Dentine Replacement with Biodentine Under Class II Composite Inlay: A Case Report

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Abstract

Biodentin is a bioactive cement with dentin-like mechanical properties, which can be used as a dentine substitute for both crown and root. It also helps in the remineralization of dentine along with maintenance of pulp vitality. This advocated to be used in various clinical applications, such as root perforations, apexification, resorptions, retrograde fillings, pulp capping procedures, and dentine replacement. Indirect laboratory-processed composite systems present an esthetic alternative for intracoronal posterior restorations and provide esthetic results that may also reinforce tooth structure. Additional clinical benefits include exact marginal integrity, wear resistance similar to enamel, wear compatibility with opposing natural dentition, optimal esthetics, ideal proximal contacts, and excellent anatomic morphology.

Keywords: *Calcium Silicate Cement, Caries,, Composite Inlays, Remaining Dentinal Thickness.*

Introduction

The caries attack proportion is the highest maxillary and mandibular permanent first molars, followed by second molars. The interproximal surface of molar are highly susceptible to dental caries and often get unnoticed in the usual dental inspection.[1] One suspects Class II caries (Fig 1) only when the patient complains of food lodgement, sensitivity or noticeable frank cavitation seen in the marginal ridge area.[2] There is various material available for the restoration of such defects. The most popular direct restorative material preferred for Class II was Silver Amalgam.[2] Due to its metallic colour and mercury hazards associated with it along with phasing out of this material worldwide, there is a sudden surge in the use of other restorative materials.[3]

Aesthetic restorations for posterior teeth are in current demand by patients worldwide. Composite restoration is among one of the choices preferred by most of the dentist.[4] Nevertheless, one of the drawbacks of composite restoration is that it undergoes polymerization shrinkage, which leads to microleakage and in short span leas to deterioration of the restoration. Indirect composite inlay was introduced to overcome these pitfalls of direct restorations. The composite inlay has an advantage over direct composite restoration since the contraction of the inlay takes place outside the oral cavity.[5] Biodentine is a new generation silicate cement which is bioactive like mineral trioxide but has superior handling properties and strength. It is an adequate dentine replacement and pulp protecting material.[6] This paper presents the clinical cases in which Biodentine was placed to replace the lost dentine during caries and cavity prep, followed by indirect composite inlays

Case Report: A 37-year-old male patient was referred to the Postgraduate Clinic of Conservative Dentistry and Endodontics (Institute of Dental Sciences and Hospital, Bhubaneswar). The patient complained of dislodged restoration and gave a history of restoration done four years back. Patient's had a non-contributory medical history. Intra-oral examination revealed mesio occlusal caries concerning 46. Clinical inspection and radiographic evaluation revealed secondary caries approximating pulp. The pulp sensibility for 46 revealeda positive response to it.

The patient had uncontrolled ropy saliva, and even after the placement of high evacuation suction and isolation device, it was challenging to do the direct restoration. Therefore we settled to restore the tooth with

indirect composite inlay. Subsequently,the patient's consent was taken to restore the tooth with indirect composite resin inlay.

The secondary caries was excavated at a slow speed using round carbide bur and spoon excavator. The weakened and unsupported enamel was removed. Ensuring the principles of tooth preparation to receive inlay, the cavity preparation was done. The cavity walls had divergent walls, rounded internal line angles and cavosurface configuration with butt joint. The walls of the cavity smoothened using finishingbur (Fig 2). As the axial wall was approximating the pulp chamber, a protective dentine replacement was done with Biodentin. After the final tooth preparation, the cavity was cleaned and dried. With the polyvinylsiloxane material (Aquasil/ Dentsply)impression was made using both heavy body putty and light body together.. Subsequently, a direct provisional restoration was placed using temporary light-cured resin-based cement (Cool Temp, Coltene). The positive replica of this impression taken was made using die stone. An appropriate shade of the restoration was selected using the Vitapan shade guide, and the casts and with selected shade image was delivered to the laboratory(Dent Care) for the fabrication of the inlay.

After 1-week patient visited again for a second appointment. The provisional restoration was taken out, and the cavity was disinfected with 2% chlorhexidine The cavity was selectively etched with 37% phosphoric acid, the adhesive (Universal Bond, 3M ESPE)was applied and light-cured (Bluephase, Ivoclar) on the tooth, and the same adhesive was applied on the silanated (Monobond S Ivoclar) internal aspect of composite inlay without being polymerized. Then the cementation was carried out by applying a thin layer of dual-cure Resin Modified Glass Ionomer Cement (Fuji, GC). The resin luting cement was light-cured (Blue Phase Ivoclar) through the restoration from both, palatal and buccal side of restoration. The excess resin luting cement from the interproximal area was removed using a dental floss. The finishing and polishing were done using a composite finishing kit (Ivoclar). Post final finishing and polishing, the occlusion was evaluated. (Figure 3) The patient was informed about the limitation of the technique and was asked to maintain a regular maintenance visit. A radiograph was taken after 6 months during follow up visits to evaluate the restoration (Figure 4).

Figure 1. Class II caries

Figure 2. Class II inlay cavity preparation.

Figure 3. Cemented Composite Inlay

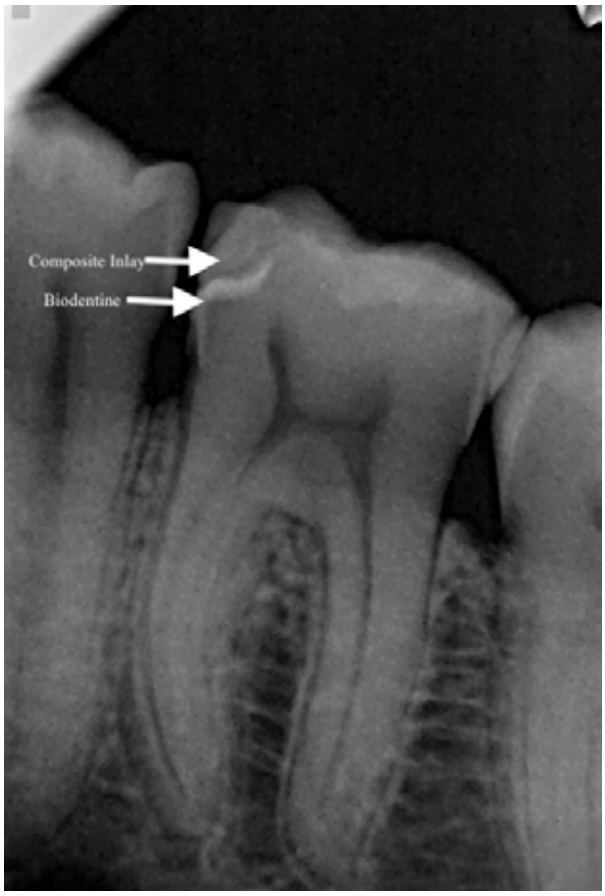

Figure 4. Radiograph of restored 46 during follow up

Discussion

Managing deep dental caries is a challenge. The Remaining dentinal thickness protects pulp from irritation caused by restorative material. It is imperative to replace the lost dentine of the cavity preparation with a biomimetic material which not only protects the pulp but also supports the restorative material like base, Biodentine sets in 45 minutes has high compressive strength and good marginal adaptation. [6]It is recommended to place the overlying direct composite resin after two weeks so that Biodentine material can achieve sufficient maturation and can withstand contraction forces from the resin composite. This drawback is overcome with indirect composite resins which are fabricated in the lab.[7]

Several tooth-colored materials are available like zirconia and ceramic, but they are expensive. In contrast, IRCs ease of handling and exhibits better stress distribution, reparability, lower cost. However, they also have some drawbacks like in the long term the surface exhibits roughness and more prone to colour changes. [8]

Like all indirect restoration, IRC results in less chair-time for the patient and minimizes the finishing and polishing time. Furthermore, it is effortless to make proximal contacts using indirect restorations. An essential advantage of using this indirect restoration method is increased surface hardness, resistance to compression, reduced risk of fractures and cracks in the internal structure of the material.[6]

One of the primary purposes of restoration is to establish and replicate occlusal anatomy and proximal contacts of the tooth. Indirect composite restoration can achieve all that and hence should be considered as restorative material of choice when the tooth can not be isolated, inaccessible areas, limited mouth opening and when the patient cannot sit for a long time during direct restoration.[8]

Conflict of Interests: None

Ethical Permission: Approved

Funding: Nil

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