



Fundamental aligner troubleshooting

By Terence Whitty



Figure 1. The manufacturing for aligner therapy starts with an impression or an intraoral scan.

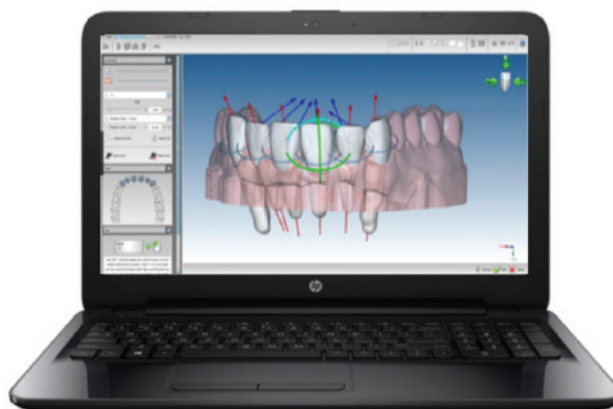


Figure 2. The virtual set-up.

Orthodontic aligners are the big buzz nowadays; every patient walking in the door seems to ask for them and they expect aligners to fix every orthodontic problem. Adverts often seen on the back of buses tell them so and of course, the internet has had a big impact informing patients about the wonders of aligner treatment too. The main problem with aligners is the actual cost but newer systems like Truline Clear and Straight™ has allowed the clinician to dramatically reduce the cost of aligners and basically make it more affordable for everyone.

Most clinicians would see Truline Clear and Straight as straight forward and a lucrative proposition, especially if the correct cases are chosen. Online resources such as Truline’s free introductory course

make the leap to DIY invisible aligners less painful in brain power and the wallet. More info can be found at www.trulinedental.com.au. But what about when things go pear-shaped during a treatment. This can lead to patient and clinician frustration and importantly, can involve costly review and remake charges.

The aligner creation process such as Truline Clear and Straight is well-established, proven and fairly straightforward. The impression or intraoral scan is taken of the initial situation and then a digital set-up of the desired treatment outcome is created in software. The software then creates a series of digital models, each incorporating subtle movements of the teeth towards the required outcome. 3D printing technologies are then typically used to produce these as physical models and then thermoforming creates the aligner itself. The patient wears each

aligner in sequence for a specified time to allow the teeth to move and conform to the increment of movement that the aligner represents.

That’s the basic theory, but the reality can sometimes have a different outcome. Considering the treatment plan is ok and the aligners are manufactured correctly, what can go wrong? Plenty! Read on...

Impressions

To take a step back and head off possible issues later, it is important to critique your impressions well up front. Intraoral scans are the best choice and a close second are good PVS impressions. Alginate is best avoided. Make sure all the tooth surfaces are captured and check for artefacts in the scans and drags in the PVS impressions. A good impression is the cornerstone to well-fitting aligners.

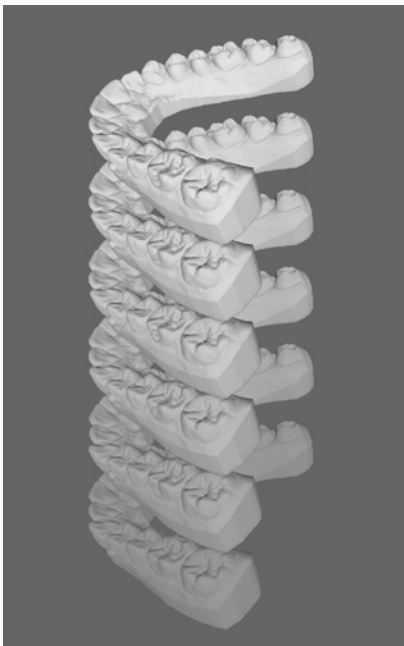


Figure 3. Virtual model creation.



Figure 4. The software arranges models for printing.

Initial fitting of aligners

You can get a lot of information from the initial fitting of the aligners. Most first aligners will fit straight in and feel slightly tight. If the initial aligner is tight and just not seating, but looks as though it will fit ok, have the patient try using the aligner seating devices, such as Aligner Chewies. This may have to be done over a day or so. If the aligner is not fitting well or does not fit at all, you could suspect the impression was not accurate, so it may be best to take new impressions and send it to the manufacturer.

Compliance issues

It takes a lot of commitment from the patient to successfully tackle aligner treatment. Wearing aligners is literally a full time job so make sure they know this before they commit to aligner therapy. If they are not committed, disaster is lurking in the background before you even start.

Without a doubt, the largest contributor to aligner treatment failure is lack of complete compliance on behalf of the patient. Unlike braces, which are worn and generally working 24/7, aligners, conversely, can be removed and just stop working during this “down time”. The length of removal time can impact treatment success drastically. Aligners should be removed for brushing, flossing and three meals a day only and that roughly equates to 1.5 hours a day, otherwise they need to be in situ. So to spell it - out 22.5 hours a day minimum! Aligners can be removed



Figure 5. The UNIZ Dental Pro prints models in under 30 minutes!



Figure 6. Manufactured aligner.

for the odd special occasion, but regular non-wearing of aligners will impact the outcome of treatment and will often be the sole reason for failure.

Part time aligner wear does not work - period. This is because of the “rubber band effect”. When an aligner is inserted, force is placed on the tooth and in turn the periosteum. Osteoblastic and osteoclastic activity starts and this can take about 72 hours or so to initiate. If the patient takes out the aligners, say, for a 4-hour period, this activity ceases and the tooth can easily move back to the starting position. Later, when the aligner is placed back in, the whole cycle needs to start again. This is just like a rubber band stretching and relaxing.

Patients will swear blind that they are 100% compliant, but the truth is in 99% of cases, the actual aligners don't lie. If they were wearing them correctly, they would fit well, be progressing and problem free. Compliance is king! Truline supplies Virtual Track printed models to check tracking and compliance. Figures 7-9 demonstrate the concept very well.

A non-compliant patient will often miss appointments, won't wear aligners to the appointment, have trouble putting aligners on and more often than not have really sparkling clean aligners!

Length of sequence issues

When a patient is given a series of aligners to take home, wear and change at intervals, there is always a danger the patient may “jump ahead” too quickly to the next aligner in sequence. Consider, if the patient is instructed to change aligners every 2 weeks but they get it into their head that the aligner

Table 1. Aligner troubleshooting chart

Problem	Likely Cause	Solution
Aligner doesn't fit well or does not fit at all	Tight fitting aligner	Use aligner Chewies to help seat aligner
	Wrong aligner given to patient	Check correct aligner or correct number in sequence is given to patient
	Impression Inaccurate	Take new impression and send to manufacturer
During treatment some aligners don't fit well	Teeth are not moving as planned or not tracking well due to insufficient space, insufficient force or compliance issues	Check IPR instructions and review case Add enhancement dimples to current aligner to increase pressure Check patient compliance
	Wrong aligner in sequence given to patient or tried by patient	Check patient is using the correct sequence of aligners
Aligner pops out	At start of treatment if obvious bad fit: Faulty impression	Retake impression Add retention dimples to aligner if not serious
Aligner very tight or hard to fit	Path of insertion issues due to tooth anatomy or position of teeth. e.g. Proclined centrals	Take care seating aligner in best path of insertion. Slightly trim aligner in deep undercuts
	Too many attachments or too much flash around attachments	Remove flash, slightly smooth and polish edges
Aligner loose	Short clinical crowns	Use pliers to add retention dimples
Tooth won't rotate completely	Insufficient force	Add movement dimples
	Insufficient space, binding contacts	Check IPR Use button and elastic
	Interference from opposing teeth	Wait for opposing arch to clear
Tooth not extruding	Attachment not engaging correctly in aligner	Use aligner Chewie to seat aligner
	Insufficient wear time (Compliance)	Review compliance
Posterior open bite	Attachment not engaging	Use aligner Chewie to seat aligner
	Range of movement is excessive	Use button and elastic
Relapse post treatment	Anterior interference Insufficient levelling Transient posterior Occlusion	Use 3-3 Aligner and allow posterior settling
	Insufficient retention	Use active retainers and rigorous retention plan

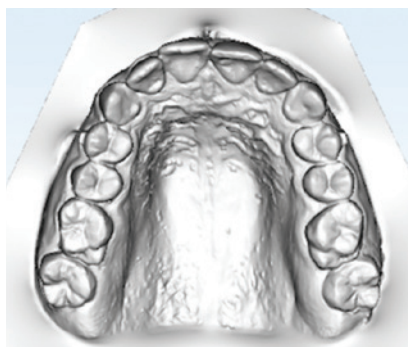


Figure 7. Scan of patient's initial situation.



Figure 8. Model of patient after 8 weeks aligner wear.

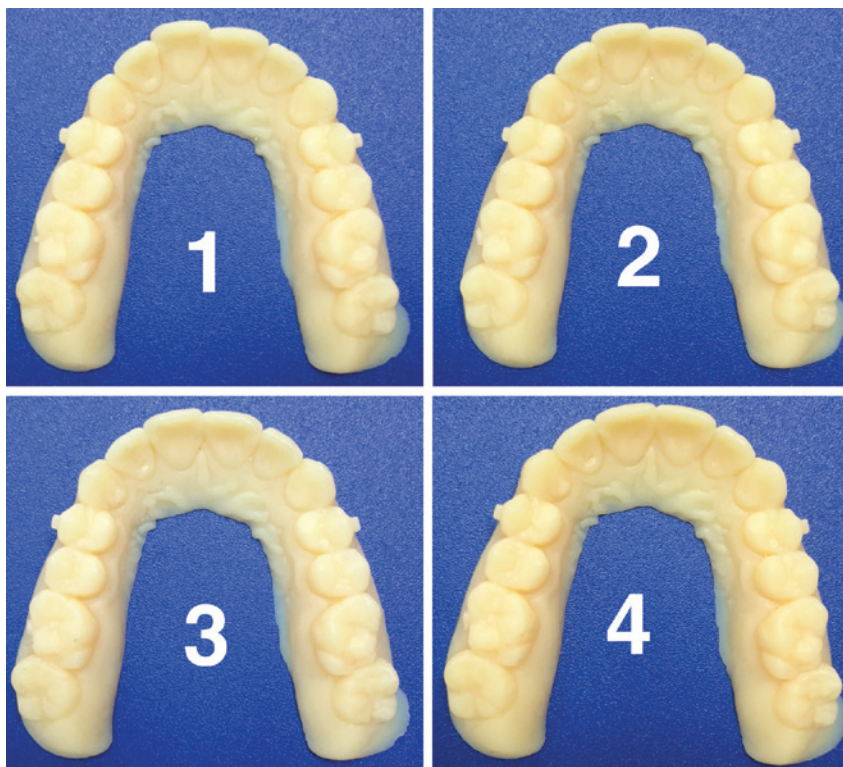


Figure 9. These are the models the aligners were made on. Looking at the four Virtual Track models. It's easy to conclude no movement has occurred in the 8 weeks since issue. Likely cause: Lack of complete compliance!

feels loose, or they are just impatient after a week or so and they change immediately to the next one, this is not ideal at all.

If this pattern goes on for the next few aligners, you can often get into a situation in no time where the aligners are not fitting correctly at all and some teeth do not "track" correctly. The only solution to this is to "back track" aligners. This is super de-motivating for the patient. It's like going down a big snake in snakes and ladders, so is best to be avoided in the first place. Education is key here and of course compliance again is king.

Attachments

Attachments are essential to aligner therapy and it's rare they are not used. Great care is needed to place attachments correctly. Use the template provided and the composite recommended. It's an easy, straightforward procedure but be very careful of flash around the attachments. Clear it well as if left, it will affect the fit of all the aligners and in some cases, stop them working correctly.

Once started don't stop!

Once treatment is started, the patient should continue through the sequence of aligners in a regular linear fashion. It is unwise to halt treatment for holidays or for extended periods of time. Get a firm commitment from the patient for the entire treatment time or failure may occur and it will need to be completely restarted. If you do need to halt treatment and put it on hold, use a specialised retainer to hold everything in place. Often, holidays are a bad time to start aligners as the patients normal routine is thrown out the window, so be wary of people going overseas for lengthy periods as you may be inviting failure. They can always begin and continue once they return.

Lost or broken aligners

If the patient has a lost or broken aligner, try and get them to move forward to the next aligner, depending on how long the previous aligner has been worn for. This will often solve the issue. If not, have them wear the previous aligner.

Broken or lost aligners can be replaced in a few days in most cases. Note the number of the aligner and also try and find the reason for breakage. Regular broken aligners from the same patient are a reason for concern and may indicate other issues.

Truline supplies models with each aligner so aligners can be remade in house and reissued at the same appointment.

About the author

Terence Whitty is a well-known dental technology key opinion leader and lectures nationally and internationally on a variety of dental technology and material science subjects. He is the founder and owner of Fabdent, a busy dental laboratory in Sydney specialising in high tech manufacturing. Using the latest advances in intra- and extra-oral scanning, CAD/CAM, milling, grinding and 3D printing, most specialties are covered including ortho, fixed and removable prosthetics, computerised implant planning and guidance, TMD, sleep appliances and paediatrics. Terence can be contacted on 1300-878-336 or visit www.fabdent.com.au.