Bulk-fill direct composite restoration technique in pregnancy – case report

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Abstract

In pregnant women, the characteristics of dental treatment must meet few important aspects: a minimal operative stress and trauma, if possible one-session treatment, short working time, and long-time results, meaning an increased survival rate of the restoration. One of the most effective and successful techniques for direct resin composites restorations is bulk-fill technique. The specific feature of this treatment method is the insertion of restorative material in one step, often a single layer. Due to the improved characteristics of the resin composites developed for this technique, all the aforementioned requirements are fulfilled, making this technique the first choice for direct resin composite restoration during pregnancy.

Keywords: *pregnancy, resin composite restoration, bulk-fill technique*

Rezumat

Tratamentele stomatologice la femeile gravide trebuie să îndeplinească unele criterii importante: traumă operatorie minimă, pe cât posibil o singură ședință de tratament, timp de lucru scurt și rezultate bune pe termen lung, ceea ce înseamnă o rată crescută de supraviețuire în timp a obturației. Una dintre cele mai eficiente și de succes tehnici pentru restaurările directe cu materiale compozite este tehnica de restaurare „în masă" („bulk-fill"). Caracteristica specifică a acestei metode de tratament o reprezintă inserarea materialului de restaurare într-o singură etapă, de cele mai multe ori într-un singur strat. Datorită caracteristicilor îmbunătățite ale compozitelor create pentru această modalitate de tratament, toate cerințele menționate anterior sunt îndeplinite, făcând din această tehnică opțiunea de ales pentru restaurările directe cu rășini compozite în timpul sarcinii.

Cuvinte-cheie: *sarcină, restaurare cu rășini compozite, tehnica de restaurare „în masă"*

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Restaurarea directă în masă („bulk fill") cu rășini compozite în sarcină – prezentare de caz

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Introduction

In pregnant women, all dental treatments, which are absolutely required, are strictly related to the fact that the female patient is in a special physiological condition, which reflects on the physical and equally emotional responses of her body[(1)].

Odontal restoration of hard dental tissues loss, often accompanied by acute dental pain, is the most common reason for which the pregnant women present to dental practice.

The priority of dental treatments in pregnant woman is to cause as little trauma as possible, with no harm for her and for the fetus. Thus, the treatment must be conservative, preferably in one session, but the working time must be short, with frequent breaks to ensure the comfort for the patient, especially if she presents in the second or the third trimester of the pregnancy[(2)]. On the other hand, dental treatments in pregnant women must meet the criteria of a long-time restoration, with no possibility for further complications such as pulpal inflammations, coronal and radicular fractures, or even tooth loss[(3)].

The dental treatment in pregnant women is subjected to the specific conditions we usually confront with during this physiological period: pregnancy gingivitis associated with gingival bleedings, intense acute responses to normal stimuli to which dental surfaces come into contact, exacerbated dental hypersensitivity and dental hyperesthesia, the limits and indications for dental anesthesia, the need for dental chair specially positioned for the woman[(4,5)]. Above all, the dentist must have an attitude of kindness, tolerance and understanding towards the special needs, both physical and emotional, for a woman during her pregnancy.

A proper, correct and rigorous dental treatment in a pregnant woman significantly contributes to a harmonious course of pregnancy and to a healthy newborn.

Nowadays, resin composite materials are the first choice as restorative materials. In order to obtain proper results, many techniques for inserting composites into the cavities have been developed: centripetal technique, incremental techniques with different

types of layers: horizontal/oblique/vertical layering technique, successive cusp build-up technique, bulk-fill technique[6]. Associated with these, specific resin composites have been developed, to fulfill the necessities for a certain method.

One of the most successful techniques used today for direct restorations is the "bulk-fill". This means the placement of a large quantity of resin composite into the cavity, often a single layer, to a depth of 4-5 mm[7]. Among the new materials specially designed for this technique there are: Filtek Bulk Fill®, 3M ESPE; Tetric N-Flow Bulk Fill®, Ivoclar Vivadent; Filtek®One Bulk Fill Restorative, 3M ESPE. They exhibit special features which allow to obtain the requirements of lower shrinkage, lower polymerization stress, better light transmission in depth, thus a smaller numbers of layers and, as a result, less time consuming, with a very good result of the restoration[8]. The bulk-fill technique, as other adhesive methods, permits a very conservative approach in dental treatment and prevents the postoperative sensitivity. The reduced shrinkage stress on the enamel and dentin walls means a very good marginal sealing, preventing nano- and microleakage, thus providing a long-time restoration.

Case report

A 28-year-old female patient presented to dental practice for the restoration of a carious lesion in tooth 35 (Figure 1). The patient was in her 21st week of pregnancy, and the reason for asking for dental treatment was the acute pain at different stimuli like sweet or cold located at her tooth. The clinical exam we performed revealed the loss of hard dental tissues as a result of dental caries, in the occlusal pits and groove. The exacerbated sensitivity at both physical and chemical stimuli is related to the special physiological period in which the patient has presented to us. The specific hormonal changes make the patient to consider the pain less acceptable or bearable than before pregnancy. Taking also into consideration that the carious lesion must be restored before further evolution, and the next stages of the pregnancy, followed by the postnatal and breastfeeding periods, we decided to use a direct technique of odontal restoration in one stage[9]. The bulk-fill technique was chosen because it has a number of certain advantages, as follows: it is a simple method of treatment, it is a very rapid technique in which the hard tissue loss is restored using a specific flow resin composite, and the result is predictable, offering a long-time success restoration[10].

As for every dental treatment, we started with removing the dental plaque by professional brushing, and the next stage was to start excavate and completely remove the altered tissues presented inside dental caries. A class I cavity for adhesive materials was obtained, by using for treatment only spherical burs, which provide a smooth internal surface and no sharp walls or angles (Figure 2).

For this case, the restorative specific resin composite for bulk technique was Filtek® One Bulk Fill Restorative, 3M ESPE. This product provides a proper light curing of the entire inserted material in one step, for a thickness up to 5 mm.

Also, the maneuver of placing the material inside the cavity is extremely easy, and its viscosity – higher than of other flowable restorative resin composites (such as SDR [Smart Dentin Replacement], Dentsply®

Figure 1. *Carious lesion on occlusal surface in tooth 35*

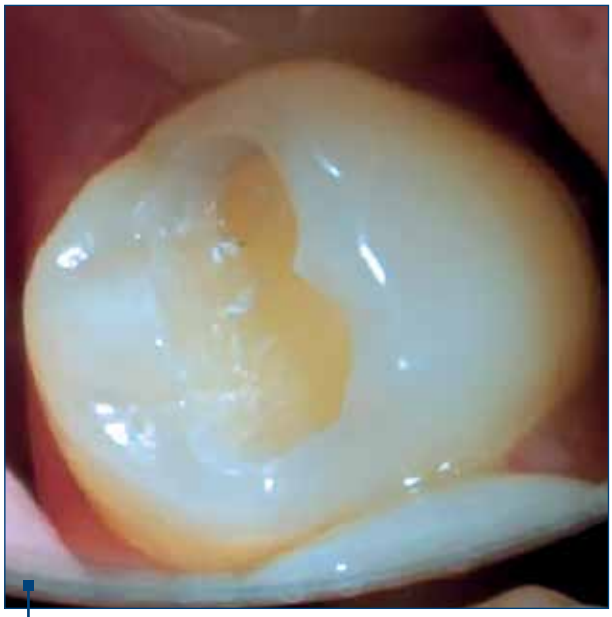

Figure 2. *Occlusal cavity for adhesive dental materials in tooth 35*

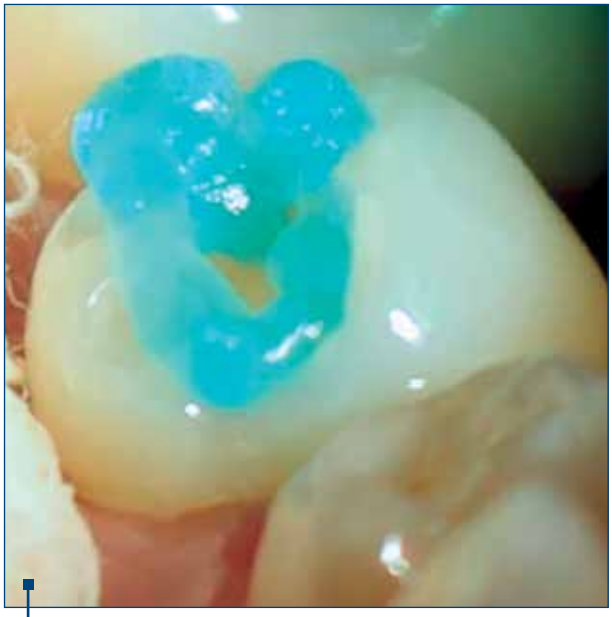

Figure 3. *Total etch adhesive technique for occlusal cavity in tooth 35*

or Filtek Bulk Fill®, 3M ESPE) – permits a slightly condensation to increase adaptation to cavity walls. Thus, it offers excellent adaptation and handling advantages[11]. The physical properties of this material – such as its flexural properties, excellent strength and low tooth wear – make it a good choice for posterior restoration when an easy technique with predictable and long-term success of restoration is needed, as in pregnant patients[12].

The next step of the dental treatment was to insert the resin composite into the cavity. The protocol started with the adhesion stage, in which we used first etching with 32% orthophosphoric acid (Scotchbond Universal Etchant[R], 3M ESPE), for 20 seconds, both on enamel and dentin (Figure 3). Following the removal and thoroughly cleaning of the acid and slightly drying the cavity, the adhesive system was applied (Adper™ Single Bond 2, 3M ESPE). The adhesive layer was light-cured for 20 seconds.

Next, the resin composite material was inserted into cavity. Using the composite placement and modeling instrument called Compothixo®, Kerr, the adaptation of the resin composites to cavity walls and the marginal adaptation were easily achieved, and also the morphological aspect of the occlusal surface. The material was light-cured for 20 seconds (Figure 4).

The last step of any dental treatment is represented by the occlusal adaptation of the direct restoration, using diamond burs, followed by polishing with polishing gums and cups in the slow-speed handpiece (Figure 5).

Bulk-fill technique for direct restoration provides a simple, rapid and facile method of restoring loss of hard dental tissue, no matter its etiology. The resin composite is placed in a unique layer, a single layer, up to 4-5 mm. Despite the great quantity of resin placed and light-cured in one step, the shrinkage stress and the cusp deflection are low. The clinical expression of these features of newly developed bulk-fill resin composites means a high quality restoration, with a good marginal sealing, good abrasion resistance, proper resistant to fractures and tooth wear, therefore a long-term success[13].

Figure 4. *Insertion and occlusal modeling of resin composite material in tooth 35*

Figure 5. *Final aspect of direct resin composite restoration of occlusal dental caries in tooth 35, using bulk-fill technique*

Conclusions

In pregnant women, the characteristics of dental treatment must meet few important aspects: a minimal operative stress and trauma, one-session treatment, short working time and long-term results, meaning an increased survival rate of the restoration, which has a prophylactic and preventive role for the entire oral cavity. In this respect, bulk-fill technique represents one of the first treatment method options, because it fulfills all the aforementioned requirements. ■

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