By Kostis Giannakopoulos, Greece

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 have 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 treated planned by a team of specialists, so that every detail and conclusion 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 between the right and left side, especially in the area of #12 and the missing #22, can lead to a square looking gingival aesthetic problem that can be esthetically handled with either a square incisal edge of tooth #12, 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 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, 3. dental midline overeruption of #21 with diastema between #11 and 21, 4. dental midline transmitted to the right by 4mm, asymmetry between the left and right side, especially in the space between #11-13 and #21-23, 4. asymmetry between the left and right side, especially in the space between #11-13 and #21-23, 5. gummy smile, especially on the area of #12 and the missing tooth #22, and 6. the gingival zenith of #12 incisally overerupted over the base shade of the teeth was A3 on the upper central incisors, A3.5 on the upper canines, 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
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.

A heavy, not long centric contact was present in MIP, which was causing slight deflection of the central. This meant that the upper central crown had been placed quite labially and because it was metal ceramic, made it feel particularly thick.

3. Thickness/aesthetics of porcelain 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.

4. Change in the position of the central. This meant that the upper crowns had been placed quite labially and because it was metal ceramic, made it feel particularly thick.

5. Retention of the lower arch.

6. Occlusal wear.

7. Lower crowding - The patient was also keen to improve the aesthetics of the lower teeth. 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.

8. Upper and lower impressions were taken for upper and lower clear aligners and for a lower Inman Aligner. A prescription of the tooth movement using Spacewize™ software was given to the technician so they were aware of exactly where we wanted the teeth to be moved. Spacewize also calculates a figure for the amount of crowding present giving us an idea of the total amount of space that would need correcting and whether the case is suitable for Inman Aligners or not.1

Alternative options

Alternative options were discussed. Fixed braces were discounted because of the cost, the difficulty in simultaneous whitening and added difficulty in having the crowns as temporary through treatment. The patient’s posterior occlusion was also good. Full anterior veneers were discussed, but after the patient understood how simply and quickly the alignment could be done, seemed a completely ridiculous and unethical solution.

Treatment

On the initial appointment the two old crowns were removed (Figure 2). The preps were merely cleaned and treated as conservatively as possible. Temporary crowns, which could be adjusted, were placed (Figure 5). Upper and lower impressions were taken for upper and lower clear aligners and for a lower Inman Aligner.

The upper anterior crowns were added 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.

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Two weeks later, the patient returned. The Inman Aligner and clear aligner were fitted on the lower and upper teeth respectively. Minimal interproximal reduction (IPR) was started. 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 anterior teeth was adjusted on this single visit. The contacts are smoothed and fluoride gel is applied each time.2
The patient was then sent home. The Inman Aligner was worn for 15 was bonded to the lower incisor to ensure the crowns could be removed it for eating and rest. 20 hours a day is the maximum need wear and this intermittent wear reduces the risk of root resorption. On return 2 weeks later, it was clear that the contacts had closed tightly and the teeth had moved a little.

More IPS was carried out on both the uppers 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 sent away for 2 weeks. The temporaries were also 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 is concentrating on using the Inman Aligner, they are always highly receptive to using bleaching 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 55-45 minutes a day.

The patient returned after another 3 weeks and was happy with the degree of whitening. An impression was taken for a lower retainer wire to be fitted. The temporary crowns were removed, the preps adjusted to allow clearance for the lower teeth to move and the lower left lateral to advance. The occlusion against the aligned lower teeth was checked. The patient was extremely happy with the end result and felt his teeth looked natural (Figures 6-12).

Discussion

The case is another example of why a progressive form of smile design is so essential in any case where a patient is looking to improve their smile. At every point, the patient sees their smile improving, first with the crowns, then with the aligner. If they are still keen to have them, then at least the teeth are straight and light, so less invasive and more translucent veneers can be used. More often than not, patients prefer a more natural result where we “make their own teeth look as good as they can”. In a case like this with previous metal ceramics, one can see how integrating alignment, and whitening can enhance aesthetics and simplify restoration dramatically. This makes a stable and aesthetically pleasing outcome far easier to achieve (Figures 15-17).

Conclusion

In each of our practices, there must literally be hundreds of patients who have issues similar to this gentleman’s complaint. Previously, conventional solutions often placed a barrier to treatment, adding time and cost into what was already an expensive treatment. Most patients just could not be bothered and would live with it. Now, simple anterior alignment can be so much quicker and more cost effective. I’m amazed at the sheer volume of patients who will have treatment like this done if they are suitable. Being able to combine whitening because the aligners are removable is just another bonus so we can capitalize on the patient’s current composure and get an even better result. Of course, case selection is absolutely vital! Understanding what is treatable and what should be referred to a specialist orthodontist is essential. This means that patients must be fully consented and understand the risks and disadvantages of not treating any posterior issues if just concentrating on anterior alignment.

Disclosure

Dr Qureshi runs courses with Dr James Russell and Dr Tim Bradstock-Smith and lectures on the

References


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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 sign 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.
2. 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.
3. 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 that the patients 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 13).

After proper healing of the periodontal tissues was confirmed with the periodontist, tooth #12 was prepared for an all ceramic lithium disilicate crown and the restorations were bonded (Figure 14) and the temporization 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