

Dental Sectional Matrix for Treating Class II Cavities

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Dental caries are among the most prevalent diseases worldwide, affecting the majority of adults and commonly occurring in interproximal regions between adjacent premolars and molars; as reported by the National Institute of Dental and Craniofacial Research (2025), most adults experience tooth decay during their lifetime. Class II cavities, tooth decay on the surface between molars (the interproximal surface), are the most difficult cavity to treat and require a special forming matrix. The matrix is a thin formed strip, usually of metal, placed between teeth allowing the dentist to recreate the natural geometry of the tooth while maintaining tight contact with the neighboring tooth to prevent food impaction and recurring decay. Because of the location of these cavities, decay often occurs on two adjacent teeth which requires two separate matrix setups. This introduces inefficiencies in the procedure which can be minimized with a redesigned double sided matrix requiring a single setup aiming to decrease procedure time and streamline dentist workflow. There is currently no widely adopted solution that enables simultaneous restoration of adjacent interproximal cavities while preserving proper anatomical contact, highlighting a clear clinical and operational need for a device that improves procedural efficiency without compromising restoration quality or patient safety.

Currently Class II fillings can cost upwards of \$1000, according to Humana insurance. However, common matrices like the Halo™ Sectional Matrix Band have a unit price around \$1.40 showing that much of the procedure cost is driven by dentist labor cost, with procedures lasting up to an hour. Additionally, according to ADA 2026 1st Quarter Updates, over 30% of dentists report being overworked or too busy to treat patients, so reducing procedure time with a novel matrix can permit for more affordable care and reduce time pressure on dental staff. According to Precedence Research, The global restorative dentistry market is valued at \$24.60 billion and is predicted to grow to \$48.93 billion by 2034. In 2010, the European Journal of Dentistry reported that Class II cavities comprised up to 77.5% of all tooth decay cases. An innovative matrix system that improves dentist workflow and decreases procedure time during the Class II operations presents an attractive opportunity in a rapidly growing market. If commercialized, the dual matrix band design will appeal to general dentists worldwide, who perform adjacent interproximal decay restorations on a daily basis. According to the American Dental Association, there are approximately 200,000 active general dentists in the United States alone, representing a substantial customer base. Given the high frequency of interproximal restorations in everyday dental practice and the low price barrier for adoption, the dual matrix band has strong potential for widespread clinical adoption and commercial success.

The product features a two sided design, allowing a two in one set up for adjacent fillings. By using annealed stainless steel, the design is durable enough to survive insertion between the teeth, but retains enough formability to allow the dentist easy contouring to rebuild the native tooth geometry. The design incorporates a void on one side of the matrix, creating a single thickness at the critical interproximal contact, differing from other patented market products attempting to solve the same issue. This provides a tighter interproximal gap post filling, preventing food compaction and decreasing the risk of future cavities. Preliminary cost estimates place material expenses at around \$0.04 per unit presenting a significant profit margin.

Mechanical testing confirmed that the new matrix band achieves material properties comparable to those of currently used bands. Additionally, independent time trials conducted by a dentist experienced in the procedure showed a measurable reduction in procedure time for interproximal cavity filling, while maintaining compatibility with existing operation tools, when using the new matrix band in comparison to when using two currently available matrix bands.

As verified by the testing, the newly developed matrix band improves upon currently available solutions for filling interproximal cavities in all specified qualities. It saves time for both the patient and dentist, uses materials with the same resistance to tarnishing, has similar mechanical properties to current matrix bands, and has a comparably low price to improve availability. Therefore, the improved matrix band offers a promising solution to this common dental procedure.