Development of a 3D model through segmentation for the treatment of impacted teeth in the Email Rein Syndrome associated with the FAM20A gene mutation

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INTRODUCTION

Enamel Renal syndrome (ERS) presents gingival calcification and amelogenesis imperfecta. We hypothesized that gingiva and toothcrown may link together impacting normal eruption. (Sahi et al. Twin poster)

The objective of our clinical work is to shield the altered and impacted tooth with 3D printed crowns during surgery in order to facilitate their eruption

Patient 1
- 12 yo Male
- Enamel-kidney syndrome
- Intrabony 14/15/24/25, eruption failure, and persistence of 54/55/64/65

Initial situation
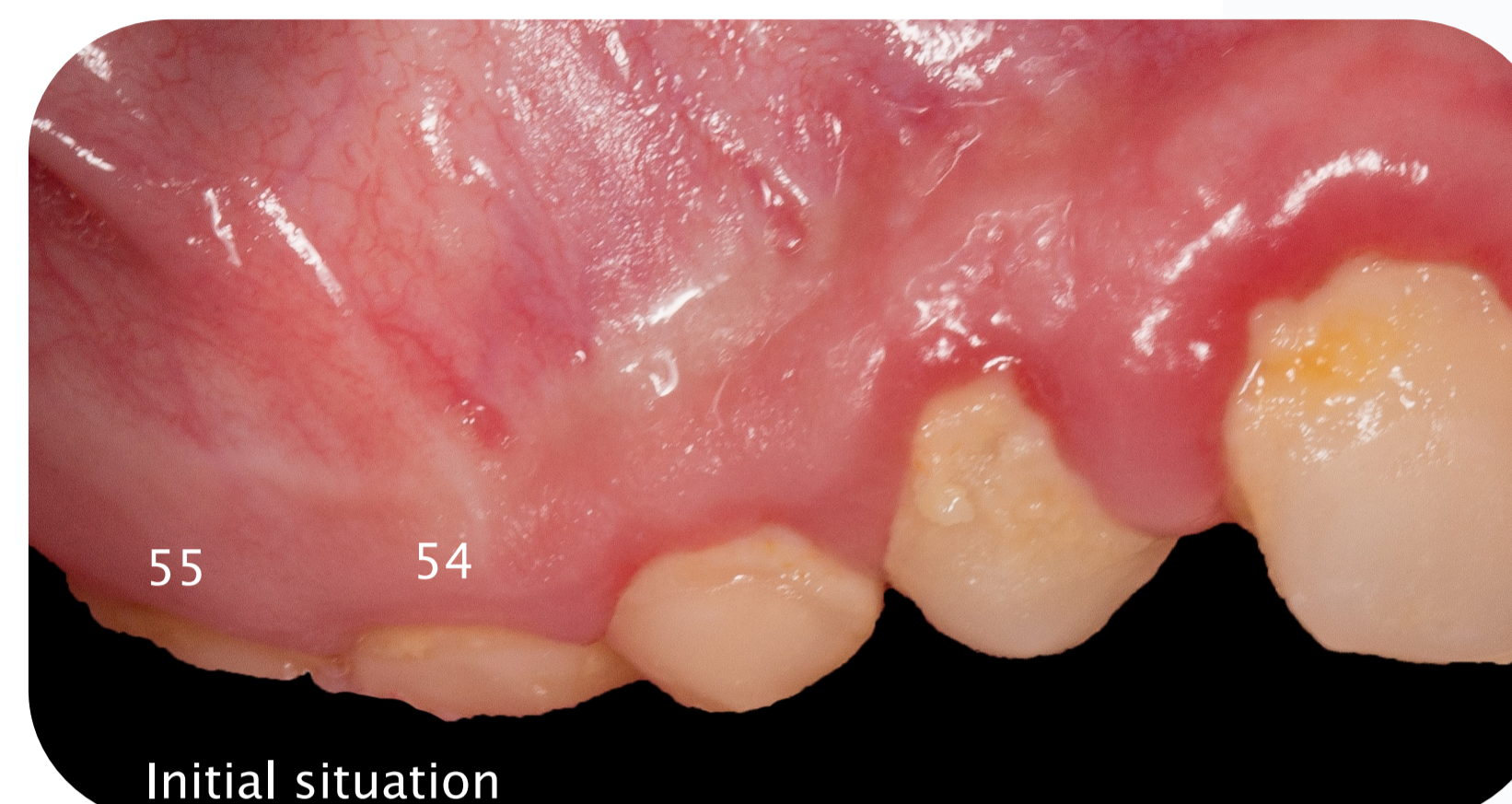
Patient 2
- 9 yo Female
- Enamel-kidney syndrome
- Intrabony 12/22, eruption failure
- Hyperplasic gingiva

Initial situation

MATERIAL AND METHODS

3D Model: Due to the inability to access impacted teeth preoperatively it was not possible to use optical impressions. Therefore, Cone Beam Computed Tomography (CBCT) was used to create a **usable 3D model**.

SOFTWARE enabled the creation of virtual crowns on models generated from CBCT segmentation and virtual extraction of deciduous teeth.

3D PRINTING allowed for the printing of resin crowns with a lifespan in the mouth exceeding 90 days.

CBCT

3D modeling after segmentation
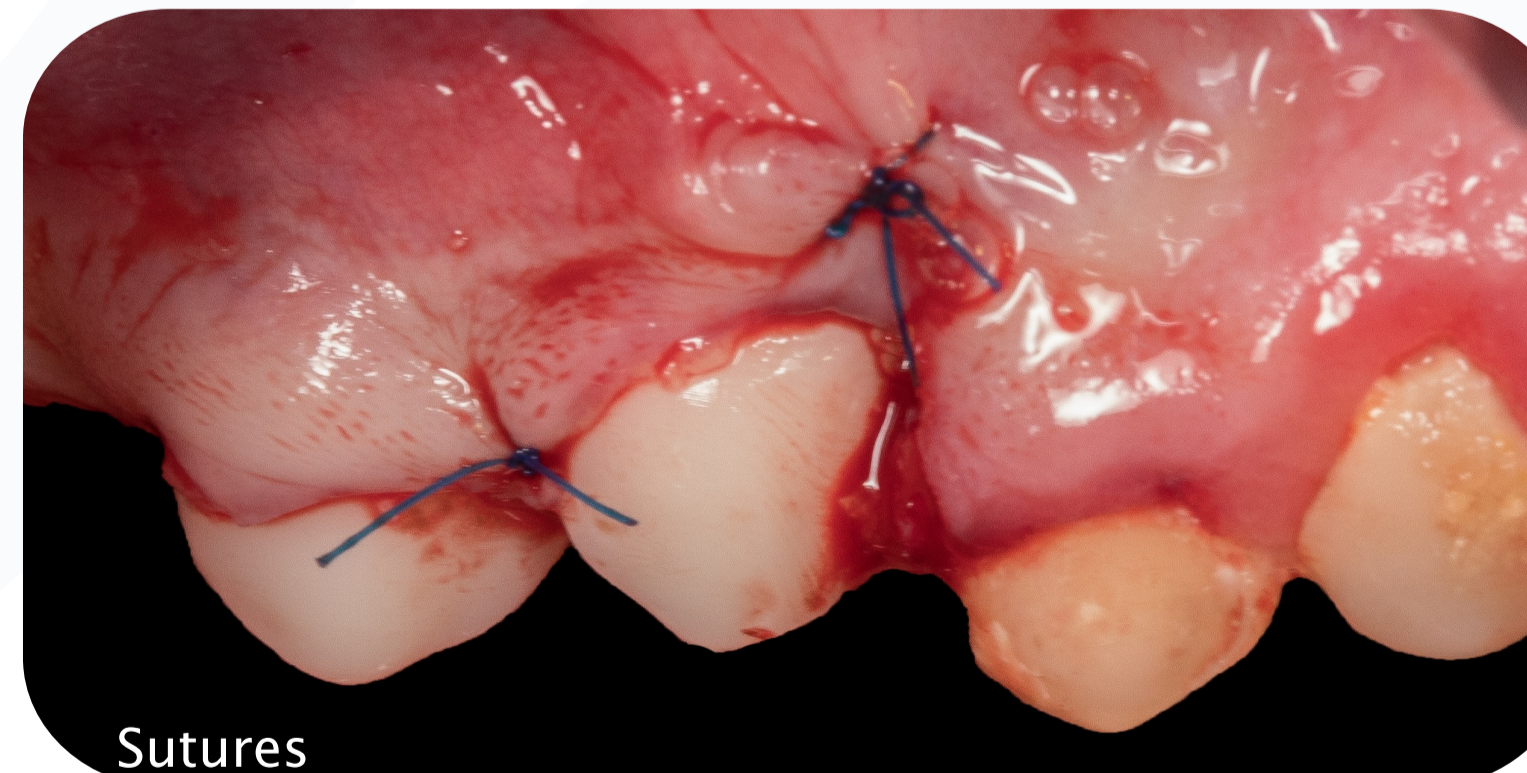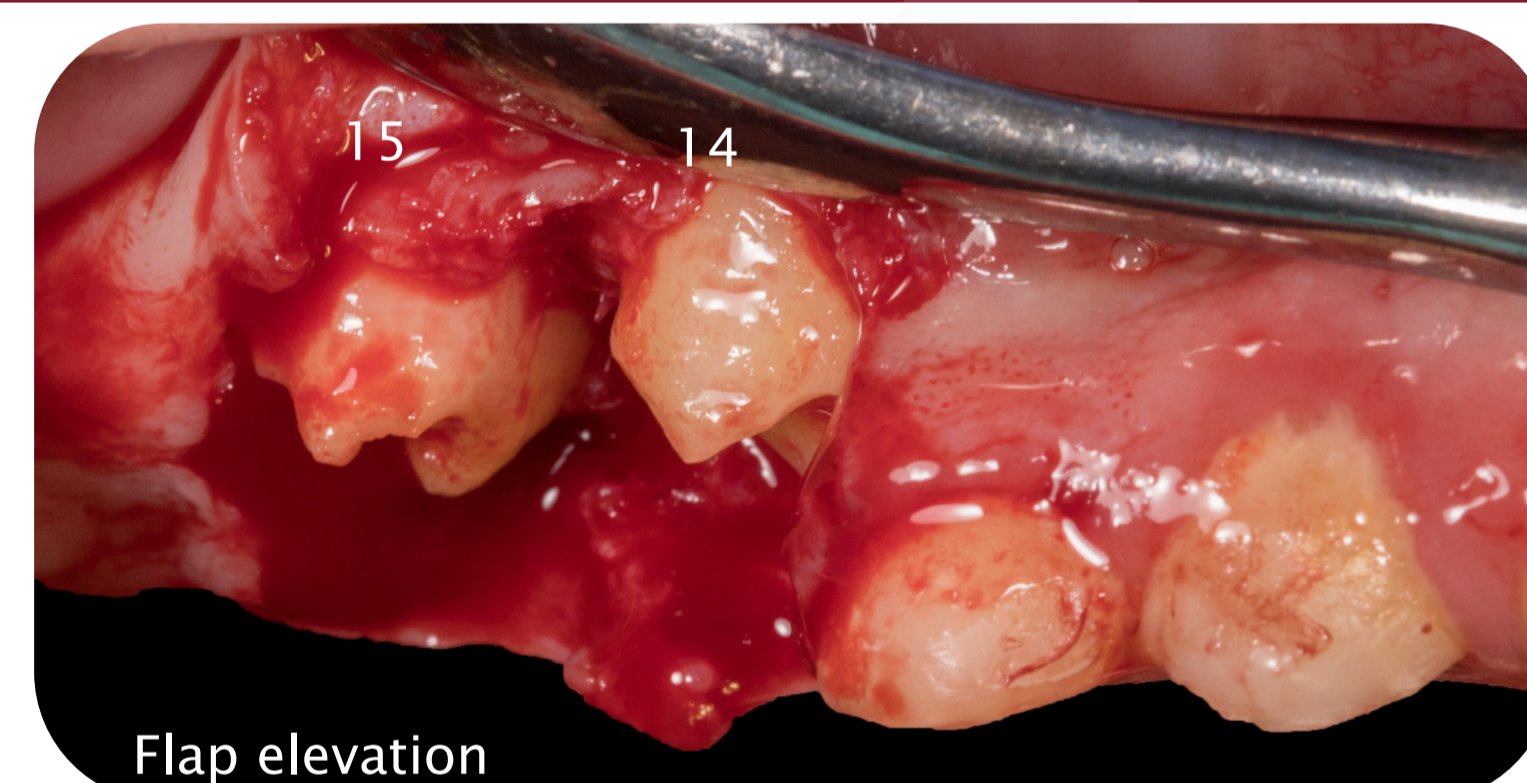

CBCT

3D modeling after segmentation
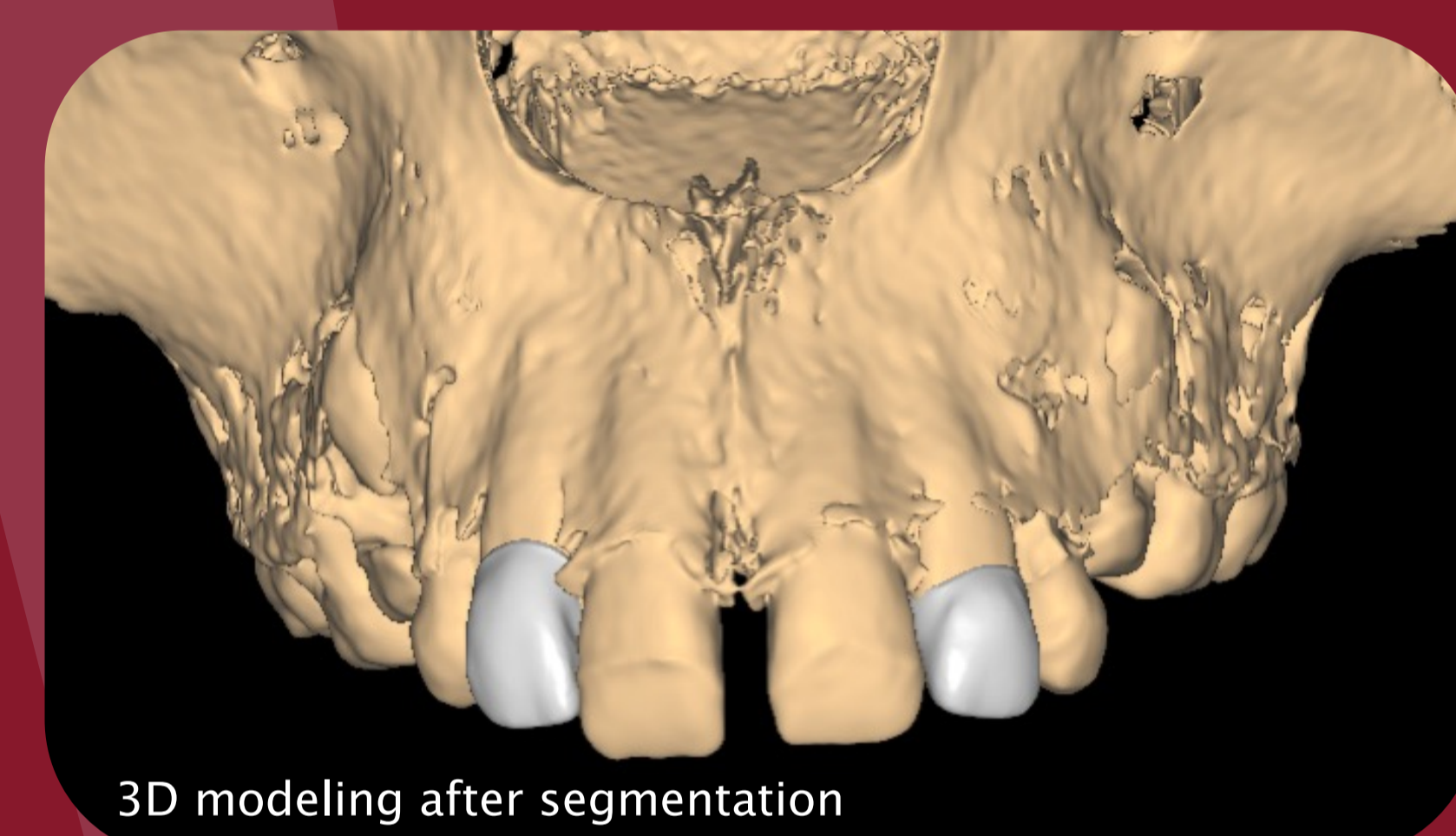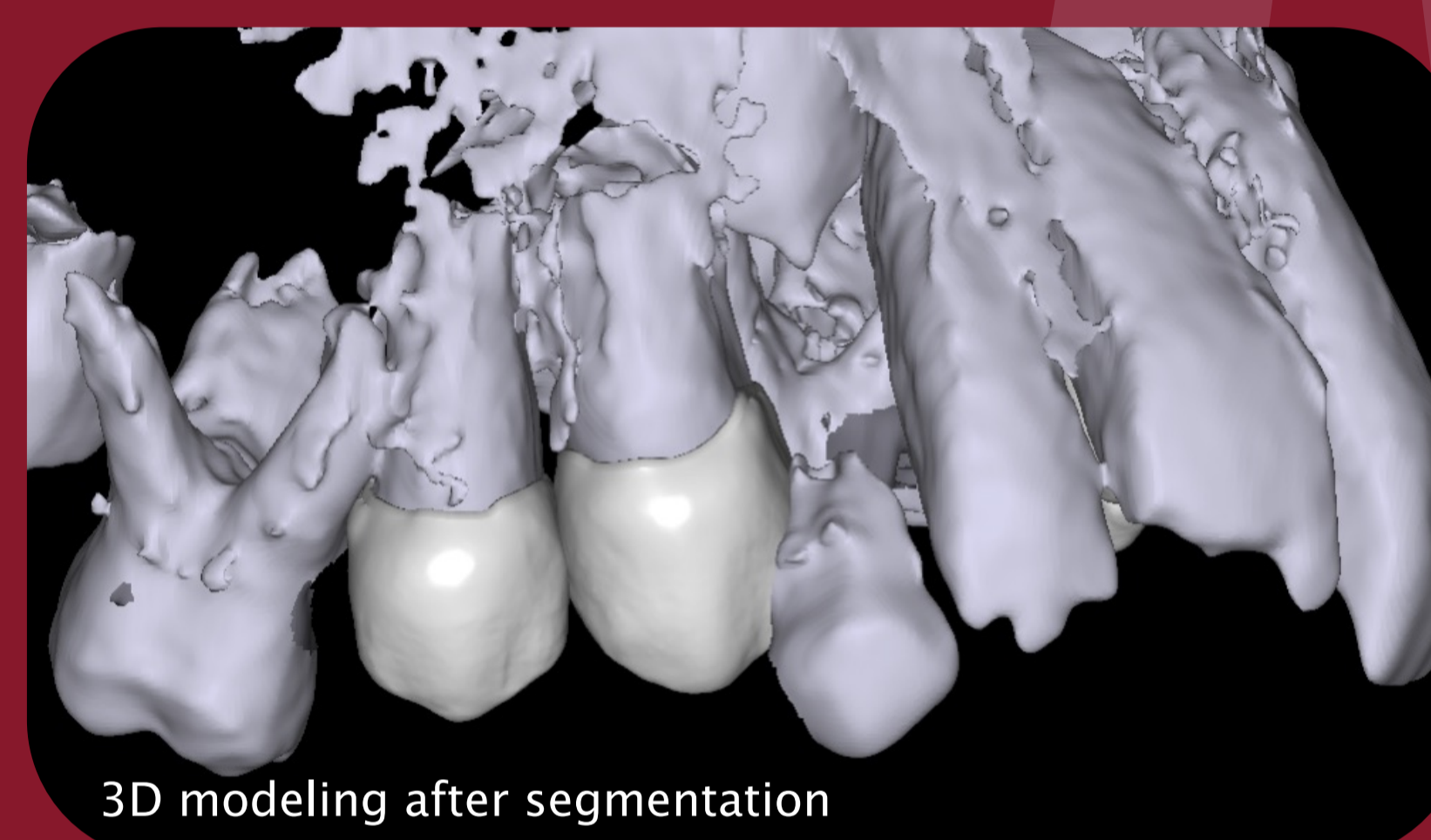
RESULTS

SURGERY started with local anesthesia. The flap was elevated and osteoectomy was performed if necessary. The flap was sutured apically to the crown.

PROVISIONAL CROWNS were cemented with glass ionomer cement. Due to the AI, no preparations of the tooth were needed.

FOLLOW-UP was performed at 2 weeks, and once a month to adjust the crowns profile, maintain the teeth under occlusion, and let the teeth keep on erupting.

IMPROVING oral hygiene by decreasing pain and sensitivity. Helping children to control the inflammation around the crowned teeth compared to native teeth.

Twin poster S. Sahi et al.

Flap elevation

Provisionnal crowns

Sutures

6 months

Gingivectomy

Provisionnal crowns 12/22 composite restauration 11/21 (M.Riou)

2 weeks

6 months

CONCLUSION

- The model presented here, lead us to have access to data that is not accessible to intra-oral scan using the CBCT datas.
- The use of CBCT as a three-dimensional model has the potential to facilitate the development of advanced treatments that are challenging to accomplish with conventional approaches, particularly in cases of significant eruption impairment such as those observed in the Enamel-kidney syndrome