of children who had experienced premature extraction of deciduous molars and had acceptable x-ray films.

METHODS

Several systems of measurements were evaluated: 1) distance from the tip of the bicuspid crown to the occlusal plane; 2) distance from the bicuspid crown to the dentino-enamel junction of the adjacent tooth; 3) distance from the unerupted bicuspid crown to the crest of the adjacent interproximal alveolar bone.

The latter was the one chosen as the most practical and most reliable for the purpose of judging the relative position of the unerupted bicuspid.

Measurements of the distance from the tip of the cusp of the bicuspid to the interproximal alveolar crest were made on the side of the missing tooth and of the corresponding tooth on the opposite side of the same arch.

The possibility that any variation noted in the unilateral extraction cases could be a normal variation between left and right bicuspids was considered. In an attempt to account for this pos-

TABLE I

Group	N	Mean Difference	S D	T	Level of Significance
Control	31	0.18mm.	0.55mm.	8.29	1%
Study	38	2.55mm.	1.51mm.		

Less than 1 possibility in 100 that the difference is due to chance.

sibility another series of thirty-one full surveys was examined and the distances of corresponding left and right bicuspids in the same arch, from the surface of the alveolar bone, were measured. These measurements were used as controls for the unilateral extraction group.

In addition to the statistical data several interesting serial observations were made in an attempt to evaluate the effect of pathology or other abnormal environmental factors on the usual rate of eruption. In some instances films were available over a period of several years, from the time of the original extraction until the tooth approached or reached its occlusal level. These data are not statis-

tically meaningful but do lend some support to the statistical material.

First reference will be to the control data which proved to be remarkably consistent in the mandibular arch. The maxillary measurements, in general, were inaccurate and therefore unusable. This was due to the variation in angulation of the film to the long axis of the tooth being x-rayed.

The distances are noted as the actual distance from the tip of the cusp to the occlusal aspect of the alveolar cortical plate adjacent to the nearest fully erupted tooth. Differences refer to differences between right and left sides in the control and between extraction and nonextraction sides in the study.

TABLE II
DISTRIBUTION OF MEASURES

Distance from tip of Cusp to Occlusal of Alveolar Bone	Control		Study - Nonextraction	Extraction
	L	R		
-1.0				1
0				6
1.0				8
2.0		1	6	8
3.0	2	1	4	8
4.0	3	2	5	3
5.0	16	12	9	1
6.0	6	10	10	2
7.0	4	4	2	1
8.0		1	1	
9.0			1	
Mean	5.5mm	5.7mm	4.8mm	2.3mm
Mean Difference	0.2mm		2.6mm	

TABLE III
DISTRIBUTION OF DIFFERENCES

mm.	Control (R-L)mm.	Study (non ext.-ext.) mm.
-1.0	7	
0	20	1
1.0	4	9
2.0		15
3.0		6
4.0		1
5.0		4
6.0		1
7.0		1
N	31	38
Mean	0.18mm.	2.55mm.

Measurements are rounded off to 0.5 mm as read on a Boley gauge.

RESULTS

The measurements in the control group were evenly distributed so that the differences are expressible in terms of the mean and standard deviation of the mean (Table I). The difference in the stage or progress of eruption between corresponding left and right mandibular bicuspid was negligible. The majority of the differences were one mm or less.

The study data were skewed considerably when arranged as comparable extraction and nonextraction distances from the alveolar bone or when plotted in terms of differences. Therefore to supplement the mean difference of 2.5 mm, a chart of distribution has been prepared to illustrate the type of curve (Tables I, II, III). This distri-

bution augments the standard deviation since most of the figures are grouped in the two mm range or greater with six showing a difference of 5 mm or more. This is also illustrated by the fact that there is a positive skewness indicated by quartiles (Table IV).

An examination of individual cases, while not of statistical significance, does present several ramifications to the problem.

It was felt that there would be exceptions to the previous data in a larger sample. Therefore the files were searched for unusual cases. The following are illustrations of extreme findings.

The bicuspid under an extraction area erupted through approximately eight mm of bone and to the occlusal level in twenty months while the corresponding tooth decreased its distance from the occlusal cortical plate by only two mm.

In another instance the bicuspid under the premature extraction reached the occlusal level later than the corresponding tooth on the nonextraction side (Fig. 1).

In four cases, which were followed serially from the time of extraction, the bicuspid under the premature extraction erupted at a more rapid pace than the corresponding bicuspid (Fig. 2). In two cases the bicuspid on the side of premature extraction reached the occlusal level before the corresponding deciduous tooth was shed.

Pathological or surgical removal of the alveolar bone occlusally to the erupting bicuspid seemed to have encouraged an increase in the rate of

TABLE IV
DIFFERENCE BETWEEN EXTRACTION AND NONEXTRACTION

	Percentiles				
	Min.	25	50	75	Max.
N=38	0.0	1.5	2.0	3.0	7.0

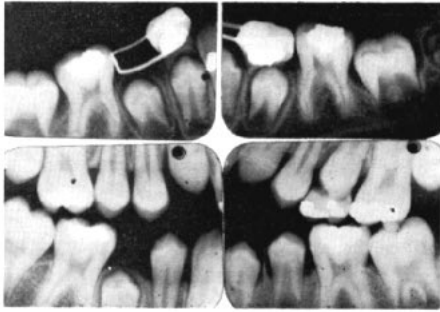


Fig. 1

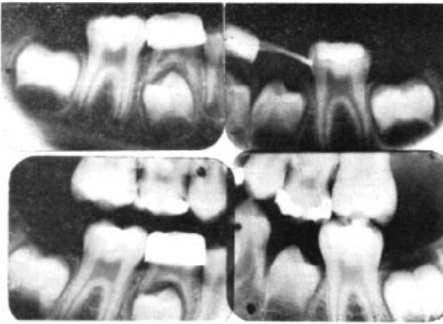


Fig. 2

progress towards eruption of the crowns into the oral cavity.

DISCUSSION

Uncountable are the statements in literature, in the clinic and in the office, to the effect that the slowly erupting permanent tooth can be encouraged to emerge from its socket by removing the corresponding deciduous tooth. This assumption is in agreement with some authors and disagreement with others. Certainly it must be agreed that it is acceptable clinical procedure to extract deciduous teeth to encourage eruption of tardy permanent teeth. This assumptive procedure is suggested not only by general practitioners, but by pedodontists and orthodontists as well. Yet it is also not unusual for a permanent tooth to be delayed in eruption where a deciduous tooth has been missing for many months (Fig. 1). Obviously, under comparable circum-

stances, eruption cannot be both delayed and accelerated by the same procedure.

Fanning⁷ reported on four cases. Her findings concur with those of this study. A longitudinal study of children in Fanning's report showed that premature extraction of the deciduous molar caused an immediate spurt in eruption of the successors. However, if the extraction occurred while the permanent tooth was too deep in its crypt, the spurt leveled off and the tooth then erupted later than its antimeres. Extraction of the deciduous molar hastened eruption and appearance in the oral cavity when the extraction was done shortly before the normal time of exfoliation of the deciduous tooth.

It is conceivable that removal of the deciduous tooth under one condition may cause a different result than removal in another environment. Pathology at the site of the extraction may have destroyed the bone overlying the permanent successor. The oral epithelium may then have fused with the reduced enamel epithelium resulting in an expedited eruption. Conversely, when the deciduous tooth is removed before the underlying bone has been absorbed by the permanent tooth, or by pathology, the oral epithelium may not then be able to fuse with the reduced enamel epithelium and the process of eruption may be altered. Assuming that the above is accepted as playing a part in the eruption of the tooth, definite precautions should be made to pack the surgical opening so that the epithelium may penetrate to the tooth crown. In any event it would appear to be advisable to remove all the alveolar bone overlying the unerupted bicuspid. When eruption is delayed where a premature extraction has taken place, the pad of hornified epithelium over the crown should be removed surgically and the area kept

patent by packing with gauze or a surgical dressing until the walls of the opening have become epithelialized.

The relative positions of the unerupted corresponding bicuspid in the control subjects when the deciduous teeth were present and nonpathologic were almost identical. In the study group the bicuspid under the area of premature extraction nearly always proceeded to erupt at a more rapid rate than the bicuspid on the side of non-extraction. The mean of 2.6 mm in the study group is not as meaningful as the median since the curve is skewed considerably above the 2.6 mm value. The general conclusion to be drawn would be that the premature loss of a deciduous molar tends to encourage a more rapid eruption of the succeeding tooth with some exceptions. Factors contributing to these exceptions may be 1) extraction before the succedaneous tooth has approached the occlusal aspect of the covering alveolus; 2) drifting of posterior molars into the space to create an impaction; and 3) excessive use of the tissue overlying the tooth for masticatory purposes.

In several instances the tooth under the extraction area appeared to erupt more rapidly than its antimere until it penetrated the cortical plate of bone. At this time the left and right bicuspid eruption became more symmetrical and the two teeth reached the occlusal level at approximately the same time. No logical reason for this could be found.

The sample is small, as is the control; however, the differences are significant enough to warrant the conclusion that bicuspid eruption is hastened by early, but not too early, extraction of deciduous molars.

CONCLUSIONS

1. Removal of a deciduous tooth will usually expedite eruption of its successor.

2. Certain precautions should be observed to help insure a more rapid rate of eruption.
3. Under certain conditions premature loss of a deciduous molar will retard or even prevent the eruption of the developing bicuspid.
4. Space maintainers should be used to prevent possible impaction of the bicuspid.
5. Surgical removal of soft tissue and in some instances alveolar bone may be necessary for eruption of the bicuspid. A surgical dressing may be necessary to prevent the bone from reorganizing over the exposed tooth.

229 Iowa Ave.

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