

B.O.P.T



BIOLOGICALLY ORIENTED PREPARATION TECHNIQUE

THE 7 FUNDAMENTALS

OF B.O.P.T

H

**HEADROW
ACADEMY**

SO, WHAT IS IT?

B.O.P.T – The Biologically Oriented Preparation Technique, is a vertical preparation, but with a new prosthetic approach. Using, a methodical, staged protocol from preparation, through to provisionalisation and then final prosthetics, we can manipulate gingival tissues to our desired contours.



SO, B.O.P.T is just a Vertiprep then, right?

No! let's not get too pedantic, but B.O.P.T is a specific concept. A vertical preparation is one of the key elements to the concept. However, the way we **invade the sulcus and then provisionalise is unique**. As a result, we **will thicken our gingival tissues**. This desired result will not always be achieved with a simple vertical preparation alone.



HANG ON, I STILL DON'T ACTUALLY KNOW WHAT A VERTIPREP IS!!

Quite simply, for over 100 years we have been preparing finish lines into teeth (horizontal preparations). **A vertiprep is a preparation without a margin. The tooth is prepared into a perfect marginless cone over which the final prosthesis sits.**

HANG ON.... WHERE DO WE FINISH THE CROWN?!!!

Stay with me here.... you will see!!! Let's jump into this and cover the 7 fundamental points to grasp this concept.

1. B.O.P.T IS A 3 STEP PROTOCOL



Figure 1 – A vertical preparation has **no finish line**.



Figure 2 – A gingivage is performed with specific vertical burs.

1. A vertical preparation – completely marginless and with **no horizontal line**. So most importantly, **the natural CEJ of the tooth is removed**, along with any previous finish line that may have been prepared.



2. Gingivage – **A controlled invasion of the sulcus during preparation**, don't worry, we'll discuss this!!

3. Provisional restorations shaped to the desired gingival contours.



Figure 3 – Pre op planning for the desired final zenith position. #11 and #12 are to be moved apically, #21 and #22 are to be dropped coronally. We also aim to correct the midline cant.



Figure 4 – These lab fabricated provisionals have been planned with the zeniths in the ideal position. We have disregarded the current gingival position. It is these provisionals that will sculpt the desired zeniths and emergence profiles.



Fig 5 – Relined provisionals on seating




Fig 6 – Desired zenith position achieved after 40 days



Figure 7 – Final EMAX restorations at 4 Years. Notice a thickening of the gingiva around the restoration margins.

This in turn will give us 3 benefits

- The ability to control our gingival zenith position – we can move zeniths up as well as drop zeniths coronally (WHAT?????!!! – yes, you will see).
- A Biotype conversion – using this concept we can **thicken our gingival tissues.** 
- Stability – thicker gingival biotypes give us **more stable aesthetic** results over time.

So why do this in the first place when we have been preparing margins with success for over 100 years?

To answer this lets, have a look at **biological width:**

You see, in a biologically healthy situation, we never want to invade the biological width. **The margins are prepared into the tooth and we are never to prepare beyond the gingival sulcus.** Importantly, notice the position of the CEJ. This is nature's reference point for all our biological architecture. **The CEJ remains intact after the tooth has been prepared.**

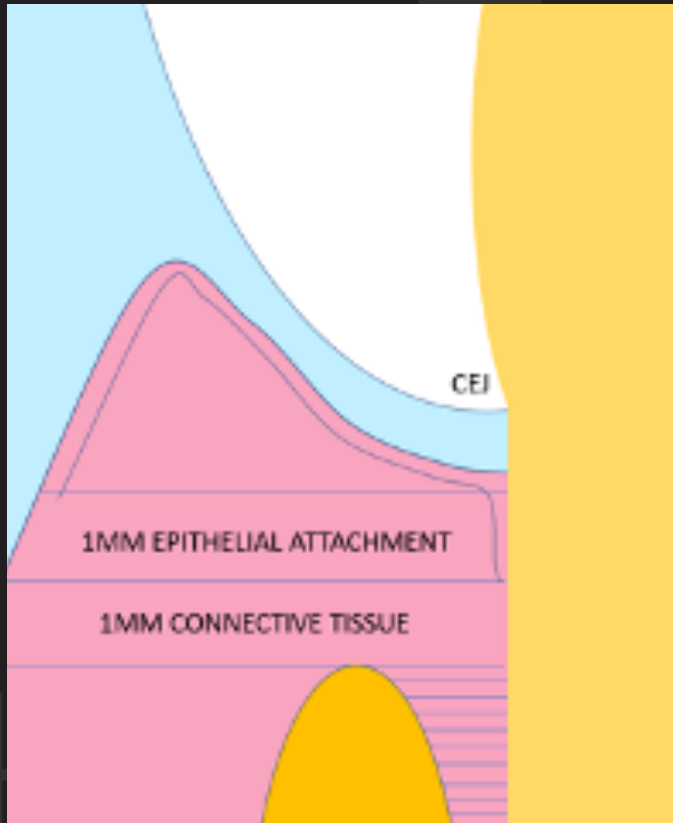


Figure 8 - Biologically healthy situation. Above the crest of the bone, the gingival tissues will arrange themselves around the Cemento - Enamel Junction.

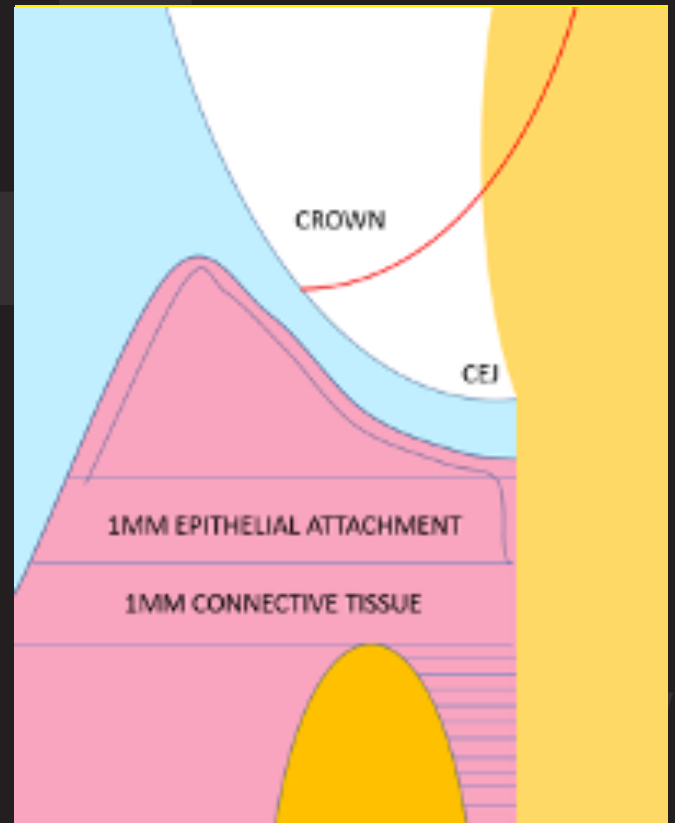


Figure 9 - Conventional crown preparations will not interfere with the biological width, the natural CEJ is intact.

Now look at the photos below: you can see this happy biological situation we have described above no longer exists!

Think of a retreatment case you have recently done where you have removed a crown and you could not establish where your margin should be. Was there too much blood as you had to go deeper to get to sound tissue? **Was there caries on the margin that completely ruined your plan?**

So where do we place a margin now? How do we recover the soft tissues?

If you are happy with the position of the soft tissue, then there is no reason why we cannot just work to this position and finish as normal.

But is this a compromise? Especially in **retreatment cases or abfraction cases**, the only way we can keep going is apical, **resulting in longer teeth.**

Wouldn't it be great if we could come back down again? If this is the aim, then **a margin here is no longer desirable, so we must go vertical.**



Figure 10 – Periodontal disease and margins positioned onto root dentine, an unhappy biological situation.



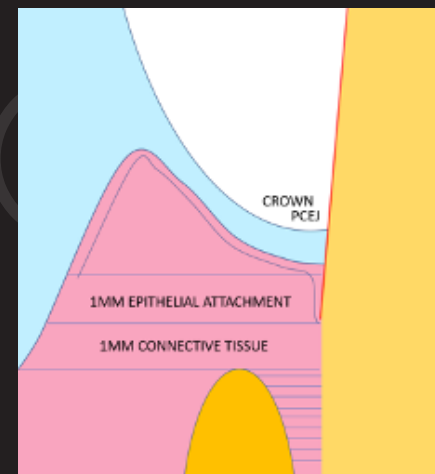
Figure 11 – Recession around all ceramic crowns, **the only way** to equalise the zeniths would be to go apical.



Figure 12 – Abfraction lesions have disrupted the natural position of the CEJ. Conventional prosthetic protocols would only allow us to keep going apical resulting in longer teeth.

You can see we remove any horizontal component to the tooth, **importantly removing the CEJ**. And we start again!

Figure 13 – **A vertical preparation will prepare beyond the sulcus and into the epithelial attachment.** The Final crown is seated on the vertiprep. This will form a new CEJ or 'PCEJ'.



2. THE PREPARATION

The preparation is completed in a controlled fashion, as we would with any conventional crown preparation.

The fundamental difference occurs in the gingival aspect of the preparation. **The vertiprep will finish subgingivally, without a finish line.**

There are different schools of vertiprep. Many will advocate that we are as atraumatic to the soft tissues as possible. Some clinicians will even prepare and take a definitive impression in one appointment. The argument here is that we don't ever want to traumatise the tissues and induce a remodelling response.

This is where B.O.P.T is unique. **We specifically aim to traumatise the gingival sulcus to create a blood clot and induce a healing response.** This is 'Gingitage,' also known as **gingival rotary curettage**. There have been many publications describing the concept of gingitage. However, it was **Loi and De Felice** that developed this specific protocol that really **allows us to take control of the zenith position.**



Fig 14 - The belly of the bur is used to remove any horizontal component of the preparation.



Fig 15 - The tip of the bur invades the sulcus ('gingivage'). The tip is not used to introduce any finish line into the tooth.

Given we are deliberately aiming to induce a bleed, it is not possible nor desirable to take a definitive impression at this appointment. Provisionalisation is essential here. The gingival sulcus is bleeding, and a healing response will begin. This is the clever bit! We shape our provisionals to the desired contours, and this will act as a new CEJ for the gingival tissues to heal around.

THIS RAISES A FEW QUESTIONS

WHY ARE WE PREPPING SUBGINGIVALLY?

Remember, the aim is to go completely vertical, to remove any horizontal line and most importantly, the CEJ – nature's reference point to build the gingival architecture.

WHY ARE WE TRAUMATISING THE GUM AGAIN?

To create a blood clot that will induce a healing response. At the same time this will also remove any chronically inflamed tissue before re epithelialisation.

AND HOW DO WE KNOW THE GUM ISN'T GOING TO RECEDE?

It's about geometry and the CEJ. The gingival tissues are seeking a 'bump' to reform a new gingival architecture. Remember, the CEJ is nature's reference point, so we are introducing a new reference point in the form of our provisional (a prosthetic CEJ or PCEJ) to create and manipulate our zeniths.

Given the preparation is cervical, the gingival fibres actually have the ability to move coronally towards the provisional if so desired.

We refer to this phenomenon as 'Coronal creep'. Coronal what????????? Stay with me, you will see...

We use **specific burs** for this concept. Observe the shape of the bur. **We DO NOT use the tip of the bur** for anything other than traumatising the gingival sulcus. There is to be no finish line in the preparation. **We use the belly of the bur to prepare the tooth** and remove any horizontal component, be it the natural CEJ or any previous finish line.



Figure 16 – **Specific vertical burs** are to be used for this protocol. Burs available through **Sweden&Martina**



Figure 17 – The subgingival preparation and removal of margins will increase space around the vertiprep. **This space will fill with clot.** On healing this will convert to new connective tissue, boosting our gingival biotype. (Preparation photo reproduced by kind permission of Dr. Ignazio Loi – Cagliari, Italy).

The removal of subgingival tooth structure will result in a space between the prepared tooth and gingival margin. **This space will fill with clot.** The support of the clot in this newly prepared space key **to thickening our gingival biotype.**



Figure 18 - the abfraction lesion here has resulted in recession and we have a **thin gingival biotype**



Figure 19 - The BOPT process **has thickened the gingival biotype** around the tooth preparation.

3. THE PROVISIONAL

The provisional will create the desired gingival zenith architecture and give us a predictable end result.

The provisional is more than just a temporary. It will give us 4 things:


- An aesthetic reference point – the provisional will dictate the zenith position. 
- A prosthetic CEJ – a new reference point for the gingival tissues to heal around.
- An over contour - the over contour will support the blood clot after gingivage. As with any healing process, a good quality, well supported clot is essential.
- Protection of the tooth preparation from bacterial leakage and sensitivity (as with any conventional provisional crown).



Figure 20 – completed vertical preparation ready to provisionalise with the aim to coronalise the gingival zenith.



Figure 21 – A preformed acrylic crown

So, we contour our provisionals in specific way:

First, we plan the desired zenith position. This can be done with laboratory fabricated shell provisional crowns, a prefabricated acrylic crown, or even off a wax up. The important thing is that we start with the end goal in mind.

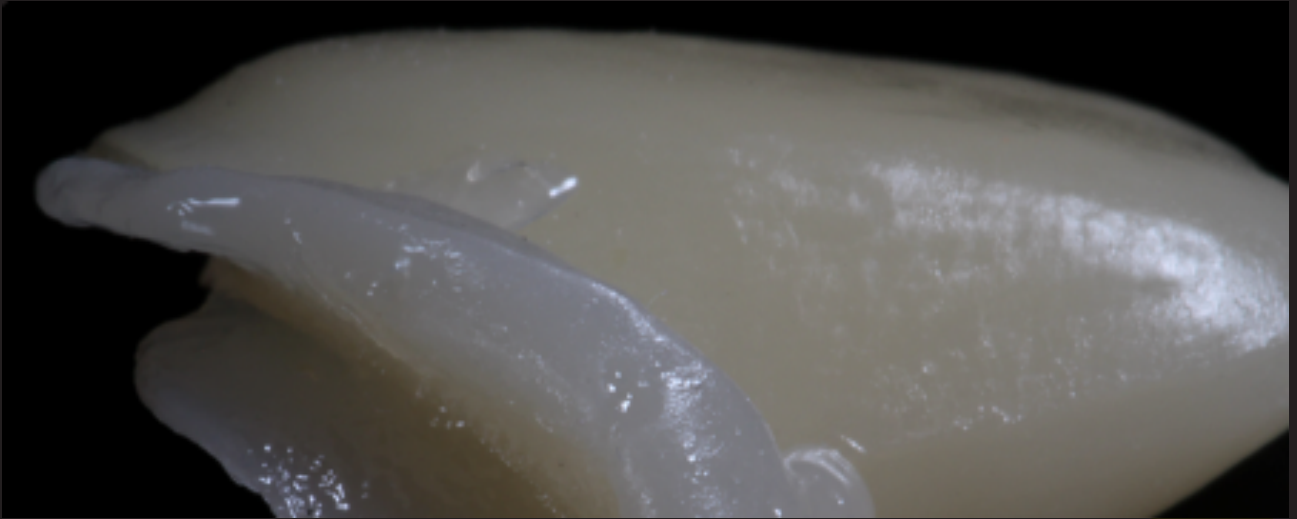


Figure 22 – The reline is a negative impression of the gingival sulcus. The resultant trough is filled with flowable composite to bulk out the gingival area

Next, we reline the provisional, and we want to get messy here! This excess flash is necessary for us to get a good 'overcontour'.



Fig 23 – First reline with BisAcryl Resin

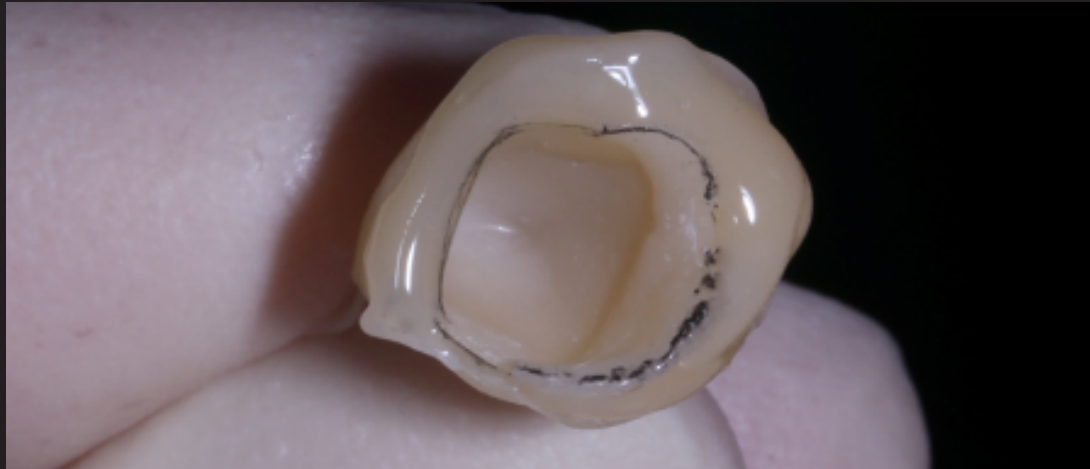


Figure 24 - the base of the sulcus has been mapped out with a pencil to ensure the flowable composite does not go beyond the vertiprep.

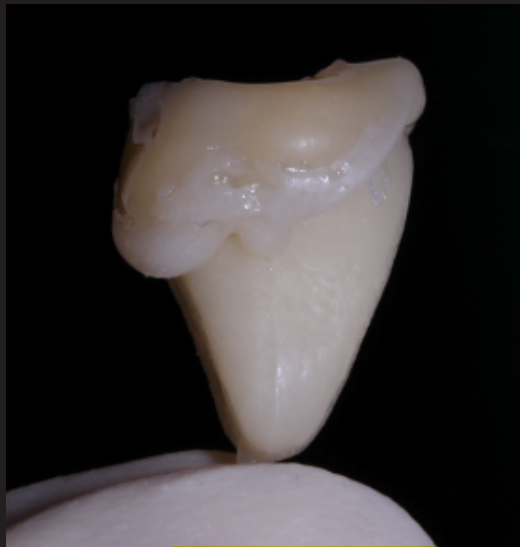



Figure 25 - The bulked out provisional prior to trimming



Now we bulk out the zenith area with flowable composite (make sure you cure it!!!!)

So now we have a bulked out gingival area that we can shape into the desired position. Especially important to note here that we do not follow the shape and position of the current gumline. We shape the tooth into the desired position, whether it be apical or coronal. The aim here is to support the clot, the tissue will follow.



Figure 26 - Notice the overcontour, this is necessary to support the clot and form the new PCEJ. 

And here we have the final polished provisional ready to cement. Let's see what happened in this case



Figure 27 - The relined crown with the ideal zenith position



Fig 28 – The provisional crown on cementation



Fig 29 – After 6 weeks, we have a new gingival zenith position and a thicker gingival cuff.

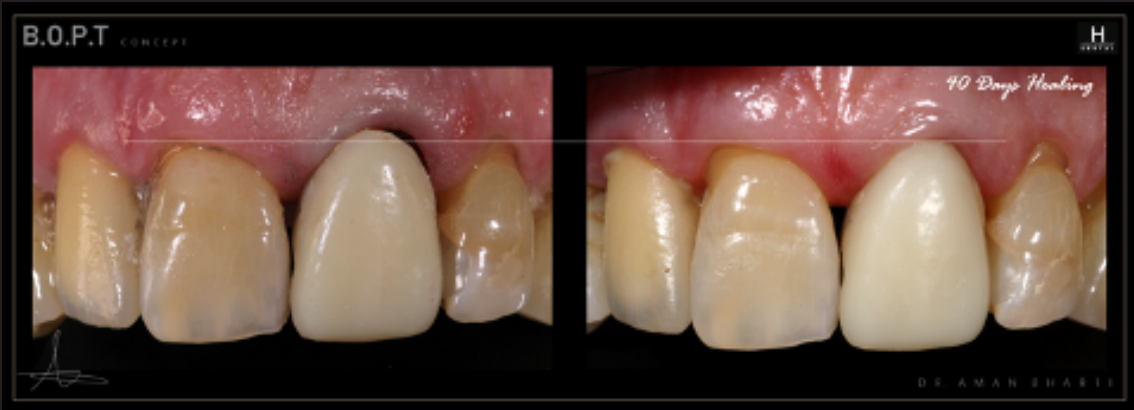


Fig 30 – Recovered zenith position

We had 'coronal creep'. Why? Because the soft tissues were looking for a 'bump' to heal around. There was also an increase in soft tissue volume due to the removal of subgingival tooth structure during preparation. This new tissue is young and adaptable so will move to find this 'bump'.

The common question we now have is how far up or down can we move our zeniths just by doing this???

Well the answer comes from our pre prosthetic planning. If we are to move gingival tissues apical, we need to ensure there is no bone in the way, so in some circumstances it will be necessary to conventionally crown lengthen and remove bone.

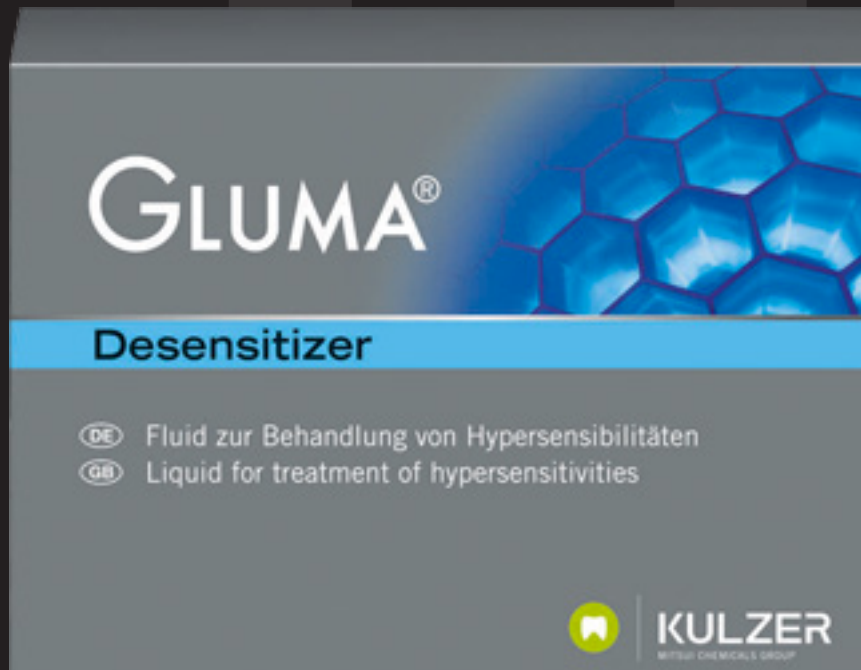
For coronal movement there are specific factors:

- The gingival biotype thickness of the patient
- How much the tooth is reduced
- How deep you have prepped into the sulcus.

In many cases we can expect to achieve 1 to 2mm of coronal creep. It may be necessary to perform a Connective tissue graft if greater movement is required. Essentially, the thicker the gingival tissues, the more creep we can achieve.

What about sensitivity?

It's important the preparations are sealed. Personally, I love Gluma from Kulzer, but there are many products out there so choose what works best for you to seal the dentine. In situations where we are wanting to achieve coronal creep, remember, any exposed tooth on the day of preparation will be covered with clot. This clot will turn into connective tissue and cover this dentine.



We now simply cement the provisional with temporary cement and wait for healing. According to Ingram, 21 days is enough. Personally, I wait 6 weeks for full gingival healing for a nice predictable impression.

4. THE IMPRESSION.

Recording an accurate impression is essential, whether it be a horizontal or a vertical case. But there is no margin, so what are we actually recording here?

It's important to understand what we are observing when we remove the temporary. We are observing **a healed gingival architecture** that has been prosthetically manipulated.

So, we have a vertiprep, an ideal gingival zenith emergence profile and importantly, **a newly formed gingival sulcus**. So yes, you can insert **a periodontal probe 1-2 mm** beyond the visible vertiprep.

It is essential the impression records:

- The vertiprep – we need to record the full extent of the preparation from the incisal to the sulcus.

- **The gingival emergence profile – this will dictate the contours of our final crowns**



- The base of the sulcus – this is the most important. We do not want to go beyond the base of the sulcus as we will then be invading our 'new biological width'. So, **the retraction cord is placed into the sulcus and the impression recorded**. Since there is no margin to be recorded, **the impression of the retraction cord is the base of the vertiprep.**

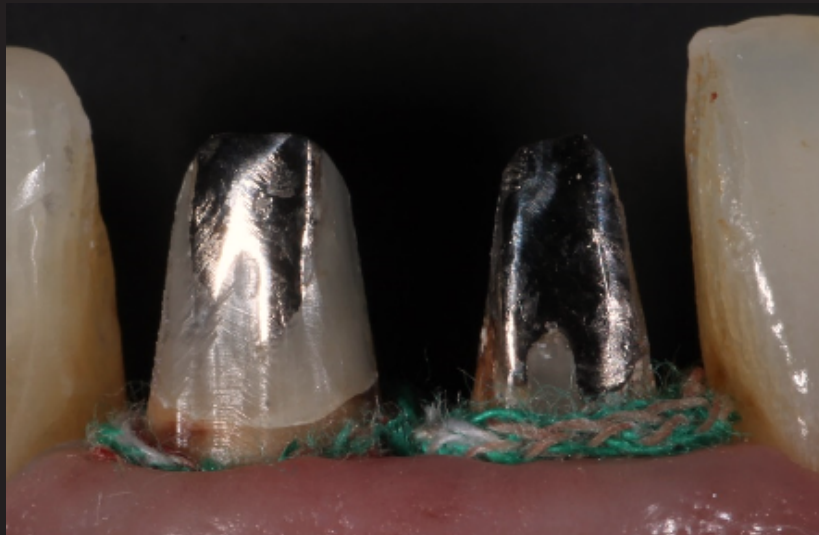


Fig 31 - Here we have two rehabilitated cores prepared vertically. A two-cord technique is used to record the impression. 00 impression cord is placed into the sulcus, Number 1 or 2 cord is then placed over the first cord to hold the sulcus open. The second cord is then removed prior to impression taking. Conventional PVS material works best.

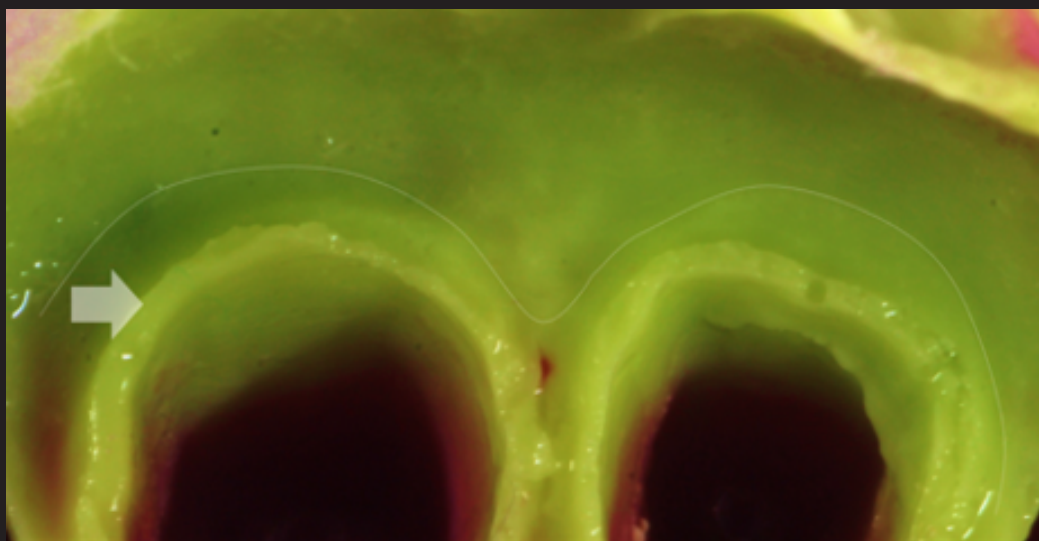


Fig 32 - Here we can see the recorded impression. The white lines indicate the recorded emergence profile. The arrow points to the base of the sulcus - effectively an impression of the retraction cord. This is the terminal point of the vertiprep, not a margin.

5. THE CAST

So, no margins??!! How will the technician finish?

Let's discuss why we prepare finish lines into teeth.

We assume the technician needs a finish line to work to. The technician also assumes they need a finish line to work to! **This is only true if we have sound tooth tissue to prepare a horizontal margin.**

Remember, a case where we record horizontal margins means **the tooth has an intact natural CEJ, so there is no place for a second 'bump,'** therefore the finish line is necessary for continuity between tooth and restoration.

We use the B.O.P.T concept **when the biological architecture has been compromised, so there is no CEJ and no margin. We do not have a finish line but rather a finishing area** that I like to term the 'landing zone'

Remember, we have created the ideal gingival architecture with the provisional.

We have recorded the base of the vertiprep by recording the retraction cord on the impression. Finally, **we have recorded the gingival emergence profile.**



Fig 33 - Vertical preparations and gingival condition upon removal of provisional restorations at 40 days.



Figure 34 - The provisionals have created the ideal gingival architecture. So, we are not recording a margin, we are recording the emergence profiles and the vertipreps to the base of the sulcus.



Figure 35 - **The resultant cast (Fuji Rock 4 Grade)**, with overlying duplicate soft tissue (Zermach Gingifast). We can see the terminus of the vertipreps subgingivally and the emergence profile that has been created with the provisional. Our final crown morphology is dictated by the cast, not a defined finish line



Fig 36 - **A close-up** demonstrating the emergence profile. The area between the base of the sulcus and the gingival margin is termed the 'landing zone'. This is how we determine the shape of the gingival contours of the final crowns.

So now **the crown will seal the vertiprep to the base of the sulcus**, and the contours of the crown are dictated by the soft tissue emergence profile. Trust your technician, it is the technician that will determine where the crown will finish based on the information recorded in the impression.

6. THE OVERCONTOUR / THE CROWN / THE PROSTHETIC CEJ

So why have we done this? Let's recap.

The gingival architecture has been disrupted and the tooth prepared vertically without a finish line. We have introduced a PCEJ with the provisional. The final crown is now the final PCEJ. So, it is the final crown that will support the healed gingival architecture.

How much overcontour is needed? Essentially, all that is required is a knife edge, as this is the only horizontal line that the tooth now has.

As we have discussed above, this is nature's reference **to reform a sulcus after gingivage.**

The degree of overcontour will depend on how aggressive the preparation needed to be; this **must be judged on a case by case basis.** Below you can see the thickness of a typical final crown.

Remember these contours have been formed by the provisionals, the final crowns are made in the image of the provisional. The aim is **to support the new emergence profile and zenith position.**



Figure 37 - the final crown margins finish at the base of the sulcus to form the prosthetic CEJ.



Figure 38 - The crown margin is finished to a knife edge and forms the PCEJ



Fig 39 -The final crown immediately post cementation.

7. STABILITY.

As with any periodontal healing process, the tissues will mature over time. Through this process, we have achieved a biotype conversion. A thicker, more desirable gingival cuff. **We know that with a thicker gingival biotype, we will get better soft tissue stability around our restorations.**

The example below demonstrates how the tissues just get better and better as time goes by.





Marginless protocols are also true for veneers and even implant restorations. The same fundamental principles apply. Once the biological situation has been compromised, we go vertical! But that's a discussion for another day!






Fig 40 – Marginless veneer preparation can also be used in situations where it is not desirable to prepare margins beyond the CEJ 



Fig 41 – Vertical implant abutments allow us to manipulate gingival profiles with provisional overcontoured crowns.

B.O.P.T

BIOLOGICALLY ORIENTED PREPARATION TECHNIQUE

IN CONCLUSION

The B.O.P.T concepts allows us to retrieve biologically compromised situations. With vertical preparations and overcontoured provisional crowns, we can control zenith positions and thicken our gingival biotypes. This in time gives us long lasting, stable tissue aesthetics around our restorations.


If you want to know more, join us on the B.O.P.T course where we discuss all the above and much much more.





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Aman qualified from Guys Kings and St Thomas in 2004. He is the principal of 2 practices including the multi award winning Headrow Dental, a boutique practice located in the heart of Leeds City Centre's fashion district. 

Passionate about aesthetic and implant dentistry, his focus has shifted towards aesthetic rehabilitations specifically using the B.O.P.T concept. Aman has been involved in teaching for many years. He is a founding member of Unique Implant Training and the Headrow Academy B.O.P.T programme. He lectures internationally and is a key opinion leader for Sweden & Martina. He appears regularly in the dental press and is the resident dentist for BBC Radio Leeds



All laboratory work completed with love and passion by Angelo Zuccari Plini, Estetica Dental Lab, London, UK.

Friendship ... is born at the moment when one man says to another "What! You too? I thought that no one but myself . . ."

— C.S. Lewis

FURTHER READING

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