blog

RESTORATIVE DENTISTRY

by Dr Clarence P. Tam HBSc, DDS

The 'Tam Blog' is an informal conversation intended to inform and to engage further conversation and debate. The NZDA News welcomes comments on the material presented.

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The blueprint for success: transitional bonding

Figure 1

WHEN YOU LOOK AT THAT CAR, are you more impressed with how fast it can go, or how far it can go on a tank of fuel? I mean, that Audi RS6 sounds the shizzle, and might hit 0-60mph in 2.7 seconds flat. Personally, I can't get over at 16 years old how my dad told me that I wouldn't be able to get a new car until the 1987 Corolla hot red hatchback bit the dust. In truth, what I really couldn't believe was how much torture that Corolla endured before finally giving up the ghost. We're talking -20 degree Celsius starts in uber-temperate Toronto. I don't think it is safe or normal to drive your car in first gear rabbit-hopping at 50km/h the length of your entire street. Okay, I was immature. What I learned, however, was to admire the awesome resilience and predictability of that Toyota engine. That precise engineering that sparked up every morning without delay. I wondered why the Oldsmobile down the street didn't do that. I mean, my friend Darrell got a new Oldsmobile to my dismay. But anyone can produce new. I wondered what rigours of engineering the Toyota design team must have unleashed to create such a beast. The virtually unbreakable beast.

Single unit dentistry is easy. Is it? Is it always a case of "grind it low; let it grow?" In certain cases, this is what we do, despite not knowing whether the teeth when they finally reunite in passive eruption will feature a solid centric contact or be the cause of a posterior lateral excursive interference, many times to maximal intercuspation and even more often to centric occlusion (yawn). But increasing the bite height has been proven to be stable and non-detrimental to TMJ function in the literature.[1] So what's the big deal? Full mouth erosion cases, here we come right? No.

Dentistry and especially comprehensive dentistry has always been a guesstimate; a treatment plan based on baseline charting, jaw envelope tracking, morphology-copying; our best hypothesis put forth. Patients expect predictable results. They expect to look like themselves, feel like themselves at the end of treatment. They don't like surprises and let's face it, neither do you. The key elements of case planning in the past were: photographs, the facebow transfer, mounted study models on minimally a semi-adjustable articulator, incisal and lateral guidance mounts, a diagnostic set-up (of some form ie. wax, digital) and of course the patient herself. Dentistry was able to be controlled, but mostly at a very limited try-in phase whether that be provisional or bisque bake. For the most part, patients had no idea of how the restorations were planned to look, feel or survive in the long-term.

For the 'wear patient' the pragmatic question is how do we predictably restore the patients occlusion within often tight financial constraints?

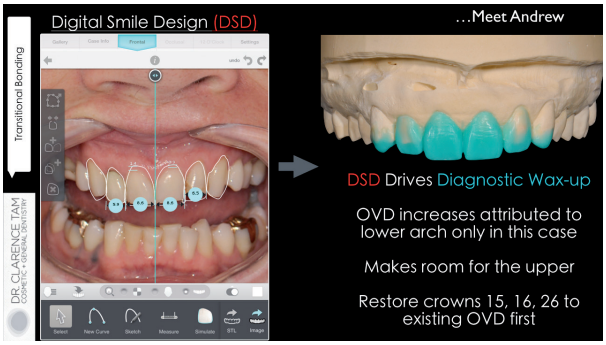
Background and Planning

Andrew presented to my practice complaining that his teeth were progressively wearing thinner at the front, and being decimated at the back. From a frontal smile view, the teeth belie a much deeper problem. When Andrew closes together, his lower teeth rest halfway within the anatomic confines of the upper teeth. He is eating his way through his teeth,. His teeth are touching at all the points that they can in order to function, to chew and process food. We all know that his maximal intercuspation (MI) is not equal to his centric relation occlusion (CRO) – or is it? Let's find out. Let's find out where his home position is. Let's try to capture centric relation. This is not a camp-specific column about how you reach CR, whether it's using a leaf gauge, bimanual manipulation, a Lucia jig, a Kois deprogrammer, or a combination of methods. Let's simply just capture CR. Kois is awesome. Dawson is just as awesome. Relax.

Aesthetic and functional reconstruction planning using Digital Smile Design (DSD). DSD is a term coined by Dr. Christian Coachman and is a computer-based technique where the strategic aims of aesthetic reconstruction are both defined and quantified ahead of a physical model. This allows questions to be answered such as, "Where is the current midline in the face? Can I change this? Do I need to change this? Should I lengthen incisally or crown lengthen? Is the smile gummy? Does the patient have an occlusal cant? Midline cant?". By calibrating the software to known intraoral dimensions, suddenly, facially-driven prototypes can be given to a dental ceramist ahead of mounting the models. Not essential. But nice. Knowledge is key. Knowledge is power. Knowledge increases predictability. To mount the models correctly, a facebow transfer is invaluable to relating the teeth to the face, much like the digital facebow was essential in identifying issues. Mounted with the CR record and the facebow transfer, the ceramist can now fabricate a guided diagnostic wax-up model based on the digital design if available. The wax-up is useful for a number of reasons: 1) Patient communication and involvement, 2) Identification of areas of addition required in OVD increase (different coloured wax) and 3) Generation of a putty templates used for both the trial smile and guided transitional bonding. The mock-up or trial smile is useful in driving patient motivation before the start of a case, and allows objective critique and/or modification of the planned design before the teeth are even touched with a bur.

In all cases, decisions that will need to be made with the ceramist include the prognosticating of individual teeth and deciding whether the OVD increase will come via additions to one or both arches. The decision to completely restore the case in bonded composite is a critical bare minimum. After all, our primary goal is to "put out the fires." In brief, our goal is to stabilise foundations by eliminating neoplastic, dentoalveolar, periodontal and endodontic-derived disease, stabilise residual dental structures that are deemed restorable, and move or design teeth to an ideal functional and aesthetic relationship. Those are a lot of variables. We can see now why there are very few 'holes-in-one'.

Figure **/2** Kois deprogrammer use for 2 weeks – centric relation



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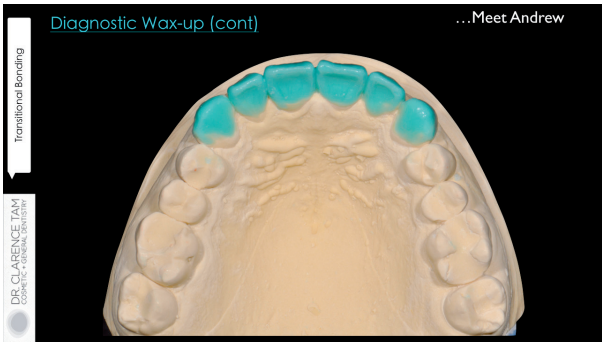

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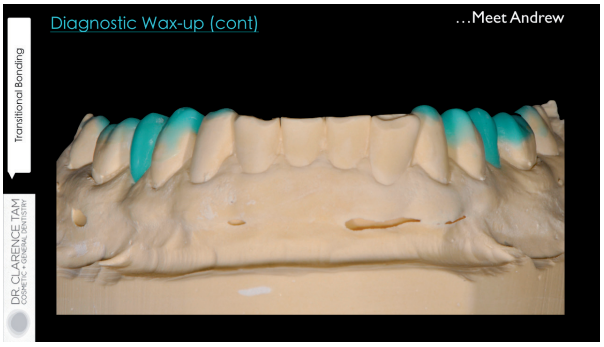

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Execution: The Back Teeth

With the treatment plan converted to a 'simulated' reality on the diagnostic wax-up, bonded porcelain restorations (IPS e-max LT, Ivoclar Vivadent, Amherst, NY) were completed on teeth 15, 16 and 26 ahead of time to the existing OVD. Planning dictated that in this case, the OVD was to be increased in the mandibular arch only. Old crowns and compromised restorations were replaced with permanently-cemented high-strength provisional bis-acryl composite (Voco Structur Premium, Cuxhaven, Germany) on teeth 36, 37, 46 and 47 on one day. Immediately on the next day, a clear silicone matrix was derived from the diagnostic wax-up and used to guide direct placement of composite resin (Voco Grandio SO, Cuxhaven, Germany) on teeth 33, 34, 35, 43, 44 and 45. Bilaterally-balanced occlusion. The anterior occlusion was now open – we had an anterior open bite of exactly the amount of clearance I would have needed for full crown preparations, only now possible without any palatal axial preparation! Ahh, lovely.

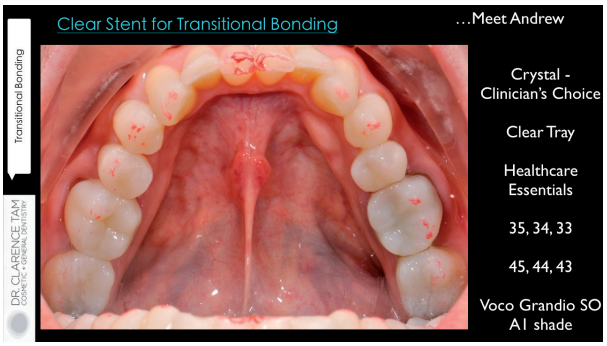
Execution: The Front Teeth

The anterior teeth were prepared the following day for provisional crowns mimicking the occlusal design planned on the diagnostic wax-up. The patient was kept in this scheme for 4 weeks to ensure asymptomatic functional adaptation to the new OVD and allowed a suitable testing period for the dimensions of the new anterior teeth. After all, better to fracture restorations now than after they are definitive, no? Test it out. See if you can gain stability. And if you can...your final porcelain masterpiece will be all that more predictable - and hopefully never fracture. The final photographs show bonded lithium disilicate restorations (Brad Grobler, Oral Dynamics, Auckland) placed on teeth 13 to 23.

Some Thoughts

I realise that logistically some of you would have restored the anterior guidance before touching the posterior teeth. Again, this is not a column dictating which is the right way – the way that works for you is the right way. As long as you can get to a final stable occlusion where essentially you have dots in the back and lines in the front, nothing else matters – but the process more often than not dictates the final result. The final photos below depict the result 1.5 years after completion, still without a single chip from either the transitional bonding on the lower arch nor the definitive bonded porcelain restorations in the upper arch.

The use of a the mounted diagnostic wax-up in the guided placement of composite resin in this reconstruction case created not only a modifiable occlusal scheme, but also allowed for a functional platform to be built which allows testing of this new holding pattern in the mouth for an indefinite period of time. In this economically-sensitive age, transitional bonding using composite represents a viable, restorative and pragmatic technique that will buy the patient both time and predictability before definitive bonded porcelain restorations are utilised. It is a tool that you can use to hopefully save more teeth in the long run.



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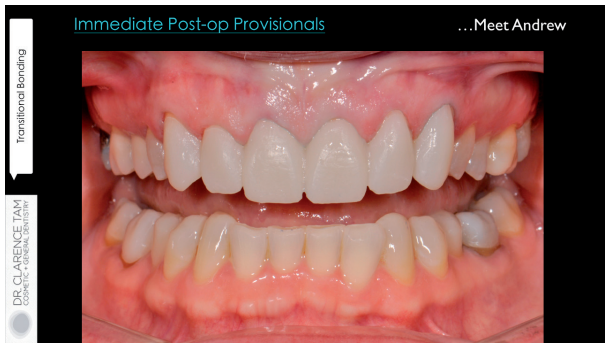

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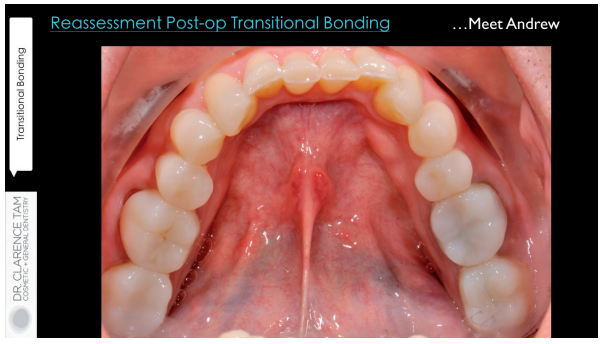

Figure **/11**

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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/Rhondium and a Voco Fellow in Australasia.

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

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