LEADING REGENERATION

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Minor Bone Augmentation

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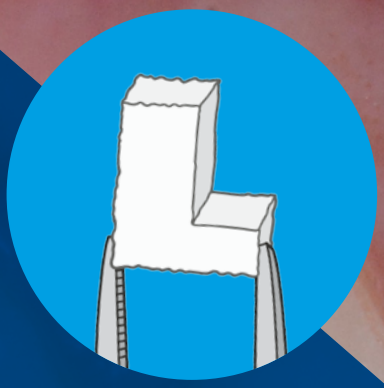


Prof. Ronald Jung,
Dr. Alfonso Gil, Dr. Tobias Basler

L-Shape Technique as a means of bone augmentation together with early implant placement

The Situation

The patient presented to the clinic with a discolored tooth 11, with mobility and a history of trauma. The tooth has a horizontal fracture in the apical third of the root and has recurrent infection after the root canal treatment. The patient feels discomfort and dislikes his esthetic appearance. He would like the fractured tooth 11 removed and replaced with a fixed solution.

The Risk Profile

	Low Risk	Medium Risk	High Risk
Patient's health	Intact immune system	Light smoker	Impaired immune system
Patient's esthetic requirements	Low	Medium	High
Height of smile line	Low	Medium	High
Gingival biotype	Thick – "low scalloped"	Medium – "medium scalloped"	Thin – "high scalloped"
Shape of dental crowns	Rectangular		Triangular
Infection at implant sight	None	Chronic	Acute
Bone height at adjacent tooth site	≤ 5 mm from contact point	5.5 - 6.5 mm from contact point	≥ 7 mm from contact point
Restorative status of adjacent tooth	Intact		Compromised
Width of tooth gap	1 tooth (≥ 7 mm)	1 tooth (≤ 7 mm)	2 teeth or more
Soft-tissue anatomy	Intact		Compromised
Bone anatomy of the alveolar ridge	No defect	Horizontal defect	Vertical defect

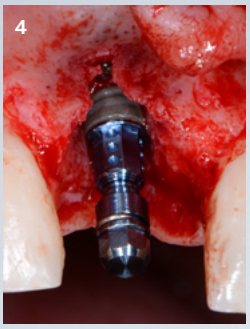
The fractured tooth has a periapical lesion together with a severe bone defect around the horizontal fracture.

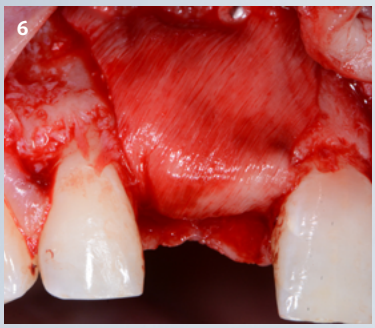
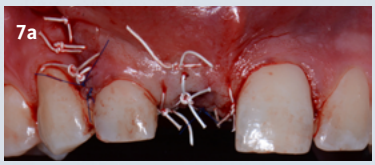
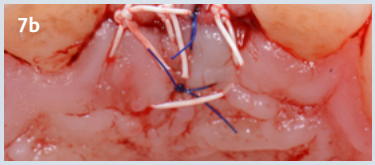
"Fractured anterior tooth that needs to be replaced with an implant supported reconstruction."

Prof. Dr. Ronald E. Jung – Zurich

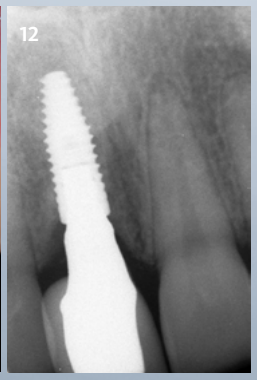
He is currently Head Division of Implantology, Clinic for Fixed and Removable Prosthodontics and Dental Material Science, Center of Dental Medicine at the University of Zürich. In 2006 he worked as Visiting Associate Professor at the Department of Periodontics at the University of Texas Heath Science Center at San Antonio, USA (Chairman: Prof. Dr. D. Cochran). 2008 he finalized his „Habilitation" (venia legendi) in dental medicine and was appointed associate professor at the University of Zürich. In 2011 he got his PhD degree from the University of Amsterdam, ACTA dental school, The Netherlands. He is an accomplished and internationally renowned lecturer and researcher, best known for his work in the field of hard and soft-tissue management and his research on new technologies in implant dentistry.





The Approach

To carefully extract tooth 11 and to replace it with an early implant placed with simultaneous guided bone regeneration through the use of Geistlich Bio-Oss® Collagen trimmed in an "L-Shape" under the protection of a Geistlich Bio-Gide®. To augment the peri-implant soft tissue with the use of a connective tissue graft during implant healing time, increasing the overall volume of site 11. To provisionalize the implant for the development of a proper emergence profile. To deliver a definitive reconstruction which is functional and esthetic for the patient.

The Outcome

The implant and its prosthetic reconstruction were succesful because they provided the patient with a fixed solution with adequate function and esthetics. The implant shows stable marginal bone levels due to the proper implant placement together with the GBR procedure. The peri-implant soft tissue is healthy and stable with sufficient volume created by the soft-tissue augmentation. The definitive reconstruction meets the patient's esthetic demands and is functional in occlusion.

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| **1** The patient presents with a severely discolored tooth that suffered trauma one year ago and shows signs of discomfort. | **2** The tooth is root canaled, has a horizontal root fracture in the apical third and exhibits with a periapical lesion. | **3** The tooth is carefully extracted and the socket is left to heal through unassisted healing. | **4** After 6 weeks an early implant is planned. A full thickness flap is elevated with a distal releasing vertical incision. A bone level implant is placed according to the prosthetic planning through a surgical guide. Notice the buccal dehiscence. | **5** A Geistlich Bio-Oss® Collagen is trimmed to an "L-Shape" and is placed on the buccal-occlusal side of the implant. Additional Geistlich Bio-Oss® granules are placed around the remaining gaps. | **6** To stabilize the grafted area the bone augmentation is covered with a Geistlich Bio-Gide®, which is fixated apically with two resorbable pins. | **7a** The flap is sutured with horizontal matress and single interrupted sutures. | **7b** Primary closure is achieved. | **8** Four months after the placement a limited access "U"-flap was created and an implant impression was taken. The tissue was rolled to the buccal side and the abutment connection was performed. | **9** A crown provisional was fabricated and screwed to the implant in order to shape an adequate emergence profile. | **10** A second implant impression was taken after 2 months with a customized impression coping. | **11** The definitive reconstruction with layered zirconia was then fabricated and delivered to the patient. The clinical situation 5 month after implant placement shows a harmonious soft tissue and a well integrated implant crown. The patient is satisfied with the esthetic result. | **12** The periapical radiograph taken at the one year follow-up shows stable marginal bone levels.

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Keys to Success

Careful tooth extraction with minimum damage to the alveolar socket walls

Proper implant placement, prosthetically driven (with a surgical guide)

Simultaneous guided bone regeneration with a stable bone substitute (Geistlich Bio-Oss® Collagen) covered by a bilayer collagen membrane (Geistlich Bio-Gide®) that is properly stabilized

Soft-tissue augmentation with the use of an autogenous connective tissue graft (not shown in the clinical pictures, page 3)

Development of an adequate emergence profile that mimics a natural tooth

Fabrication of a ceramic implant reconstruction that blends with the adjacent dentition and is screw-retained (when possible)

Primary stability of the augmented bone volume is the clinical challenge in guided bone regeneration (GBR)[1] after flap closure. In this case a volume stable biomaterial has been used to augment on the buccal side of the implant. By using Geistlich Bio-Oss® Collagen with an “L-Shape” covered with Geistlich Bio-Gide® a very stable horizontal and vertical bone volume around the implant is provided which results in a stable hard and soft-tissue condition after the healing time. This is key for the long term performance of an implant especially in the esthetic zone.

REFERENCES

1 Mir-Mari J et al., Clin Oral Implants Res. 2017 Jun;28(6):631-639 (preclinical study).