

## CLINICAL ARTICLE

# Indirect Aesthetic Onlay Restoration as A Minimally Invasive Alternative for Prosthetic Rehabilitation Of Carious Molar: A Case Report

*Dr. Maulee Sheth<sup>1</sup>, Dr. Sonali Kapoor<sup>2</sup>*

- 1. PG III, Department of Conservative Dentistry and Endodontics, Manubhai Patel Dental College and Hospital, Vadodara*
- 2. Professor &HOD, Department of Conservative Dentistry and Endodontics, Manubhai Patel Dental College and Hospital, Vadodara*

### **Abstract:**

Onlays are a durable and aesthetic method of restoring a tooth that has been weakened, fractured or damaged by extensive dental caries. Minimally invasive methods to replicate the histology of the tooth while rehabilitating a carious molar helps to deliver a sustainable and an aesthetic restoration. This report details a case of a 22-year-old patient with complex caries in lower molar treated with the principles of biomimetics combined with the PIAR (Posterior Indirect Adhesive Restorations) principles.

**Keywords:** Aesthetic, Onlay, Minimally Invasive

### **Introduction:**

Encountering severely decayed, damaged, and otherwise compromised vital teeth is common in daily practice. However, when they are located in visible posterior areas, a balance must be reached between achieving biomechanical stability and satisfying esthetic demands. <sup>1</sup> Because there is no singular restorative or adhesive approach that can achieve all clinical, functional, and esthetic goals in all situations, a more open and pragmatic methodology is required. When based on the histo-

anatomy of the natural tooth, the clinical protocol undertaken and the indirect restorations delivered can demonstrate natural integration and biomimetic sustainability.<sup>2</sup>

As the aesthetic aspect of dental care becomes important to patients, aesthetics is playing an increasingly important role in their choice for dental restorations. Various aesthetic materials for posterior teeth include direct composite restoration, indirect composite restoration, metal ceramic restoration AND all ceramic restoration. This case report describes the application of biomimetic principles for delivering indirect adhesively bonded restoration to treat carious molar.

### **Case Report:**

A 22-year-old male patient reported to the Department of Conservative Dentistry and Endodontics at Manubhai Patel Dental College and Hospital with the chief complaint of decayed tooth in lower right back tooth region. On clinical examination, complex caries involving buccal and occlusal surface of the tooth i.r.t 46 was noted (Figure 1). The tooth also showed absence of tenderness on percussion and on testing pulp vitality using a cols test showed normal response.

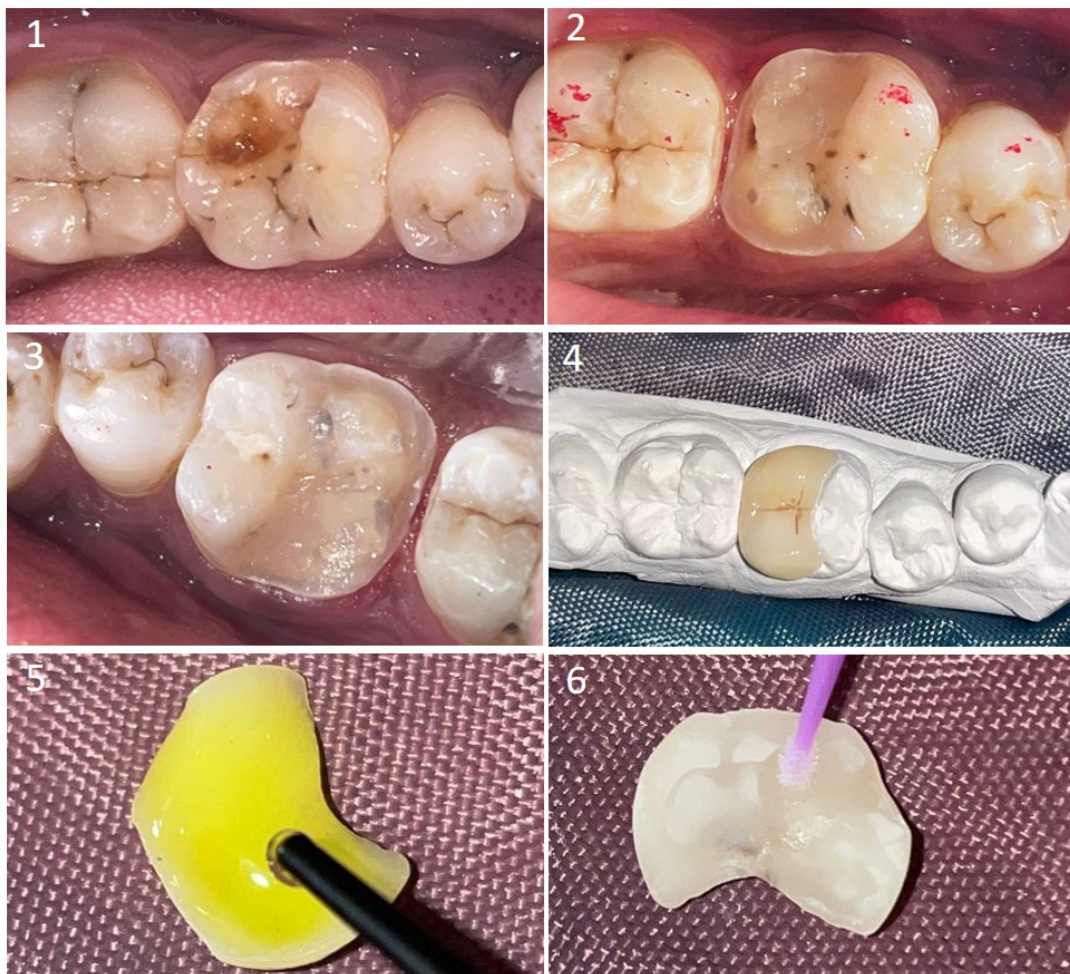
After administering local anesthesia, isolation and caries excavation were performed to prevent moisture or bacteria from contaminating the dentin. An immediate dentin seal was established after tooth preparation to simultaneously protect the dentin-pulp complex and enhance bond strength through maturation of the hybrid layer. The shade selected for the onlay was B2 using the VITA Classic shade guide.

For tooth preparation, distal contact and an undermined distolingual cusp was chosen to be included in the preparation and a slot was prepared in the distal contact area. Following the PIAR (Posterior Indirect Adhesive Restorations) principles, a butt joint was given in the distolingual margin being the non-functional cusp, and a long bevel was given for the distobuccal margin, as the functional cusp.<sup>3</sup> The slot, and the two distinctive margins were prepared in a way that they merged with each other without any undercuts. Figure 2, shows the final tooth preparation. If any undercuts were present, they were blocked using flowable composite resin. The exposed dentinal surfaces after the caries excavation and tooth preparation were sealed using the flowable resin (Figure 3).

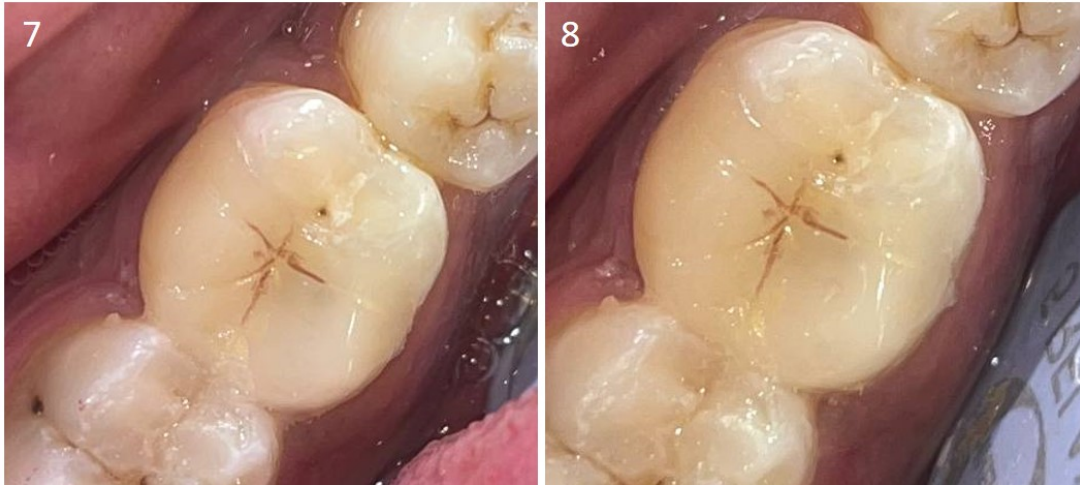
Followed the block out and build up, the preparation margins were refined and occlusal clearance was checked. After placing the retraction cord, two-step impression of the preparation using addition silicone was taken.

E. max onlay after fabrication, was then checked for any possible defects on the margins or adaptation i.r.t 46 (Figure 4). The onlay was etched first using Hydrofluoric acid (9.5%) for 90 seconds followed by silanization (Monobond S)(Figure 5,6). The adjacent tooth was isolated using teflon. Followed by the surface treatments, the onlay was cemented to the tooth using a dual cure resin cement (Calibra). After tack cure, the excess cement was removed first from the interproximal region using a floss followed by final curing (Figure 7)

An IOPA was taken post-cementation to check the adaptation followed by post-operative instructions for the patient. At intervals of 2 weeks and 28 weeks, the E.max onlay showed acceptable performance. (Figure 8)



**Fig 1:** Pre-operative Clinical image, **Fig 2:** Tooth preparation for e. max onlay, **Fig 3:** After Biobase and refinement of the tooth preparation, **Fig 4:** After fabrication of E.max onlay, **Fig 5:** Surface treatment using 9.5% Hydrofluoric acid, **Fig 6:** Application of silane coupling agent



**Fig 7:** Post cementation, **Fig 8:** Follow up after 2 weeks

## **Discussion:**

One of the reasons biomimetic dentistry is successful is due to the preservation of the most important structures of the tooth organ; preserving the areas that biologically offer the most support. The response to chewing forces and stress distribution within the tooth organ is related to its structure. The preservation of enamel at the periphery of the preparation of onlay restorations helps resist deformation, while the dentin-enamel complex dissipates forces, increasing resistance to fracture. <sup>2</sup>

In this case, after caries excavation blocking of undercuts was performed. Removal of undermined tooth structure for onlay preparation avoids thin walls and ensures proper dentin/enamel thickness. Building up the tooth and undermined tooth structure with bonded composite resin to full anatomy before the preparation increases structural integrity and allows for a minimally invasive morphology-driven preparation which was the aim of the restoration.

IPS E.max (Ivoclar vivadent) newly developed glass ceramic material containing lithium disilicate (LS2) that shows esthetics and strength can be successfully combined. It was thus the choice of

restorative material for this case. All ceramic material with high strength provide good restorative alternative to moderate to large size carious lesion's'.

A study on the evaluation of clinical success and survival rate of ceramic onlay showed the lack of recurrent caries, minimal marginal discoloration and color match. Additionally, they even reported the excellent longevity of ceramic onlays justifying them as a valuable tool for posterior teeth. <sup>4</sup>

Self-adhesive or conventional cementation methods can be used for luting of ceramic restorations. Dual cure resin cement was the choice of luting cement inn our case. This is because of its adequate degree of polymerization, extended working time and the combined advantages of light and chemically activated resins. As a result, a fast initial setting of the resin cement contributes to a stabilization of the restoration. <sup>5</sup>

Certain limitations of ceramic onlay restoration include requirement of 2-3 appointments, good laboratory support, repair difficulties and high cost.

## **Conclusion:**

Although treating severely decayed, damaged, and otherwise compromised vital teeth is commonplace in daily practice, doing so has traditionally represented an esthetic challenge for restorative dentists. However, if the histo-anatomy of the natural tooth is considered when selecting and executing clinical protocol, indirect partial-coverage restorations can be placed to provide aesthetic integration, biomimetic sustainability, and functional durability in visible posterior areas.

## **References:**

1. Rudra Kaul SR, Wazir ND. Case Report Onlays in Dentistry: An Endangered Species.
2. Vohra F, Rashid H, Ab Ghani SM. Modern adhesive ceramic onlay, a predictable replacement of full veneer crowns: a report of three cases. Journal of the Dow University of Health Sciences (JDUHS). 2014 Apr 10;8(1):35-40.

3. Ferraris F. Posterior indirect adhesive restorations (PIAR): preparation designs and adhesthetics clinical protocol. *Int J Esthet Dent*. 2017 Jan 1;12(4):482-502.
4. Qamheya AH, Qamheya M, Arisan V. Lithium disilicate restorations: overview and a case report. *J Dent Oral Disord*. 2016;2(9):1047.
5. Hamdy A. Effect of full coverage, endocrowns, onlays, inlays restorations on fracture resistance of endodontically treated molars. *J Dent Oral Hyg*. 2015;5:2.