The aesthetic performance of dental restorations has always been a factor of utmost importance in the success or failure of the treatment. Lately, as aesthetic awareness of the population increases and the evolution of dental materials has made new techniques possible, optimal aesthetics can be achieved following less invasive restorative procedures. In many cases, multidisciplinary treatment is necessary so that the best possible outcome is achieved with a minimum degree of compromise between invasiveness and aesthetics. Every complex case should be treatment planned by a team of specialists, so that every detail and limitation from each point of view is taken into account. The restorative dentist usually designs the smile and oversees each phase of the treatment by all other specialists.

Congenitally missing lateral incisors are a common dental problem that can be esthetically dealt in three different ways: 1. canine substitution, 2. tooth supported restoration, and 3. implant supported restoration. Tooth auto transplantation (usually premolar) and removable partial dentures are other, less commonly applied treatment options. In the case of only one lateral incisor missing, an additional problem of symmetry exists and needs to be addressed. Peg shaped lateral incisors pose another aesthetic problem that is usually restored with as follows: 1. all ceramic crowns, 2. porcelain veneers, and 3. direct or indirect composite veneers. Additional to the inadequate width and length of the peg shaped lateral, many times there is also a gingival aesthetic problem that can lead to a square looking restoration and too much gingival display if not properly treated. The occlusion was Class I.

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In this article, a case is reported of a young patient with one congenitally missing and one peg shaped lateral incisor. The patient was treated with a combination of orthodontic, periodontal surgery and aesthetic restorative dentistry interventions.

Case report
A 22 year old Caucasian female presented to the clinic asking for aesthetic improvement of her smile. The patient was single and a student of law school. The medical history was unremarkable with no pathologies and no known allergic reactions reported to any kind of medication. No medications were taken on a systematic basis by the patient. The dental history was also unremarkable with only preventive and minor operative dentistry interventions and prophylaxis in the past. The patient mentioned a history of congenitally missing teeth in her family.

The chief complaint of the patient was spaces between the teeth and specifically the missing upper left lateral incisor tooth, the irregularly shaped upper right lateral incisor, and the diastema between teeth #11 and #21. Also, she was concerned about asymmetries in her smile and misalignment of her teeth. Finally, the patient stated she would like to have a brighter smile (Figures 1-3).

The dental examination revealed no pathological findings or signs of dental disease. The DMFT was low and the comprehensive periodontal examination was within normal limits; soft tissue examination resulted in no pathological findings; radiographic bitewing examination revealed no pathological findings as well.

The aesthetic evaluation of her smile resulted in the following issues that would need to be addressed in the treatment plan: 1. peg shaped lateral incisor #12, 2. congenitally missing lateral incisor #22 with diastema between #11 and #21, 5. dental midline transmitted to the right by 4mm, asymmetry between the left and right side especially in the area of #12 and the missing tooth #22, and 6. the gingival zenith was asymmetrical between #11 and #21 (Figures 4-6, Table 1). The occlusion was Class I. The base shade of the teeth was A3 on the upper central incisors and A3.5 on the upper canines with the Vita Classic shade guide (Vita Zahnfabrik, Bad Sackingen, Germany). Photographs and alginate impressions were taken in the exam appointment to fabricate study models. Then the team of aesthetic/restorative dentist, orthodontist and periodontist treatment planned the case. The recommended treatment plan was accepted by the patient in favor of the alternative treatment plans.

Orthodontic phase
The orthodontic treatment goals were as follows: 1. intrude #11 to align the incisal edges of the centrals, 2. equalize the spaces between #11-15 and 21-25, 3. transfer the dental midline to the left, and 4. correct misalignments and minor rotations in different areas. Some composite resin was bonded on the facial surface of tooth #12 to facilitate bracket placement. The composite was white in shade to

<table>
<thead>
<tr>
<th>Tooth (#)</th>
<th>Length (mm)</th>
<th>Width (mm)</th>
<th>Spaces</th>
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</thead>
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<td>4.1</td>
<td>7.4</td>
</tr>
<tr>
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<td>6.0</td>
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<td>22</td>
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<tr>
<td>25</td>
<td>9.5</td>
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Table 1: Teeth and spaces between them were measured. The proportions of the teeth (length/width ratio) and the arrangement of the spaces were crucial information in treatment planning, especially in patients with a high lip line.

By Kostis Giannakopoulos, Greece

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AESTHETICS 15

Conservative approach to multidisciplinary aesthetic dental treatment

Figure 1 - 3: The unaesthetic smile of the patient before treatment.

Figure 4 - 6: Retracted view of the teeth before treatment. Note the peg shaped #12, the missing #22 and the asymmetry of the spaces between teeth #11-13 and 21-23.

Figure 7 - 9: Photographs of the patient during the orthodontic phase of the treatment.

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A multi-disciplinary approach to minimally invasive functional aesthetic dentistry

By Dr. Tif Qureshi, UK

Simple tooth alignment is rapidly becoming accepted as the norm in cases that previously would have been treated with porcelain veneers. However, patients often present with a mix of problems such as previous metal ceramic work, the treatment of which should be integrated as part of the treatment plan. Timing becomes a vital part of the treatment when mixing restorative care, alignment, tooth whitening and occlusal planning. The following case illustrates an effective approach to treatment.

Case report
A patient presented complaining that “his two front teeth (old upper anterior crowns) felt as if they were too large and were always hitting the lower teeth”. In addition, his bite never felt “right” (Figure 1). He also wanted to try to improve the appearance of his teeth. He was aware of what could be done with porcelain veneers, but wanted to try to make the best of his own teeth.

Examination
On inspection, it was clear there were several issues:
1. Occlusion - The irregular alignment of the lowers and the thickness of the upper old crowns were adding to the problem of unbalanced anterior contacts. The back of the crowns, especially the upper left central, were hitting the front of his lower teeth, in particular the lower left central.
2. Thickness/aesthetics of crowns - The occlusion meant that the upper crowns had been placed quite labially and because they were metal ceramic, made them feel particularly thick. They also appeared rather opaque.
3. Lower crowding - The patient was also keen to improve the aesthetics of the lower teeth as the incisors had an irregular outline. The incisal edges appeared to be of different heights. This was down to the varying anterior-posterior position.
4. Colour - The old crowns had been made at A3/A3.5 and the natural teeth had darkened a little with age.

Treatment plan
A combination of techniques and good timing can make sure we optimize the opportunity for treatment. In this case, the treatment plan was as follows:
1. Remove the two upper crowns and replace them with temporary composite crowns;
2. Simultaneously fit a lower Inman Aligner to align the lower incisors into a better functional position, while using bespoke clear aligners to slightly tilt the upper crowns into better alignment. The rationale for using upper clear aligners and a lower Inman was that only 1 mm of movement was needed for the uppers and about 2.5 mm of movement was required for the lowers. Inman Aligners are much faster than clear aligners with these kinds of movements. And 2-3 clear aligners can be just as quick with very small movements of 1 mm and be a little more cost effective if made bespoke. It would also allow us to treat both arches more or less simultaneously.
3. Whiten the teeth (during last phase of alignment);
4. Change the composite temps to all ceramic crowns to match.
5. Retain the lower arch.

Alternative options
Alternative options were discussed, but after the patient understood how simply and quickly the alignment could be done, seemed a completely ridiculous and unethical solution.

Two weeks later, the patient returned. The Inman Aligner and clear aligner were fitted on the lower and upper teeth respectively. Despite calculating the amount of crowding present, the IPR is never carried out in one go. Only IPR strips or discs are used. This gives the opportunity to ensure the stripping is far more anatomically respectful than using burs or heavy discs. This massively reduces the risks of excess space formation, gouging or poor contact anatomy. No more than 0.15 mm per contact on the posterior teeth were adjusted on this single visit. The contacts are smoothed and fluoride gel is applied each time.10
The patient was then sent home. The Inman Aligner was worn for 16-20 hours per day with the patient removing it for eating and rest. 20 hours a day is the maximum needed wear for intermittent wear reduces the risk of root resorption.10,11 On return terms, 2 weeks later, it was clear that the contacts had closed tight and the teeth had moved a little.

More IPR was carried out on both the upper and lowers. The occlusal contacts of the upper temporary crowns were adjusted to allow clearance for the lower teeth to move and the lower left lateral to advance particularly and the patient was then set up for rears for 2 weeks. The temporary crowns were then facially contoured to ensure they were flush with the natural teeth. On the subsequent return visit, it was clear that the teeth were aligning rapidly and especially well (Figures 4 and 5). We then decided to start some simultaneous tooth whitening. Impressions were taken, even though the result was still 25% from completion. Sealed, rubber trays were made and careful instructions given to the patient. While the patient was concentrating on using the Inman Aligner, they are always highly receptive to using bleach trays. It adds greatly to motivation and often means they achieve a far better result. DayWhite from Oral Healthcare (formerly Discus Dental) is used so that the patient only needs to wear the bleaching trays 5-45 minutes a day.

The patient returned after another 3 weeks and was happy with the results of whitening. More whitening was carried out and then the temporary crowns were removed, the prep cleaned with CXL and new impressions were taken after some minor adjustments to the incisal margins.

A new lower impression was taken of the final lower arch to ensure the crowns could be made with a good long canine contact. The tempos were replaced and impressions sent to the laboratory. The patient was booked in for a single week later and two weeks after cessation of bleaching where colour and tooth morphology was examined and discussed with the patient. Two weeks later, the patient returned. A retainer wire was bonded to the lower incisor teeth using a preformed wire on a jig made by the orthodontist.}

Can You See Who’s Wearing Braces? (Your patients can’t see them either)
make it easier to distinguish and completely remove it after the orthodontics was completed. After treatment, the goals set were to improve the gingival healing and to make it easier to distinguish and use the gingival asymmetries.

**Surgical phase**

As stated previously, the dental team decided to align the incisal edges of #11 and 21 and not intrude further #11 to align the gingival zeniths. This decision was based on the fact that the teeth showed no signs of wear, in which case the worn tooth would be intruded more to be back in its original pre-wear position and then would be treated restoratively. The goals of the periodontal surgery were:

1. Align the gingival zeniths of teeth #11 and 21, gingivectomy with osseous reduction on #12 to reduce as much as possible the gingival display without compromising the long term prognosis of the tooth due to loss of periodontal support, 5. gingivectomy in mostly all the upper teeth to bring the gingival display to a more pleasing appearance.

After surgery, a healing period of 8 weeks was recommended by the periodontist before the restorative procedures start (Figures 10, 11). The option of a single implant placement for the missing lateral incisor #22 was rejected before surgery, as an additional bone grafting procedure would be required and this was not accepted by the patient (Figure 12).

**Aesthetic/Restorative phase**

Six weeks after the periodontal surgery, in office whitening was performed so the patient’s desire for brighter teeth is met (Phillips Zoom, Philips Oral Healthcare, Stanford, USA). The shade of the teeth 10 days after the whitening was completed was A1 for the upper centrals and A2 for the canines (Figure 15).

After proper healing of the periodontal tissues was confirmed with the periodontist, tooth #21 was prepared for an all ceramic lithium disilicate crown and teeth #21 and 25 were prepared for an all ceramic lithium disilicate Maryland type crown with wings (e.max, Ivoclar Vivadent, Schaan, Lichtenstein). The latter was selected because of the conservative approach and the minimal preparation required only on the palatal surfaces of the abutment teeth, as the occlusion was favorable and the patient had no parafunctional habits. This type of restoration appears to be a viable solution in selected cases, as it does not have the problems of the conventional Maryland bridge with frequent debondings and the tooth showing through thin and translucent central incisors. After gingival retraction with a retraction paste (Astringent Retraction Paste, 3M ESPE, Seefeld, Germany), a final impression was taken with polyether heavy and light body impression material (Permadyne, 3M ESPE, Seefeld, Germany) on a full arch metal tray. The bite registration was recorded and an alginate impression was taken of the opposing dentition. The final restoration was performed with a glycerin matrix (KOMET, Lemgo, Germany), rubber points (Astropol, Ivoclar Vivadent, Schaan, Lichtenstein) and finishing strips (Soflex, 3M ESPE, Seefeld, Germany). Finally, a diamond polishing paste was used (Ultralrod Products Inc, South Jordan, UT, USA) on a Flexluff (Cosmedent, Chicago, IL, USA). An alginate impression was taken to fabricate a new Essix orthodontic retainer in the in-house lab within 1 hour. Oral hygiene and maintenance instructions were given to the patient and a follow up appointment was scheduled after 4 weeks (Figures 15-21).

A multidisciplinary approach in treatment planning and performance, as well as the use of contemporary restorative materials and techniques allow for a conservative, yet very aesthetic final result.

**References**

3. “Great value and it has been a game changer for my practice. The forum effectively turns a one-day course into a 365-day one!” - Andrew Wakefield BDS

**Training Dates**

- 16th November 2014 - Dubai
- 15th January 2015 - Riyadh
- 20th February 2015 - Dubai
- 1st May 2015 - Dubai

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