INDIRECT PULP CAPPING FOR TREATMENT OF REVERSIBLE PULPITIS IN PRIMARY TEETH- CLINICAL PROTOCOL FOR TWO VISITS TECHNIQUE

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Summary

Indirect pulp capping is a successfully applied method for treatment of reversible pulp inflammation in primary teeth. It is a vital treatment method where the aim is to stimulate the protective abilities of the pulp and its potential for regeneration by applying a suitable pulp capping agent. Two visits technique of the method is a good way to control the caries process and it is indicated for patients with moderate and high caries risk. The aim of this publication is to present clinical protocol “step by step” for indirect pulp capping, two visits technique for treatment of reversible pulpitis in primary dentition. Clinical protocol: on the base of contemporary meta-analysis of leading authors work in the sphere in the last 15 years and our own researches we summarize and present protocol for clinical use where are included: clinical and radiographic criteria for diagnostic of reversible pulpitis, clinical steps for application and criteria for assessment of the results and follow up period. Conclusion: Presented by us clinical protocol proposed following advantages: main diagnostic criteria for reversible pulpitis and indications for indirect pulp capping in primary teeth, main clinical steps for application of the method and criteria for assessment of the results. We encourage the use of the clinical protocol in everyday dental practice.

Key words: indirect pulp capping, two visits technique, reversible pulpitis, primary teeth

Introduction

One of the most successful methods for treatment of pulp inflammation in primary dentition is the indirect pulp capping (IPC). This statement is supported by contemporary guidelines of pediatric dentistry and number of authors work in this
sphere in the last 20 years (1-7). The method is applicable in cases of reversible pulpitis and lack of direct communication with the pulp (1,2,3,6,7,8,9).

There are two different techniques well known- indirect pulp capping in one and two visits techniques (1,8,9,16,17,18). In both techniques the aim is to get partial remineralization of a thin layer of demineralized dentin left over the pulp. As a result of light to moderate pathological stimulus vital odontoblast in the pulp under the place of carious lesion are stimulated to produce tertiary reactionary dentin only in the place of irritation as a defense reaction (1,2,3,5,8-19).

In made by us meta-analysis of the contemporary specialized literature only three out of twelve authors included in it carried out the two visit technique (17,18,20). Kabaktchieva et al. study both techniques in cases with asymptomatic pulpitis in primary teeth and prefer the two visit one in cases of children with high caries risk. Registered success rate after the study is 91% (17). Vij et al. discuss only the two visit technique and the success rates are up to 94% (20). National association of pediatric dentists in Bulgaria recommend only the two visit technique and states that more studies and quality researches about one visit technique are necessary (2). Our own researches about the method show that the two visit technique of indirect pulp capping for treatment of reversible pulpitis in primary teeth is more successful in comparison with the one visit one and the registered rates of success are 95% for two visit technique compared to 92,5 % for one visit technique (9).

The aim of this publication is to present systematic and approbated by us clinical protocol for two visit technique of indirect pulp capping for treatment of reversible pulp inflammations in primary dentition.

Clinical protocol

Subjective and objective criteria, included in the protocol are a result of summarized by us information from the last 15 years. The information is obtained from contemporary meta-analysis of the clinical and radiographic criteria which authors discuss (17,18,20-29) in diagnostics of reversible pulpitis in primary teeth and received by us as criteria in taking indirect pulp capping in two visit technique as a treatment method (9)

We use caries detector (Caries Detector Facelight, W&H, Austria) (fig.1) in differentiation of infected from affected (demineralized) dentin.
We apply calcium-hydroxide cement as a pulp capping agent which is with a proven ability for remineralization of demineralized dentin, with good biocompatibility and excellent antimicrobial characteristics (8,31,32,33). It is pointed as a “gold standard” for the method and it is preferred because of the excellent result registered in huge number of contemporary researches (1,9,17,18,21,22,23,26,28,30).

The proposed clinical protocol “step by step” for indirect pulp capping in two visits is a result of our long term clinical experience and our studies results of which are published and still followed up (9,17).

Presentation of the clinical protocol

1. Indications: reversible pulpitis in primary teeth, patients with moderate or high caries risk

2. Diagnostic criteria:

   - Subjective:
     - Primary tooth with large carious lesion;
     - No history of past or present spontaneous/night pain;
     - Possible provoked pain by chewing which goes away after removal of the irritant.

   - Objective:
     - Visually a primary tooth with large carious lesion* (cavitated or noncavitated) (criteria for large caries lesion is determined by consent of National association of pediatric dentists in Bulgaria (2) (fig.2-a);

*carious lesions in the cervical regions are not indicated for vital therapy

   - No visually observed communication with the pulp (fig.2 –A);
   - No pathological mobility or pain by percussion;
   - No swallow, redness, sinus tract or abscess in the surrounding soft tissues.
Radiographic criteria: periapical or bitewing X-ray
- Deep Carious lesion close to the pulp horn, or it may seem that there is no dentin barrier;
- Lack of pathological resorption in furcal and apical regions;
- Lack of pathological external or internal root resorption;
- Physiological root resorption no more than 1/3 of the normal root length
3. *Step by step protocol for indirect pulp capping, two visit technique (fig.2)*

**INDIRECT PULP CAPPING TWO VISITS TECHNIQUE**

*Figure 2. Schematic representation of procedures*

- Local anaesthesia (if necessary);
- The tooth is isolated with cotton rolls (if possible use of rubber dam is recommended);
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);

- The cavity is cleaned with physiological solution;
- The pulp wall is covered with calcium-hydroxide cement (fig. 2-c);
- The cavity is closed for a period of 6 to 8 weeks with IRM (ZnO with catalyst) (fig. 2-c);
- On the second visit, after 6 to 8 weeks, the cavity is revisit, left demineralized dentin layer is removed and the secondary remineralized dentin layer and the tertiary reactionary one have to be left in the cavity. The excavation is controlled with caries detector (fig. 2-d).
- Calcium hydroxide cement is applied on the pulp wall (fig.2-e);
- The tooth is filled with compomer/composite (fig.2-e).

4. **Follow up period:**

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

   *Clinical criteria for success:*

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

   *Radiographic criteria for success:*

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

**CONCLUSION.**

Presented by us clinical protocol for indirect pulp capping, two visits technique for treatment of reversible pulpitis in primary teeth is a result of made by us meta-
analysis of the specialized literature and our own researches and publications in this sphere. Clinical and radiographic diagnostic criteria are borrowed from the experience of world leading authors and strictly followed by us and the registered successful results are 95%.

We recommend indirect pulp capping, two visits technique as a suitable treatment method for reversible pulpitis in primary dentition. The presented clinical protocol has following advantages: it is indicated for treatment of children with moderate or high caries risk; we recommend caries detector as an objective way to differentiate infected from affected dentin; first visit is so called “pulp-control” in healing processes in the pulp and save of its vitality; it is useful for students and dental practitioners with experience and young dentists.

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