

ОРИГИНАЛНИ НАУЧНИ СТАТИИ

INDIRECT PULP CAPPING FOR TREATMENT OF REVERSIBLE PULPITIS IN PRIMARY TEETH- ONE VISIT TECHNIQUE, CLINICAL PROTOCOL

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Summary

Vital pulp therapy is a recommended treatment method for reversible pulpitis in primary dentition due to undeniable evidences for reparative and regenerative abilities of the pulp of primary teeth. Indirect pulp capping is a preferable method in cases of reversible pulp inflammations where there is no direct communication with the pulp as a result of carious lesion. The aim of the method is to affect the pulp inflammation by stimulating the healing processes and production of reactionary dentin. The purpose of the publication is to present the clinical protocol "step by step" for application of one visit technique of indirect pulp capping for treatment of reversible pulpitis in primary teeth. Clinical protocol: On the base of world experience and our contemporary meta-analysis of the researches published in the last 15 years concerning the problems of diagnostics we determine clinical and radiographic diagnostic criteria for reversible pulpitis in primary teeth and indications for application of indirect pulp capping, one visit technique as a method of treatment. We present clinical protocol "step by step" for one visit technique of indirect pulp capping. Clinical and radiographic criteria for success after treatment are summarized. Conclusion: We summarize all the information concerning diagnostics and indication for one visit technique of indirect pulp capping and present a contemporary clinical protocol which is useful for dentist`s everyday practice.

Key words: indirect pulp capping, one visit technique, primary teeth, reversible pulpitis, vital therapy

Introduction

Indirect pulp capping is a preferable method of treatment of reversible pulpitis in primary dentition. It is indicated in cases where there is no direct communication with the pulp as a result of carious lesion (1,2,3). Good results after application of the method in cases of pulp inflammation in primary teeth have been published in 1966

by Aponte et al. (4). The aim of the method is to affect the pulp inflammation by stimulating the healing processes and production of reactionary dentin. In this way the pulp vitality is saved till the moment of physiological exfoliation (1,3,5). The method is according to tendency for micro invasive approach in pediatric dentistry (6,7).

Indirect pulp capping is a type of a vital pulp therapy for treatment of inflammatory diseases of the pulp which is indicated due to the regenerative and reparative abilities of the pulp of primary teeth (5,8,9). Huge number of authors worked and published in the last 15 years proof production of reactionary tertiary dentin under a thin layer of demineralized one left in the cavity above the pulp and covered with suitable pulp capping agent. Registered successful results are between 73,3% and 100% (7,10-20).

There are two techniques for application of the method of indirect pulp capping for treatment of reversible pulpitis in primary teeth – one – and two visits techniques but different authors recommend one or the other technique (5,7,21).

One visit technique is mostly recommended one among researchers and clinicians due to made by us literature review (5,11-19). Main reasons for supporting the technique are connected with studies that stated same or similar microbial count in the demineralized dentin layer left in the cavity during the one visit technique and that in the dentin layer revised in the second visit of the two visits technique (5,21-24).

The aim of this publication is to present the clinical protocol “step by step” for application of one visit technique of indirect pulp capping for treatment of reversible pulpitis in primary teeth.

Clinical protocol:

Clinical and radiograph criteria included in the protocol are a result of a summarized by us information. It is obtained on a base of a contemporary meta-analysis of the specialized literature which discusses the diagnostic and treatment of reversible pulpitis in primary teeth (10).

To visualize the differentiation between infected and affected dentin and in this way to improve the successful outcome after application of the method we use contemporary caries detector (Caries Detector Facelight, W&H, Austria) (fig. 1).



Fig. 1. Caries detector Facelihgt (W&H, Austria)

We use calcium-hydroxide cement as a pulp capping agent in our research which is stated to be the golden standard in indirect pulp capping (one visit technique) applied for reversible pulpitis in primary teeth. It is recommended and preferred by most of leading world authors work in this sphere and the registered results are excellent (5,7,10,11,12,13,16,18).

Sequence of the steps in the presented clinical protocol for indirect pulp capping, one visit technique is a result of our two years clinical experience and studies which are published and still followed up (10).

Presentation of the clinical protocol

1. *Indications:* reversible pulpitis in primary teeth, patients with low caries risk

2. *Diagnostic criteria:*

- Subjective:
 - o Primary tooth with large carious lesion;
 - o No history of past or present spontaneous/ night pain;
 - o Possible provoked pain by chewing which goes away after removal of the irritant.
- Objective:
 - o Visually a primary tooth with large carious lesion (criteria for large caries lesion is determined by consent of National association of pediatric dentists in Bulgaria (6) (fig.2-a);
*caries lesions in the cervical regions are not indicated for vital therapy
 - o No visually observed communication with the pulp (fig.2 –a);
 - o No pathological mobility or pain by percussion;
 - o No swallow, redness, sinus tract or abscess in the surrounding soft tissues.
- o Radiographic criteria: periapical or bitewing X-ray
 - o Deep Carious lesion close to the pulp horn, or it may seem that there is no dentin barrier;
 - o Lack of pathological resorption in furcal and apical regions;
 - o Lack of pathological external or internal root resorption;
 - o Physiological root resorption no more than 1/3 of the normal root length

3. *Indirect pulp capping – one visit technique, “step by step”*

INDIRECT PULP CAPPING, ONE VISIT TECHNIQUE

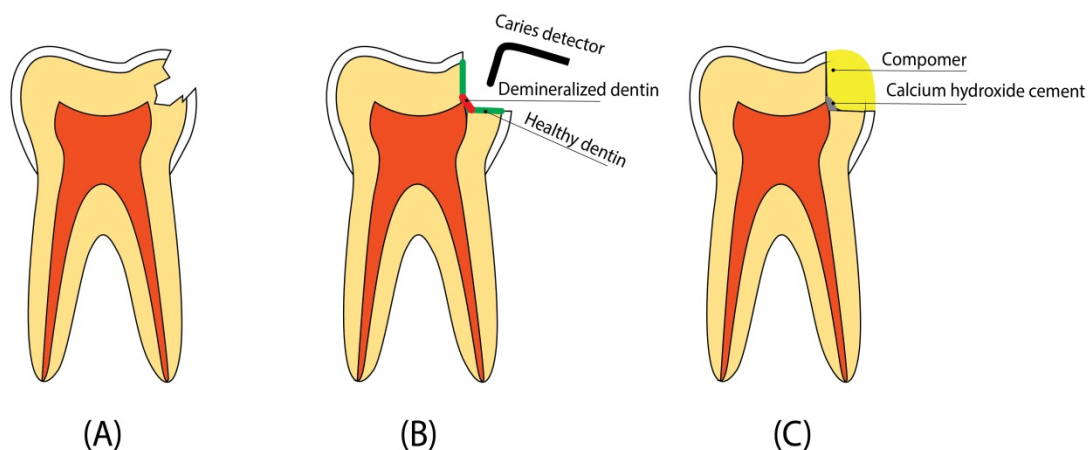


Fig. 2 Schematic representation of procedures

- o Local anaesthesia, if necessary (fig. 2-a);
- o Tooth isolation - with cotton rolls or rubber dam (if possible);
- o Carious dentin should be removed from the dentin walls and strictly from the dentin-enamel junction with round bur or excavator till healthy dentin (Caries Detector lights up in green) except the pulp wall where a thin layer of demineralized (affected) dentin has been left (Caries Detector lights up in light red) (fig. 2-b);
- o The cavity should be clean with physiological solution;
- o The pulp wall should be covered up with calcium hydroxide cement (fig.2c);
- o The cavity should be filled with compomer (fig.2-c).

4. *Follow up period:*

- o Control check-ups are scheduled for 6 months, 1 year and 2 years after treatment.

Clinical criteria for success:

- o Lack of pain;
- o Lack of fractures of the obturation or secondary caries around the edges;
- o Lack of swelling, redness, fistula or abscess of the surrounding soft tissues;
- o Lack of pathological mobility of the tooth.

Radiographic criteria for success:

- o Presence of formed reactionary dentin (if there is no evidence for formed tertiary dentin the case is not classified as a failure);
- o Normally continuing physiological root resorption;
- o Lack of pathological external or internal root resorption;
- o Lack of pathological changes in furcal or periapical regions.

CONCLUSION:

Presented by us clinical protocol for one visit technique of indirect pulp capping for treatment of reversible pulpitis in primary dentition is a result of made by us contemporary meta-analysis of the specialized literature and our studies and publications. Clinical and radiographic criteria are borrowed from world experience of leading authors and they are strictly applied by us so the successful result registered are up to 92,5%.

We recommend indirect pulp capping, one visit technique as a suitable method for treatment of reversible pulpitis in primary teeth. Presented clinical protocol for indirect pulp capping, one visit technique has three main accents- it is indicated for patients with low caries risk, differentiation between infected and affected dentin is made with contemporary caries detector and the technique may be used successfully by dentist with experience and good clinical practice.

References

1. American Academy of Pediatric Dentistry (AAPD). Guidelines on pulp therapy for primary and immature permanent teeth. Reference Manual, Clinical Guidelines 2015/2016; 37:(6): 244-252
2. Carrotte PV, Waterhouse PJ. A clinical guide to endodontics- upgrade part 2. British Dent J 2009; 206: (3): 133-139
3. Rodd HD, Waterhouse PJ, Fuks AB, Fayle SA, Moffat MA. Pulp Therapy for Primary Molars. UK National Clinical Guidelines in Paediatric Dentistry. Int. J. of Ped. Dent. 2006 Sept; 16: (1): 15-23
4. Aponte AJ, Hartsook JT, Crowley MC. Indirect pulp capping success verified. ASDC Journal of Dentistry for Children. 1966; 33: (3): 164-166
5. Orhan AI, Oz FT, Orhan K. Pulp exposure occurrence and outcome after 1- or 2- visit pulp therapy vs complete caries removal in primary and permanent molars. Pediatr Dent 2010; 32: (4): 347-355
6. Национална асоциация на лекарите по детска дентална медицина. Консенсус за лечение на пулпити и периодонтити на временни зъби. Първи симпозиум 2011; 7-8 октомври, Хисаря, България: 24-36

7. Kabaktchieva R, Gateva N, Nikolova K. Success rate of one session and two session techniques for treatment of asymptomatic pulpitis of primary teeth with indirect pulp capping. J of IMAB 2013; 19: (2): 269-273
8. Kidd EA. How “clean” must a cavity be before restoration? Caries Res. 2004; 38: (3): 305-313
9. Tziafas D. Dentinogenic potential of the dental pulp: facts and hypotheses. Endod Topic. 2010; 17: (1): 42-64
10. Милчева Н. Лечение на обратимо възпаление на пулпата на временни зъби. Дисертационен труд, Медицински университет, Варна, България. 2016: 156 стр.
11. Al- Zayer MA., Straffon L., Feigal R., Welch K. Indirect pulp treatment of primary posterior teeth: a retrospective study. Pediatr Dent, 2003; 25: (1): 29-36
12. Casagrande L, Bento LW., Dalplan DM, Garcia-Godoy F, de Araujo FB. Indirect pulp treatment in primary teeth: 4 – year results. Am J Dent 2010; 23: (1): 34-38
13. Falster CA, Araujo FB, Straffon LH, Nor JE Indirect pulp treatment: in vivo outcomes of an adhesive resin system vs calcium hydroxide for the protection of the dentin- pulp complex. Pediatric Dentistry, 2002; 24: (3): 241-248
14. Farooq NS, Coll JA, Kuwabara A, Shelton P. Success rate of formocresol pulpotomy and indirect pulp therapy in the treatment of deep dentinal caries in primary teeth. Pediatric Dentistry 2000; 22: (4): 278-286
15. Gruythuysen R, Van Strijp G, Wu M. Long-term Survival of Indirect Pulp Treatment Performed in Primary and Permanent Teeth with Clinically Diagnosed Deep Carious Lesions. J Endod 2010; 36: (9): 1490-1493
16. Franzon R, Casagrande L, Pinto AS, Garcia- Godoy F, Maltz M, de Araujo FB. Clinical and radiographic evaluation of indirect pulp treatment in primary molars: 36 months follow – up. Am J Dent 2000; 20: (3): 189-192
17. Kotsanos N, Arizos S. Evaluation of a resin modified glass ionomer serving both as indirect pulp therapy and as restorative material for primary molars. Eur Arch of Pediatr Dent 2011; 12: (3): 170-175
18. Marchi JJ, de Araujo FB, Fröner AM, Straffon LH, Nör JE. Indirect Pulp Capping in the Primary Dentition: a 4 Year Follow – up Study. J Clin Pediatr Dent 2006; 31: (2): 68-71
19. Rosenberg L, Atar M, Daronch M, Honig A, Chey M, Funny MD, Cruz L. Prospective Study of Indirect Pulp Treatment in Primary Molars Using Resin – modified Glass Ionomer and 2% Chlorhexidine Gluconate: A 12 – month Follow – up. Pediatr Dent 2013; 35: (1): 13-17
20. Vij R, Coll JA, Shelton P, Farooq NS. Caries control and other variables associated with the success of primary molar vital pulp therapy. Pediatric Dentistry 2004; 26: (3): 214-220
21. Ferreira JM, Pinheiro SL, Sampaio FC, de Menezes VA. Caries removal in primary teeth- a systematic review. Quintessence Int 2012; 43: (1): 9-15.
22. Fuks AB. Pulp therapy for the primary and young permanent dentitions. Dent Clin North Am 2000; 44: (3): 571-596.

23. Kennedy DB, Kapala JT. The dental pulp: Biological principles of protection and treatment. In: Textbook of Pediatric Dentistry. Braham RL, Morris ME, eds. 2nd ed. Baltimore, Md: Williams and Wilkins 1985; 492-502
24. Ribeiro CC, de Oliveira Lula EC, da Costa RC, Nunes AM. Rationale for the partial removal of caries tissue in primary teeth. *Pediatr Dent* 2012; 34: (1): 39-41