

Inlej retineri kao nosači tela mosta u bočnom segmentu - prikaz slučaja

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Inlay retainers as bridge abutments in the posterior segment – case report

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**PRIKAZ IZ PRAKSE (PP)
CASE REPORT****KRATAK SADRŽAJ**

Inlej retinirane adhezivne nadoknade predstavljaju interesantnu alternativu konvencionalnim metodama, u slučaju nedostatka pojedinačnog zuba. Cilj ovog rada je bio da ukaže na mogućnosti primene inlay retiniranih adhezivnih protetskih nadoknada baziranih na kompozitnim sistemima. Klinička procedura je minimalno invazivna, i jednostavna za izvođenje. Uvođenje vlaknima-ojačanih kompozita, kao i poboljšanje adhezivnih tehnika cementiranja čine ove restauracije dugotrajnim rešenjem, sa dobrim estetskim i funkcionalnim rezultatima. Ovaj prikaz slučaja iz prakse daje uvid u kliničke postupke tokom izrade inlej retiniranih adhezivnih nadoknada.

Ključne reči: inlej, nosač mosta, minimalno invazivna nadoknada**SUMMARY**

Inlay retained adhesive restorations are an interesting alternative to conventional methods when a single tooth is missing. The aim of this paper was to present possibilities for the application of inlay retained adhesive prosthodontic restorations based on composite systems. The clinical procedure is minimally invasive and simple to conduct. The introduction of fiber-reinforced composites as well as the improvement of adhesive cementing techniques makes these restorations a long-term solution with good esthetic and functional results. This case report offers an insight into the clinical procedure during the preparation of inlay retained adhesive restorations.

Keywords: inlay, bridge abutment, minimally invasive restoration

Stomatološka nauka je oduvek pokušavala da zameni zub koji nedostaje na različite načine i upotrebom različitih materijala. Tokom vremena, upotrebljavane su različite konstrukcije vezano za primere minimalne krezubosti, dakle slučajeve gde nedostaje samo jedan zub^{1,2}. Retineri sa punim krunama mogu se nazvati uobičajenim i oprobanim rešenjem kako za mala, tako i za veća bezuba polja. Klasični dizajni konstrukcije mosta mogu biti veoma dobro, ili makar zadovoljavajuće rešenje tokom dugog niza godina³, ali se vremenom postavilo pitanje njihove invazivnosti.

U vreme preventivne stomatologije, kada su karijesne lezije sve manje i manje, kada su veliki defekti pre izuze tak nego uobičajena pojava, slučajevi gde nedostaje samo jedan zub postaju značajan terapijski problem.

Dental science has always tried to replace a missing tooth in different ways and using different materials. Over time, various constructions in cases of minimal partial edentulism i.e. when only a single tooth is missing^{1,2} Full crown retainers may be considered a conventional solution for both small and large toothless space. The classical design of a bridge construction may be a good, or at least satisfactory, solution for a long time³, but the question of their invasiveness has emerged.

In the era of preventive dentistry, when caries lesions are smaller and smaller and large defects are an exception rather than a rule, the cases of a single tooth missing become an important clinical problem.

Postoji veliki broj članaka o tome, treba li protetski rehabilitovati slučajevi minimalne krezubosti⁴. Očigledno je, da je moguće živeti i sa svega nekoliko zuba, što ovaj problem dodatno otežava. Migracije, rotacije i inklinacije nastaju kasnije, ali stomatognatni sistem ne šalje urgentne signale koji bi primorali pacijenta ili terapeuta na brzu intervenciju naročito ukoliko se gubitak dogodi van vidljive zone smeha. Reklo bi se, da dilema najčešće nije da li, već može li se zub koji nedostaje zameniti bez primene većih protetskih zahvata, odnosno poštujući aktuelne trendove i primenu minimalno invazivnih zahvata u restaurativnoj i protetskoj rehabilitaciji.

Smatra se da su dentalni implantati dobro i poželjno rešenje ovog problema⁵. Međutim, razvoj novih materijala u stomatologiji dao je nove ideje i ponudio nova potencijalno različita rešenja ovog pitanja. Ideja da se zub zameni nadoknadom koja se na ostale zube oslanja samo u jednom njihovom delu nije nova. Pokušavalo se sa različitim dizajnima, od kojih su neki bili klasični inlej-retineri, neki ličili na obuhvatne kukice, ali su nedovoljna otpornost tih materijala, i, još važnije, insuficijentna veza sa tvrdim zubnim tkivima učinili da se ove nadoknade pre svrstaju u privremena, nego trajna rešenja problema. Međutim, razvoj novih bonding sistema, kao i novih, bezmetalnih konstrukcija sa veoma dobrim karakteristikama oživela su stare nade, vraćajući minimano invazivne nadoknade još jednom u žižu interesovanja stomatološke javnosti.

Athezivne nadoknade generalno se mogu modelovati od kompozitnih ili, keramičkih materijala. Iako su velike nade polagane na fiber-glass sisteme, njihova je klinička primena prvobitno bila problematična zbog problema sa estetskim delom kompozitnog sistema (prebojavanja, retencije plaka itd.)^{6,9,10}. Novi kompozitni sistemi, kakvi su oni sa dvojnomo toplotno-svetlosnom polimerizacijom, izgleda da su prevazišli ove poteškoće¹⁷. Poređenja radi, i keramički sistemi pre pojave cirkonijumskog Herkula teško i nesigurno su se mogli suprotstaviti bočnim masticatornim silama, bez obzira na mnoge pokušaje poboljšanja geometrije preparativnog dizajna^{7,12}. Moglo bi se reći da su obe vrste bezmetalnih nadoknada sposobne da se nose sa rastućim zahtevima stomatološke nauke i prakse, mada je svakako neophodno dobro poznavanje njihovih specifičnosti da bi se, u konkretnom slučaju, opredelili za jednu vrstu athezivnih restauracija.

Cilj ovog rada je da ukaže na mogućnost primene inlej retiniranih athezivnih protetskih nadoknada baziranih na kompozitnim sistemima.

Prikaz slučaja

Pacijent A.D. se javio na Kliniku za stomatološku protetiku stomatološkog fakulteta u Beogradu zbog problema sa žvakanjem na desnoj strani i nedostatka prvog stalnog molara. Nakon anamneze i kliničkog pregleda

There are many papers about whether the cases of minimal partial edentulism should be treated.⁴ Obviously, it is possible to live even with a couple of teeth which makes this problem even worse. Migration, rotation and inclination occur later and the dentoalveolar system does not trigger urgent signals which would urge the patient or dentist to a prompt intervention particularly if tooth loss occurs outside the line of smile. It seems that the question is not if but can the missing tooth be replaced without large prosthodontic interventions or, in other words, with respect to the actual trends of minimally invasive treatments in restorative and prosthodontic rehabilitation.

It is believed that dental implants are a good and desirable solution of this problem.⁵ However, the development of new materials in dentistry has offered new ideas and potentially different solutions of this matter. The idea to replace a tooth with an restoration retained on only a part of adjacent teeth is not new. Various designs have been employed and their good characteristics have revived old hopes bringing back minimally invasive restorations under attention of the dental public.

Adhesive restorations can, generally, be modeled from composite or ceramic materials. Although high expectations have been put on fiber-reinforced systems, their clinical application was initially questionable due to the problem of the esthetic part of the composite system (discoloration, plaque retention etc.)^{6,9,10} New composite systems, such as those with dual cure, seem to have overcome this shortcoming.¹⁷ For example, ceramic systems could resist posterior masticatory forces with difficulty and uncertainty before zirconia Hercules appeared, despite numerous attempts to improve their preparation design.^{7,12} Both types of metal-free restorations are believed to be able to cope with the increasing demands of dental science and practice, but still, it is important to know their specific properties in order to make the right choice in each case.

The aim of this paper was to present possibilities for the application of inlay retained adhesive prosthodontic restorations based on composite systems.

Case report

Patient A.D. visited the Dept. of Prosthodontics of the School of Dentistry in Belgrade due to masticatory problems on his right-hand side and the first permanent molar missing. Patient's history and clinical examination revealed minimal partial edentulism in the lower right

ustanovljena je minimalna krezubost donjeg desnog kvadranta, gde tokom perioda od šest godina nedostaje prvi stalni molar (sl.1). Drugi molar i drugi premolar imaju restauracije prve i druge klase.



posterior region where the first permanent molar had been missing for six years (Fig. 1). The second molar and premolar had class I and II restorations.

Slika 1. Nedostatak prvog stalnog molara.
Figure 1. First permanent molar missing.

Pacijentu su predočene terapijske mogućnosti: klasičan tročlani most, implant, ili adhezivni inlej-retinirani most. Prva mogućnost odbijena je zbog neophodnosti obimnog brušenja, na šta pacijent nije pristajao, a druga iz finansijskih razloga. Stoga je izbor pao na izradu adhezivne nadoknade. Premda je meziodistalni promer nešto sužen, zubi nisu pokazivali znake inklinacije ili rotacije, pa je ovakav slučaj bio dobar primer za ovu vrstu nadoknade.

Preparacija je urađena u gleđi i dentinu pomoću standardnog seta dijamantskih borera (Komet Brasseler), sa prethodnim potpunim uklanjanjem postojeće restauracije (sl. 2.). Glavne smernice su vezane za preparaciju regije konektora, koja bi za ovaj slučaj trebala da bude minimalna, s obzirom da nema karijesa na zubu. Njegova preporučena površina je minimalno 9 mm², s akcentom na gingivo-okluzalnu dimenziju. Dubina kaviteta je okluzalno iznosila minimalno 2 mm, dok širina istmusa varira za premolare i molare, od 2 mm do 3 mm, respektivno. Divergencija zidova kaviteta je bila neophodna, kao i zakošavanje gleđnih prizmi. Iako ovakav dizajn liči na klasičnu preparaciju za ispun, najveću pažnju zapravo treba obratiti na odnos između mezijalnog i distalnog kaviteta i na njihov međusoban položaj. Ovo je važno, jer rotacija i inklinacije mogu modifikovati osnovne principe zbog pravca unošenja mosta, pa ponekad zahtevaju obimnija brušenja. Korišteni su različiti setovi posebnih borera koji omogu-

The patient was offered the following treatment modalities: a classical three-unit bridge, an implant or an adhesive inlay-retained bridge. The first option was rejected by the patient because of the need to perform large preparations whereas the second one was rejected due to financial reasons. The third option was chosen, an adhesive inlay-retained bridge. Although, the mesio-distal distance was slightly narrowed, the teeth did not show signs of inclination or rotations, making this case a good example for this kind of restoration.

The preparation was made in enamel and dentin using the standard set of diamond burs (Komet Brasseler) after the complete removal of an old restoration (Fig. 2). The main guidelines were associated with the preparation of the connector region, which should have been minimal in this case, because there was no caries. Its recommended surface area was minimally 9 mm² with particular attention to its gingival-occlusal dimension. Occlusally, cavity depth was minimally 2 mm whilst isthmus width varied for premolars and molars, between 2 mm and 3 mm, respectively. The divergence of cavity walls was necessary as well as enamel beveling. Although this cavity design resembled a classical preparation for a filling, the utmost attention was paid to the relationship between mesial and distal cavities and their positions. This is important because rotation and inclination may modify basic principles because of the direction of bridge placement and sometimes larger preparations are

ćavaju lakšu obradu, jer svojim oblikom daju potrebnu konvergenciju i dimenzije. Završna obrada gleđnih prizmi je urađena sa posebno konstruisanim instrumentima (SonicSYS, KaVo, Biberach, Germany). Ovim se obezbeđuju kako adekvatne dimenzije, tako i najpovoljnija završna obrada kaviteta.



required. Different sets of special burs were used for easier preparation because their shape determined convergence and dimensions. Enamel beveling was done specially designed instruments (SonicSYS, KaVo, Biberach, Germany). This enabled adequate dimensions as well as the most favorable finish of cavity preparation.



Slika 2. Preparacija kaviteta za inlej-most.
Figure 2. Cavity preparation for the inlay-bridge.

Slika 3. Postavljanje konca pred uzimanje otiska.
Figure 3. The application of retractive cord prior to taking an impression.

Otisak je uziman adicijom silikonima (Virtual, Ivoclar Vivadent, Schaan, Liechtenstein, sl. 4.), za pripremu regiona gingivalnog sulkusa korišten je retrakcioni konac (Ultrapak, Ultradent, USA, sl. 3.). Kaviteti su zatvoreni privremenom ispunom (Citodur).



The impression was taken using addition silicon (Virtual, Ivoclar Vivadent, Schaan, Liechtenstein, fig. 4) and retractive cord was used for the preparation of gingival sulcus (Ultrapak, Ultradent, USA, fig. 3). The cavities were filled with temporary cement (Citodur).

Slika 4. Otisak adicijom silikonima.
Figure 4. Addition silicon impression.



Slika 5. Izgled kompozitnog mosta.
Figure 5. The composite bridge.

Otisak je izliven na klasičan način, sa posebnim osvrtom na postavu kočica (s obzirom na dubine kaviteta). Za izradu adhezivnog mosta korišćen je kompozitni sistem Vectris-Adoro (Ivoclar Vivadent, Schaan, Liechtenstein).

U skladu sa jednostavnošću dizajna preparacije, aplikacija distanc-laka je vršena bez dodatnih slojeva (ne sme na gingivalnom zidu). Modelacija fiber-glass osnove je zahtevala izradu dodatnog modela, i on je izliven iz otiska¹⁴. Konture osnove su izrađene na osnovnom modelu, prateći morfološke karakteristike kvržica radi pružanja potpore kompozitu, a zatim je pristupljeno vakuum-formiranju u aparatu Vectris VS1. Završena osnova je peskirana, a potom je na nju nanesen lajner kao priprema za nanošenje slojeva kompozita.

Kompozitni materijal, korišćen za fasetiranje ojačane osnove je SR Adoro, mikropunjeni kompozit sa dvojnomo, toplotno-svetlosnom polimerizacijom¹⁵. Njegove glavne prednosti u odnosu na ranije generacije su to što ima kvalitetnije površine, koje se izuzetno lako poliraju, stalnu boju i minimalnu prijemčivost za plak. Na raspolaganju je i širok spektar dentinskih i incizalnih boja, kao i obilje efekata (Stains, Shades, Impulse itd.). Slojevi su inicijalno prosvetljeni 20s u Quick aparatu (da bi se olakšala modelacija), a gotova restauracija je završno polimerizovana u Lumamat 100 (Ivoclar Vivadent, Schaan, Liechtenstein). Poliranjem, nadoknada na kraju pokazuje visoki sjaj (sl. 5.).

Nakon kliničke probe, eventualnih modifikacija i okluzalnog uravnoteženja, most je cementiran kompozitnim cementom (Variolink II, Ivoclar Vivadent, Schaan, Liechtenstein) sa klasičnim bonding sistemom (Syntac + Heliobond)¹⁶.

Kaviteti su pripremljeni total-etch tehnikom (30 s i 15 s za gleđ i dentin, sl. 6.), ispirani i osušeni. Aplikovan je bonding sistem Syntac Primer i Adhesive (15 s i 10 s aplikacije, respektivno), potom Heliobond, koji je prosvetljen u trajanju od 20 sekundi (sl. 7.). Pre prosvetljavanja, treba obratiti pažnju na dobru disperziju bonda da bi se omogućilo pravilno naleganje nadoknade.

Kompozitne restauracije su pre cementiranja, silanizirane (Monobond S, 60s, bez prosvetljavanja), i aplikovan je bond (Heliobond, 20 s, sa prosvetljavanjem).

Potom je Variolink II kompozitni cement (baza i katalizator) zamešan u odnosu 1:1, u željenoj boji (base yellow i catalyst yellow za ovaj slučaj). Cement je nanesen u višku, a zatim je most lagano postavljen na mesto (sl. 8.). Kompozitni cementi pokazuju nešto drugačije karakteristike od drugih cemenata, pa je ovde vreme održavanja pritiska važnije nego sam pritisak. Potom je uklonjen višak cementa, pri čemu je gingivalno korišćen zubni konac, zbog teže dostupnosti regije. Moguće je višak ukloniti preprosvetljavanjem (5-10s), nakon čega cement otpada u komadu. Završna polimerizacija je urađena sa svih strana po 40s, uz obavezno prisustvo glicerina gela, koji se nanosi preko eksponiranih zona, radi sprečavanja kiseonične inhibicije polimerizacije.

The impression was cast in a usual manner, with special attention given to the placement of posts (with respect to cavity depth). Vectris-Adoro composite system (Ivoclar Vivadent, Schaan, Liechtenstein) was used for adhesive bridge preparation.

With respect to the simplicity of preparation design, distance-varnish was applied without additional layers (the gingival wall was avoided). Modeling of the fiber-glass base required an additional model, which was cast from an impression.¹⁴ The base contours were made on the primary model following the morphological characteristics of cusps in order to achieve good support for the composite and then, Vectris VS1 was used for vacuum-forming. The completed base was sand-blasted followed by the application of liner prior to composite layers.

SR Adoro, microfilled composite, with dual cure was used for making faceted.¹⁵ Compared to the previous generations, this composite provides better surface quality, easy polishing, stable color and minimal plaque adhesiveness. A wide spectrum of dentinal and incisal colors and effects is available (Stains, Shades, Impulse etc.) Layers were initially light-cured for 20 s in the Quick apparatus (to allow easier modelation) and the finished restoration was finally cured in Lumamat 100 (Ivoclar Vivadent, Schaan, Liechtenstein). Polishing provides extreme shine of the restoration (fig. 5).

After the clinical check-up, minor modifications and occlusal articulation, the bridge was cemented with a composite cement (Variolink II, Ivoclar Vivadent, Schaan, Liechtenstein) and a classical bonding system (Syntac + Heliobond).¹⁶

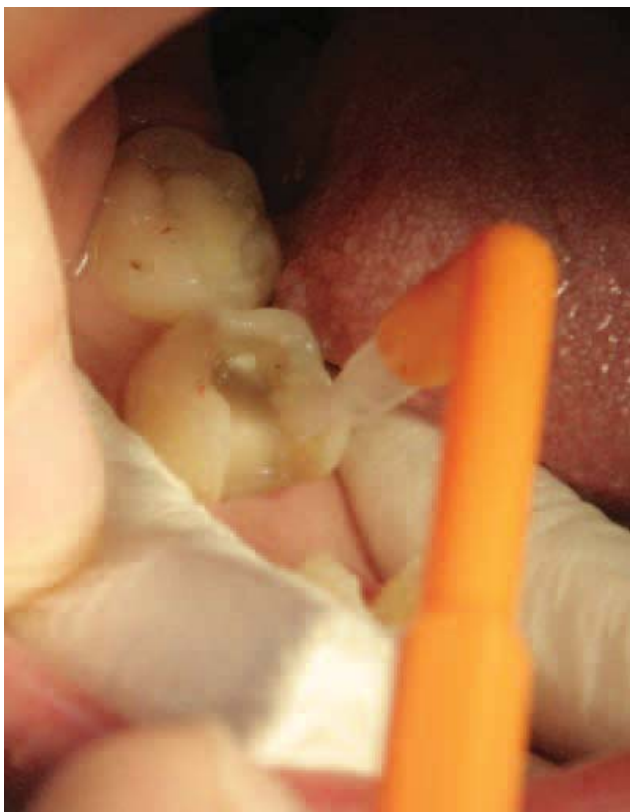
The cavities were prepared using the total-etch technique (30 s for enamel, 15 s for dentin, fig. 6), rinsed and air-dried. Syntac Primer and Adhesive bonding system was applied (15 s and 10 s application, respectively), followed by Heliobond which was light-cured for 20 s (fig. 7). Prior to light-curing, attention was paid to carefully disperse bond to enhance adequate seating of the restoration.

Composite restorations were silanized prior to cementation (Monobond S, 60 s, no light-curing) followed by bond application (Heliobond, 20 s, light-cured).

Afterwards, Variolink II composite cement (base and catalyst) was mixed in the ratio 1:1 and in the desired color (base yellow and catalyst yellow in this case). Cement was applied in slight excess and the bridge was slowly fitted in place (fig. 8). Composite cements show slightly different characteristics than other cements, and the time of applied pressure here was more important than pressure itself. Afterwards, the excess was removed, with dental floss used gingivally. It was also possible to remove excess by pre-polymerizing (5-10 s) because cement would have fallen off in a single part. The final polymerization was done from all directions (40 s, each) with glycerin gel applied over exposed surfaces for preventing oxygen layer inhibition during polymerization.



Slika 6. Nagrizanje gleđi.
Figure 6. Enamel etching.



Slika 7. Aplikacija bonding sistema.
Figure 7. Application of the bonding system



*Slika 8. Uklanjanje viška kompozitnog cementa.
Figure 8. Removal of excess of composite cement.*



*Slika 9. Izgled završene restauracije.
Figure 9. Finished restoration.*

Na sl. 9 vidi se adhezivna inlej-retinirana nadoknada nakon dva dana, kao i kontrolni pregled posle godinu dana (slika 10.).



Fig. 9 shows the adhesive inlay-retained restoration after two days as well as the control follow-up after one year (fig. 10).

Slika 10. Kontrolni pregled nakon 1 godine.
Figure 10. One-year follow-up.

Diskusija

Adhezivne restauracije predstavljaju veoma interesantan segment zubno-protetske prakse. Razvoj novih i inovativnih materijala učinio je stare težnje ka minimalnoj invazivnošću delom realnosti, a njihova jednostavnost primene čini ih svakako poželjnim u svakodnevnoj praksi¹⁸. Celokupna preparacija i uzimanje otiska vrše se u istoj poseti, a koliko sutradan moguće je cementirati završenu restauraciju. Nadalje, oni se veoma dobro ukalapaju među susedne zube sa estetske tačke gledišta, jer ostavljaju bukalne površine zuba nosača intaktnim. Inlej mostovi, međutim, imaju i potencijalne slabe tačke. One se najčešće tiču smanjene otpornosti, i, češće, problema sa retencijom. O adhezivnim nadoknadama može se naći veći broj radova u stručnoj literaturi⁷⁻¹³. Od interesantnijih, treba pomenuti članke Goehring i sar.

Interesantan je prikaz iz prakse od strane Iglesia-Puig⁹ gde je klasični most odbačen kao solucija od strane pacijenta, dodatno i zbog prisustva bukalne paramolarne kvržice odnosno tuberkuluma na maksilarnom levom

Discussion

Adhesive restorations are an interesting segment in prosthodontic practice. The development of new and innovative materials has made old attempts for minimal invasiveness a part of reality and the ease of use makes them desirable in everyday practice.¹⁸ The entire preparation and taking an impression are finished in the same visit and the finished restoration can be cemented as early as a day after. Furthermore, such restorations fit well between adjacent teeth from an esthetic point of view as they leave buccal surfaces of abutments intact. Inlay bridges, however, have some potential weaknesses. These are associated with decreased resistance and, more often, problems with retention. There are numerous papers about adhesive restorations.⁷⁻¹³ Among some more interesting ones are the papers of Goehring et al.

An interesting case was reported by Iglesia-Puig⁹ in which a classical bridge was rejected by the patient and, additionally, due to the presence of a buccal paramolar cusp, i.e. tuberculum, on the first maxillary left molar.

prvom molaru. U ovom slučaju, korišćena je metoda direktne modelacije nadoknade u ustima pacijenta. I premda neki od ovih radova mogu funkcionisati tokom godina, mnogo duže nego očekivano, najpre bi se ovakve nadoknade, generalno, morale svrstati u grupu dugotrajnih privremenih restauracija.

Grupa istraživača sa Univerziteta u Cirihu, predstavljeni od strane T. Goering i sar.¹¹, dali su značajan doprinos rešenju ovog problema. Prvi članci bili su vezani za Targis-Vectris sistem, pokazujući su da staklena vlakna, u kombinaciji sa pravilno izvedenom adhezivnom tehnikom cementiranja, bila klinički uspešna u većini ispitivanih parametara nakon 2 godine. Nakon 4 godine, Freilich i sar.¹⁰ su našli uspešnost od 75% i značajno poboljšanje od 86% nakon promene oblika osnove od nisko- ka visokopakovanj FRC vlaknima (broj slučajeva: 12). Behr¹⁸ je sugerisao da nalazi ove studije nisu opravdali očekivanja publikovana u prethodnim in-vitro istraživanjima^{7,12}. I dok je fiber osnova mogla da izdrži sile u oralnoj sredini, problemi in vivo javljali su se uglavnom od trošenja, abrazije i prebojavanja, ukazujući još jednom na mane fasetirajućeg materijala (Targis).

Može se zaključiti da su ove karakteristike veoma poboljšane sa uvođenjem Adoro sistema. Takođe i u studiji koju daje Goering¹⁷ sa novim materijalom, pokazano je da stabilnost boje, tekstura površine kao i sjaj ostaju stabilni nakon 12 meseci. Nisu detektovani klinički znaci trošenja. U ovoj studiji, uključeno je 16 inlej-adhezivnih mostova od SR Adoro i Vectris materijala. Zatim, predato je još 15 inlej-retiniranih mostova pomoću SR Adoro/Vectris sistema i dodate eksperimentalne keramike, kao kompartivna grupa. Ova studija nije imala čak ni jedan gubitak. Štaviše, sve restauracije su klinički bile intaktne nakon 12 meseci, bez ikakvog gubitka u kvalitetu.

Stoga, razvojem novih materijala koji mogu biti uspešno korišćeni za izradu adhezivnih mostova ove se prepreke mogu uspešno prevazići, a dugotrajnost, komfor i estetika ovih nadoknada predstavljaju vrlo jednostavno i praktično rešenje.

Zaključak

Minimalno invazivni tretmani su budućnost stomatološke nauke. Slučajevi minimalne krezubosti su sve prisutniji kao problem, a želje pacijenata za što manjom invazijom na njihova tkiva sve su češći zahtev u svakodnevnoj praksi. U tom kontekstu, adhezivne restauracije, svojom jednostavnošću, minimalnom invazivnošću i dugotrajnim rezultatima pretenduju da postanu najčešće realizovani zahvati u stomatološkoj protetici.

In this case, the restoration was directly modeled in the mouth. Although some of these restorations may be functional over the years, much longer than expected, they should, generally, be classified as long-term temporary restorations.

A research group from the University of Zurich, known as T. Goering et al.¹¹, has given a significant contribution in solving this problem. Their first articles were related to the Targis-Vectris system, showing that glass fibers in combination with a proper adhesive cementing technique were clinically successful in most observed parameters after 2 years. After 4 years, Freilich et al.¹⁰ found success in 75% of cases and a significant improvement of 86% after the change in the base shape from low- to highly-packed FRC fibers (number of cases: 12). Behr¹⁸ suggested that the findings in this study did not fulfill expectations published in previous in vitro studies.^{7,12} Although the fiber base could have resisted the forces in the oral cavity, in vivo problems occurred mostly due to wear, abrasion and discoloration, confirming once again the disadvantages of the faceting material (Targis)

It can be concluded that these characteristics are greatly improved with the introduction of the Adoro system. Furthermore, in a study by Goering¹⁷, the new material was used and showed color stability, surface texture and shine over the period of 12 months. Also, no clinical signs of wear were detected. This study comprised 16 inlay-adhesive bridges made from SR Adoro and Vectris. Additionally, 15 inlay-retained bridges from SR Adoro/Vectris and additional experimental ceramics were placed as a comparative group. This study did not report a single loss. Moreover, all restorations were clinically intact after 12 months with no loss of quality.

Therefore, these obstacles can be successfully overcome by using newly developed materials for adhesive bridges and longevity, comfort and esthetics of these restorations add to this simple and practical solution.

Conclusion

Minimally invasive treatments are the future of dental practice. The case of minimal tooth loss are becoming a more common problem and patients' demands for as minimal as possible invasion are increasing in everyday practice. In this context, adhesive restorations tend to become the most often conducted treatments in prosthodontic practice.

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