A class II smile makeover with clear aligners

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Case study

A patient in her mid-twenties presented unhappy with her gummy smile.

She said she didn't like her front teeth pointing outward and the shade/shape of her top teeth, which were affecting her self-confidence. No acute pain was reported.

She wanted to have her teeth treated but was unprepared to have fixed braces at her age. She sought to have braces that were invisible and did not regress her confidence further. Furthermore, she wanted to have composite bonding to improve the edges of the teeth.

Case assessment

The patient's last dental visit was more than 12 months prior due to the COVID-19 pandemic. She was referred to the practice through a friend.

As part of any assessment, we started by discussing the patient's main concerns, which helps build a rapport with her so she felt at ease. We then moved on to discussing her medical and social history.

The patient was generally fit and well, taking no medication and no known allergies. Alcohol consumption was moderate and she was a social smoker.

Her oral hygiene was good, reporting that she brushed twice daily with an electric toothbrush and flossed occasionally.

The preoperative photographs are shown in Figure 1 and Figure 2. The results of the extraoral and intraoral examination are summarised in Table 1.

A panoramic radiograph was taken, which revealed good bone levels and root length/forms (Figure 3). No pathology was detected.

The findings of the assessment allowed us to produce a problem list (Table 2).

The following possible treatment options were discussed:

- No treatment
- Referral to specialist orthodontist for comprehensive treatment with fixed appliances (either lingual or labial)
- Fixed labial appliances with the same aim of achieving an improved overjet and overbite
- Restorative treatment without alignment.

The patient elected for orthodontic treatment in order to align the arches and to then create space for restorations.

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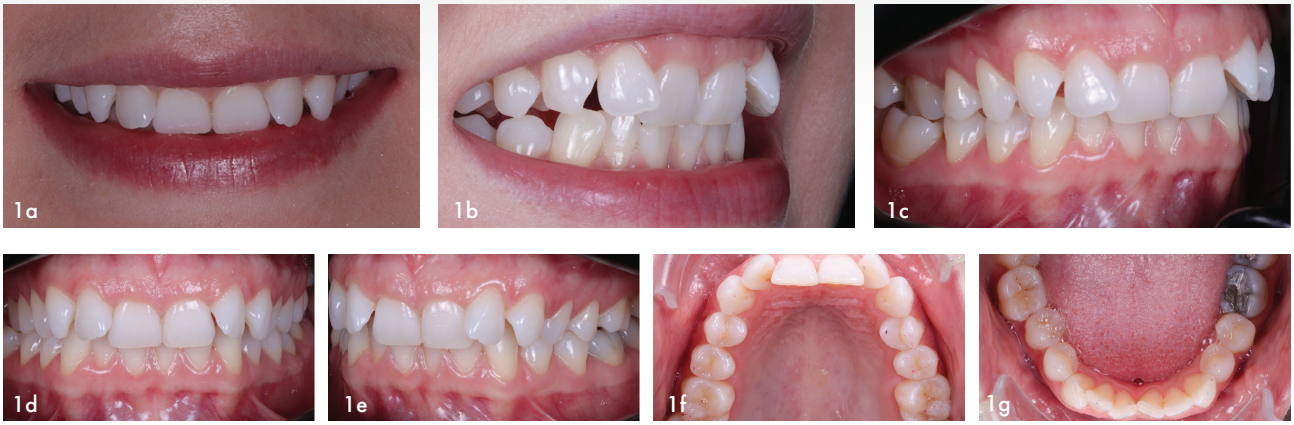


Figures 1a to 1g: Preoperative photographs

The Invisalign system was selected to perform the pre-restorative orthodontics. The treatment goals set out in Table 3 were agreed.

Treatment provided

A Clincheck was produced for dual arch Invisalign Go Plus treatment. Specific instructions were provided in the form of

Table 1: Assessment summary

Face	Normal lower face height Upper midline coincident; lower midline shifted to the right class II skeletal base Lip catch present		
Smile	High smile line Deficient buccal corridor Mesial of upper canines are prominent		
Function	Canine guidance in excursive movements Healthy and asymptomatic TMJ		
Periodontal status	Fair oral hygiene: minor inflammation and calculus present, thick gingival biotype		
Occlusion	Sagittal	Right	Left
	Incisal	Class II div II	
	Molar	CL II sub-unit [25]	CL II sub-unit [25]
	Canine	CL II sub-unit [50]	CL II sub- unit [50]
	Overjet	1mm [UR1 & LR1]	
	Vertical		
	Overbite	Increased approx 50%	
	Transverse		
	Crossbite	UR6	
	Space analysis		
	Upper arch	Mild/moderate crowding	
	Lower arch	Mild crowding	

Table 2: Problem list

Aesthetic

- Lower midline to right of facial midline
- Skeletal CL (II) defect
- High smile line (gummy smile)
- Mild deficient buccal corridor
- Wearing facets on the upper anteriors
- Lip catch
- Prominent mesial lobe of the upper canine

Occlusion

- Reduced overjet
- Increased overbite
- Molar relation
- CL (II 25 unit) RHS CL (II 25 unit) LHS
- Incisal classification CL (II) div (II) Canine
- CL (II 50 unit) RHS CL (II 50 unit) LHS
- Crossbite unilateral (UR6 v LR6)
- Labial segment crowding on upper and lower arch (mild)
- Upper arch shape (square)

Dentition

- Wearing of the upper anterior incisal edges
- P/E UR8 and UL8
- Distoangular LR8, LL8

Biology

- Marginal generalised gingival inflammation

Table 3: Treatment goals (non-extraction approach)

Aesthetics	1. Improve the deficient buccal corridor with some buccal expansion 2. Improve the shade of the teeth using some tooth whitening 3. Improve aesthetics by levelling, alignment and composite restorations of upper anterior teeth 4. Align arches and relieve crowding 5. Improve the lip catch with some de-rotation and IPR
Occlusion	1. Restore to class I incisal relationship 2. Provide an ideal overjet and overbite 3. Maintain the molar relationships 4. Accept the unilateral crossbite 5. Align arches to remove destructive anterior occlusion
Dentition	1. Keep a watch on the upper and lower wisdom teeth
Biology	1. Improve OH by referring to DH prior to commencing treatment 2. Have plaque/bleeding score <20%
Retention	1. Removable Vivera retainers. To be worn full-time for 6/12 followed by lifelong night time wear (at least 5/7)

Figure 2a: Clincheck – pre-treatment anterior

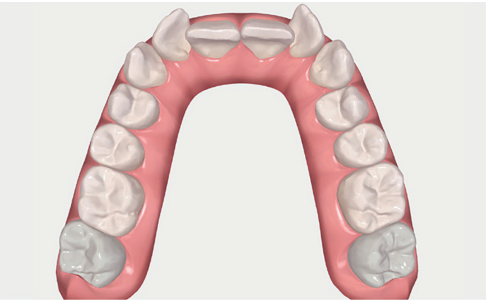


Figure 2b: Clincheck – upper occlusal view

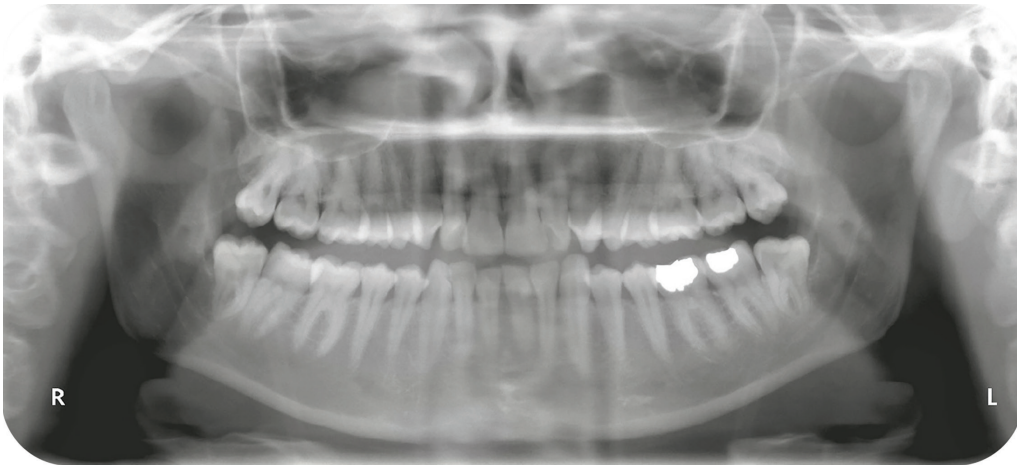
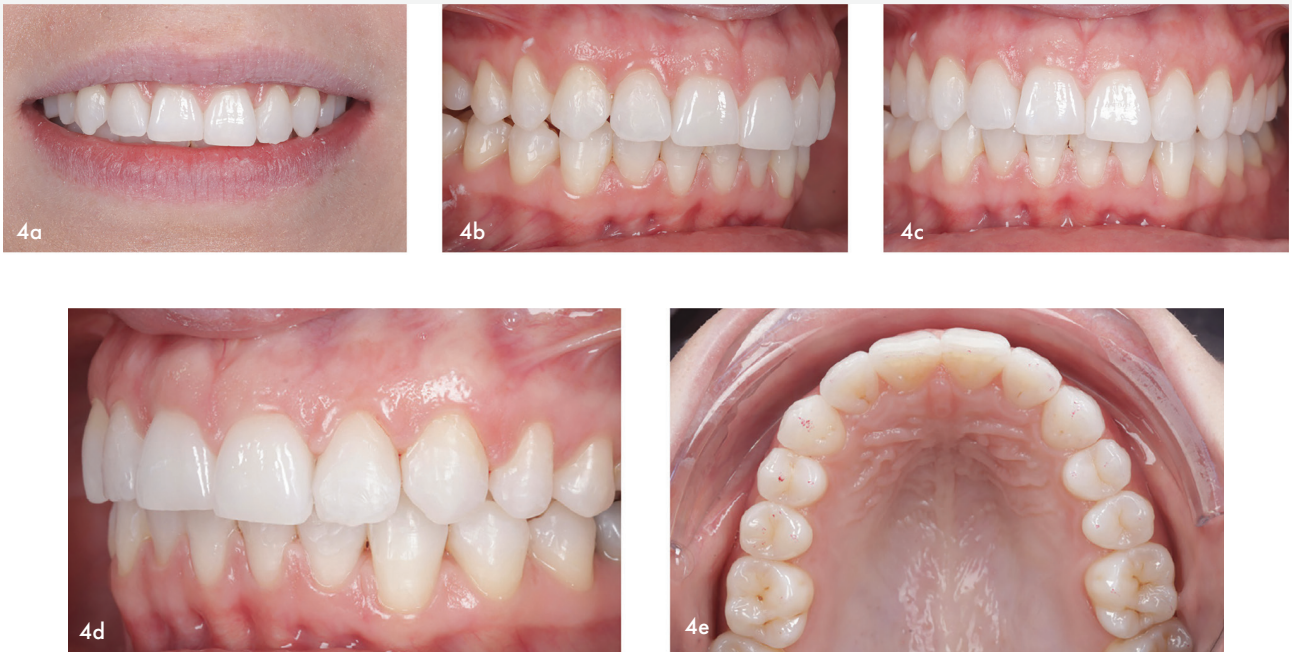


Figure 3: Pre-treatment OPT



Figures 4a to 4e: Post alignment/bleaching smile improvement

a four-sentence prescription to the Invisalign technician and included the following:

1. Patient chief complaint: not happy with the retroinclined upper incisors. Please resolve. Please also level the gingival margins of the upper anterior teeth
2. Anterior reference point: please procline UR1 by 4mm and use this to align the teeth
3. Posterior reference point: use the mesiobuccal cusp of the upper 7s to widen the smile
4. Overjet/overbite: please provide an overjet of 3mm and a positive overbite.

Clincheck analysis

- IPR carried out on maxillary and mandibular arches (additional aligners) to relieve crowding and help correct arch form
- Expansion of the buccal segments, respecting the gingival biotype and biological limits to avoid gingival recession
- Actual and relative intrusion of the maxillary anterior teeth
- Optimised intrusion, rotation, multi-plane root control attachments used throughout
- Power ridges placed on the upper incisors
- Lower arch shows buccal expansion, lower canine rotation and gentle proclination of the lower incisors to relieve crowding, improve incisal angulation to the jaw base and avoiding significant change to inter-canine width or gingival recession
- Round tripping avoided.

Treatment

The original treatment plan included 17 aligners on the top and bottom arch.

The patient completed her alignment journey with 31 aligners on top and lower. An additional 14 aligners were needed in the refinement phase.

This equated to a treatment time of approximately eight months. This was based on the patient being fully compliant and wearing each aligner for seven days with at least 20 hours wear a day.

The patient was asked to replace the aligners on a night to ensure it inflicted minimal pain.

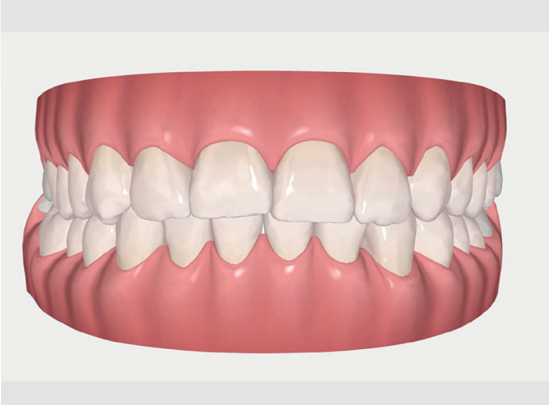


Figure 5a: Clincheck – post-Invisalign anterior

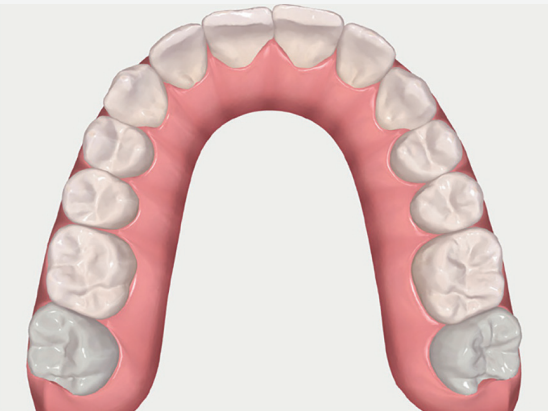


Figure 5b: Clincheck – post-Invisalign occlusal view

Bleaching

In order to lift the shade of the teeth, Boutique Hybrid whitening (syringes) was carried out while the patient had her aligners on from day one.

The patient was shown how to apply a pea-size amount on her aligner and instructed to do this every night to get the best possible outcome. The peroxide easily diffuses through the composite buttons and lifts the shade of the dentine, so effectively it saves time for both the clinician and the patient.

The patient was asked to continue doing the tooth whitening until she was happy with the shade (in total, 3.5 syringes were used).

The post-treatment photos are shown in Figures 4 and 5. The patients main concerns of her smile alignment, shade and crowding were all resolved. An improved inter-incisal angle and contact was created.

Contouring

An acceptable aesthetic result was achieved with minimal restorative work.

Additive bonding was applied to the upper anteriors to improve the shape and shade of the teeth. The composite bonding was done under strict regime of rubber dam isolation to ensure a safe environment and appropriate moisture control.

The non-working/adjacent teeth were isolated with polytetrafluoroethylene (PTFE) tape. The composite chosen for this case was Cosmedent milky opaque dentine and SB3 shade, as it exhibits high physical strength under compression.

Cosmedent Casi was used to apply the composite as its built-in curvature helps to create natural contours. Thereafter, the Cosmedent number three brush was used to blend the composite to the existing tooth surface.

The polishing was done using Cosmedent Flexidisc and using polishing spirals and points to achieve high lustre, respecting the tooth anatomy.

The improvement of the smile using a combination of orthodontic and additive composite bonding is demonstrated in Figure 4. The upper anteriors are now beautifully following the lower lips convexity and there is no longer a gummy smile on display.

Following the contouring process, this young patient was ecstatic to see her final smile revealed. Although, she had seen the trial smile at an earlier stage in the treatment, she had not fully appreciated what could be achieved with composite or the difference it would make.

As the patient was happy with the outcome, the treatment was concluded (Figure 6).

An intraoral scan was done using the Itero to fabricate the Vivera upper and lower retainers (0.4mm thick) for lifelong

Figures 6a, 6b, 6c: Final photos

retainer wear. This will ensure the teeth are not only retained but will also have a protective function in ensuring minimal progression of any further tooth surface loss.

Conclusion

This case demonstrates how careful case selection, assessment and treatment planning can provide an excellent outcome for patients using the Invisalign system.

Nevertheless, orthodontics can be combined with simple additive composite bonding to produce satisfactory aesthetic and functional outcomes.

I feel that the ability and understanding to provide simple orthodontic treatment should become the norm for the modern-day GDP who wants to deliver minimally invasive aesthetic dentistry.

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