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### Comparison Between Radiographic Image of Mesiodens and Its Real Position and Morphology

Porównanie zgodności obrazu radiologicznego z faktycznym położeniem i budową meziodensa

#### INTRODUCTION

In radiographic evaluation of retained supernumerary teeth the following features are recommended as distinctive criteria: radiolucency of the studied tooth compared with the teeth in the dental arch, sharpness of outline, tooth size and projection of its image with the change of central ray axis to parallax (1—7).

The aim of present studies is to evaluate the accordance between radiographic image obtained by different techniques and the real state known from the beginning.

#### MATERIAL AND METHODS

There was constructed a jaw model of acrylate in which six human front teeth removed for therapeutic reasons were placed. A gutter running from upper lip frenulum along a palatal suture to the second palatal fold was made in the model.

The groove was filled with soft heated wax and the studied tooth which was supernumerary, so-called mesiodens, was placed in it. Before taking radiographs, mesiodens was put:

- a — in a vestibular position with respect to upper incisors;
- b — in a central position between incisors;
- c — in a palatal position.

In every position five X-ray pictures were taken: central dental picture, right and left dental side slanting picture, occlusal picture and panoramic film. Series of radiographic X-ray pictures in particular positions of mesiodens were repeated several times at intervals to eliminate random results coming from the differences in realization techniques. Size, shape, outline sharpness, degree of supernumerary tooth radiolucency and its position with respect to central incisors were estimated from the pictures.

Dental pictures, counter sharpness and radiolucency of the studied tooth did not differ from those central incisors which made it possible to determine vestibular or palatal position of mesiodens on the basis of mentioned features. Size and shape of mesiodens were in agreement if the tooth had a vestibule or intermediate position but in the palatal position its shortening was shown by X-ray picture.

It has been noticed that anteroposterior changes of mesiodens caused perpendicular shifting of its image. Mesiodens in a vestibular position had the lowest projection while that in palatal position had the highest projection. Deviation of incisors in the opposite direction to the central ray incidence was seen in side slanting dental pictures. It made possible to identify the side of the projection.

Mesiodens in a vestibular position and incisor axes moved in an opposite direction to the projection. In the case of a palatal position of mesiodens in a lateral, slanting projection, its image projected on this side of the incisor on which projection was made (Figs. 1—6).

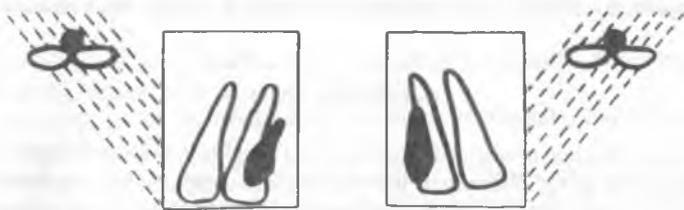


Fig. 1. Model vestibular position

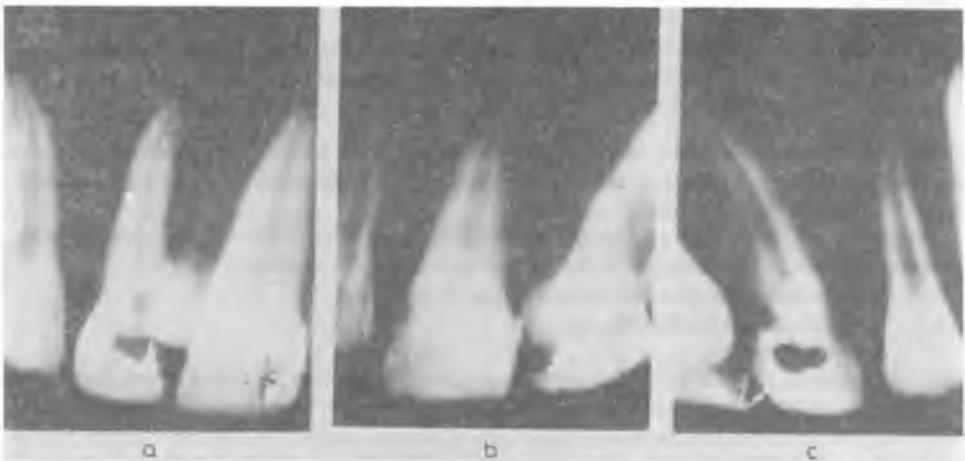


Fig. 2. Dental pictures of vestibular position; — a) right-lateral, b — central, c— left-lateral positions, respectively

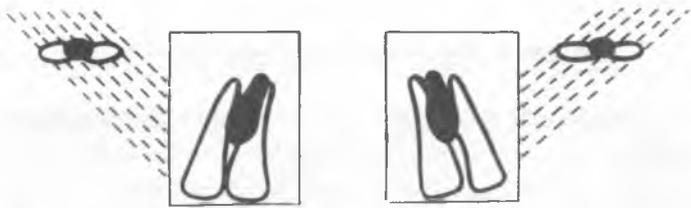


Fig. 3. Model of mesiodens between incisors



Fig. 4. Dental pictures of mesiodens between incisors; a — right-lateral, b — central, c — left-lateral positions, respectively

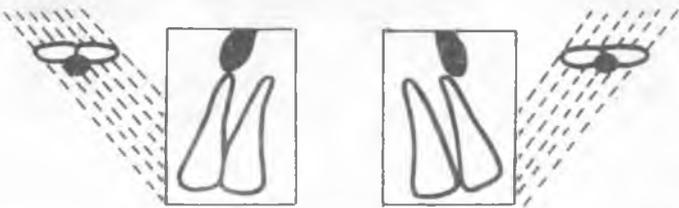


Fig 5. Model palatal position of mesiodens

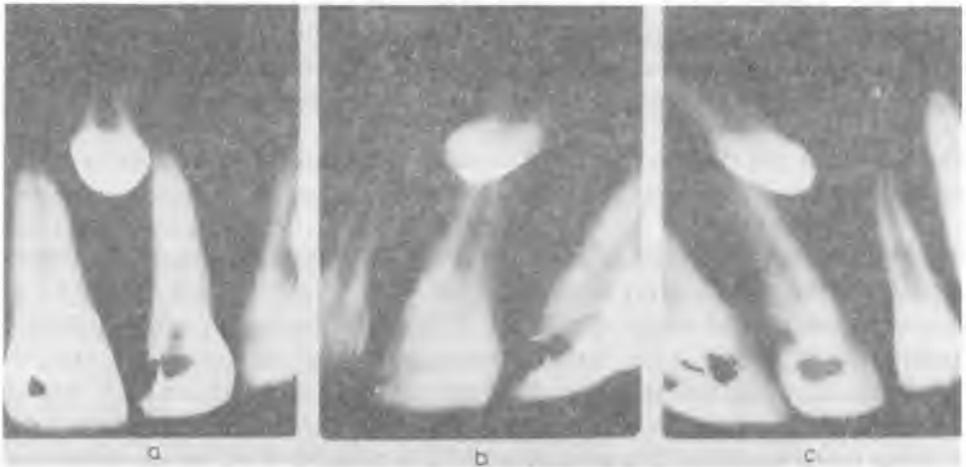


Fig. 6. Dental pictures of a palate position of mesiodens; a — central, b — right-lateral, c — left-lateral positions, respectively

**Occlusal pictures.** A mesiodens radiographic image in occlusion pictures shows shortening almost to a spherical formation in a palatal position of the tooth. Significant deformation of mesiodens image made it impossible to determine its real shape and size using the discussed projection. Recognition of vestibular, intermediate and palatal positions of mesiodens in the model was easy, when tooth was in the direction of palatal caused upward movement of its projection similarly to dental pictures (Fig. 7).

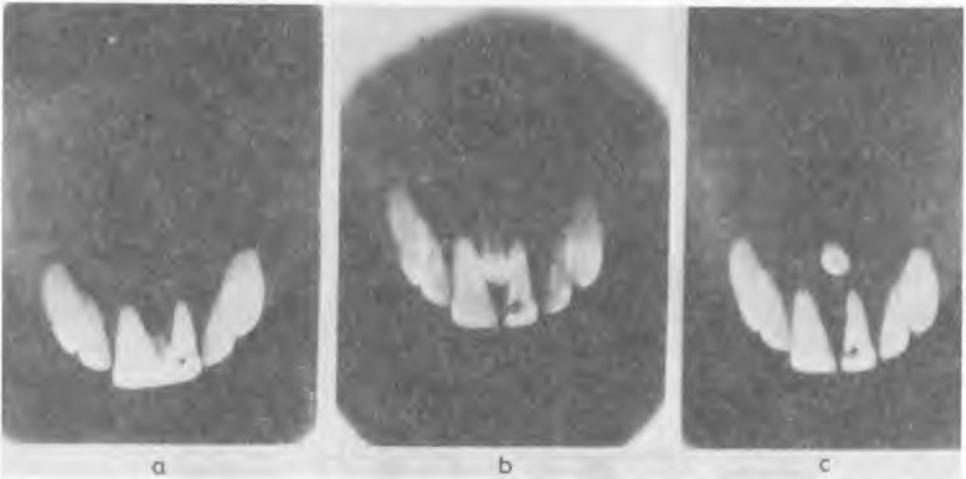


Fig. 7. Occlusion pictures of mesiodens in the model: a — in the vestibular position, b — intermediate position, c — in the palatal position

**Panoramic pictures.** Shape and size of the tooth (despite of deformations which occur in panoramic pictures) were found accurately only in intermediate position of mesiodens. The image of the tooth in a palatal position out of the layer was washed away, shortened and broadened. However, the tooth in a vestibular position was sharp and a little lengthened. Mesiodens location could be found indirectly because when the tooth shifted to a palatal position, its projection in the panoramic radiograph shifted upwards (Fig. 8).

#### DISCUSSION

Interpretation of results of different mesiodens positions in model investigations registered in X-ray pictures should consider discrepancy between the discussed studies and everyday practice. In clinical practice the objects studied radiographically show individual differences, because of teeth crowding, various mineralization and differentiated development stage of tooth buds. A model investigation is a simplified way of showing radiographic features referring to a given tooth position. The advantage of it is possibility of taking numerous

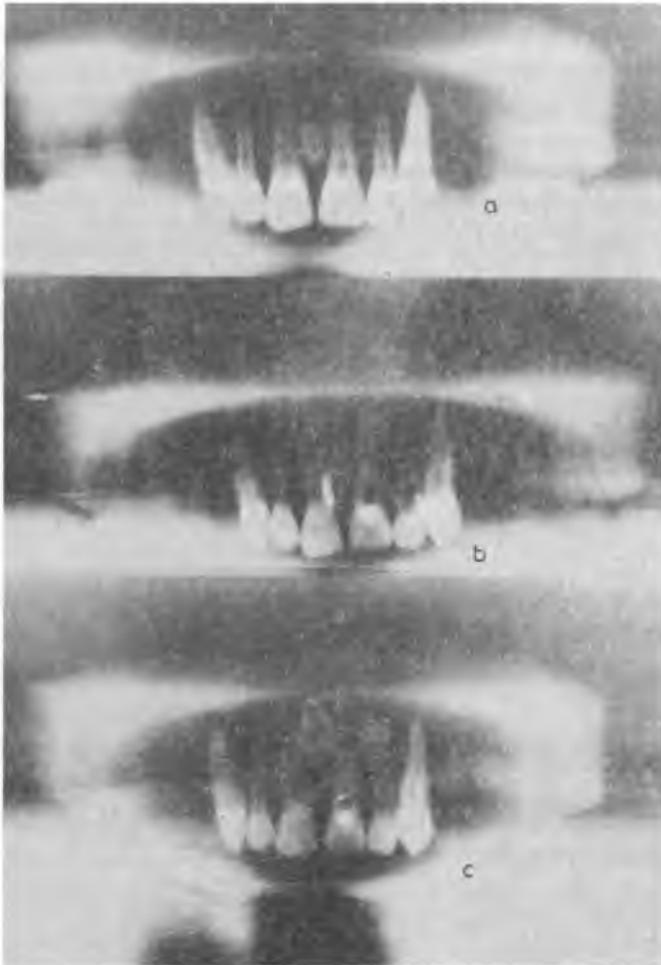


Fig. 8. Panoramic film showing mesiodens; a — in the vestibular position, b— intermediate position, c — in the palatal position

X-ray pictures of the model to obtain material for comparative studies. Such procedure concerning people is forbidden unless there are some important treatment indications.

According to the aim of studies the projection which provides the most reliable information about a supernumerary retained tooth was determined. The smallest deformations were observed in central dental pictures.

Analogically panoramic film registered tooth morphology faithfully, but only in the case of mesiodens intermediate position within the layer including the dental arch. Both in front of and behind the layer mesiodens was deformed as described in literature (1, 2).

Lateral pictures showed a shortened image of mesiodens. Lateral slanting dental pictures using parallax and occlusion pictures proved to be the best in tooth position determination. Both types of projections gave false data about tooth shape.

It follows from the investigations that independently of the projection, the tooth in a palatal position moved upwards in the X-ray picture. It was very distinct and easy to detect in model investigations. In practice when tooth position is unknown and cannot be confronted with a radiographic image without a surgical intervention it does not exclude true high position of the tooth in the bone. However, there should be considered possibility of tooth palatal position when in the X-ray it appears to be extremely high located.

### Conclusions

1. A single projection does not permit to establish with an equal accuracy position, shape and size of the retained tooth.
2. Occlusal and dental lateral radiographs are the best to determine tooth location.
3. Shape and size of the retained tooth are faithfully shown by central dental radiographs.
4. When the tooth moves in the direction of palate the X-ray picture shows it as the movement upwards.

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## STRESZCZENIE

Za pomocą różnych technik radiologicznych badano zgodność obrazu rentgenowskiego z położeniem i budową mezejodensa przesuwanego na modelu szczęki od strony przedśionkowej w kierunku podniebiennym. Stwierdzono, że żadna pojedyncza projekcja nie pozwalała z równą dokładnością ustalić jednocześnie lokalizacji i morfologii zęba zatrzymanego. Umieszczenie najlepiej odwierciedlały zdjęcia zgryzowe oraz zębowe boczne skośne, wykorzystujące zjawisko paralaksy. W celu poznania kształtu i wymiarów mezejodensa bardziej użyteczne było odczytywanie zdjęć zębowych centralnych, które jednak nie pozwalały wypowiedzieć się zdecydowanie co do jego położenia względem sąsiadujących siekaczy.

Na pantomogramie uzyskiwano wierną rejestrację budowy badanego zęba tylko wówczas, gdy leżał on w obrębie warstwy obejmującej łuk zębowy. We wszystkich projekcjach w miarę przesuwania na modelu mezejodensa w stronę podniebienia jego obraz rentgenowski przemieszczał się ku górze.

