

Reimpaction of primary molars - epidemiological study, clinical cases

Anca Maria Răducanu, Victor Feraru

Bucharest, Romania

Summary

Introduction. Reimpaction is a clinical condition in which a completely erupted tooth suffers submergence into the alveolar bone, producing the clinical aspect of infraocclusion.

The authors present a literature review showing its more important aspects concerning prevalence, the uncertain etiology, diagnosis methods, diagnosis criteria and treatment options.

Objective. The main objectives of this paper were to establish the prevalence, the degree of infraocclusion, the complications and the main treatment options for the reincluded primary molars.

Material and method. The study was carried out on a number of 265 patients treated over a period of one year (April 2003 – April 2004) in the Pediatric Dentistry Department of the University of Dentistry Bucharest.

Results and Conclusions. The prevalence of reimpaction was 7.16%. Reimpaction has mainly affected the first mandibular molar. Reinclusion has a risk of delayed exfoliation of primary molars and occlusal and eruption disturbances of permanent teeth. Early diagnosis and treatment prevent these complications.

Treatment decisions are mainly guided by the clinical assessment of the presence or absence of successor tooth, evaluation of onset, time of diagnosis, resorption rate, rate of progression of infraocclusion. The prevalent treatment option was expectation with supervision of the time of primary molars exfoliation and permanent teeth eruption and the development of permanent occlusion.

Keywords: reinclusion, tooth ankylosis, infraocclusion, primary molars, epidemiology.

Introduction

Definitions

- Reimpaction is a term that defines the situation in which a tooth has completely erupted touching the occlusal plane and than submerged again into the alveolar bone [1,2], producing the clinical aspect of infraocclusion.

- Infraocclusion is a clinical term, which describes a tooth situated below the normal occlusal plane. It can appear following partial eruption or reimpaction.

- Ankylosis is considered the major

cause of infraocclusion [1]. It is a specific anomaly that implies the fusion of the root cement with the alveolar bone [5,6].

Etiology

The etiology is still not clear but the following are involved [1,2,5,6]:

- heredity;
- local factors: traumatisms, inflammations, etc. that produce discontinuities or deteriorations of the periodontal ligament or the alveolar bone metabolism.

Classification

A simple classification of the infraocclusion has been described by Brearley and Mc Kibben [1,5,6]:

- Slight infraocclusion – the occlusal surface of the molar is located at approximately 1 mm below the occlusal plane, compared to the not-ankylosed teeth in the same

quadrant (*Figure 1*).

- Moderate infraocclusion – the occlusal surface is located below the level of the contact point with one or two of the neighboring teeth (*Figures 2, 3*).

- Severe infraocclusion – the occlusal surface is located at the proximal gingival tissue level of one or both neighboring teeth [1,5,6] (*Figures 2, 3*).

Figure 1.



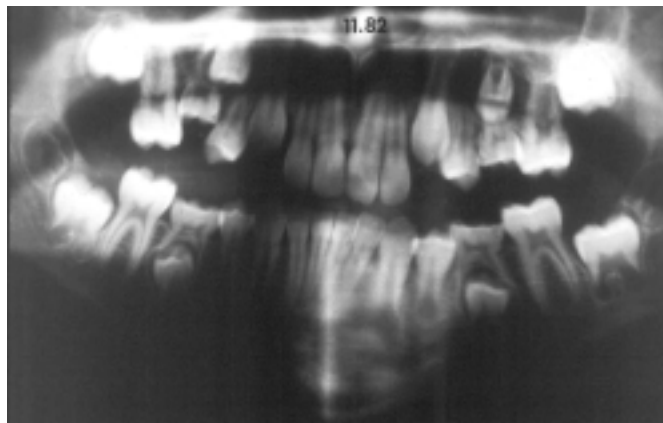
Slight infraocclusion [7]

Figure 2.



Moderate infraocclusion of 65 and severe of 55

Figure 3.



Severe reimpaction of 5.5, 16 bended towards mesial, 15 is impacted and moved towards mesial [8]. Moderate reimpaction of 65. Position of 25 seems slightly modified. Moderate reimpaction of 75 and 85 [8]

Diagnosis

1. Clinical diagnosis

-presence of infraocclusion;
-high tonality at percussion (when over 20% of the root surface is ankylosed);

-loss of mobility (when over 10% of the root surface is ankylosed);

-incomplete development of the alveolar process, lack of the physiological mesial migration, lack of response to orthodontic forces, orifice in the alveolar ridge's gingi-

val mucous [1,5].

2. Radiological diagnosis

- obliteration of the periodontal ligaments space and absence of ligaments continuity in the cement and alveolar bone fusion area (inconsequent sign) [5];
- in reimpaction (in-bone/sub-mucous) signs of attrition, caries or restorations of the reimpacted tooth appear [5];
- root resorption is concordant with age or delayed, irregular [1,5];
- presence/absence of the successor and its position inside the bone structure.

Complications

- risk of delay of the primary tooth exfoliation and the permanent tooth eruption;
- bending of the neighboring teeth towards the ankylosed tooth, with loss of space at occlusal level [5];
- over-eruption of the antagonists [2,4];
- occlusal disturbances.

Treatment

1. Treatment objectives

- stopping the evolution of the pathology;
- ensuring normal successor eruption;
- development of adequate alveolar bone support;
- prevention of complications.

2. Treatment method selection criteria

- infraocclusion degree (slight, moderate, severe);
- moment of onset (early/late) and progress rate (fast/slow);
- diagnosis moment (early/late);
- root resorption degree and rate (fast/slow);
- presence/absence and severity of complications;
- presence/absence and location of the successor.

3. Treatment options [1,2,5,6]

- expectation and supervision of exfolia-

tion;

-tooth reconstruction with increasing of height and rebuilding of the occlusal contact:

- composite restorations
- preformed metallic crowns

-extraction and supervision of permanent tooth eruption;

-orthodontic treatment:

- preventive: space preservation in case of premature extraction
- curative: recovery of lost space if the successor exists or closing of space if the successor does not exist

-combinations of the mentioned methods (extraction-orthodontic treatment, orthodontic treatment-prosthetic treatment).

Personal Study

Objective

Achievement of an epidemiologic study concerning the temporary molars reimpaction frequency, using multiple criteria: sex, age, teeth type, severity, complications and treatment options.

Material and method

Initial study sample of patients: 265 patients with primary and mixt dentition (136 females, 129 males), with ages between 2 years and 2 months and 17 years and 9 months, with an average age of 7 years and 6 months.

Sample of patients affected by reimpaction: 19 patients (11 F and 8 M), with ages between 5 years and 9 months and 17 years and 9 months, with an average age of 9 years and 7 months.

The epidemiologic study has taken place in a one-year period (04.2003-04.2004).

Results

1. *Frequency of patients affected by reimpaction, by age intervals:*

- 5-7 years – 3 patients
- 7-9 years – 4 patients
- 9-11 years – 5 patients
- **11-13 years – 6 patients**
- **over 13 years – 1 patient with anodontia.**

2. *Teeth samples:*

- total number of molars in the initial sample of patients = 1853
- total number of molars in the sample of affected patients = 101
- total number of affected molars = 31 (7 superior molars: 1 M1, 6 M2; 24 inferior molars: 14 m1, 10 m2)

3. *Molars repartition by the symmetry/asymmetry of the affection:*

- in the **maxillae** the affection is **exclusively asymmetrical** with 7 teeth (M1: 1 and M2: 6)
- in the mandible:
 - symmetrical affection appears in 14 teeth (8 m1 and 6 m2)
 - asymmetrical affection appears in 10 teeth (6 m1 and 4 m2)

4. *Affected patients repartition by the number of reimpacted molars that coexist in the same patient:*

- number of patients with 1 reimpacted molar = 8
- **number of patients with 2 reimpacted molars = 10**
- **number of patients with 3 reimpacted molars = 1**

5. *Molars repartition by infraocclusion degree:*

- **slight – 21 teeth**
- **moderate – 6 teeth**
- **severe – 4 teeth**

6. *Molars repartition by the presence or absence of the successor:*

- **with successor – 26 teeth**
- **without successor – 5 teeth**

7. *Reimpacted molars repartition by*

complications:

- **without complications: 24 teeth**
- **with complications: 7 teeth**

8. *Reimpacted molars repartition by exfoliation:*

- with delayed exfoliation: 7
- **with normal exfoliation: 24**

9. *Molars repartition by treatment:*

- **expectation with primary tooth's exfoliation supervision for 10 teeth**
- **reconstruction by fillings for 5 teeth**
- **extraction and permanent tooth's eruption supervision for 6 teeth**
- **combinations for 10 teeth (E + OT for 9 teeth; E + PT + PT for 1 tooth).**

Conclusions

1. *Frequency of the two groups of patients by sex and age:*

- composition of initial sample of patients by sex: **51.32% F**; 48.87% M
- composition of sample of affected patients by sex: **57.89% F**; 42.11% M
- frequency of reimpaction diagnosis by age intervals:

- 5-7 years - 15.79%
- 7-9 years – 21.05%
- 9-11 years – 26.31%
- 11-13 years - 31.58%
- over 13 years – 5.26%

Conclusion: feminine sex and the 11-13 years old age interval seem to be slightly more frequently affected by reimpaction.

2. *Frequency of patients with reimpaction within the initial sample*

- reimpaction frequency within the initial group of patients was **7.16%**

Conclusion: reimpaction frequency within the initial sample of patients is concordant with literature data but the diagnosis peak is higher in 11-13 year-olds.

3. Symmetric/asymmetric affection frequency by dental arch

- mandible:
 - symmetrical – 45.15%
 - asymmetrical – 32.25%
- maxillae: affection is exclusively asymmetrical (22.58%)

Conclusion: in the mandible asymmetrical impairment is predominant while in the maxillae the symmetrical one is exclusive.

4. Frequency of reimpacted molars

- frequency of reimpacted molars in the initial sample – **1.67%**
- frequency of reimpacted molars in the affected group – **30.69%**
- frequency in the dental arches: mandibular molars – 77.42%; maxillary molars – 22.58%
- teeth frequency in descending order: m1 – 45.17%; m2 – 32.25%; M2 – 19.35%; M1 – 3.23%.

Conclusion: $\frac{3}{4}$ of the reimpacted molars are mandibular; the first inferior molar is the most affected tooth.

5. Patients frequency by the maximum number of reimpacted teeth, in descending order:

- frequency of patients with 2 reimpacted molars is 52.63%
- frequency of patients with 1 reimpacted molar is 42.10%
- frequency of patients with 3 reimpacted molars is 5.23%

Conclusion: over half of the affected patients have 2 reimpacted molars.

6. Frequency of infraocclusion severity in descending order:

- slight: 67.75%
- moderate: 19.35%
- severe: 12.90%

Conclusion: over $\frac{2}{3}$ of the teeth presented slight reimpaction.

7. Frequency of molars by the existence of the successor tooth, in descending order:

- with successor: 83.87%
- without successor: 16.13%

Conclusion: most of the reimpacted molars have a successor.

8. Frequency of reimpacted molars by complications, in descending order:

- without complications: 77.41%
- with complications: 22.59%

Conclusion: over $\frac{3}{4}$ of the reimpacted molars did not present complications.

9. Frequency of reimpacted molars by their exfoliation moment, in descending order:

- with normal exfoliation: 77.42%
- with delayed exfoliation: 22.58%

Conclusion: over $\frac{3}{4}$ of the reimpacted molars present an exfoliation concordant to age.

10. Patients/molars frequency by treatment, in descending order:

- expectation with supervision of primary molar exfoliation: 32.26%
- reconstruction with fillings: 16.13%
- extraction with supervision of permanent tooth eruption: 19.35%
- combinations: 32.26% (E + OT for 9 teeth; E + OT + PT for 1 tooth)

Conclusion: expectation and the combined treatment represent $\frac{2}{3}$ of the total treatments performed.

Criterion	Personal statistic study	Speciality literature
Prevalence	7.16%	1.3% -8.9% -14% [5] 38.5% in certain people (Jews) [6]
Arches - maxillae - mandible	The mandible is three times more frequently affected	The mandible is ten times more frequently affected than the maxillae at 6-11 years [6].
Affected molars	Affected molars: - m1>m2>M2>M1	The most affected molars are, according to different authors, the following [5,6]: - the second inferior molar or the first inferior molar - the first and the second temporary molar in equal proportion
Sex - F - M	Slightly more frequent F 57.89% 42.11%	Unsignificant
Complications - yes - no	22.59% 77.41%	- relatively frequent
Successor - with - without	83.87% 16.13%	- frequent in severe forms
Age at diagnosis	Diagnosis peak at 11 -13 years	Diagnosis peak at 8 -9 years
Minimal diagnosis age	5 years and 9 months	Around 3 years
Symmetry - simmetrical affection - asymmetrical affection	More frequent in the mandible Exclusive in the maxillae	More frequent in the mandible More frequent in the maxillae
Infraocclusion severity - slight - moderate - severe	Infraocclusion severity increases with the age - slight 67.75% - moderate 19.35% - severe 12.90%.	Infraocclusion severity increases with age [5]. Severe infraocclusion has a frequency of only 2.5 -8.3%
Treatment - abeyance and supervision - combined treatment (E+OT or E+OT+PT) -extraction+supervision -reconstruction+supervision	32.26% 32.26% 19.35% 16.13%	- frequent in the slight and moderate reimpaction -frequent in the severe reimpaction with successor -frequent in the severe reimpaction with/without successor - frequent in the slight and moderate reimpaction

Table 1. Study conclusion compared to specialty literature data

Case 1

Patient PD, 12 years and 1 month

Diagnosis:

- moderate reimpaction of 7.5, 8.5, with successors (Figures 4,5,6,7,8);
- late onset;
- unequal root resorption between the two molars and the two roots of each molar;
- no complications.

Figure 4



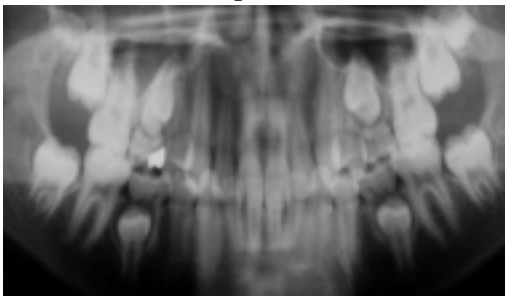
Moderate reimpaction of 7.5

Figure 5



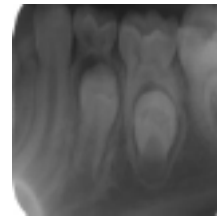
Moderate reimpaction of 8.5

Figure 6.



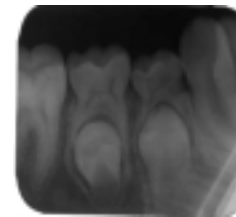
Moderate reimpaction of 7.5, 8.5

Figure 7



Moderate reimpaction of 7.5

Figure 8



Moderate reimpaction of 8.5

Treatment:

- expectation with supervision of infraocclusion progression during 6 months;
- teeth extraction and supervision of premolars eruption.

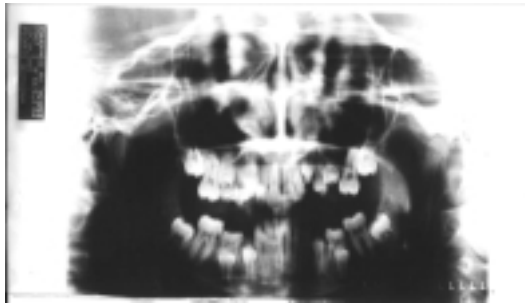
Case 2

Patient PG, 11 years and 9 months

Diagnosis:

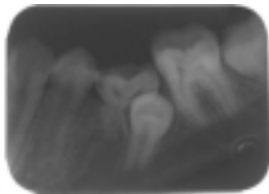
- severe reimpaction of 7.5, 8.5, with successors (Figures 9,10,11);
- severe reimpaction of 6.5 without successor (Figure 9);
- earlier onset but late diagnosis;
- root resorption is slowed down and unequal;
- position of 35, 45 seems modified;
- complications (bending of the neighbors, movement of successors).

Figure 9



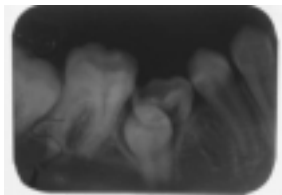
Severe reimpaction of 7.5, 8.5 and 6.5
Position of 35, 45 seems modified

Figure 10



Severe reimpaction of 7.5

Figure 11



Severe reimpaction of 8.5

Treatment:

- extraction of reimpacted teeth;
- orthodontic treatment and supervision of premolars eruption.

Conclusions

Early diagnosis and treatment may prevent the appearance of complications. The prognostic and treatment plan is elaborated by certain criteria – the infraocclusion degree, the presence or absence of successor, the onset and diagnosis moment being the most important ones.

In cases of severe ankylosis with existing successor extraction is recommended, while in slight or moderate cases expectation is preferred, with or without clinical crown reconstruction.

In severe cases of infraocclusion without successor extraction is recommended, followed by precocious orthodontic treatment.

References

1. Ekim SL and Hatibovic-Kofman S: A treatment decision-making model for infraoccluded primary molars. *Int J of Ped Dent*, September 2001; Vol. 11, no. 5: 340-344.
2. Ertugrul F, Tuncer AV, Sezer B: Infraocclusion of primary molars: a review and report of a case. *ASDC J Dent Child*, May-Aug 2002; 69(2): 166-171, 124. Medline.
3. Kuroi J, Magnusson BC: Infraocclusion of primary molars: a histologic study. *Scand J Dent Res*, Dec 1984; 92(6): 564-576. Medline.
4. Kuroi J: Infraocclusion of primary molars. An epi-

demiological, familial, longitudinal clinical and histological study. *Swed Dent J Suppl*, 1984; 21: 1-67. Medline.

5. Ruschel, HC, Modesto A and Gomes MP: Anquiose Dento-Alveolar de Molares Decíduos: Preceitos Literários Parauma Conduta Clínica Racional. *R.B.O.*, 1996; 53(6): 48-52.

6. Sidhu HK and Ali A: Hypodontia, ankylosis and infraocclusion: report of a case restored with a fibre-reinforced ceromeric bridge. *BDJ*, December 8, 2001; Vol. 191, nr. 11: 613-616.

7. Growth and Development Photos: www.cudental.creighton.edu

8. Ankylosed deciduous teeth: www.oc-j.com/Schuster/HTML_EN/Themen/Thema08.htm

Correspondence to: Assoc. Prof. Dr. Anca Maria Raducanu, Faculty of Dentistry Bucharest, Department of Pediatric Dentistry. 12, Ionel Perlea Street, Bucharest 1 – Romania.