

# Replacement of a congenitally missing lateral incisor in the maxillary anterior aesthetic zone using a narrow diameter implant: A case report

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**Short title:** Narrow diameter implant in the anterior aesthetic zone.

**Key words:** Narrow diameter implant, congenitally missing lateral

## Clinical relevance

*Scientific Rationale for the paper:* This article describes a patient managed using a narrow diameter implant in the anterior aesthetic zone in a site of a congenitally missing maxillary lateral incisor. Congenitally missing laterals present a problem to both clinician and patient since the alveolar bone is frequently underdeveloped resulting in horizontal volume discrepancies presenting with significant aesthetic concerns. These cases are further complicated as they often fall into the “complicated” category according to the SAC classification as set by the ITI. The novel Straumann® BLT Ø 2.9mm implant (Straumann Group, Switzerland) provides an attractive preference to both clinician and patient.

*Principal findings:* This paper presents the management of a congenitally missing lateral space using the Straumann® BLT Ø 2.9mm implant.

*Practical implications:* The use of narrower diameter implants is beneficial in dealing with narrow spaces and decreased bone volume.

## Initial Presentation

A 21-year-old female patient with no medical history or habits of concern presented with a congenitally missing maxillary lateral incisor (tooth 22) and main complaint of: “I have a missing tooth and the bridge keeps falling out and it doesn’t look appropriate”. Upon clinical and radiographic examination of the site (Figure 1), a significant hard tissue defect was present due to local underdevelopment of the alveolar bone. Additionally the roots of the adjacent teeth 21 and 23 were converging apically.

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Figure 1: Pre-operative clinical photo and radiograph.

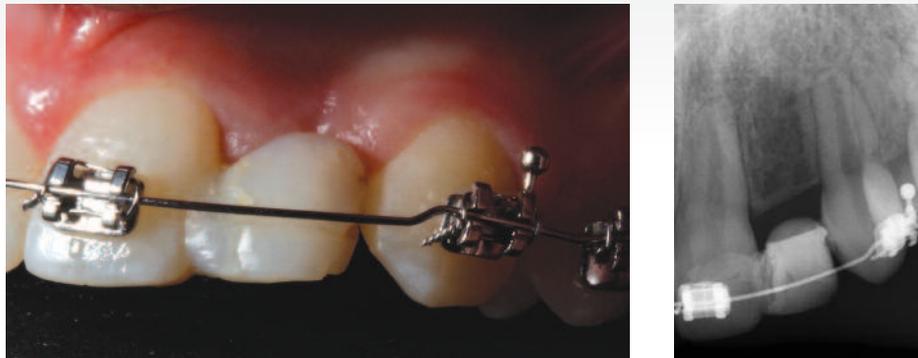


Figure 2: Orthodontic intervention, uprighting 21/23, picture and radiograph.

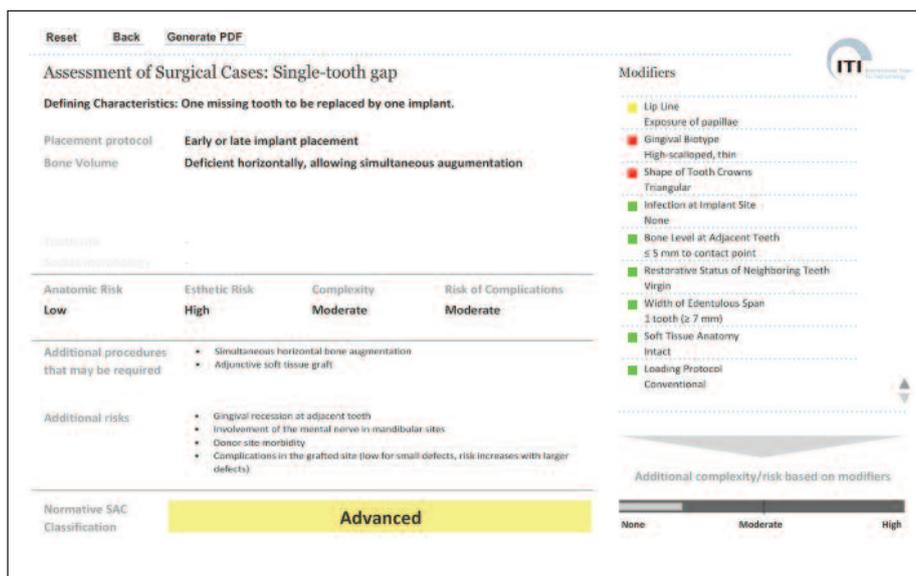


Figure 3: SAC classification.

### Treatment Planning

The patient was assessed using the SAC classification and found to be an advanced case. (Dawson et al. 2007) After discussion with the orthodontist, restorative clinician and laboratory technician, it was decided to upright teeth 21 and 23 with an orthodontic appliance creating space apically between the roots to where a minimum safe distance of 1,5mm is required between implant and tooth (Buser et al. 2004). It was decided to restore the site using a narrow diameter Straumann® BLT Ø 2.9mm implant. Although the literature is scant on the novel Straumann® BLT Ø 2.9mm implant, sufficient evidence exists on the use of narrow diameter implants in the anterior aesthetic zone (Klein et al.

2014). It was further decided to conduct a simultaneous guided bone regeneration as described by Kuchler et al. (Kuchler & von Arx 2014) to counter the physiological under development of the alveolar ridge (Rakhshan 2015) and provide long term stability of the implant. (Buser et al. 2004) The underdeveloped alveolus inherently presents with a decreased blood supply and may hinder osseointegration hence a conventional loading protocol at 12 weeks was chosen (Benic et al. 2014) in a two stage approach.

### Surgical Procedure

A beveled, slightly palatal, crestal incision was made in the interdental site between 11 and 22 with intra-sulcular



Figure 4: Intra-operative picture of 22 site.



Figure 5: Implant placement of a Straumann® BLT 2.9mm in 22 site.



Figure 6: Contour graft procedure using Cerabone™ and Jason Membrane™.

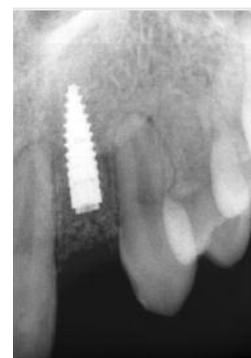


Figure 7: Immediate post-operative picture showing closure and radiograph.

incisions extending from 21 to the mesial of 24. No vertical releases were made to avoid scarring and optimize blood supply to the flap. (Burkhardt & Lang 2014). On exposure of the alveolar ridge, the bucco-palatal dimension was approximately 3.5mm at its most coronal part. To preserve bone and to satisfy the safety margins described by Buser (Buser et al. 2004), bone expanding osteotomes were used to widen the ridge prior to osteotomy site preparation (Figure 4). This ensured that maximum bone volume is preserved. A Straumann® BLT Ø 2.9mm implant was placed achieving an insertion torque of 35Ncm (Figure 5). A contour graft procedure was carried out using a slowly resorbing xenograft material (Cerabone™, botiss, Germany) and resorbable barrier collagen membrane (Jason Membrane™, botiss, Germany) (Figure 6) (Buser et al. 2013). A periosteal release incision was performed and the advanced flap was closed under negligible tension (Burkhardt & Lang 2014)

and sutured closed with 6.0 non-resorbable monofilament sutures (Ethicon™, USA) (Figure 7). The existing Maryland bridge was adapted and replaced to allow for optimal pontic site development and papilla fill (Figure 8).

### Prosthetic Procedure

After 12 weeks the Maryland bridge was removed (Figure 9) and the implant was surgically exposed and a de-epithelialized roll back flap was created to further bulk out the buccal tissue aspect. A 3.5mm H oval healing abutment was placed to create the emergence profile of a standard lateral incisor and the Maryland was once again replaced with sufficient space for optimal interdental hygiene protocols (Figure 10). After 2 weeks of healing time, the standard oval healing abutment was removed and a provisional crown was placed to assist in customizing the emergence profile further (albeit minimally) (Figure 11).



Figure 8: Immediate post-operative picture, buccal view.



Figure 9: 12-weeks post-operative occlusal view.



Figure 10: Picture of healing abutment and provisional modified Maryland bridge.



Figure 11: Customized provisional crown 22 implant.



Figure 12: Definitive implant supported zirconia crown.



### Final Result

After 6 weeks, the provisional crown was removed and a definitive implant supported zirconia crown was constructed and placed (Figure 12 & 13). An oral prophylaxis was performed to remove chlorhexidine staining. Base line peri-implant probing depths were taken (Mombelli & Lang 1994) and oral hygiene instructions were given to the patient. The patient was ecstatic with the final result.

### Conflict of Interests and Source of funding

The authors declare that they have no conflict of interests related to this case. The University of the Witwatersrand, Johannesburg, supported the case.

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Figure 13: Definitive implant supported zirconia crown and radiograph.

the prosthetic restoration of this case. Thank you to Dr Govindrau Mohangi for always being a mentor and outstanding teacher.

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