Impressions.

Why you should worry about distortion?

Impression distortion it's easy to spot, right? If you answered yes - you would, in fact, be wrong. Large or obvious impression distortions as in **Figure 1** are easy to spot, and 99% of the time it is corrected by re-taking the impression. However, small distortions can be difficult to see and account for the majority of your remakes. You may not see them or are unable to recognise small distortions or realise their effect on the outcome of your restorations. Even if you do spot these small distortions it can be easy to fall into the trap of expecting a percentage of your work to end in being a remake or relying on your lab to get around the small distortions.

Expecting a percentage of remakes is a shortsighted view from both a *business* and a *relationship* perspective.

From a *business* perspective expecting a percentage of your crown fits to go wrong means a loss in chair time. Chair time is the most precious commodity you have in the surgery and knowing how much this time is worth to you is imperative. Do you know how much your running costs are, for your surgery? Knowing these costs is essential for you and your whole team to know whether or not you are turning your chair time into a profit. Surgery running costs vary greatly but it is definitely a worthwhile exercise to find out. Typical running costs of surgeries are anywhere from £350 to £700 an hour (1). Knowing how much a remake both costs you and costs your team is imperative, because for every crown that doesn't fit it costs you three. Here is the explanation as to how. The first cost is the initial or original work you and all your team have completed that did not fit. The second cost is the one to replace the first piece of work and the third is the work you could have been fitting if you weren't fitting the second one.

This is also true for your lab and as 80%(2) of remakes are impression related then it is a huge cost to the lab. A huge cost that is mostly out of their control.

The *relationship* aspect is with your patients and your lab. The patients satisfaction and the consequence of referrals from them relies on their perception of a successful treatment, if they get a first class looking crown that fits first time they are more likely to recommend you to friends and colleagues, if they get a first class looking crown that takes two or even three visits to get to fit they are unlikely to recommend you to anyone. In fact, they will tell ten of their friends that you didn't know what you were doing and had to do it twice or worse, three times! Then we move onto how your lab perceives you and how they feel about your relationship with them. Most clinicians historically have expected or have been given remakes for free. This is a mistake, as it will inevitably reinforce your behavior. Your behavior may be that you no longer look too carefully at your impressions that you send to the lab because there are, in your perception, no financial consequences to remaking your work. If you are continually asking for remakes, you are no longer an attractive or viable business partner and the lab may discontinue their relationship with you. Self-esteem is also a factor for all parties involved. For yourself, it is not good to keep having to explain to patients why this crown does not fit. It is not good for your members of staff to work in a surgery where patients are not happy and your lab will not feel good about themselves if they have to remake crowns again and again.

Prevention. *(Non-technical).*

The best way to prevent yourself from allowing poor impressions to leave your practice is to train yourself and your team, including your lab, to identify problems that may occur. Make the assessment of impressions routine before temporisation. Make the culture of inspection one of identification of cause; it should never be one of blame.

So what makes an impression good? It includes all of the aspects from this list. However, this is not an exhaustive list.

- *Uniform, homogeneous mix of material*
- *Tray is sufficiently filled with impression material*
- *Thoroughly applied tray adhesive*
- *Rigid, sturdy impression tray*

- *No voids or pulls on margin detail*
- *Detailed margins with no tears or rough surfaces*
- *No tray show-through of the impression material*
- *Good blend between heavy body and light body materials*
- *Strong bond between impression material and tray*
- *No tooth contact with the tray*
- *Complete information about the impression material used provided to the dental laboratory*

Recording remakes in a systematic way and finding the cause of them to prevent it happening again promotes and reinforces the correct and financially beneficial behavior.

Remember, record, review and improve.

Assessing the causes of remakes and their numbers that are caused by poor impressions and how to correct or stop the occurrence of that cause happening again is essential.
This behavior of recording the number of remakes and their cause is what will force you to question and improve your impression taking techniques. It will make your surgery time happier, relaxed and more profitable.

<u>How to identify if it is an impression distortion?</u>

You will need the original impression; the original model and the original restoration, along with these you will also need the new model and new restoration. Before the patient arrives for the second fit appointment try the following procedure. Take the original restoration and place it gently on the original model. Identify if it fits onto the original model. Does it fit to the margins? Are the interproximal contacts heavy or correct? If all of these aspects are correct then the lab has constructed the restoration to the blueprint you provided for them. Next, take the new restoration and gently place it onto the new model and again check all aspects of the fit. If both impressions are a true and accurate representation of the mouth then both crowns should be interchangeable between both models. Take the old restoration and try it onto the new model, if it doesn't seat then the probable cause is impression distortion. If it does seat then the likely cause is lab based.

Both situations should be investigated. And remember that you are looking for cause not blame!

Prevention (technical)

Flexure in plastic trays, pressure points due to thin plastic and ill fitting or wrongly sized trays will cause distortion in your impressions. Tray selection for both size and type is crucial. A correctly sized and pre checked rim/border lock tray is difficult to beat. The presence of the rim on rim/border lock trays causes a back flow of the material in the tray, which increases pressure in the areas that you need. Pre measure tray size to ensure correct choice of tray.

Shrinkage. This can be caused by not using an adhesive on the tray walls. This needs to be correctly applied and be allowed to dry. If an adhesive is not used it may allow the impression material to pull from the walls of the tray on setting, on removal from the jaw or it may also mean that the impression can only be poured accurately once as multiple stone castings causes great stress on this aspect of the impression. The material will set and shrink microscopically towards the greatest mass.

Injection technique, when using wash injection techniques, keep the nozzle below the material, this prevents air being introduced into the margin areas.

Working times, observe all manufacturers mixing and setting times they are there for a reason and it is usually prudent to extend the setting time by one minute to ensure full setting. This feels like it is a lifetime but taking the correct amount of time to take the impression can result in saving you time. Expect an impression from start to finish to take you at least 15 minutes. Add to this retraction cord placement or the use of Expasyl then it can easily be over 25 minutes!

Movement, slowly, firmly and confidently place the tray into the mouth and once in the correct position do not move it. It can cause facial or lingual pulls.

Quality of impression materials. Use adequate amounts of high quality impression materials that are manufactured with strict controls to ensure a consistent product and result. Accurate alginate impressions used for opposing dentition, study models and diagnostic work must also have the same care and attention to detail that all your impressions must have. One of the common faults with opposing impressions is not including all of the arch or adequate soft tissue detail. It will help your lab greatly if both these aspects are strictly adhered to.

Tips for successful impression taking.

Tip. Use a metal or rigid plastic tray.
Reason. If the tray can be easily flexed with finger pressure, the impression material will likely flex during setting and will distort the material inside it.

Tip. Use a custom tray for patients that you may consider need one.
Reason. Properly constructed custom trays help to make your impression five times more accurate than a stock tray.

Tip. Use tray adhesive on all trays.
Reason. With adhesive, the shrinkage goes toward the tray not the centre of mass.

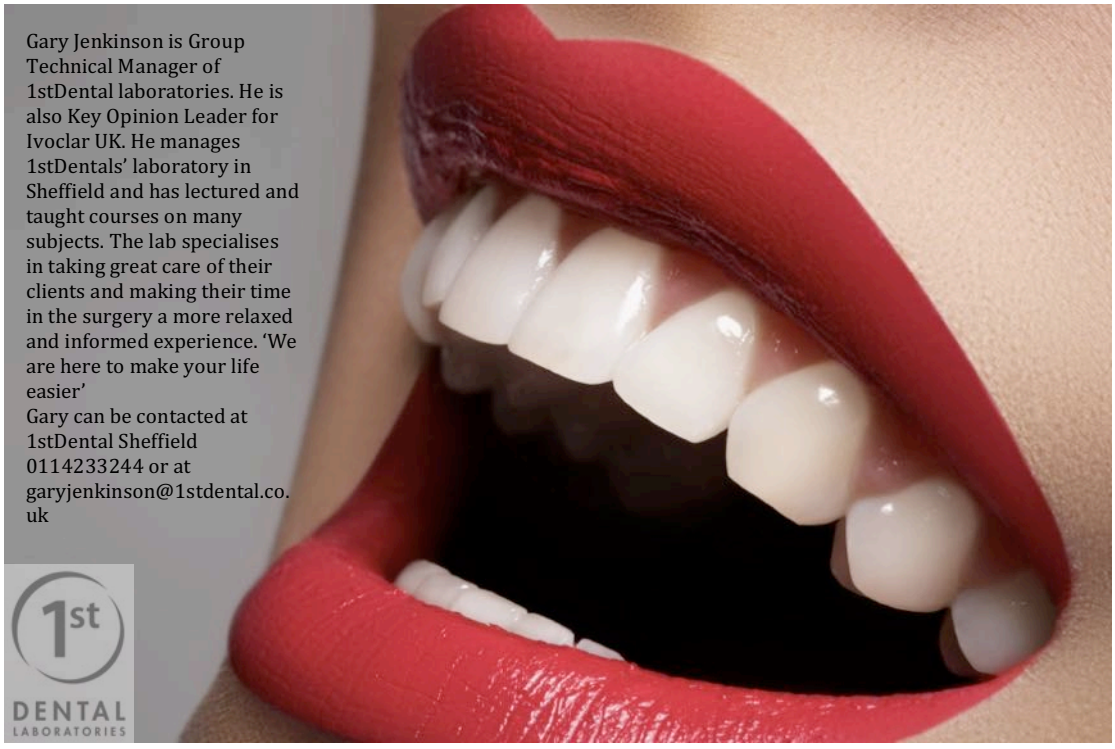
Tip. Be aware of your latex gloves.
Reason. Sulphur found on latex gloves inhibits the setting of many impression materials.

Tip. Time all impression taking and strictly adhere to the manufacturers recommendations plus one minute.
Reason. Allowing the material to fully set is essential for them to perform correctly.

Tip. Keep mix tip of your impression material submerged.

Reason. Air bubbles can be formed when the syringe tip is in the open.

Conclusion. Impression distortion is not just a technical problem requiring only a technical solution. As with most things if you want better results you need to invest more in the solution and this means slowing down in order to improve quality and consistency of our work and investing our most precious possession, "time". Investing this time in both the technical and non-technical aspects of impression taking will lead to an improvement in our work, our stress levels, our relationships with patients and ultimately our profit margins. Everyone wins.



References;

Information from Chris Barrow. (1)

Dr Damon Adams

Impression Distortion…Only a technical problem? Dentistry Today (2)

3M Espe website

http://solutions.3m.com/wps/portal/3M/en_US/3M-ESPE-NA/dental-professionals/products/category/impression/tips/

Figure 1

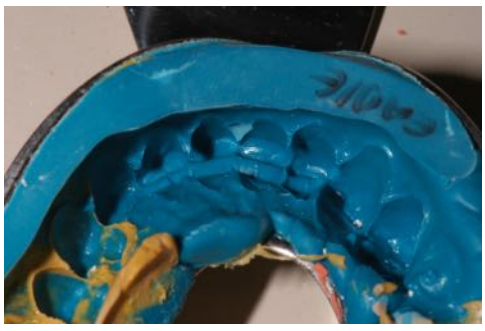


Figure 2 and 3 Impression material looks uneven – This is due to tray movement before setting. Achieving correct occlusal function with this model is very difficult. To prevent this, use an adequate amount of material and do not move the tray once you have seated it in the mouth.

Figure 4 The use of the correct amount of material in the tray is essential, this picture shows that not enough material has been used as there are gaps and voids. The use of a rim lock or border lock tray would have caused a back flow of material which may have prevented the shortage occurring.

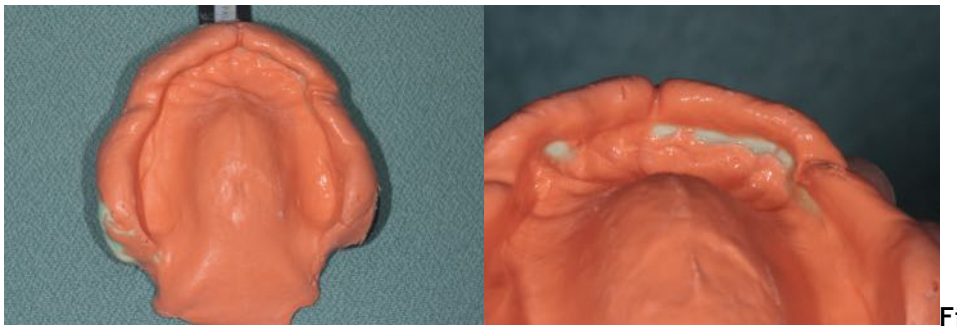


Figure 5 and 6 The alginate impression looks fantastic until on further inspection you can see that the soft tissue has encroached onto the custom tray, this will lead to inaccuracy in reproduction and can be avoided if careful positioning of the arch in the tray.

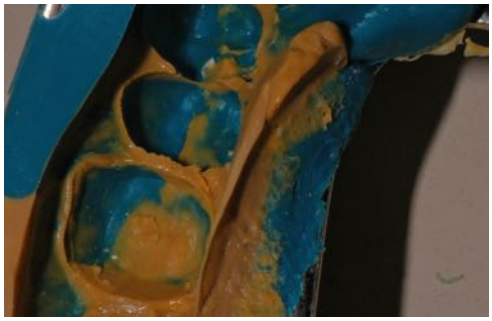


Figure 7 shows good detail on the margin of the prep.