The gummy smile dilemma

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The gummy smile patient has always presented the orthodontist with a dilemma. For many years, I would feel that churn in my stomach when a gummy patient presented to my practice for a consultation, because the only clear path to truly correct the condition was fixed orthodontic appliances and surgery. I considered whether I should mention it to the patient or choose to ignore the condition and present a treatment plan that would just align the teeth. The majority of gummy smile patients that came for consultations did not really list gummy smile as their chief complaint, because most did not know that there was something that could be done about it. Until the last decade, correction of the gummy smile has been under-researched and lacking in innovation.

Often, we will treat these patients by aligning the teeth and creating a beautiful straight smile, leaving the gumminess and feeling bested when the patient really smiles and shows an acre of gingivae. Just a few millimetres of gingival display can distract from the results of even the most beautifully treated orthodontic case. Herein lies the
dilemma: treat it or ignore it? Do we offer an invasive treatment plan because we know how it can positively affect the patient’s life, but run the risk of him or her declining treatment? Or do we settle with routine care, doing the best we can without addressing the elephant in the room?

These cases have always been extremely difficult to treat, and even when we attempt to treat them, the path of treatment can seem unclear on how to achieve a desirable finish without compromising the smile for less gingival display. Historically, the only effective option for correcting gummy smile has been orthognathic surgery, specifically removing a wedge of the maxilla via LeFort surgery in order to impact, thus eliminating excess gingival display. When most patients are presented with this type of treatment plan, most decline after hearing the word "surgery". This may be due to the high risks associated with surgical intervention, the high cost or a combination of these objections. Thus, from the patient’s standpoint, the possibility of correcting his or her gummy smile feels hopeless. An alternative method of treatment should be considered to obtain impaction and correct the gummy smile at less cost, with less risk and with stunning results.

It should be noted that non-orthodontic treatment methods have been attempted, including the neuromodulator botulinum toxin—which paralyses the whole or parts of the levator labii superioris muscles and parts of the zygomaticus minor muscles—and crown lengthening with gingivoplasty. Botulinum toxin treatment can be effective, but the patient has to keep up on maintenance quarterly, it can be costly and it does not solve the source of the problem. Crown lengthening with gingivoplasty is only an option for a few patients, depending on crown height and the amount of gingival attachment.

Over the last decade, we have had pioneers in China, Japan, South Korea and our own backyard (Drs John Pobanz and John Graham) that have shown beautifully treated gummy smile cases using temporary anchorage devices (TADs) to impact the maxilla and correct the gummy smile with very low invasiveness. It must be noted that, despite there being several decades of sound research and hundreds of successfully treated cases, using TADs to reduce the gingival display and create a beautiful smile at the same time can be difficult at best.

As I have gained experience in treating gummy smile patients, I have found that they have become the most rewarding types of cases I treat, and the smile transformations on these patients has been emotionally and physically life-changing for these individuals. I see many patients in my examination room with gummy smiles, and when I tell them that we can fix this non-surgically, most of them are disbelieving because they have dismissed resolution as a possibility without a painful surgery. I love seeing their eyes light up as they consider the possibility of having their life transformed.
through a non-invasive orthodontic treatment that usually takes less than 24 months.

This case study will discuss a patient I treated with my gummy smile protocol and demonstrate just how spectacular these treatments can be with the correct simple protocols.

**Diagnosis**

The first step to treating a gummy smile is accurate diagnosis. Most people who have an excessive gingival display upon smiling are usually very good at hiding it. In the initial examination, it is critical to have the patient smile authentically and avoid a posed or hidden smile. Furthermore, when taking records and photographs, it is important to obtain a truly authentic smile with accurate representation of gingival display.

Besides having the patient present his or her authentic smile in order to assess gingival display, it is important to assess upper lip length and the amount of incisor display at rest. One of the worst things we could do as practitioners would be to impact the maxilla and age a smile by eliminating incisor display at rest, since this is associated with a youthful smile.

To assess incisor display at rest, I will have the patient repeat the word “Emma” and observe where his or her lips rest when his or her mouth is open. I have found this to be the best way to determine the amount of incisor display at rest. Normal incisor display at rest can be categorised in millimetres or percentage of enamel display to the lip. Ideal incisor display at rest should be 2–3 mm or one-third enamel display. If the patient shows 50% or more of the central incisors at rest, I investigate further to see how far the upper lip retracts.

**Figs. 3a & b:** Day of TAD placement.

**Figs. 4a–d:** Three months into intrusion.
on smiling and measure the amount of gingival display upon smiling. The decision to treat the gummy smile is easier with knowledge of these findings.

The case presented is that of my treatment coordinator, Brooke (32 years old). After working in my office for two years, she asked me to correct some crowding and give her a beautiful Frost smile. However, she did not mention anything about correcting her gummy smile. Upon looking at her case, I noticed good facial features at rest, a little bit of asymmetry in the lower jaw, and good vermillion display (Figs. 1a–h). From her profile, she appeared to have good upper lip projection, but with a slight chin button and possible slight retrognathism. In her smiling photograph, she shows 100% of her incisors, plus an additional 4–6 mm of gingival display. With this much gingival display, I would consider this case to be a moderate to extreme example of a gummy smile. Often patients have a posed or guarded smile when they have excess gingival display, so I make sure to crack a joke in the consult room to encourage an authentic smile and see how much gingival tissue they actually show. Based on how the patient’s eyes in this case lit up in the photograph, I would consider this photograph to have captured her authentic smile. It is the smile I imagine she shows when seeing her children after a great day at work. The photograph shows that her anterior teeth are on the midline of her face, and at lip rest, she shows 100% of her incisors. Looking at her smiling photograph, I also noticed that her posterior teeth had slight lingual crown tip and that her two maxillary central incisors dominated her smile. She had a slight smile arc, which is good. She had Class I molar and canine relationships with about 3 mm of space between teeth #22 and 23. I noticed she also had slight wear on her upper canines. Her upper arch appeared to be asymmetric and there was mild crowding on the lower. The CBCT scan showed normal root length and height. She had not previously undergone orthodontic treatment.

**Treatment plan**

Brooke chose to have the Damon Clear 2 bracket (Ormco) for her treatment. The protocol for this case would be to place low-torque upper 2-2 brackets to keep the teeth from flaring under intrusive force, and standard torque on the canines because they were severely dumped in. On the lower, I chose regular-torque 2-2 brackets and high-torque brackets on teeth #33 and 43. When placing the brackets, I bond for an exaggerated smile arc because once intrusion has been completed, it is very common for a smile to appear flat. I want to keep that natural look of the maxillary teeth following the lower lip line. For a normal case, I would bond the canines at 5 mm from the cusp tip to the slot, but for a gummy smile, I bond them at 6 mm. The central and lateral incisors I bond at 6.5 mm.
Figs. 6a–h: Final photographs.
With a case like this where both the posterior teeth and the anterior teeth were to be intruded, many orthodontists would use a trans-palatal arch to hold the molars in place while intruding to keep them from rolling out and flaring. I like to keep the mechanics simple in these cases and approach it slightly differently. My protocol entails placement of two anterior TADs for intrusion and placement of bite turbos on the occlusal surfaces of the mandibular second molars. I then have the patient do a squeeze exercise consisting of 60 squeezes per day, really concentrating on engaging the posterior fibres of the temporalis muscle to impact the posterior arch, keeping it upright as the anterior is intruded. What I have found is that for cases like Brooke’s, where there is 4–6 mm of gingival display, it takes about ten months of intrusion to gain complete gummy smile correction.

The situation about four weeks before I placed the TADs is shown in Figures 2a–d. Treatment had progressed through the beginning archwires to correct rotational and torque issues. At this point, there was a 16 × 25 stainless-steel archwire on the upper and lower jaws. The sequence would advance to a 19 × 25 stainless-steel archwire for the majority of intrusion to keep the inclination of the anterior teeth under control while intruding the maxilla.

Figures 3a and b show Brooke on the day I placed the TADs. I placed them distal to the lateral incisors and mesial to the canines. It is extremely important not to use too-heavy force. If you do, the maxillary incisors will flare and it will be really difficult to regain control of the case. There are two ways in which I attach the TADs to the archwire for intrusion force. For Brooke’s case, I took a 5 mm, 150 g double delta closing spring from the TAD, looped it around the archwire, and hooked the other end to the TAD. Using a closing spring allows you to hook it up once and leave it in for the duration of the intrusion. The only issue with using springs is that it can cause inflammation of the gingival tissue and can sometimes embed in the tissue. If that ever happens in a case, I switch to the second method I use, which is a power chain. A power chain is great because it is much lower profile, and a clear power chain is not nearly as noticeable as the unsightly closing spring. The only downside is that you have to replace power chains, as they lose their elasticity.

Figures 4a–d show Brooke three months into intrusion. The springs had had a chance to start working their magic, and the next step in the protocol was to start with triangle anterior elastics to keep the lower arch coming forward and up to meet the impaction. For Brooke, I had her wear elastics from the upper post to the mandibular canine and first premolar on both sides.

Figures 5a–f show Brooke at ten months of intrusion. This is about the time where I take a look at the photographs to see what is left of the gummy smile. Keep in mind at this point that any patient who is treated like this for a gummy smile will need gingival contouring at the end of treatment. Everyone loses his or her gingival architecture to some degree after impaction of the maxilla. At this point, Brooke’s gummy smile was no longer looking gummy. I thus decided to remove the TADs and work on the finishing touches for her case.

Summary

The total treatment time for this case was 22 months. Ten of which was spent on intrusion. Brooke was hesitant about the idea of TADs, so we started intruding a little later than usual. Had we started earlier, her treatment could have been finished a little sooner.

Comparison of the before and after photographs (Figs. 1a–h & 6a–e) demonstrates the clear transformation. Notice how her smile now lights up her face. In her smiling photographs, notice how her smile no longer draws attention to any part of the smile. Before, her smile was dominated by her maxillary central incisors. Notice that there is about 1 mm of gingival display from the anterior to posterior, which is perfect for a youthful smile. As women age, the upper lip tends to lengthen, so we want to treat for graceful ageing, as well as beautiful aesthetics. Notice how wide and broad her smile is now. The buccal corridors are now filled with beautiful teeth, giving her more upper facial support. There is even more vermillion display and her upper lip projection from her profile picture appears enhanced. Because we impacted the maxilla, the lower jaw followed and came forward and up. That gave her better chin features as well. Observe the 4–5 mm of impaction and the new angle of the mandible. You can also see the gain of arch width in the posterior segment.

All around, this was an amazing transformation that changed Brooke’s life. These are the kinds of cases that we are missing out on if we choose to just ignore the problem of excessive gingival display in our patients. We now live in the day and age where these types of cases are an opportunity for practice growth, rather than a dilemma. Speak up! Change a patient’s life by treating his or her gummy smile.

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Dr Stuart L. Frost has recently published his first book, The Artist Orthodontist: Creating an Artistic Smile is More Than Just Straightening Teeth! He has had the opportunity to speak or lecture in 29 countries and has been a featured speaker annually at the National Damon Forum since 2000. In 2019, he gave a lecture at the American Association of Orthodontists (AAO) Annual Session and constituent meeting. He has been voted one of the top orthodontists in PHOENIX magazine's Top Dentists list annually since 2004. Dr Frost is a member of the Ormco Insiders Group, AAO, Pacific Coast Society of Orthodontists, American Dental Association and Arizona Dental Association.