Examination Of Teeth Eruption In The Support Area Of The Romanian Subjects

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Abstract

The aim of this study was to find out how many of the orthodontic patients had problems with the support area and if these could be identified and treated before any complications could occur; and also how the eruption process in the support area is influenced by these modifications. **Materials and Methods**: In this study, 62 patients, 34 girls (mean age: 10.03 years), and 28 boys (mean age: 9.67 years) were sampled from those who were prepared for treatment at the Orthodontic Department. Their panormaic radiographs were analyzed, especially the support area and the sequence of eruption of canine and bicuspids. **Results:** 56% of female and 43% of male subjects had an intact support area, while the rest showed modifications. 61% from patients with a good support area showed a normal sequence of eruption. However, when the second group was analyzed, 90% of them presented a modified sequence of eruption. In the first group in 84% of situations, even the second molar erupted normally, but, in the second group, 68% of the patients showed a modified sequence. **Conclusion:** Half of the investigated subjects showed some modifications in the support area. The number of male subjects with this situation is higher than that of the female subjects. When the support area develops normally, the sequence of eruption of permanent teeth is not modified, but, in those subjects who showed a changed support area, even the sequence of eruption was changed. In the same way, we can conclude about the sequence of eruption of the second molar: if the support area is normal, it will erupt after the second premolar; but if otherwise, some changes will occur in the process of eruption.

Keywords: teeth eruption, support area, mixed dentition, eruption process.

INTRODUCTION

The process of teeth eruption remains a big interest amongst specialists as long as there are parts of this process which are not fully understood yet. In the past few years/decades, various theories have been suggested on the development of this process. One of them presupposes that there is a certain structure in the oral cavity which exerts an amount of pressure on tooth buds; starting through this way, the tooth eruption begins (Kutesa et al., 2013). The theory which most scientific researchers agree with claims that the force for the beginning of the eruption process comes from collagenous fibers inside the periodontal ligament.

Eruption of the teeth is a continuous biological process in which the developing teeth appear in the oral cavity (Nelson, 2014). There are some special situations in which this process does not follow normal timing, and because of this, some teeth erupt earlier than their predecessors (for example, in some situations, lateral upper incisors appear before central incisors).

Timing and sequence of dental eruption are important factors usually considered when a dental treatment is being planned, especially in the orthodontic field as well as in other specialties such as; pediatric medicine and medicolegal specialty, for estimating the age of the patient. Time of eruption can be influenced by several factors. Some of these factors are normal situations that cannot be changed, such as gender, race, geographical environment, social and economic situations. However, others have been considered to be pathological, genetic or endocrine disorders that affect the development of the human body (Fatemifar et al., 2013).

The purpose of this study is, to find out how many of the orthodontic patients have problems with their support area, if these could be identified and treated before any complications could occur, and also how the eruption process in the support area is influenced by these modifications.

MATERIALS AND METHODS

After the research protocol was established, it was approved by the Ethical Committee of Scientific Research of the University of Medicine and Pharmacy, Tirgu Mures. A written consent was also obtained from each patient or their parents/legal representative in order to use patient's radiographs for this study.

In this study, 62 patients, 34 girls (mean age: 10.03 years), and 28 boys (mean age: 9.67 years) were sampled, from patients who were prepared for an orthodontic treatment at the Orthodontic Department of Faculty of Dentistry, University of Medicine and Pharmacy, Tirgu Mures, Romania. For each patient, their digital panoramic radiographs were analyzed. For performing of digital radiographic images, Pax Flex 3D, Vatech X-ray machine was used. The exposure time was 12.8 seconds.

The inclusion criteria were: children of Romanian origin, no history of orthodontic treatment before this radiographic examination, good general health, no growth causing hormonal or systemic disease, and good quality of panoramic radiographs. After data were obtained, they were introduced into Microsoft Excel and a statistic analysis was performed using the Excel Data Analysis package.

RESULTS

After all the 62 panoramic radiographs were analyzed, we found that the support areas were intact in 50% of the subjects (Figure 1), but in 50% of the situations, same areas had some modifications (Figure 2). In 19 cases (56%) of female subjects, the support areas were found to be intact; but in 15 cases (44%), some changes were observed. Of male patients, 12 cases (43%) of the same area were without changes, but 16 (57%), from the boys, showed some deviations from normal.

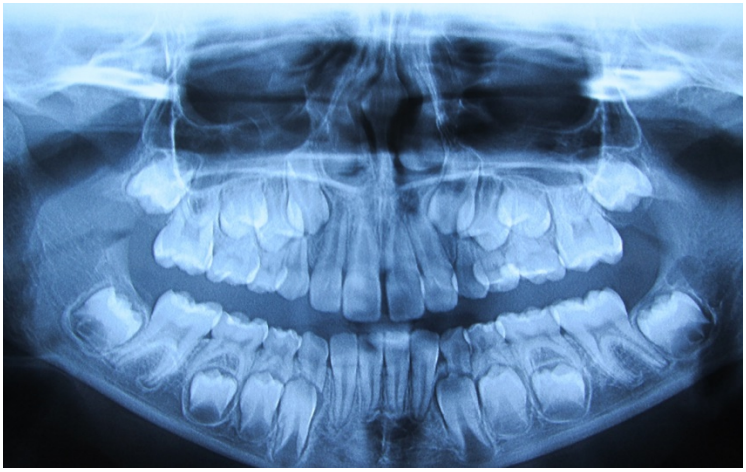

Figure 1. Panoramic radiograph showing an intact support area in analyzed subject

Figure 2. Panoramic radiograph showing modifications in the support area

Another parameter analyzed in this study was the sequence of eruption in those subjects who showed an intact support area. In the upper arch, the standard for normal eruption is: first bicuspid, second bicuspid and canine. In the lower arch, there are 2 situations considered as normal: canine, first bicuspid and second bicuspid or first bicuspid, canine and second premolar (Figure 3) .

From the 31 subjects who showed an intact Korkhaus area, 19 (61%) showed a normal sequence of eruption, but 12 of them (39%) did not (Figure 4). In female patients with a well preserved support area, 13 of them (68%) had a normal eruption of teeth in the lateral area; but in 6 cases (32%), there were some changes. In those 12 male subjects, 6 (50%) of them had a normal sequence of eruption, but the other 6 (50%) had not.

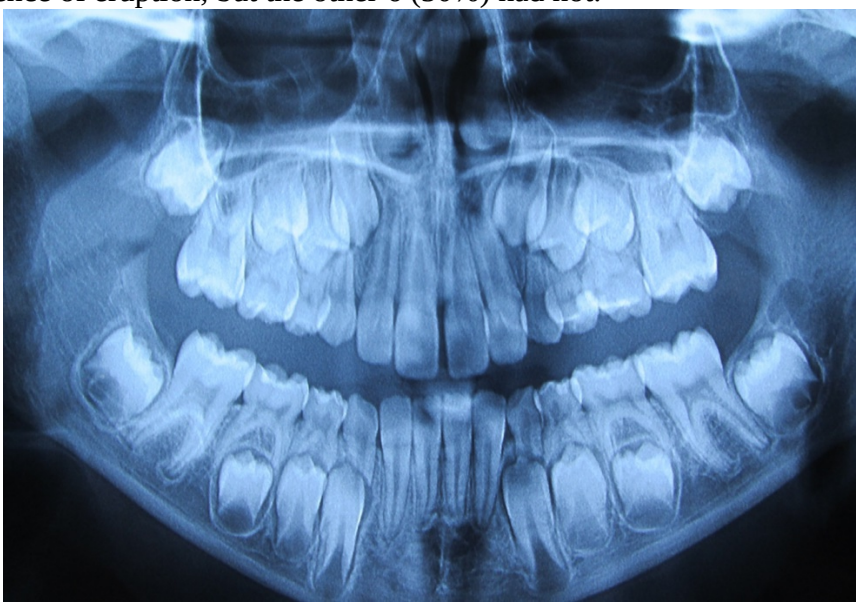

Figure 3. Panoramic radiograph showing a normal sequence of eruption

Same data were collected from the patients where a modified support area was found. In 3 (10%) of the cases, we found a normal sequence of eruption; but in the other 28 (90%), we found modifications. Amongst 15 female patients, in 2 cases (13%), we observed normal eruption. Thus, in 13 (87%), we noticed some changes. In male subjects with a modified support area, 1 of them (6%) showed a normal sequence, but 15 (94%) did not.

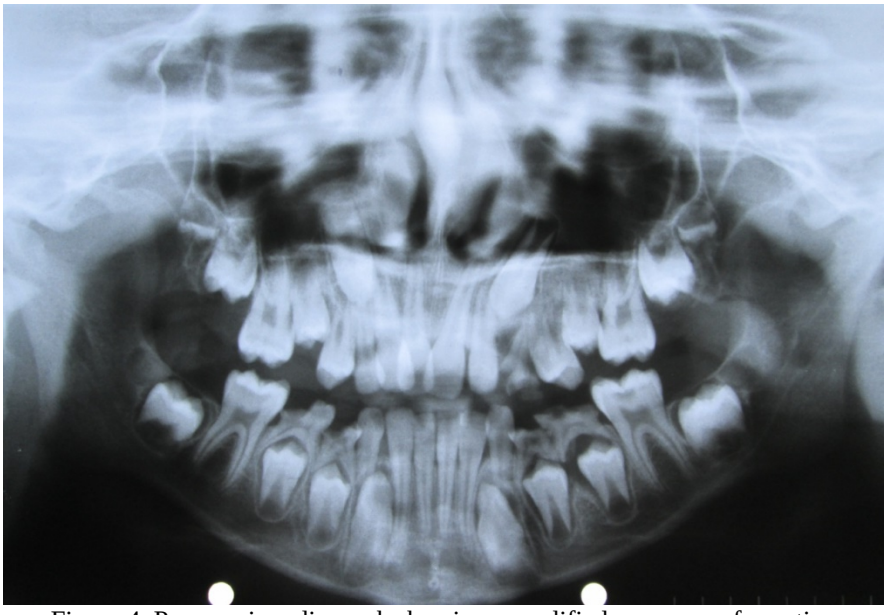

Figure 4. Panoramic radiograph showing a modified sequence of eruption

The eruption of second molar, which normally erupts after the second bicuspid, was analyzed in 31 patients with an unaffected support area. In 26(84%) of patients, it was found to be normal; but in 5 (16%) cases, it was not. When the same parameter was observed in the second group of patients, it was noticed that 10 (32%) showed a correct eruption, but 21 of them (68%) did not.

DISCUSSION

Eruption of the teeth can be defined as an axial movement of a tooth from its bone position until it emerges in the oral cavity (until it reaches its position for functional occlusion). However, most of the times, this term is used to describe the moment when a tooth appears in the oral cavity (Dorotheu et al., 2013). Therefore, this process is considered to be the last event of the developmental process of teeth. At the end of it, teeth will find their own place in the dental arch according to the genetic information of the body (Ogodescu et al., 2011). Normally, it starts around 6 months of age and finishes around 2.5 years for deciduous teeth and 18-25 years for permanent teeth (eruption of the third molar). Most of the times, there is a correlation between the time when deciduous or permanent teeth erupt and the chronological age of the patient. Nevertheless, racial, ethnical, sexual, and some individual factors can influence this process (Almonaitiene et al., 2010). Eruption can be considered as a physiological process which influences even the normal development of the craniofacial complex (Kobayashi et al., 2010).

Generally speaking, the support area defines part from the maxillary or mandibular arch where the deciduous canines and molars are positioned. This is an important area because most common problems appear in this part of the arch during transition from deciduous to permanent teeth (Crielaard et al., 2011). Usually, the width of the deciduous teeth is bigger than the mesio-distal diameter of the permanent teeth resulting in a certain amount of space called Lee-way space. However, there are some situations when it happens exactly in the oposite, and then some problems appear during the emerging of the permanent teeth. In other circumstances, deciduous teeth can be lost earlier or they can be retained longer than the normal period, thereby appearing as a modified sequence of eruption of the permanent teeth (Bayrak et al., 2012).

Monitoring the sequence of eruption of the permanent teeth is very important as a daily practice, because, in this way, if some modifications are noticed, the specialist can treat the situations and prevent the appearance of some complications (Geller et al., 2011). The most common situation in Romanian subjects is the premature loss of the deciduous teeth, mostly due to the complication of caries. It is well known as a fact that the enamels in these teeth does not have the same resistance to acid attack from the oral cavity. On the other hand, even oral hygiene in most of the patients is not properly done, because there is this general concept that these teeth will change anyway around age 6 years. All of these factors have a role in determining the premature loss of primary teeth, especially in the support area (Mehdi et al., 2013). In our study, we found that 50% of the investigated subjects showed some changes in this area, but contrary to other studies, other parameters were not analyzed, like height, weight, etc. There is a higher number of male subjects with changes in the support area than female ones (Atar et al., 2010).

In this study, it was found that in those subjects who showed a normal development in the canine-molars primary teeth area, the sequence of erupion was appropriate. On the other hand, in those patients where modifications were observed in the support area, there were some deviations from the normal sequence of eruption. Therefore, the same findings where made by other specialists in their studies on different populations (Shaweesh, 2012; Lakshmappa et al., 2011).

CONCLUSION

The number of the studied cases and the fact that they come from one country can be considered as the limitations of our study. Based on our findings, we have concluded on the following:

- Half of the investigated subjects show some modifications in the support area; the number of male subjects with this situation is higher than the female subjects.
- When the support area develops normally, the sequence of eruption of permanent teeth is not modified, but in subjects who show a changed support area, even the sequence of eruption will be changed.
- In the same way, we can conclude about the sequence of eruption of the second molar: if the support area is normal, it will erupt after the second premolar; but if otherwise, some changes will occur in the process of eruption.

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