

# Aesthetic Rehabilitation With Vertical Bone Augmentation

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## Introduction

Alveolar atrophy of anterior teeth frequently leads to unfavourably proportioned prosthetic treatment, frequently resulting in longer crowns, or bridges and dentures with artificially created gingiva and missing papillae. If additionally the patient shows a high lip line, the aesthetic outcome will often be a compromise. The patient therefore usually does without fixed tooth replacements.

## Materials and methods on the basis of a medical case

A 53-year-old patient presented herself at the dental surgery of Dr. Nicko. She was unhappy with the existing tooth replacement, a fixed anterior bridge, which she found aesthetically unpleasant. Due to a high lip line the border area between bridge pontics and alveolar process was exposed when laughing or speaking. She had worn this bridge prosthesis for over 15 years, the maxillary alveolar process was heavily atrophied. A few years ago, the causal periodontitis was treated successfully, with results remaining stable until recently. However, the patient was looking for a new treatment with a predictable aesthetic outcome and made great demands on aesthetical and functional results. We therefore considered bone restoration using distraction osteogenesis as the right choice of treatment. This way of vertical bone distraction makes it possible, depending on the position of the distractors used, to influence the direction of bone augmentation. In order to later have a correct lip support, the alveolar process had to be distracted in caudal and vestibular direction. We received more detailed information using a wax-up. The patient was informed about the aesthetic compromises she would have to take into account during preparation phase.

### 1. Operation with insertion of the distractors

In order to allow for a secure aesthetic rehabilitation of the exposed anterior tooth area, the bridge had to be removed and teeth 14, 15, 23, 24 and 25 had to be extracted. Eight weeks after tooth extraction with the soft tissue being healed at this point, horizontal osteotomy of the alveolar process followed in the region 15 to 25. Carrying out the osteotomy we strictly paid attention to leaving the palatal periosteum intact. Afterwards, distractors, type Track 1 Plus by KLS Martin Group, were fixed and correctly three-dimensionally arranged in caudal and vestibular direction. In order to secure a correct bone expansion, a predetermined breaking point of the alveolar process was integrated between 11 and 21.

### 2. Distraction process

Seven days after surgery the patient began with distraction. For three weeks, she turned the screws twice a day, every time achieving a change of 0.3 mm. We paid attention to carrying out distraction beyond the necessary limit. The provisional prosthesis was adapted on a regular basis. Having achieved the final state we observed a clear caudal and vestibular shift of the alveolar process, its corresponding fracture between 11 and 21 as well as an increase in volume of the soft tissues. The projecting distractor ends were removed and the tubes were filled with plastic in order to gain a more favourable aesthetic solution for the provisional tooth replacement.

### 3. Wax-up, implant planning, surgical templates

The aesthetic planning was carried out on a model. We started with determining the position of the later incisal edge using a wax-up. Afterwards, we were able to erase the alveolar process on the model in order to produce the desired tooth shape and length. This result was used to create surgical templates which determined the exact shortening of the alveolar process and positioning of the implant shoulder.

### 4. Implanting

Three months after finishing the distraction process we removed the distractors by surgery, modelled the alveolar process according to the corresponding templates and placed nine Camlog implants using the surgical templates. The shortening of the alveolar process indirectly widened the alveolar ridge by removing the narrow parts and supported the increase in volume of the soft tissues which later would fill the former bone sections.

### 5. Prosthetic restoration

After uncovering, six months after implantation, conditioning of papillae followed using individual gingival formers. Afterwards, single zirconium oxide crowns were cemented with zirconium oxide abutments. The results achieved did correspond exactly to what the patient had expected from the treatment and to the objectives that had been set at the beginning of the treatment.

## CONCLUSIONS:

Distraction osteogenesis is a means of adequately increasing the volume of bones and soft tissues in order to offer predictable results with a low risk factor. Described procedure is recommendable for standard use in aesthetically sensitive areas with alveolar atrophy.

The following passages will show a way how to offer predictable aesthetic and functional results through substantial vertical as well as horizontal loss of bone tissue in order to incorporate fixed tooth replacements that have an optimal proportion and a natural look.



Initial state



Initial state



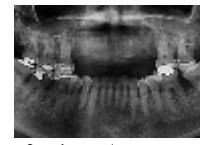
Initial state



Initial state



Initial state roentgenographically



Initial state roentgenographically



Osteotomy



After insertion of distractors



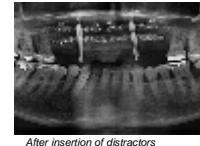
Functional test of a distractor



Wound closure



Provisional tooth replacement after osteotomy



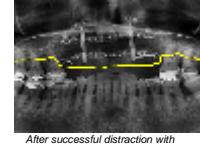
After insertion of distractors



After finishing of the distraction process



Shortening of distractors



After successful distraction with fracture regio 11/21



Wax-up for determining incisal edges



Wax-up try-in for determining incisal edges



Erasure of the alveolar ridge on the model



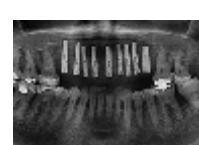
Wax-up after erasure of the alveolar ridge on the model



Wax-up after erasure of the alveolar ridge on the model



Corresponding drilling template



State after implantation roentgenographically



State after implantation roentgenographically



Individualisation of the gingival formers



State after uncovering applying a tunnel technique



Individualisation of the gingival formers



Papillae created



Finishing



State after finishing the crowns (detail)



Finishing, smiling patient