

**The Garrison Composit-Tight®
3D XR Sectional Matrix System:
Strength and Innovation**

Procedure/Study by
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Composit-Tight® 3D XR 



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Strength and Innovation**

By Clarence Tam, HBS, DDS

Clarence is originally from Toronto, Canada, where she completed her Doctor of Dental Surgery and General Practice Residency at the University of Western Ontario and the University of Toronto, respectively. Clarence's practice is mostly limited to cosmetic and restorative dentistry. She is well-published to both the local and international dental press, writing articles, reviewing and developing prototype products and techniques in clinical dentistry. She frequently and continually lectures throughout New Zealand and Australia.

Clarence is the Chairperson of the New Zealand Academy of Cosmetic Dentistry. She is an Accreditation Candidate and Sustaining Member of the American Academy of Cosmetic Dentistry and seeks to be the first in New Zealand and Australia to gain Accredited Status with them. Clarence is an Opinion Leader for Henry Schein Shalfoon, 3M ESPE, Kuraray-Morita, GC Australasia, SDI, Coltene-Whaledent, Dentsply/Triodent/Rhodium, Garrison Dental Solutions and the only Voco Fellow in Australasia.

Clarence maintains a private practice limited to cosmetic and restorative dentistry in Newmarket, Auckland.

Dentists struggle on a daily basis with Class II restorations, especially on short or malpositioned teeth. There is the struggle of needing a tight gingival seal to minimize overhangs and the need for post-restorative finishing. There is the struggle of attaining perfect anatomical contours and there is that nightmarish moment when the matrix is removed and the contact checked. If your day has gone well, you will hear a satisfying and smooth snap of the floss as it passes through the contact. If you don't, you're looking to re-prepare the proximal box and essentially start all over; unless you're one of those dentists. We all have been guilty of it – the loose or slightly open contact. We wish we were better. We wish there was a better system.

The ability to consistently close a contact smoothly and predictably is the hallmark of a good sectional matrix system. The ability to close a diastema where an old restoration had left a food trap and an overhang without wondering whether you will get that contact “snap” is the hallmark of a great sectional matrix system.

The Class II restoration, if done well, should anatomically reproduce interproximal dental anatomy comprising perfect buccal, lingual and occlusal embrasure forms, feature minimal proximal line angle flash and exhibit a solid contact point at the anatomical height of contour. On average, it takes approximately three minutes to separate teeth by the width of a matrix band. Conventional Tofflemire systems depend on solid wedging pressure interproximally to gain separation. The success of this method is reliant on the equal buccolingual placement of the wooden wedge as well as generating enough separation force, which would vary especially if moisture or saliva caused the wedge to slip and lose grip. Tofflemire matrices are also notorious for having unanatomical and unsupported point contacts at the marginal ridge, which increases the risk of fracture. The large cervical embrasure left by this technique inevitably leads to lateral food impaction during mastication. Chuang et al (2011) studied the three-dimensional morphological contact point characteristics between Tofflemire systems and a sectional matrix system, with the findings of the latter producing greater contact tightness, albeit a slightly concave contact area,¹ perhaps as a result of burnishing the matrix against the convex contact on the adjacent tooth before placement of the restoration. Loomans et al (2006) confirmed that contact point strength was statistically greater when a sectional matrix system paired with a separating (tension) ring was utilized when compared to teeth restored with circumferential matrix systems.²

Modern sectional matrix systems feature a tension ring, which strives to grip securely and adapt to proximal surfaces as intimately as possible while simultaneously providing enough pressure to separate teeth. The design incorporates a V-shaped negative space cervically under the tension ring to allow for seating over a wedge. The latter is typically anatomically-shaped and functions to seal the matrix band against the gingival cavosurface margin instead of generating separating force.

I had the opportunity to work with the Garrison Composi-Tight® 3D XR system over the last few months. Here are my observations:

1) I am in love with the proximal contact strength that it can generate. Actually, I am a little scared of what it can do when it comes to contact strength. There have been times when, after hard contact point burnishing, I have needed to use a metal abrasive strip to lighten the contact point. The non-stick 3D Slick Bands™ are great, although I need a pair of hemostats to remove them due to the tight contact. (A problem I am totally happy with!)

2) The rubber tines of both the premolar (blue) and molar (orange) Composi-Tight® tension rings adapt extremely intimately to the tooth axial wall. This will work well to the advantage of minimizing the need for any post-operative flash removal, but missing cusp situations require matrix-guided or direct cusp reconstruction before the ring is attached (or the area will essentially cave in and be anatomically incorrect from the sheer pressure).

3) The premolar (blue) sized tension ring is what I use 90% of the time. It has a distinct advantage over other systems in its small vertical footprint – this means that when you are doing that 17MO with the rubber dam clamp on the 17, you can actually place the matrix and the Composi-Tight® 3D XR tension blue ring on the clamped tooth without it pinging off. This makes life a lot easier, allowing maintenance of moisture control in a situation where occasionally the rubber dam clamp would need to be removed (and the rubber dam apparatus as a result) to allow access to fully place the tension ring.

4) The premolar (blue) sized tension ring is also a God-send when it comes to working between canines and first premolars as well as primary teeth – the soft face and tenacious grip means that you have a lower chance of getting an air-borne ring in your left eye. Saves you the embarrassment and gives you a nice contact point.

It is interesting that Peumans et al (2001) found that the use of a condensable resin composite did not significantly increase contact strength when a sectional matrix system was used (Palodent), but confirmed that sectional matrix systems created the strongest contact strengths characterized by significantly wider mesio-distal diameters and contact strengths measured with standardized metal blades compared to circumferential systems.³

Basically, the Garrison Composi-Tight® 3D XR is a one-stop shop sectional matrix system with everything necessary to give you a predictable restorative result from both an anatomical standpoint as well as its powerful contact-closing ability. The product is very hardy, outperforming other tension rings in both cyclical fatigue to failure (~300 cycles vs. 100 cycles for nickel titanium tension rings) as well as resistance to deformation.

References

- 1) Chuang, S.F., Su, K.C., Wang, C.H. and Chang, C.H. Morphological analysis of proximal contacts in class II direct restorations with 3D image reconstruction. 2011. J. Dent. Jun: 39(6):448-46.
- 2) Loomans, B.A, Opdam, N.J., Roeters, F.J., Bronkhorst, E.M., Burgersdijk, R.C. and Dorfer, C.E. A randomized clinical trial on proximal contacts of posterior composites. 2006. J. Dent. Apr:34(4): 292-97.
- 3) Peumans, M., Van Meerbeek, B., Asscherickx, K., Simon, S., Abe, Y., Lambrechts, P. and Vanherle, G. Do condensable composites help to achieve better proximal contacts? 2001. Dent Mater. Nov:17(6):533-41.

Demonstration case

This tooth 14 exhibited a mesial marginal ridge crack extending partially across the pulpal floor. The super-contact-producing Garrison Composi-Tight® 3D XR sectional matrix system was used here to successfully and predictably recreate the interproximal contours, as evidenced radiographically. With sectional matrix systems, despite the strong contact point, there may be small overhangs interproximally (as evidenced on the distal), which need to be removed with a blade or finishing bur. A single shade of Voco Grandio SO A3.25 (a unique shade to Voco between A3 and A3.5 and a packable composite) was used incrementally in this case with an outstanding chameleon effect.



01

Initial situation featuring a failing amalgam DO restoration on tooth 14 with a mesial marginal ridge hairline fracture.



03

Marginal ridge reconstruction completed incrementally using a single shade of A3.25 Grandio SO (Voco, Cuxhaven). Note the minimal line angle flash and need for finishing.



02

Garrison bicuspid-sized grey Slick Bands™ featuring both the blue Composi-Tight® 3D XR ring and the orange Composi-Tight® 3D ring, both with Soft-Face™ technology for unsurpassed grip. Final position for MOD restoration.



04

Completed restoration using a single shade of A3.25 Grandio SO (Voco, Cuxhaven).



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