User report: Palodent Plus sectional matrix system

"The Ring of Rings"

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The design of the occlusal relief is a demanding task for any practitioner. In addition to aesthetic aspects, functionally correct dimensions of the interproximal contacts are a prerequisite of any successful restorative treatment. Whether predictable tight contacts can be created, however, will depend on the matrix system used. With the new Palodent® Plus sectional matrix system by DENTSPLY, the placement of posterior adhesive restorations will be faster, more predictable and less stressful in terms of proximal contact design.

A functional design of the interproximal space requires tight contacts with a correct anatomic shape. The advantages are obvious: Food traps are prevented; the risk of secondary caries and periodontal disease is reduced, improving long-term prognosis; and avoiding excess material in the cervical area facilitate quick and easy polishing of the restoration.

Universal matrix systems – such as the Tofflemire or AutoMatrix® systems – certainly continue to be indicated in this post-amalgam era of adhesive restorations for large defects and core build-ups. However, correct interproximal design for small to medium class II cavities has always been difficult to achieve with these systems. The frequently observed accumulation of various matrix systems in the drawers of adept practitioners is a monument to the various stages of technological development in this area (Fig. 1). With the Palodent Plus sectional matrix system by DENTSPLY DETREY, a new, simple and highly practical gold standard has now been defined (Fig. 2).

The Palodent Plus sectional matrix system

Palodent Plus is a perfectly matched and complete matrix system. The smart WedgeGuards are an important component of this system. These are safely placed in the interproximally space using wedges in three different sizes and protect the adjacent teeth from being damaged during preparation. The wedge placed with the WedgeGuard can remain in place until the matrix is adapted, the shield can be easily removed with the special forceps belonging to the system.

The special pin tweezers allow easy placement and removal of matrices and wedges, as the pin at the tip of the tweezers positively engages the grip holes of all system elements. Palodent Plus wedges are made of resin and have a V-wave shape that allows atraumatic adaptation of the matrix to the cervical area of the tooth. They are strong enough to easily insert into the proximal space, while its elasticity allows it to closely adapt in all spatial dimensions. Wedges can even be stacked if required.

Unlike wooden wedges, the Palodent Plus wedges are not responsible for the actual separation of the teeth. With the Palodent Plus system, separation is effected by strong nickel-titanium rings. These come in two sizes – for molars/premolars and for deciduous teeth. The glass fibrereinforced plastic tines are configured such that the restoration/tooth transition zone can be shaped in an anatomically correct manner with less flashing excess even in the case of large cavities. V-shaped grooves ensure secure fixing of the wedges. The nickel-titanium alloy used here offers excellent spring strength force. In mechanized endodontics, the same material is known for its outstanding memory effect. The rings are autoclavable up to a thousand times.

In the rare event that a Palodent retaining ring is deformed by overstretching, a Palodent Plus forceps can be used to engage the grooves of the ring and tighten it to restore original shape (Fig. 3). The Palodent Plus matrices come in five sizes, all of them with tabs located proximally and above the interdental space for safe placement using the special forceps. The pronounced curvature of the matrices with their anatomically designed marginal ridges and gingival aprons ensure facilitate better overall contacts with less flashing.

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Case report

The bitewing radiograph (Fig. 4) of the 44-year-old female patient shows deep proximal caries at the distalmost tooth 27. Before preparation, the special Palodent Plus tweezers are used to place a matching WedgeGuard (Fig. 5). The protection of the adjacent tooth is especially helpful in the case of difficult to explore caries profunda defects. After caries removal and a check with caries marker and subsequent finishing of the cavity with diamonds, the metal wing is removed by the special tweezers, engaging the existing pin hole (Fig. 6). The remaining wedge is simply left in place for further use.

In the present case, the proximal margin of the cavity is located deeply subgingivally in the dentine. Therefore, the 6.5-mm matrix is first placed with its gingival apron below the gingiva without a wedge. Thanks to its anatomic design, the matrix immediately achieves a stable position after placement with the Palodent Plus forceps, without drifting upwards (Fig. 7).

While the light blue Ni-Ti ring is universally suited for molars, in this case, the dark blue ring is used, as it is indicated not only in premolars or deciduous teeth, but also provides extra separation in deep proximal cavities. The glass fibre-reinforced plastic tines are V-shaped and open. They allow safe placement of the rings over interdental wedges already in place.

In this case, the nickel-titanium ring is placed with a molar matrix in place; only then is the largest wedge of Palodent Plus system inserted through the V-shaped space of the ring tines (Fig. 8). The anatomically shaped plastic wedges are briefly compressed during insertion and re-expand shortly thereafter. Unlike with the traditional rigid wooden wedges, this prevents deformation of the proper convex form of the matrix shape by "counteranatomic" insertion (Fig. 9).

Thanks to the hollow underside of the Palodent Plus wedges, a second thin wedge can be inserted from palatally (Fig. 10). The wedges are thus simple to introduce and have a perfect anatomic shape, ensuring a safe seal even with caries profunda cavities.

In the Palodent Plus system, it is the rings that provide the necessary separation, not the interdental wedges (Fig. 11). Unlike what is commonly seen in other systems, the wide tines of the rings are not pressed onto the matrix in wide proximal cavities but adapt ideally to the natural interproximal contours.

The author prefers self-etch adhesives in the posterior region, further optimizing the bond by selectively etching the enamel with phosphoric acid. After enamel etching, the one-component adhesive Xeno®V+ is applied (Fig. 12), which thanks to innovative monomers no longer has to be refrigerated. After 20 seconds of agitation with the brush, the adhesive is blow-dried until there is no more movement and the surface appears shiny. Due to the depth of the defect, the polymerization time is doubled from 10 to 20 seconds (Fig. 13).

Using the SDR® bulk filling technique, the deep proximal cavity can be filled in one step up to the enamel-dentine junction. The flowable-like consistency of SDR ensures a precise flow onto the cavity walls with excellent adaptation and a self-levelling surface (Fig. 14). Given the practical shape of the SDR Compula® tip, the material can be applied from occlusally without using an additional flow material. The occlusal capping layer consists of Ceram-X® mono+.

Removing the ring is simple thanks to the Palodent Plus forceps with its angled ends for secure gripping (Fig. 15). Figure 16 shows the interproximal space directly after removal of the matrix system. The natural contour is already present – with next to no reworking required. A fixed contact point is located in the correct position beneath the occlusal edge.

An immediate test with Oral-B Satin Floss dental floss confirms the reliability of the Palodent Plus sectional matrix system even in deep proximal defects. Following occlusal finishing, the surface is polished with Enhance® Multi finishing and polishing cups (Fig. 17). Prisma® Gloss polishing paste provides the final lustre. Interdental hygiene is unproblematic (Fig. 18); here it is demonstrated to the patient.

Conclusion

The Palodent Plus sectional matrix system offers a unique, integrated system for the interdental workflow of adhesive restorations: intelligently designed WedgeGuards, special tweezers for easy placement and removal of WedgeGuards, matrices and wedges, anatomically shaped matrices with marginal ridges and gingival aprons, atraumatic wedges with a V-wave shape and innovative nickel-titanium rings with glass fibre-reinforced resin. The combination of the new sectional matrix system by DENTSPLY and SDR facilitates user-friendly, reliable restoration of class II defects with well-sealed cavity margins. In my opinion, that Palodent Plus defines a new gold standard: a fast and stress-free proximal design using "*the* ring of rings".

Author

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Born in 1964. Licensed as a dentist in 1988. Degree of Dr med dent awarded by Westfälische Wilhelms-Universität Münster in 1988. Dentist in private practice in Rheine, Germany since 1991. Publications and presentations in aesthetic dentistry, bleaching, implantology, endodontics and dental surgical and office software. Member of the German Society for Oral Implantology (DGOI).

Figure legends

Fig.1: Collection of accumulated matrix systems.



Fig. 2: The Palodent Plus sectional matrix system.



Fig. 3: Resetting a ring using the Palodent Plus forceps



Fig. 4: Bitewing radiograph of tooth 27 with deep proximal caries.



Fig. 5: Clinical baseline situation with WedgeGuard in place.



Fig. 6: Removing the metal wing with the Palodent Plus tweezers.



Fig. 7: Placing the matrix with the Palodent Plus tweezers.



Fig. 8: Placement of the wedges through the V-shaped space of the ring.



Fig. 9: Vestibularly placed Palodent Plus wedge.



Fig. 10: A second, palatally placed Palodent Plus wedge.



Fig. 11: Natural adaptation of the tines to the interproximal contour.



Fig. 12: Applying Xeno V+ with a brush.



Fig. 13: Light-curing Xeno V+.



Fig. 14: Filling with SDR to the enamel-dentine junction of the occlusal and proximal deep cavity.



Fig. 15: Angled grip arms for secure application of Palodent Plus forceps.



Fig. 16: Interproximal space directly after removal of the matrix.



Fig. 17: Polishing with Enhance Multi cups.



Fig. 18: Final result after finishing and polishing.



Fig. 19: Demonstration of interdental hygiene with a brush



Fig. 20: The author

