CLINICAL

Restorative: ceramic smile makeover

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A patient in their early 30s came across my clinic through a distant friend a few years ago where she began to follow my work on social media. Originally based abroad, the patient made plans to see me while she relocated to the UK for postgraduate studies. The headlining observation from the patient was that the teeth appeared very small and 'child-like' (Figure 1).

The patient was now seeking a solution with minimal maintenance, longevity and superior aesthetics, akin to what she often encounters on social media.

Initial presentation

The patient presented with a mostly unrestored healthy adult dentition. Her oral hygiene was slightly sub-optimal, which was associated with an overdue appointment since she relocated and smoking five to seven cigarettes per day.

Her dental history revealed she'd undergone fixed appliance orthodontics more than 15 years previous, and currently had no fixed or removable retainers.

The teeth present with mild lower labial crowding and a midline discrepancy of 1.5mm with class I classifications for incisal/canine/molar (Figure 2).

Assessing the patient's smile and dental anatomy, it is observed that at full smile, the lip line is moderate, with the lips showing around 2mm of gingivae beyond the zeniths of the upper incisors. However, it was also noted at this stage that the clinical crown heights appeared blunted by excessive free gingivae cervically without any papillae hypertrophy, suggesting altered passive eruption (APE).

The upper maxillary plane showed a slight cant, with the left lifting higher than the right and exacerbated by the gingival margins of the four incisors. The shade of the teeth had the base colour of Vita A2.

Treatment options

The following treatment options were considered and discussed with the patient:

- Stabilisation
- Hygiene scale and polish and thorough oral hygiene instruction
- Smoking cessation
- Pre-restorative orthodontics
- Removable or fixed appliances
- Single arch (lower) or both arches
- Crown lengthening
- Gingivectomy
- Surgical
- Non-surgical
 - Prescription tooth whitening
 - Restorative
- Composite veneers six to 10 teeth upper arch

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Fig. 1: Preoperative smile



Fig. 2: Preoperative retracted

- Direct freehand or transferred via clear silicon stent off a wax-up
- Semi-indirect milled buccal surfaces to be bonded with heated or injectable composite
- Porcelain veneers six to 10 teeth upper arch
- Lithium disilicate
- Composite contouring for worn lower incisors due to anterior guidance with mild-crowding.

Orthodontics

The mild rotations presented on the upper teeth were mild enough to allow a fully restorative journey and achieve welldesigned anterior/lateral excursive movements should the patient not have the will or time to undergo the movements of teeth.

For the lower teeth, the patient agreed that orthodontics would be beneficial, however limited by the time she planned to be in the UK. This ultimately led to the compromise to focus on the upper teeth with the potential to align the lower teeth thereafter, which the patient understood as the opposite sequence to my clinical recommendation. The clinical impact of this is manageable with the mild crowding and a realistic compromise to accept for both the patient and myself.

Crown lengthening

Determining the type of APE is crucial for deciding which type of crown lengthening is suitable. With a periodontal probe and no LA at the consultation, I could determine that at the base of the sulcus, the CEJ could not be felt and more enamel was beyond that point on the upper incisors.

Preliminarily, a non-surgical approach using a laser diode to provide the gingivectomy was recommended with the understanding that once the patient was fully numb, an accurate measure of where the crestal bone/buccal plate began relative to the CEJ would be the final check ahead of any laser gingivectomy

Veneers

The patient had understood previous to our consultation that a direction involving porcelain would provide her the most long-term result with the least amount of maintenance, which suited her international lifestyle.

With the view to create larger teeth to fill her smile with fairly small natural teeth as the base, it was communicated to the patient that very little enamel removal would be required and more likely than not, I would be able to bond to greaterthan 90% enamel surfaces by preparing through a trial smile in temporary composite.

Treatment plan

Following a thorough discussion, we decided on the following treatment plan:

- Stabilisation
- Hygiene scale and polish and thorough OHI
- Smoking cessation
- Crown lengthening
- Gingivectomy non-surgical with laser diode
- Prescription tooth whitening
- Restorative
- Porcelain veneers upper 10 teeth with lithium disilicate.

The case presented several clinical challenges, including:

- Masking maxillary cant combined with good anterior/ lateral guidance
- Improving midline discrepancy
- Designing anatomy of teeth that reflect the aesthetics and genetics of the patient.

Clinical overview

After the initial stabilisation for gingival health and lifestyle recommendations with smoking cessation, which the patient took well, the first clinical step was crown lengthening. With the use of photos at full smile stacked with intraoral contrastor photos, I could visualise the ideal lengths to allow



Fig. 3a: Laser gingivectomy



Fig. 4a: Visualising maxillary cant with grid lines





Fig. 3b: Guided healing of gingivae – two-week review



Fig. 4b: Initial plaster model from immediate post-laser impression



Figs. 5a-c: Wax-up process



Fig. 3c: Healed appearance of gingivae – four-week review



Fig. 4c: Aesthetic wax-up



her upper lip to gently cover the zeniths of the gingival margin. The aim would also be to reduce the suggestion of the maxillary cant.

With the anaesthetic working, a diagnosis was made to determine a type 1A APE, which was very ideal for non-surgical crown lengthening.

The gingivectomy ranged between 0.5mm-2.5mm on the upper 3-3, performed freehand and guided healing with the use of a high-filler flowable composite applied in a crescent on each newly defined margin, held by lightly etched enamel collar (Figure 3).

Two-stage PVS impressions were taken prior the guided healing supports to allow me to hand-design the smile in wax (Figure 4). Combined with a digital workflow, an intraoral scan is also taken for my orthodontic technician to fabricate the whitening trays that will now extend onto the newly exposed enamel surfaces. Two weeks later, I reviewed the gums, removed the composites and fitted the whitening trays.

An analogue wax-up was chosen and created by myself as I wanted more creative input in this smile, expressing what I felt suited the patient's smile and genetics outside of the digital libraries.

This is a slow but rewarding process that lends me to listen to albums in full through a select choice of in-ear monitors, but that's a story for another day (Figure 5).

The trial smile helped us identify a few shortcomings to my design (Figure 6) and also helped us learn that the patient preferred tighter embrasures when transitioning from the lateral incisors to canines.

It successfully showed the restorative ability to camouflage the maxillary cant (Figure 7) and allowed the patient to have more time to take-in the significant changes around the corner. Many photos and videos were taken for myself and



Figs. 6a-c: Comparing preoperative with the wax-up and with the intraoral trial smile



Figs. 7a-c: Comparing preoperative with the crown lengthening and with the intraoral trial smile



Fig. 8: Diagram by Lukas of the proposed lithium disilicate composition

on the patient's phone for reference.

My artful ceramist technician Lukas Kebrle met the patient at our 'prep' appointment and brought to the table some thoughts on narrowing mesial/distal cervical surfaces, which gave these new larger teeth a bit more tightness and dimension.



Fig. 9: Viewing secondary and tertiary anatomy of the veneers

As a collective, we decided to use a medium translucency BL3 disilicate base with subtle use of aesthetic porcelain and translucent incisal enamel without introducing optically blue/grey regions (Figures 8 and 9).

The ethos in the enamel preparation is simply to create 'just enough' space for the porcelain to deliver the desired



Fig. 11 a: 00 retraction cord in-situ ahead

of the two-stage PVS

Fig. 12a: Preoperative







Fig. 11b: Previewing the veneers on their



Fig. 11c: Immediate postoperative



separate die

preserving smooth and shared anterior guidance



Fig. 12c: Immediate postoperative



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Figs. 13a-c: Comparison with the wax-up versus the porcelain veneers and their internal textures crafted

optical and physical properties, while also being mindful of the challenges in crafting the veneers that I have learnt over the years with my relationship with Lukas (Figure 10).

A two-stage PVS with OO cord along all the veneers margins is my preferred approach where Lukas and I feel 3D printed models still lack in tactile feel and precision compared to plaster/metal pins (Figure 11).

The IPS e.max (Ivoclar) veneers are bonded with heated paste composite in a medium translucency BW shade and the immediate postoperative photos highlight the absent of soft-tissue trauma and initial integration of the restorative work (Figure 13).

Lukas's initiative is also observable, which looks to improve the midline of the patient smile by leaning the mesial lobe of the UR1 towards to left, a little further than my wax-up first designed for (Figure 12).

Reflection

In hindsight, the UL2 needed more cervical preparation, as Lukas could not obtain a suitable mesio-cervical embrasure while allowing a viable path of insertion, so the final result suggests a mesial tip to the root.

If the patient permanently relocates to the UK or extends her time here, I will shift my focus onto the lower arch to provide some orthodontic treatment.

I don't anticipate the need for porcelain veneers, and I will use composite to rebuild the worn incisal edges of the incisors and perhaps on the canines should I need to for occlusion.

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Fig. 14: Before and after retracted



Fig. 15: Before and after smile