CRAFTSMANSHIP

GET BETTER TODAY

Issue #2 – August 2024

By Omar Tabaqchali

The Dental Journal

Overcoming Failure & Dental School Exams

Literature Piece

Demystifying Occlusion - A Beginner's Guide! (and a Link to Another Great Occlusion Guide!)

Clinical Case Spotlight

Class II Composite by Dr Adam Naughton

This Month's Favourites:

A Book & Quote I can't stop thinking about!

Welcome to the 2nd Issue of the Craftsmanship newsletter. After some time away and travelling, I am excited to bring you this month's newsletter, albeit a little bit later than I would have liked!

📒 The Dental Journal

This past month has been extremely turbulent for me academically, as I failed and had to re-sit one of my modules before being able to progress onto my final year of dental school. Alhamdulillah I am grateful to say I eventually became successful and will be starting fifth-year in September!

Being someone who hadn't failed much academically before this point, this was a hard pill to swallow. It came with a lot of self-doubt, especially because the re-sit was a very high-stakes exam (failing it would get me kicked out of dental school!). Here are a few lessons I learned about this failure that you might be able to take away and avoid making the same mistakes I did:

- **Preparation is not enough**; you also have to execute to the same high standard - I believe that this failure really came from not structuring my exam time appropriately on exam day, rather than a lack of revision. Revision is important, but it's equally important to have the discipline to pace yourself during a long exam.
- **Don't do this alone** - after receiving the results and finding out that I had failed, my natural instinct was to simply try and figure everything out on my own, but I realised that I didn't have all the answers (clearly!) and needed the help of friends and also other resources, not just for the practical advice they gave, but also the mental aspect of dealing with this failure.
- **Follow the advice you'd give to someone else in your situation** - I learned throughout this process that it is so easy to give advice to others, but it is infinitely harder to follow that same advice when you are in that situation yourself. Again, this is where friends can be so valuable in giving you that objective, birds-eye view of the situation.
- **When good isn't enough, become undeniable** - this was a huge mindset shift I took away, and this concept is something that has become important for all aspects of my life recently. When sitting the exam for the first time, I certainly had enough knowledge to pass, but not to perform much better and to my potential. When preparing for this re-sit, I made sure to leave no stone unturned and stayed razor sharp, mastering the foundations of the module and diving deep into the specifics. I am grateful to say that my re-sit result reflected this, and that I am in a better position with my knowledge now compared to where I would have been, had I passed in the main sitting.

Although dental school won't start until September, I am working on a few dental "projects" one of them being Craftsmanship of course, so stay tuned for podcasts and the September Issue to be released before the start of BDS5, the final season of dental school!

Demystifying Occlusion - A Beginner's Guide

(& a Link to Another Great Occlusion Guide!)

It's fair to say that occlusion is one of the hardest concepts we are tasked with understanding during dental school, so much so that many qualified dentists I have spoken to didn't definitively grasp the concept until they were in practice. While in dental school, understanding occlusion is key when doing both prosthodontics and orthodontics.

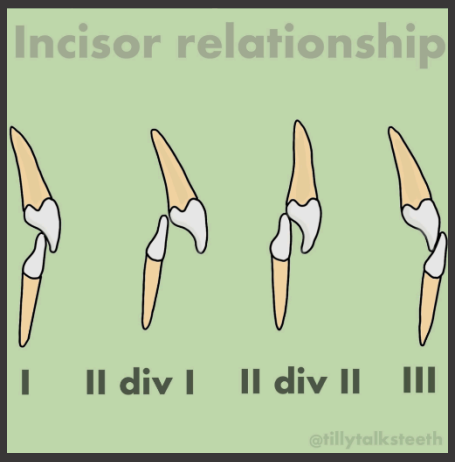
Being a fourth-year dental student means that I have studied this within my time at dental school, and have also read around the ideas within occlusion to help me understand the concepts. By no means am I an expert, and I am sure that when I qualify I will have the same experience as my mentors and older colleagues, and only have a complete understanding and be able to manipulate the knowledge fully to aid in planning and executing treatments when I am years into my clinical practice. This does not mean, however, that I cannot share what I already know and some of the frameworks I have learned to use from other clinicians or from university lectures, etc. An idea that I believe is true is that you don't need to be a fully-fledged master to teach anything; you just have to be one step ahead of the person you are teaching, and with that context established, this article is really aimed at dental students who are in their first few years, or who want to just have a more systematic way of understanding and identifying a patient's occlusion.

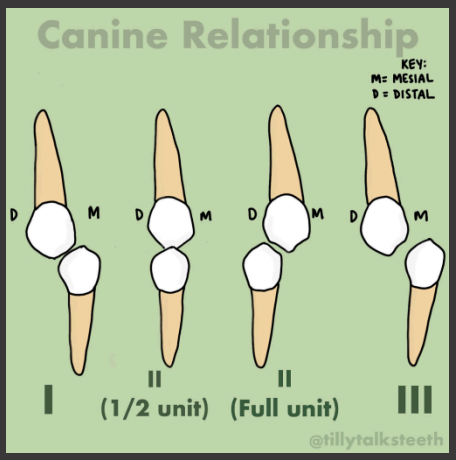
Starting things off simply, occlusion itself is defined as the relationship between the arches, and this can be broken down into several components: the teeth, the muscles of mastication, and the temporomandibular joint (TMJ). Each of these have a role to play, and in cases where patients suffer from occlusal issues, then the cause will likely lie in one or multiple of these features. With regards to the types of occlusion, in a lecture I attended a long time ago, a clinician said that static occlusion is a result of biting, and dynamic occlusion is that of chewing.

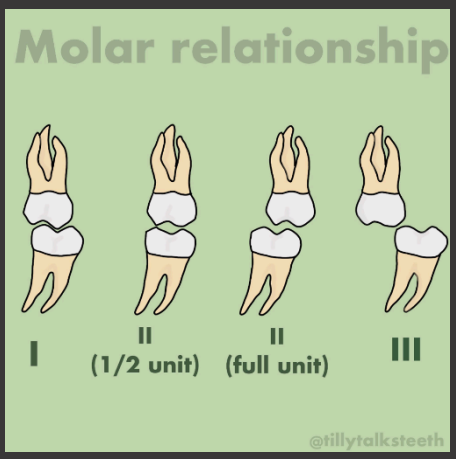
You may be wondering how this is relevant practically, when there is a patient in the chair. This is important to understand because when doing an occlusal analysis, you will need to have the patient biting down when diagnosing any static relationship, and physically moving their mandible when diagnosing any dynamic relationship.

Starting with static is always easier, so let's begin here. You want the patient biting down as I mentioned, and you want to assess their incisor, canine, and molar relationships. This is simply where the upper teeth are in relation to the lower teeth, and there are diagrams to illustrate the different classes of each relationship, as it is far easier to visually understand them than to explain them in writing, and this can be seen here!

The credit for these drawings goes to a colleague and newly qualified dentist Tilly Weerasuriya (@tillytalksteeth on Instagram).







One important point to note though is that although Class 1 of every classification is the "norm", there is by no means one ideal occlusion. The goal occlusally is for patients to have occlusal harmony, where forces generated by the muscles and placed on the teeth and TMJs are balanced as equally as possible and are not causing any symptoms of pain or discomfort, or leading to aesthetic problems for the patient. This can be achieved by having a stable Intercuspal Position (ICP) in dentate or partially dentate patients or placing the patient into another reproducible occlusal position in cases where there is no ICP, usually known as the Retruded Contact Position (RCP).

Also note that when assessing canine and molar relationships, remembering to assess both sides is crucial, as one side may be different to the other, especially in cases of crowding or missing teeth. A good way to remember this is to simply include it in your notes template, and have a slot to fill in the patient's occlusal relationships on both the right and left-hand sides. Additionally, Class 2 and 3 relationships can be further described using units, with one unit representing the mesiodistal width of a canine or premolar, and 2 units representing the mesiodistal width of a molar. Fractional units can also be used here.

When diagnosing a patient's dynamic occlusion, it is absolutely necessary that they are moving their mandible in some way. This is because mastication is not just a simple, single-axis hinge motion. Although the TMJ generally moves in one plane, the four muscles of mastication can manipulate the mandible in almost all directions, and this impacts occlusion. The main dynamic movements we need to be looking for are known as guidance. This simply refers to which teeth and in contact and "guide" the path of the mandible during a specific movement. This can be broken down once again into lateral excursion movements (left and right) and protrusive/retrusive movements (forwards and backward). Lateral movements can be either canine guidance (where only the canines are in contact during the movement) or in group function (group referring to multiple teeth in contact, usually the canine in addition to at least one other posterior tooth). Protrusive movements should ideally have anterior, or incisal guidance, where once again, only the teeth being mentioned are in contact during that movement, but in some cases, you may see posterior guidance.

Although we said there is no ideal occlusion, there are certainly advantageous occlusal relationships that lend to fewer issues due to the nature of the teeth involved. For example, canine guidance is ideal for lateral excursion in most cases, as canines have longer, bulkier roots, and can withstand the occlusal forces placed on

them laterally, to a greater degree than the posterior teeth, which tend to have shorter, thinner roots than canines. This physiological feature also makes molars unideal for protrusion, as they should not be in contact alone, as they would have to withstand the forces of the muscles of mastication in a direction they are not anatomically advantaged for. As a general rule of thumb, posterior teeth are good for withstanding static, axial loads like clenching, and anterior teeth are superior for taking on dynamic loads.

These general rules for the most favourable occlusal relationships do have exceptions when carrying out restorative treatment however. We have established that canine guidance is generally ideal in most cases, but an exception to this would be if we have a bridge pontic as our canine, especially for a resin-bonded bridge. This is because the shear forces placed on the canine would lead to a very high chance of debonding on the abutment tooth, and in these cases, if the patient was in canine guidance previously, changing their lateral excursion (on that side) into group function would distribute the loads away from the canine pontic, improving the prognosis of this restorative work. The same would apply if we had a case with an implant crown on the canine; the absence of a periodontal ligament would render the implant vulnerable to the lateral shear forces, so changing their occlusal scheme into group function is imperative.

Another time where restorative work impacts occlusion is with simple composite restorations. When we "check the occlusion" after layering our composite and "remove the excess" it is so important to understand what it is we are doing here. The articulating paper shows us any areas of contact between teeth in the arches, and when we polish away all the blue marks, we essentially remove every contact with the opposing tooth. Is that what we really want? You would probably agree with me that we do want contact between opposing teeth, so preserving these blue-marked areas is important (, we just don't want heavy contact areas). However, what we should be removing are heavy contacts, and those contacts that are at the interface between the composite and the tooth structure, as these areas of contact may weaken the tooth-restoration interface, decreasing prognosis.

A necessary clinical step when doing any composite restoration is to do a pre-op articulating paper check, to see what contacts are already present on that tooth, because if the goal is the conformative approach, then we would want to replicate that in our final

I mentioned ICP and RCP earlier, which are static positions. ICP is achieved when the teeth are in maximum intercuspation, and RCP is when the teeth are in contact while the condyle is in the most posterior-superior position in the glenoid fossae. It is important to address what it means for occlusion to be balanced, and this is where the contacts between the maxillary and mandibular teeth are consistent across the arches, so they should not be far heavier on one side compared to another for example. This is important in single-tooth dentistry, or when we are doing any restorative treatment using the conformative approach, as we want our restorations to maintain ICP and not be too high for example, which would leave a heavy contact on that restored tooth, and very light or sometimes no contact on other teeth (this can cause pain for the patient). In dynamic occlusion, particularly lateral excursions, we talk about there being a working and non-working side, with the working side

being the one which the mandible moves towards. Issues can arise when we get unwanted contacts during excursive movements, known as interferences (can be described as being on the working or non-working side), and this can cause pain or grating sensations for patients, known as crepitus, or in some cases, lead to wear or chipping of teeth.

While ICP and RCP generally refer to the position of the teeth, terms like centric occlusion and centric relation mean similar things, but are used to refer to the position of the TMJ within the glenoid fossa while the teeth are in their respective positions. It's good to have a rudimentary understanding of these, although they are generally utilised in more complex restorative cases.

Occlusion is tough, especially as we are first introduced to it, so I hope this will be of some help in clearing up any misconceptions you have about this topic, and the link below would be a good revision tool as well! I will look to release more content on occlusion in the future, both on the newsletter and on the podcast, where I will bring on an expert clinician to dive deeper into occlusion with!

https://geekymedics.com/occlusion/

🔍 Clinical Case Spotlight

This month's clinical case is presented by this month's guest writer, Dr Adam Naughton (Instagram: @dr.adamnaughton) who is a dentist who has completed his foundation training. Here he shares a case where he treats a patient with a carious UL4.

Presentation

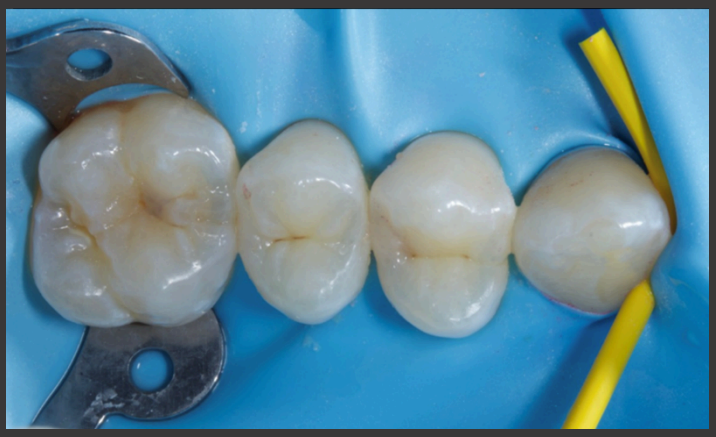
The patient presented at a routine examination with multiple carious lesions. The focus of this case will be the management of non cavitated disto-occlusal carious lesion in UL4, extending into dentine.

Assessment

Radiographic imaging was carried out with routine bitewings and had a fully normal response to cold.

Treatment - The Workflow

Pre-operative



This was the first image taken, it shows the tooth after quadrant 'heavy' rubber dam isolation. The clamp used is a B3 brinker clamp. I have found clamp selection to be an incredibly important and underappreciated aspect of placing dam well consistently and the brinker clamps have greatly simplified this. A wedjet is used a mesially to keep the dam in place, I often use a small corner of the dam sheet in place of the wedjet as it is often easier to place but we did not have any scissors in the surgery and the wedjet worked well here.

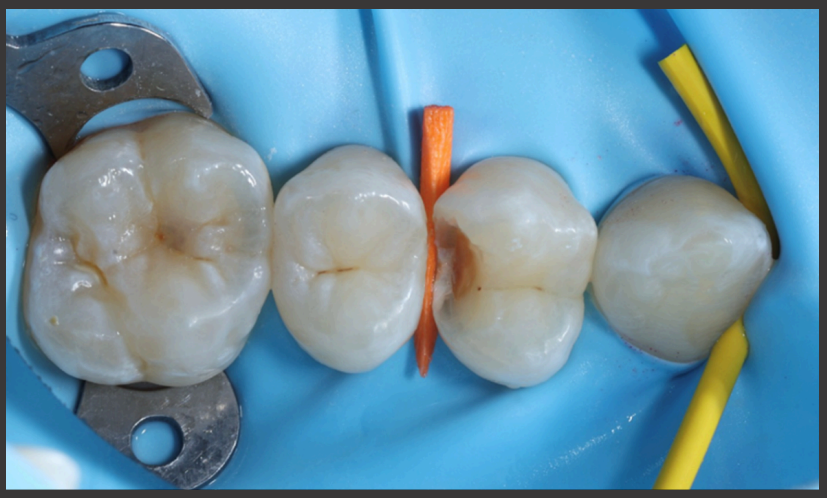
I place the clamp first on the tooth and then the dam on the frame and stretch the dam attached to the frame over the clamped tooth. I find the small tension provided, by placing the frame on the dam first, makes placing the dam much easier and stops the sheet flapping everywhere down the patient's throat. I then work to the most mesial tooth, which is always usually at least to the 3 if working on a posterior tooth, to secure the dam.

There are 2 further details in placing dam which make life easier. First is 'rocking the clamp' to allow the dam sheet to slide underneath and ensure the clamped tooth is fully sealed and the other is inversion. To do this I blow air from the 3 in 1 at the area I am working and use a BPE probe in the cervical area of each tooth to tuck in the dam sheet, so it folds in on itself. This not only prevents gingival crevicular fluid

seeping through the dam but also aids in placement of wedges/sectional matrices later in the workflow.

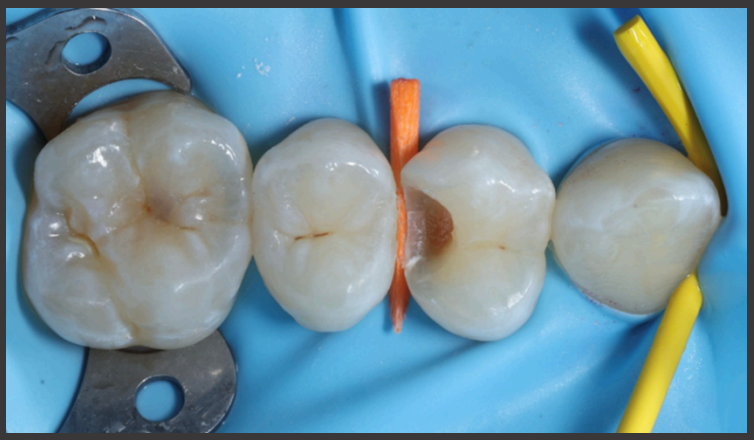
The last thing to do before lifting the handpiece for most class 2s is to pre-wedge. This helps provide some separation between the teeth, reducing risk of iatrogenic damage and providing a margin to finish/smooth the base of the cavity against.

Initial Cavity + Breaking The Contact



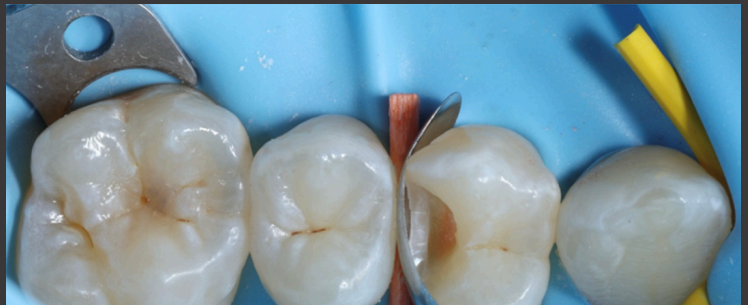
One of the most important and difficult aspects of class 2's is breaking the contact point. Pre-wedging as mentioned above helps with this, it is also important to extend the cavity width adequately. With composite restorations a saucerised and smooth cavity shape helps to reduce C-factor and ensure there is no undermined enamel.

Final cavity



The final cavity is saucerised and bevelled at the cavity margins. This removes aprismatic enamel and exposes more enamel rods for bonding, improves marginal composite adaptation and further removes undermined enamel. Unfortunately, here I can see a very small area of the cavity margin that has not been fully smoothed and bevelled and potentially a small area of demineralised enamel at the base of the cavity which could have been cleaned further. Caries detection dye may have been useful here to give an objective assessment of my caries removal. Despite this, I am happy overall with the cavity optimisations – including the smoothing of the base of the cavity margin against the wedge and the on the whole clean enamel margins to bond to.

Matrixing

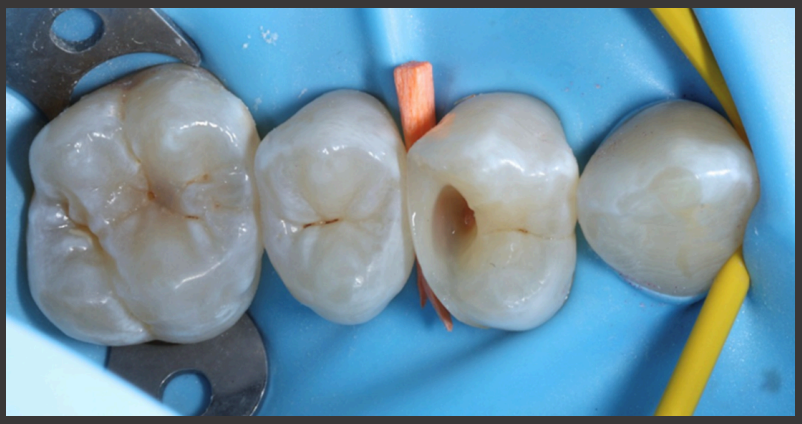


In a gold standard workflow air abrasion would be used prior to matrixing to further clean the dentine however here I did not use as I did not

have it freely available at the time. I use a selective enamel etch technique using phosphoric acid for 20 seconds and then place the matrix.

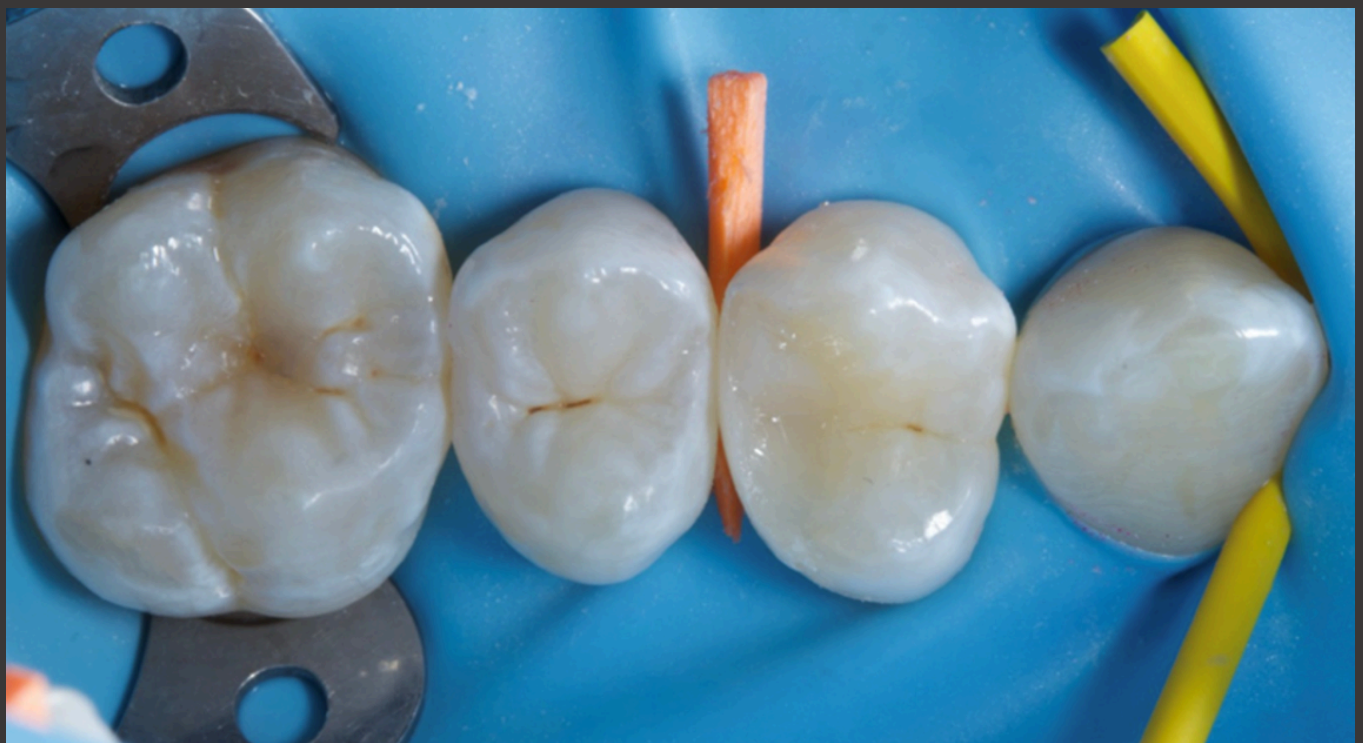
A double curve Tor VM sectional matrix was used here. These matrices have a greater curvature than standard sectional matrices and I have found them to work incredibly well on pre-molars and create beautiful contact shapes and contours. A palodent V-ring was used to provide separation of the teeth and stabilise the matrix. Something I had overlooked before my FD year was the importance of the sectional matrix in creating cleansable, anatomical contacts with appropriate height and curvature, which cannot be achieved with non-contoured circumferential bands.

Conversion To Class I



The snowplough technique where paste composite is placed over an uncured flowable base (SDR used here) was used to build the distal marginal ridge. Signum modelling resin, a flat plastic and paintbrush were used to adapt the composite to the matrix. I have slightly over built the ridge here however I am happy with the shape, adaption to the tooth and importantly the contact created. It is then useful to remove the ring and matrix to provide greater access to the cavity to create the occlusal morphology

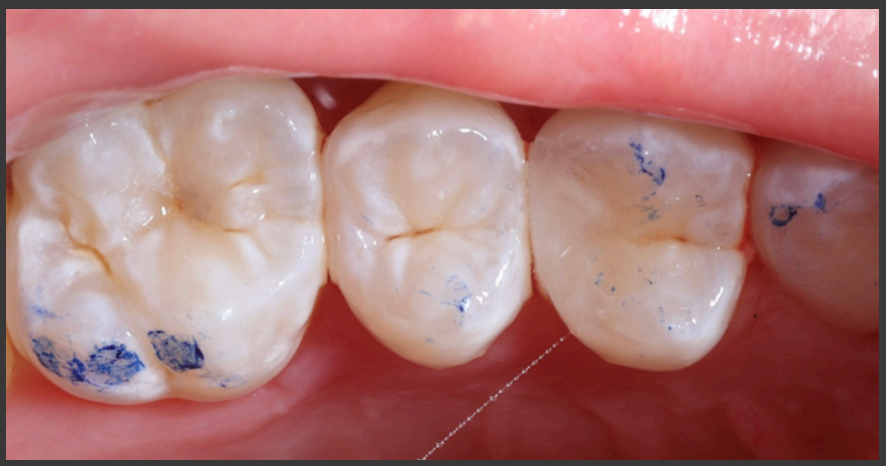
Occlusal anatomy



The same technique and equipment were used to create the occlusal anatomy. I have found creating the shape and amount of composite required for each increment outside the mouth and transferring using a straight probe preferable for controlling increment size than going straight from capsule to cavity. Using the opposing unrestored half of the tooth as a guide for the morphology is also useful. This is far from perfect and I continue to aspire to improve my morphology however I am happy with my progress since starting my foundation year in this area.

I used a restorative scaler to remove any excess and ensure smooth interproximal margins. No polishing equipment was used however I have found using the paintbrushes with modelling resin to give a smooth result.

Occlusal check



The marginal ridge was adjusted until out of vertical and lateral forces. A pre-operative occlusal check would have been wise to ensure the restoration is fully conformative rather than just ensuring it is ‘not high’.

🏆 This Month’s Favourites!

📚 Book

The Courage to be Disliked

By Fumitake Koga and Ichiro Kishimi

This is a great though-provoking book that I've been opening every now and then. It's written as a conversation between two people, a young, brash apprentice (or “youth” as he is called) and an older and wiser “philosopher” who discuss and debate different concepts and ideas around happiness, society, freedom, etc. This book isn't filled with your life hacks and practical tips, but is very inspiring in that it allows you, the reader to think deeply and contemplate about what is being discussed. I would highly recommend this one to just about anyone!

💬 Quote

“Champions do daily what other people do occasionally”

- By Kenny Smith

This is a great reminder that mastery is built from a foundation of consistency. Any career is a marathon and not a sprint, so putting in small amounts of regular consistent effort will ensure progress without the burnout. It’s better to be a dimly lit candle that illuminates for a long time, than a big bright one that sputters out very quickly.

That is all for this month’s issue of the Craftsmanship Newsletter! I hope you have enjoyed and found some benefit from this one, and stay tuned for new podcast episodes & next month’s issue!

And as always…

💪 Get Better Today!