A Root Resorption Pattern in the "Duck Stage"

by

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Introduction

Many causes are responsible for the resorption of permanent tooth roots. The local causes usually include some trauma on the tissues around the apical region, chronic inflammation, tumors, excessive bite load or improper orthodontic treatment [1, 2]. On the other hand, the systemic causes are the malfunction of thyroid gland, hereditary factors, etc. But the present state of scholarship is inclined to the view that the hereditary factors play a larger role in the resorption of permanent tooth roots.

According to MASSLER [3] and MALONE [4], some kind of root resorption took place in 85 % of the permanent teeth and 10 % out of this was said to be quite severe. In addition, there are cases of permanent root resorption through mutual surression of the permanent teeth in the process of their development.

Since 1957, our Department of Radiology has been engaged in the consecutive measurements, roentgenography and preparation of study models with the use of 304 gradeschool children at Takata City, Niigata Prefecture, Japan. In the course of our studies, our attention was attracted by a girl in which the resorption of his permanent tooth roots took place in the so-called duck stage. The present paper is concerned with our clinical findings of this patient.

Data and Observations

- 1) Name and age of the patient : K. N., 6 years old (female).
- 2) Familial history : Nothing to be especially noted.
- 3) Consecutive roentgenological findings on $\frac{3\ 2\ 1}{3\ 2\ 1} \frac{1\ 2\ 3}{1\ 2\ 4}$ region.

a. At this stage, $\frac{B\ A}{B\ A} \frac{A\ B}{A\ B}$ had been already shed and $\frac{2\ 1}{2\ 1} \frac{1\ 2}{1\ 2}$ erupted. Here $\frac{1\ 1}{1\ 1}$ had attained to full eruption and the edges of $\frac{2\ 2}{2\ 2}$ were as high as the central crown portion of $\frac{1\ 1}{1\ 1}$. The axes of $\frac{2\ 1}{2\ 1} \frac{1\ 2}{1\ 2}$ were in the radiating manner with a pronounced diastema. On the other hand, the root formation of $\frac{2\ 1}{2\ 1} \frac{1\ 2}{1\ 2}$ had nearly completed but the portion near the apex was not perfectly calcified yet. $\frac{3\ 3}{3\ 3}$ were inside the alveolar bones lying in the upper area of respective $\frac{2\ 2}{2\ 2}$ apices (Fig. 1).

- b. June 1960 (8 years and 2 months).

By this time, $\frac{2\ 2}{2\ 2}$ had nearly completed their eruption. $\frac{2\ 1}{2\ 1} \frac{1\ 2}{1\ 2}$ were observed

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to have narrower apices under the constraint by calcification. These apices were comparatively short and the length of crown was more or less the same as that of apex. $\underline{3|3}$ still had their crowns inside the bone and they were in contact with $\underline{2|2}$ at $1/2$ on the distal side of the latter apices. For this reason, the bone structure was not recognized between the pericoronal space of $\underline{3|3}$ and the periodontal space of $\underline{2|2}$ (Fig. 2).

c. June 1961 (9 years 2 months).

The apices of $\underline{2\ 1|1\ 2}$ had already completed their calcification. $\underline{3|3}$ were still in their respective bones and their pericoronal spaces were observed to be swollen up. The apex of $\underline{2|}$ was pressed distally by the cusp of $\underline{3|}$ and because of this, it was brought in close contact with both the apices of $\underline{2\ 1|}$. The apex of $\underline{2}$ was also observed to be overlapping the coronal portion of $\underline{3|}$ by about $1/2$. These factors had the effect of causing the axes of $\underline{2\ 1|1\ 2}$ to be arranged in the radiating manner (Fig. 3).

d. June 1962 (10 years 2 months).

The axes of $\underline{1|1}$ were nearly in parallel to each other but there was no contact between the two. $\underline{3|}$ was situated on the distal side to the apex of $\underline{2|}$ and at a distance of about $1/2$ its crown was attested to, with the pericoronal space being directly linked to the apex of $\underline{1|}$. Therefore, there was not found the periodontal space of $\underline{1|}$ there. $\underline{2|}$ had been directly subjected to the suppression by $\underline{3|}$ from the apical direction and, on account of this, $2/3$ of its root was resorbed. $\underline{3|}$ had pressed $\underline{2|}$ inside the bone and caused its root to be contacted with the apex of $\underline{1|}$. Moreover, about $2/3$ of the apex on the distal side had been resorbed in the shape of a crescent (Fig. 4).

e. June 1963 (11 years 2 months).

The relation existing among $\underline{3\ 2\ 1|}$ was not different from what it was previously but its degree was somewhat advanced. The apex of $\underline{2|}$ had been almost resorbed under the suppression by $\underline{3|}$. $\underline{3|}$ had passed the previous position a year before and completed its eruption. The root resorption of $\underline{2|}$ had much advanced as compared with the previous year and had almost disappeared with the exception of about $1/2$ on the mesial side (Fig. 5).

f. June 1964 (12 years 2 months).

The relation existing among $\underline{3\ 2\ 1|}$ was not much different from what was before both one and two years before. $\underline{3|}$ had almost completed its eruption and $\underline{1\ 2\ 3}$ were seen to be forming the points of mutual contact. Where the apex of $\underline{2|}$ had been resorbed, new bone trabecula was beginning to develop in the fairly solid state and fill up the defective area (Fig. 6).

Consideration

According to the recent literature [3, 4], the resorption of permanent teeth is as much as 85 % with the severe cases accounting for nearly 10 %. One of the reasons why the causes responsible for these changes have been hitherto not sufficiently known may be sought in the fact that the employment of consecutive roentgenography on them for several years is not often attempted.

Fig. 1. 7 years 2 months

Fig. 4. 10 years 2 months

Fig. 2. 8 years 2 months

Fig. 5. 11 years 2 months

Fig. 3. 9 years 2 months

Fig. 6. 12 years 2 months

The relation of 3 2 as described above is sometimes encountered in the daily dental practice, while the behavior of 2 3 would have made the ordinary dentist to consider 2 to be an idiopathic root resorption unless its intermediate course should be well known, as it has been in this study.

Conclusion

In our process of chronological examinations roentgenologically of gradeschool pupils at Takata City, Niigata Prefecture, Japan, we encountered a oddity case of root resorption in a boy on the upper both lateral incisors. After six years' chronological roentgenography of the girl, we have determined the case to be due to a suppression by the development of 3|3 in the so-called duck stage. It has been also made clear that the root resorptions of 2|2 were caused by the respective suppressions by 3|3. But as for accounting for the root resorption of 2, it might be difficult by merely referring to a roentgenogram in which 3 has taken as being erupted in the normal position.

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