

Vonlay: A Review

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Abstract- Dentists are concerned about post endodontic treatment because it can be minimally invasive and extend the life of teeth that had root canal therapy. The development of treatment options that more closely satisfy the biological, biomechanical, and aesthetic objectives of "minimally invasive" dentistry has been made possible by advances in biomaterials and an understanding of the relevance of tissue preservation. With the current state of knowledge, we can suggest minimally invasive bonded partial restorations that satisfy the main standards of contemporary dentistry, either to circumvent the drawbacks of direct restorations or as an alternative to full coverage restorations, which are thought to cause more dental damage. One such approach is vonlay.

Keywords: Vonlay, minimally invasive, Onlay, Veneers.

INTRODUCTION:

Tissue preservation is the cornerstone of modern dentistry so, patients are looking for less invasive and more effective treatments for over two decades [1]. Modern high-strength materials, such as lithium disilicate ceramic, along with processing techniques like CAD/CAM and heat pressing have allowed dentists to provide their patients with highly appealing, high-strength restorations that, even in thin parts, can sustain occlusal stresses and blends smoothly with the existing dentition [2]. Clinicians can improve the shape, color, or location of teeth using a variety of techniques like veneers, full crowns, onlays, endocrowns in modern restorative dentistry. A wide range of materials and processing techniques are also available for fabricating restorations. One such design proposed by Dr. Ronald E Goldstein is "Veenerlay or "Vonlay" [2]. Vonlay is a blend of an onlay with an extended veneer on buccal surface of posterior tooth. This restorative option requires a much less invasive preparation than a full coverage crowns. Vonlays are used to restore multi-rooted teeth that presented endodontic treatment and extensive coronal destruction [2]. Vonlay overcomes the disadvantages of old restorative technique as it requires less invasive preparation and it enhances the strength and esthetics of remaining tooth [3].

HISTORY

Historically, complete coverage restoration was considered the best treatment option when a patient needs restoration in the posterior region; however, the issue is the greater tooth reduction in full coverage restorations, which induced a shift to minimally invasive dentistry, which has recently been adopted and attempts to maintain as much tooth structure as possible when feasible [4].

"Minimally invasive dentistry," which aims to maintain as much tooth structure as possible, has become popular in recent years. This implies a shift from methods like full coverage restorations which results in destruction of sound enamel to alternative simplified design like vonlay. Due to advancements in adhesive technology and the use of stronger ceramic materials, teeth can now be restored with less invasive methods like vonlay [4].

NEED OF VONLAY

Traditionally for the restoration of posterior tooth which have undergone root canal, various treatment options are available like full crown restorations, onlays, inlays, endocrowns [3]. Full crowns are the most commonly used restoration technique and it also evenly distribute stresses acting on restored tooth and also increases the life of tooth but it violates the principles of "minimally invasive" dentistry as it requires more intensive reduction of healthy tooth structure [5].

Another common treatment option is onlays, which covers all the occlusal surface without covering axial surface of clinical crown [6]. By covering more than one cusp, onlay provides favorable distribution of stresses, reducing the risk of tooth and restoration fracture [7].

Inlays are also attempted to restore posterior tooth affected by caries, but it cannot be used as a restoration in root canal treated tooth because it provides wedging effect on restored tooth and can cause fracture of restored tooth [5]. Endocrowns are monolithic one piece, core and crown restorations [6,8], and their retention mainly depends on friction with pulp chamber walls and adhesion with the available tooth structure. They are indicated in limited cases such as tooth having reduced interocclusal space for post and core and crown [6]. Veneers are one of the most esthetic treatment option available till date, but it is limited to anterior tooth [3].

To overcome shortcomings of all restorative technique Dr. Ronald E Goldstein introduced “Vonlay” or “Veenerly” which includes veneer on buccal surface and onlay on occlusal surface of posterior teeth. Also, vonlay is more esthetic than onlay and is less invasive than full crowns. It is hopeful treatment alternative to full crowns, onlays, inlays and endocrowns [2].

INDICATIONS

Patients between the ages of 25 and 45years old, psychologically and physically capable of tolerating standard dental procedures, no current periodontal or pulp diseases, endodontically treated and attrided posterior teeth, posterior teeth having caries on buccal and occlusal surfaces [1].

CONTRAINDICATIONS

Patients with periodontal disease which are aggressive and resistant, patients with poor oral hygiene, high caries risk patient, uncooperative patients, patients who had abnormal occlusal habits like bruxism or clenching [1].

TOOTH PREPARATION

Occlusal preparation: -

The aim was to achieve overall reductions in the height of the occlusal surfaces of at least 2mm of reduction on functional cusp and 1.5 mm of reduction on non-functional cusps [2,4,9] in the axial direction and to get an Occlusal table or “Occlusal sidewalk” in the form of a butt joint (fig 1). The occlusal box was extended by 2mm depth from cusp tip to the pulpal floor, 1 mm depth from the pulpal floor to the gingival seat with 12-degree divergence angle with conical flat end diamond bur (ISO 170/016, TF-31, Mani, Germany) ending with an isthmus portion measuring one third of the bucco-lingual width Occlusal [4] Preparations were done using a flat ended tapered diamond bur to achieve a shoulder finish line for the seating of the ceramic onlay [2]. To assess the amount of occlusal reduction a silicon index was fabricated on the natural tooth before preparation [4].

Buccal preparation: -

Depth cuts were placed on the buccal surface using diamond depth cutting bur. The remaining enamel was removed using round end bur (ISO 199/ 016, TR-12, Mani, Germany) to obtain a supragingival 0 diamond.5mm chamfer finish line which will aid in placement of the veneer. Proximal reduction was performed using round end tapered diamond bur parallel to the long axis of the tooth [4]. The proximal reduction was stopped just short of breaking the contact (fig 2). The final finishing of the preparation was done using fine grit diamond bur [2].

Cementation: -

After the completion of tooth preparation impression was made with polyvinyl siloxane impression material of light and putty consistency using a double-mix single-stage technique [2]. The Lithium Disilicate was milled using CAD/CAM milling technique. After verifying the fit, the vonlay was cemented intraorally using resin luting cement [2]. The inner surface was etched with 10% hydrofluoric acid was washed with water and dried. Silane coupling agent was applied for 1 min and dried [2,8,9]. The tooth was etched for 10 seconds and washed and dried using botting paper. Adhesive was applied and cured for 20 secs. Resin cement was applied on the inner surface and vonlay was cemented using light cure removed completely using [1,9].

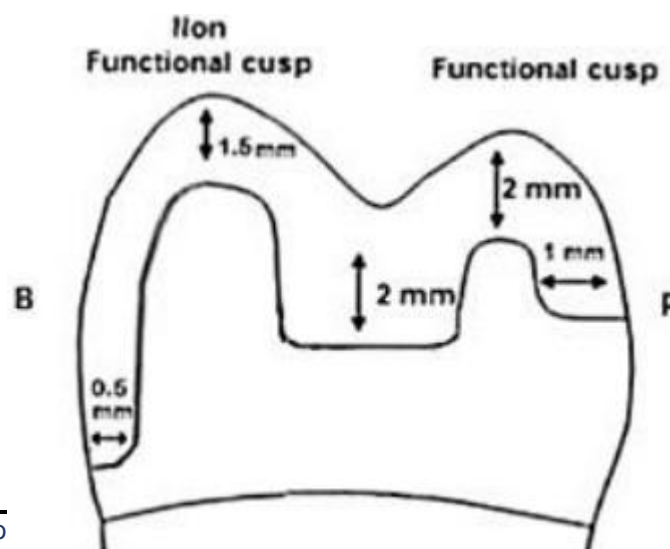


Fig. 1: - Vonlay preparation dimensions

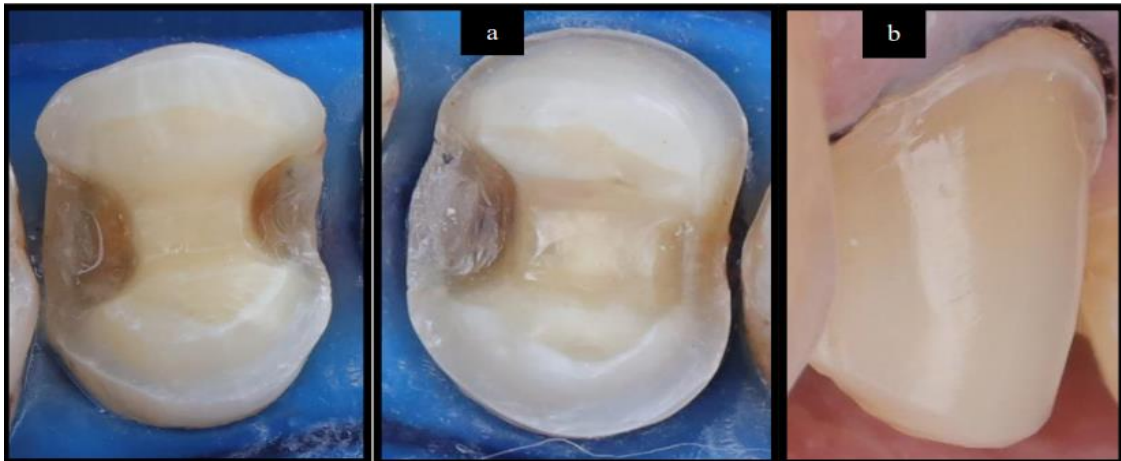


Fig: -2 Prepared tooth to receive vonlay (a, b)

SUMMARY

Vonlays represents a very hopeful treatment alternative for endodontically treated posterior teeth, it allows maintaining of tooth structure, it is compatible with minimally invasive dentistry, and it is adequate for the concept of bio integration. It is a conservative approach for mechanical and aesthetic restoration of nonvital posterior teeth [2].

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