



## 3 Steps to Full Mouth Reconstruction

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## Introduction

Having practiced dentistry for 15 years, I have treated 100s of complex cases including teeth with wear/broken dentition which required increasing OVD. Besides enabling me to undertake comprehensive treatment planning for patients, it has improved the aesthetic outcome of my cases, given me more predictable results, increased my productivity, enhanced patient satisfaction, and decreased stress. This is also true for every dentist I have taught.

My teaching experience of over 10 years in this field has exemplified the fact that any general dentist, regardless of their experience, with dedication and appropriate guidance, can implement full mouth rehabilitation. To treat these cases predictably, you need to understand three simple fundamental steps which are involved in the process.

Step 1 entails understanding occlusion and treatment planning. If you think about it, oral rehabilitation is nothing but a collection of single tooth restorations such as composite bondings, crowns, onlays, or veneers which work harmoniously due to occlusion.

After developing an understanding of occlusion and planning your case, you can start with step 2, which is the reconstruction of anterior teeth. This can be done using direct, indirect, or a semi direct method. Sometimes you just need to carry out anterior reconstruction for the patient with localised anterior wear and use the DAHL technique to let the posterior teeth come into occlusion.

However, many patients do not fall under the criteria of the DAHL technique. For this reason, they will need posterior reconstruction which is step 3 of the process. Posterior reconstruction can also be carried out using direct/indirect or semi-direct methods.

Before proceeding further, let us look at the steps involved in direct adhesive reconstruction in detail:

### **Step 1: Understanding occlusion and Treatment planning**

- Comprehensive assessment (including occlusal assessment)
- Impressions and records
- Mounting = Decide if CR/CO/ICP?
- Diagnostic Wax up
- Try in = Mock up

### **Step 2: Anterior build ups**

- Upper and Lower Anterior definitive
- Posterior temporaries using wax up

**Step 3: Posterior build ups**

- Posterior definitive = one arch or one side at a time
- Protection
- Maintenance

In order to give you more, I have compiled resources in the form of video demonstrations, templates, etc. I will be sharing these with you via QR code and link as a gift. It contains 23 videos and 1 eBook. So don't forget to use this QR code or click on the link to get the most out of these articles.

**Step 1a: Understanding Occlusion - Key to full mouth reconstruction**

If you break down full mouth reconstruction into a tooth by tooth dentistry, you may realise that any general dentist with some experience is capable of doing this type of single tooth dentistry, such as building a single tooth with composite, preparing and fitting onlay, crown or veneer for a single tooth. So, if you can build one tooth, then you can build 28 teeth, right? Therefore, the only factor that differentiates between building 28 teeth in 28 patients or in a single patient is managing how they come together and that is why understanding occlusion is the key to success when it comes to doing full mouth reconstruction.

Occlusion becomes really important when the patient has a parafunctional habit. Let us look at this table to understand the difference between parafunction and function.

<b>Factor</b>	<b>Function</b>	<b>Parafunction</b>
Duration of tooth contact per day	4-10min	Up to 4 hrs
Magnitude of applied force	20-40 lbs per sq. In.	Up to 300 lbs sq. In.
Direction of applied force	Vertical	Horizontal or lateral
Lever	Class III	Class II or Class I
Type of muscle contraction	Isotonic	Isometric (poor blood supply, buildup of lactic acid resulting in cramps and spasms)
Proprioceptive influence	Neuromuscular protective mechanism present	Neuromuscular protective mechanism absents
Mandibular closure position	ICP	Eccentric
Pathological effect	None or at least minimal	Pathological changes, vary in different patients

### **Mutually protected occlusion**

After understanding the above, we need to consider the best possible scheme of occlusion upon carrying out full mouth reconstruction for our patients. Stuart and Stallard were one of the few first to adopt the mutually protected occlusion. This is a concept of occlusion in which the teeth act in groups for their 'Mutual Protection'. Some of the key points of this type of occlusion are:

- Upon closing to ICP, there is a light ICP contact with anterior teeth and good stable even contact with posterior teeth. When biting gently shimstock should not hold anterior teeth but should hold posterior teeth. The anterior teeth will hold shimstock only when the patient clenches. This occlusal scheme protects anterior teeth from heavy vertical loading.
- Upon closing to ICP, there is a simultaneous even contact of the posterior teeth, which thereby take the occlusal forces along their long axis.
- Anterior teeth help in protrusive guidance whereby they disclude posterior teeth and hence protect them from horizontal forces.
- Lateral guidance prevents any non-working side contacts.
- All guidance is initially shallow and then gets steeper gradually.

### **Step 1b: Treatment planning**

#### **Comprehensive Assessment:**

Any treatment planning starts with a comprehensive assessment. During this assessment, we are gathering data to help us plan the treatment. We need to find any warning signs from the beginning.

Before you start any treatment, you need to make sure that you and the patient are both happy to work with each other. If the patient is not happy with you or if you are not happy with the patient, then I would strongly suggest that you so not start full mouth reconstruction.

You may find warning signs during clinical examination such as issues with TMJ, including pain or limited /irregular movement, muscle pain, myospasm, wear facets, drifting, fracture, pain/sensitivity with teeth, the individual prognosis of teeth, condition of current restorations, unstable bite, etc.

Finding the first point of contact and assessing the slide between CO to ICP is also very important if you are planning to reorganise the occlusion.

I have created an Ebook to help the dentist carry out a comprehensive clinical assessment which includes general assessment, occlusal assessment, and implant assessment. Use the QR code or click on the link above to gain access to this book.

### Facebow record

Facebow records the physical relationship of the maxilla, particularly the maxillary teeth to the condylar hinge axis of the mandible and the horizontal plane. Facebow helps in mounting models in an accurate relationship, replicating the patient's jaw movement, which will as helpless assessment and treatment planning cases such as comprehensive and functional.



diagnostic wax up. It helps us when we're doing full mouth reconstruction and we would like to mount patients' models in an accurate position.

### Centric Relation record

Many dentists find it difficult to record Centric relation records for patients. Using a leaf gauge is one of the easiest ways to record CR. However, if the patient is dysfunctional and difficult to guide, then it may be necessary to make a special deprogrammer such as the Kois deprogrammer and let them use it for a few days or weeks before recording the CR. In some cases, it may be advisable to give the patient a Michigan Splint before starting any treatment.

You will be required to mount models in CR in the following situations:

- To mount mandibular and maxillary models in CR
- Reorganised approach to restore teeth e.g., full mouth reconstruction, changing OVD

- Unstable bite
- Fabrication of Michigan splint



You don't need an inter-occlusal record to mount models when a patient has,

- Stable bite and restoration do not involve reorganised approach or changing OVD
- Stable bite and mounting needed in ICP



However, remember that you always need facebow record to mount any models on any decent articulator.

### **Diagnostic wax up and mock up:**

Once you have planned treatment then you can ask the technician to carry out a diagnostic wax up. Diagnostic wax up helps in

- Visualising end point, shape and contour of restorations
- Assessing patient's expectations through mock up
- Assessing planned occlusion and making necessary possible changes
- Assessing space for the tooth restoration needed
- Preparing guides for the preparation by taking Index from wax up
- Fabrication of provisional restorations



I see many dentists come up to me with mounted models with diagnostic wax up without being certain about the treatment plan. It is vital to know your treatment plan before you advise the technician for a wax up. If you are going to provide the patient with just onlay, then you need to tell the technician to add wax only on occlusal surfaces of the molars and not cover the whole tooth. Similarly, if you are just doing palatal and incisal build up, then you need to let the technician know to not place wax on the buccal aspect of the anterior teeth, otherwise, it may mislead the patient. If you are not sure of the plan, then ask the technician to mount models and assess articulated models before asking them to carry out wax up. If you are doing digital articulation and wax up, then it is easy to make amendments.

Once you are happy with the wax up, you can then carry out a mock up using bisacryl temporary crown and bridge material and check for function and aesthetics. Once you have tested your mock up for at least a week and both you and the patient are happy, then you are ready to move on to step 2 of the full mouth reconstruction.

### **Step 2: Anterior build up**

This remains a keenly debated topic. While the majority of dentists would carry out anterior reconstruction first, only a handful of practitioners start with posterior teeth.

I prefer to start with anterior teeth because it is easy to make adjustments once 3-3 the build is completed. It is easy to remove or if necessary, add composite to a single surface without any cusp or

fissures then add something posteriorly. It is also easier to change OVD by adding or removing composite in the anterior teeth vs posterior. Given that anterior teeth are further from condyles it is easier for condyles to seat into CR without any interferences.

If you choose to treat posterior first, then it's much more difficult to adjust; you lock the patient into the specific OVD and as contacts are closer to the joint, it may act like an interference.

Before proceeding further with build ups, we need to discuss some fundamentals of bonding.

### **Composite Bonding:**

It is vital to use an appropriate bonding agent while carrying out full mouth reconstruction or any composite restoration for that matter. Numerous bonding agents are available in the market and everyone has their pros and cons. However, my go-to bonding agent is optibond FL. It is a fourth-generation bonding agent. They are still considered to be a gold standard.

This system allows complete removal of smear layer by using total etch (15-20sec). These systems are very effective when used correctly, have a good long-term clinical track record, and are the most versatile of all the adhesive categories because they can be used for virtually any bonding protocol (direct, indirect, self-cure, dual-cure, or light cure).

Isolation used to be considered to be the key to bonding restoration. However, studies are inconclusive on the effectiveness of the rubberdam. In addition, if you are using techniques such as injection molding or Smilefast, it is not possible to use rubberdam as it prevents complete seating of the stent. I still use rubberdam for isolation as my composite build ups are done using a direct technique using a guide made from Exaclear from GC. Isolating the area with rubberdam reduces stress as there is no risk of contamination from saliva and you can take time and get predictable results.

Although this article is about composite reconstruction, I would like to mention that , in my opinion, carrying out Immediate Dentine Sealing is very important when you are considering bonding an indirect restoration. It improves bonding quality and reduces sensitivity.

There are various tools available that may help you in carrying out bonding. I have created a small video explaining the tools I use for the bonding. Use the QR code or click on the link above to gain access to this resource.

Methods for carrying out anterior build up:

1) Direct:

- Putty index
- Clear index (Memosil/Exoclear)
- Injection molding?
- Smilefast

2) Indirect:

- Composite palatal backing
- Ceramic palatal backing
- Gold Palatal backing
- Crown

3) Direct indirect method:

- Buccal porcelain Veneer in combination with palatal composite build up Direct Build ups (Lower):



Direct Build ups (Upper):



Lower anteriors are almost always built up using direct methods rather than indirect unless the reconstruction is complete indirect reconstruction. As a general rule, I prefer direct palatal backing using Exaclear and the stamp technique. However, it may be wise to have indirect palatal backing and bond them using heated composite if the thickness of the composite is more than 2 or 3 mm.

While building anterior teeth it is important to build lower teeth first and make sure they are aligned and then build up upper anterior teeth. In an ideal world, it should not make a difference if you build upper teeth first or lower if you are able to transfer your wax up exactly. However, this is not always possible. Hence, we build lower teeth first, because if there are any discrepancies in the teeth position or wax up transfer, and if you have to build the upper teeth first and then build lower teeth to match the upper, then the lower teeth may not be aligned which will be visible. But if you do this the other way round and if upper palatal backings are not aligned, then it is not a big deal as far as occlusion is fine, as it won't be visible. Hence, always build lower teeth first and then upper teeth.

### **Stabilising posteriors:**

Once anterior teeth are built at an increased OVD, it is vital to stabilise posteriors as there will be an open bite and the patient may find it difficult to function during the transition phase. Stabilising posteriors will also prevent any further teeth movement such as supraeruption of posteriors or intrusion of the anteriors.



Stabilisation can be achieved by using stents from diagnostic wax up and using Bisacryl temporary crown and bridge material and cement them using temporary cement such as poly F or using glass ionomer restorative material to create 'GIC stops'. GIC stops are easy to use. Apply Vaseline to the maxillary teeth, place GIC on the occlusal table of the mandibular teeth and ask the patient to close. Anterior teeth will act as a stop. You could choose to place GIC on the maxillary teeth instead of mandibular teeth or you could place GIC on both arches if the space is too much. If this is the case, then make sure you build one arch first, let it set then place vaseline on that GIC, and only then place GIC on the opposite arch otherwise you may risk bonding two GIC blobs to each other.

When you are using GIC for stops then make sure GIC is only covering the occlusal table and not extending over to the next tooth. This will help the technician distinguish teeth while doing the second wax up.



Once you have reviewed the patient after 1 or 2 weeks and the patient is happy and occlusion is stable, you can then take new impressions and facebow record to mount models in ICP. As you have already built the patient's anterior teeth in CR, the patient's ICP should equal their CO at this point. Ask the technician to do wax up for the posteriors. You can use this wax up to build posterior teeth using the stamp technique. You may choose to use the original wax up instead of getting new wax up done but usually, there are always some changes in occlusion due to polishing and minor adjustments and hence having another wax up will allow you to carry out direct build us with much more accuracy. When asking the technician to do wax up, ensure that you ask them to wax up alternative teeth first and then duplicate the model and then carry out the remaining wax up. This will help you create appropriate stents for your posterior build up.



### **Step 3 Posterior build up**

#### 1) Direct restoration:

- Stamp method (Exoclear/Memosil)
- Putty index
- Direct freehand build up

#### 2) Indirect restorations:

- Onlays (Lithium disilicate, Composite, Hybrid, Gold)
- Crowns (Lithium disilicate, Zirconia, Gold)
- Veneer-lays (Veneers covering occlusal surfaces)

If you are choosing to use the direct build up method, then the stamp technique is one of the easiest and most predictable methods. Indices are created using Exaclear material from GC. While making these indices, like any other indices, make sure they are thick enough to be rigid, otherwise, they may flex while applying pressure. Make sure the composite is heated to allow good adaptation to the indices and to the tooth. Place some composite on the tooth surface first so that any air pocket taking place will be between composites rather than composite on the tooth. While trimming the index, make sure the index is not extending too much beyond the margin otherwise it will be difficult to clear the access before curing.



Posterior teeth can be built one side at a time or one arch at a time. It is entirely up to the clinician as both techniques have their pros and cons. If you chose to do one side at a time, then it will be comfortable for the patient to use the other side while getting used to the side you have just built but you are not in control of the upper full arch, it may affect the smile line if you are not very careful. If you are doing one arch at a time, then it is best to do the lower arch to make sure that the curve of Spee is flat, but then the patient may struggle to function between appointments unless you are carrying out all build ups in one visit.



### **Protection and Maintenance:**

It is important to make it clear to the patient from the outset that it is likely that they will not stop parafunctioning and hence, they will need some sort of protection. Michigan splint is one of the favorites for this job. It is hard and provides appropriate occlusion, which allows the patient to relax. Soft nightguards are known to increase the patients' parafunctional activities. If the patient has had orthodontic treatment, then using Essix retainers is also considered appropriate.



Patients are advised to visit hygienists regularly depending on their needs. Regular check-ups are very important because the occlusion is dynamic and teeth move and occlusion changes. So, every time the patient comes for a check-up, it is vital that you check their occlusion and adjust if necessary. Composite may require polishing to remove staining or repair any chippings.

### **Conclusion**

- Direct adhesive reconstruction is a more conservative and cost effective way to restore patients' dentition.
- 3 steps technique is developed to provide predictable results following easy 3 steps.
- Patients need to be made aware regarding longevity of this treatment which is less than conventional reconstruction. However, it also comes with much less biological cost. "

"I hope you found this article in the series useful. If you have any questions feel free to contact me at [info@drdevangpatel.com](mailto:info@drdevangpatel.com) or join my Facebook group 'Full mouth reconstruction for GDPs' for FREE where you will find lots of resources which may be of help to"