Restoring a congenitally absent lateral: an aesthetic case

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Introduction

Restoring congenitally absent lateral incisors in teenagers can be clinically challenging. As a clinician, you must try and look to the future and plan for further restorations and implants for when your restorative work eventually fails.

You must also be able to communicate this ongoing restorative cycle to the patient and, more importantly, their parents.

Case Study

Patient ZG, a 15-year-old male, attended the clinic with his mother looking for restorative solutions for his UR2 after having his fixed braces deboned. Examination showed that the patient had a congenitally missing UR2 and a diminutive UL2. His oral hygiene was good and there was mild to moderate levels of fluorosis on his teeth.

Orthodontic treatment had left the patient in a class one incisal, molar and canine relationship. It had provided 6mm of space in which to place a restoration. The patient was currently wearing an Essex retainer with a pontic in the UR2 area, but hated taking it out at school to eat.

A full series of clinical photography was used to help plan this case (Figures 1 to 5).

Treatment planning process

The ideal treatment to replace the UR2 would be an implant. On average, an implant has a survival rate of 94.6% over 13.4 years (Moraschini et al, 2015). However, in this case, the patient was too young. If we were to place an implant now, the implant would act as an ankylosed tooth, it would be fixed in place.

Jaw growth would still occur until adulthood, which for a male would be approximately 24 years, perhaps longer. This would result in the teeth moving, but the implant crown would be fixed in its original place, resulting in an unaesthetic look. We needed a solution for the medium- to long-term until a time an implant would be suitable. If we leave the space and do nothing, the teeth will move and we will lose the space.

A single tooth denture was a possibility, however, the patient and mother declined this option. Socially, the patient did not want a denture, or to be known amongst his peers as having a denture.

A bridge would be the only viable option for this patient. A conventional bridge would be extremely destructive, but a resin retained cantilever bridge (RRB) would work well.

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Figure 1. Initial situation

Figure 2. Initial situation – retracted

A study completed at Bristol University in 2015 by King and colleagues indicated that RRB with minimal tooth preparation had superior longevity than those with other preparation designs.

The study also showed that the survival of a resin retained bridge at five years was 80.8% and 80.4% at 10 years (King et al, 2015).

A resin retained bridge would be the best fixed option for patient ZG and, if we get it right, it will last until he is ready for an implant.

It would be best to place the wing of the RRB onto a canine tooth, this is due to the greater surface area that it provides. In addition, the aesthetics are not as affected as the metal of the wing tends not to shine through and darken the tooth.

However, in the case of ZG, the canine was small and would not provide as great a surface area compared to his central incisor. If we place the metal wing on the central incisor, the metal can shine through.

Research is now showing that bonded zirconia-based resin retained bridges can provide excellent outcomes as they:

- Are highly durable
- Are aesthetic
- Have a high survival and success rate. One study demonstrated a 10-year survival rate of 98.2% and a success rate of 92% (Kern et al, 2017).

What about the UL2? By placing a RRB in the UR2, we would be restoring it to ideal height and width. If we left the UL2 alone, the symmetry would be off. A veneer could be placed to match the height and width, however, no matter how minimal we try to be, this would require irreversible tooth preparation.

A composite veneer would require no preparation and provide a cosmetic result. If the patient decided to have a veneer when he was older then he would still be able to.

The treatment plan was a zirconia-based resin retained bridge using the UR1 as an abutment to replace the UR2 and a composite veneer to restore the UL2.

Preparation stage

Impressions were taken and sent to Ceramic Designs Laboratory for a wax-up for the UL2 and to plan the resin retained bridge.

At the lab, we discussed the case with the models in front of us. The main concern was what tooth would be a better abutment for the RRB: would it be the canine or the central incisor. The lab recommended that we make two resin retained bridges – one for the canine and one for the central incisor.

Although a canine is generally the better abutment, this canine is smaller, therefore with the two bridges I would be able to determine which bridge fits best, both clinically and aesthetically.

Figure 3. Initial situation – close-up

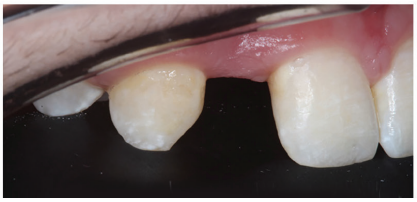
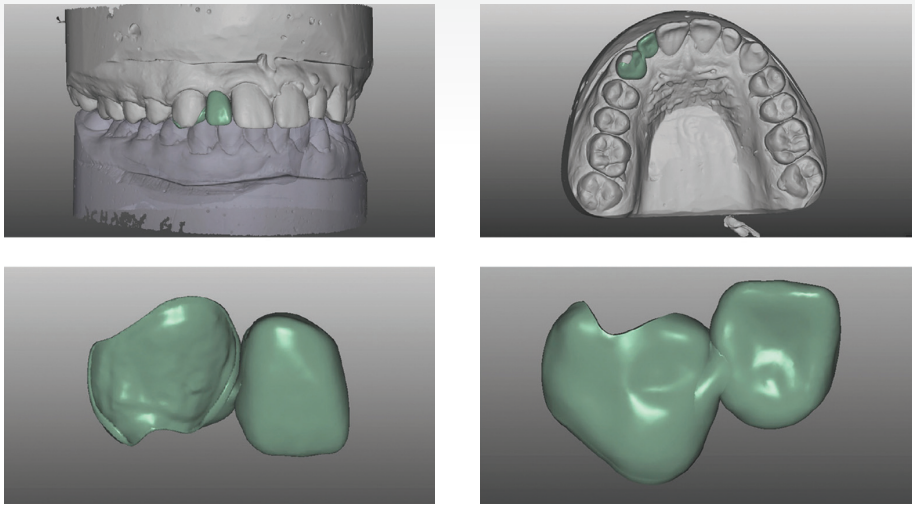


Figure 4. Initial situation – right-hand side

Figure 5. Initial situation – left-hand side



Figures 6, 7, 8 and 9: Zirkonzahn software was used to design two resin retained bridges

A small chamfer was made on both the canine and incisor. As it is minimal and only in enamel, this would not cause a problem if one was left. Using a round bur with no water, an indent was made in the UR2 space to help create a better emergence profile for the pontic. An impression was taken using Impregum.

I chose a Rochette design as I was concerned about being able to get the zirconia bridge off without damaging it and still be able to rebond it. However, in hindsight I would have gone for a full coverage wing.

Laboratory stage: Enikö's perspective

Our normal protocol is to wax up the resin retained bridges and then cast it from metal. However, as the patient in this case was very young and the aesthetics were important, it was decided to make a zirconia frame.

It was designed on Zirkonzahn software (Figures 6 to 9). For the best result, we provided two resin retained bridges – one with the wing on the UR1 and the other one had the wing on the UR3.

After the designing stage, we nested it in a zirconia block and had it milled out of it. Once the milling was done, we cut it out from the block by hand as the restoration was attached with little sprues to the block.

These sprues were smoothed, and we did a manual cut back on the raw zirconia to gain more space to build up the ceramic on it. Having this option is great as we can provide better aesthetic results.

Once we have the desired shape of the bridge, we used different colouring liquid on the framework, which is made by dipping the framework into the liquid before sintering so that the zirconium infiltrates with the liquid.

Once done, we put it in a burnout furnace for 30 minutes to help with the drying and then it goes in the sintering furnace where the zirconia structure transforms on a high temperature. Due to this, we have a much stronger zirconia frame that we can easily trim up to either be ready for building ceramic on it, or to stain and glaze it if it was a full contour crown.

With this case, we had space to build some enamel on the structure. I used GC porcelain and stains for the final effect that brings the tooth alive. I used quite a lot of white stain as the patient had fluorosis. I used the photographs that Rachel provided to help achieve the aesthetics.

The fit stage

The resin retained bridge was cemented and the UL2 was restored on the same appointment. Having tried in both bridges, I felt that the UR1 abutment provided a better emergence profile. I used Estecem II Plus (Tokuyama Dental), a composite cement that works well with zirconia. The universal shade is ideal for aesthetic situations.

The RRB was cemented under rubber dam and following the manufacturer's instructions. Once the bridge was cemented, I started to restore the UL2. I used Estelite Asteria NE and AB1 with a white tint from Tokuyama Dental.

The orthodontist had placed the UL2 in line with the rest of the arch, however, to provide the best aesthetic possible I needed room to place the composite and effects. Due to this, I reduced the mid-buccal face by 0.5mm.

In future, if I was to refer a similar case, I would ask the

Figure 10: Final result

Figure 11: Final result – retracted

Figures 12 and 13: Final result – close-up

Figures 14a and 14b: Before and after comparison

orthodontist to position the tooth 0.5-1mm palatally to allow space to provide the restoration.

Reflection

When I reviewed this case two weeks later, I was extremely happy with the results. The colour matching from the Estelite Asteria composite was excellent, however, I should have been braver and used more of the white tint to try and match the fluorosis.

The bridge was excellent and Eniko did a fantastic job managing the aesthetics in this difficult case.

In hindsight, I would have asked for a full wing rather than the Rochette design and I would also ask the orthodontist to position a diminutive or peg lateral tooth 0.5-1mm palatally so I would have room to restore the tooth

References

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