

Eric Van Dooren | Florin Cofar  
Victor Clavijo | Gustavo Giordani | Venceslav Stankov



# Interdisciplinary Esthetic Dentistry

# **\_basics**

## **Planning and execution**

Volume 1

The  
**big**  
Picture





## Foreword



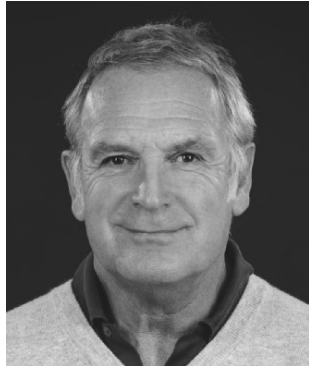
First and foremost, this book is written by clinicians for clinicians. It always aims for a pragmatic approach to solving problems in the clinical reality. By mixing timeless concepts with ever-evolving technology, it takes the reader on a journey, providing both the context and the solutions to problems we face every day.

The clinical work in this book has been executed on a time frame of 30 years, across 3 different geographic and cultural realities (Western Europe, Eastern Europe and Brazil), yet sharing a common and congruent vision on how to approach dentistry.

This book is a compendium of core interdisciplinary concepts and ever-evolving tools and workflows to handle complex scenarios. Last but not least, it is a tribute to the people we worked with, and probably most important, it is a tribute to the people we served.

We wish you happy reading.

*Eric Van Dooren and Florin Cofar*



**Eric Van Dooren, DDS**

Dr Van Dooren attended the Katholieke University in Leuven, Belgium, where he received his degree in dentistry in 1982.

After graduation, he opened a private practice in periodontics, fixed prosthodontics, and implants in Antwerp, Belgium.

He is an active member of the European Academy of Esthetic Dentistry.

Dr Van Dooren lectures nationally and internationally mainly on esthetics, implants, and esthetic periodontal surgery.



**Florin Cofar, DDS**

Dr Cofar graduated University Victor Babes, Timisoara, Romania, in 2007.

He is specialised in interdisciplinary esthetic dentistry, with a broad expertise on digital technology.

As a philosophy, he is geared towards clinical pragmatism, efficient and meaningful use of technology to broaden the holistic diagnosis and treatment capabilities in oral rehabilitations.

Currently lectures worldwide and practices in Timisoara, Romania.





**Victor Clavijo, DDS**

Dr Clavijo holds a degree in Dentistry from Universidade Paulista, São Paulo, Brazil (2002) and obtained the title of Specialist, Master and Doctor in Restorative Dentistry, from UNESP Araraquara (2003–2011).

Despite his academic background, his focus is on clinical care. He has followed in the footsteps of his father, who has been a clinician for over 50 years in the city of Indaiatuba, São Paulo, Brazil.

He has more than 60 articles published in national and international journals and has authored and co-authored books in the dental field.

His work is based on clinical and scientific evidence.

Currently, he divides his time between appointments at his clinic, classes, and courses in Brazil and abroad. In addition, he contributes to research in dentistry; he conducts research annually at the University of Southern California, Los Angeles, USA, as a visiting professor.



**Gustavo Giordani, DDS**

Dr Giordani has specialized in maxillofacial and periodontal surgery, and implantology. After graduating from the Universidade Paulista (UNIP), São Paulo, Brazil, he took a fellowship in Belgium, on "Implants and Periodontal Plastic Surgery" with Dr Eric Van Dooren, collaborating with him to the present day. Dr Giordani is treating cases in an interdisciplinary fashion, working with specialists all over the world.

He lectures internationally on soft tissue management, periodontology, and implantology in prosthetic treatments. His main focus is treatment for gummy smile, esthetic crown lengthening, root coverage, gingival grafts, and immediate implants. He works closely with the Dentcof team and Ateliê Oral, one of the most successful dental clinics in São Paulo.



**Venceslav Stankov, DDS**

Dr Stankov is among the best-positioned professionals in the domain of dental medicine in Bulgaria. He manages a team of 24 staff as the Chief Doctor at the Dr Stankov Dental Clinique. His clinical work is focused on end-to-end esthetic treatment in dental medicine, implantology, periodontal plastic microsurgery, periodontal regeneration, complex cases of prosthetics on natural teeth, and implants. He is a renowned and influential national lecturer and a trendsetter in his area of expertise.

He has taught several postgraduate courses in the fields of periodontology and prosthetics. He won second prize in the 1-year Global Institute for Dental Education (GIDE) master program at the University of California, Los Angeles, USA, in 2013.

His career started after he graduated in dental medicine at the Faculty of Dental Medicine, Medical University of Plovdiv, Bulgaria, in 2007. He is a visiting lecturer at the Zimmer Institute, Switzerland. He is an active member of the Bulgarian Academy of Esthetic Dentistry, the GIDE Study Club, and the Zimmer Club.





# Contributors

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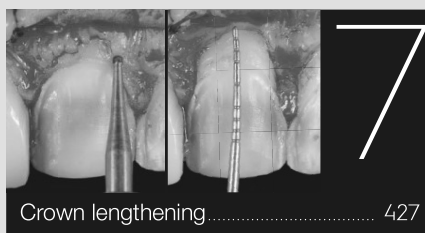
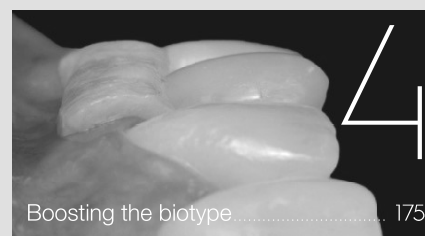
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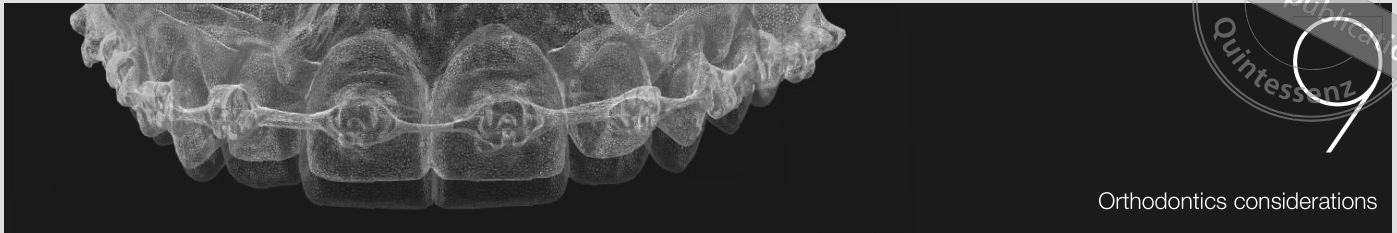


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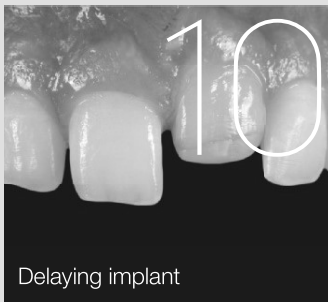
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**\_synergies** Optimising complex cases – Volume 2



Orthodontics considerations

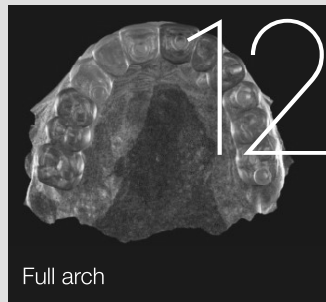
**\_complications** Retreatments and maintenance – Volume 3



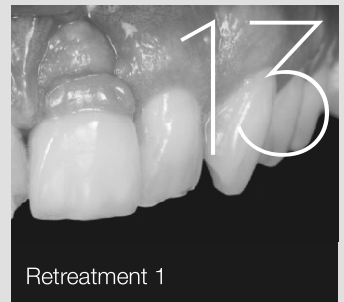
Delaying implant



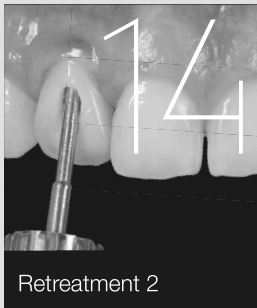
The central-lateral incisor dilemma



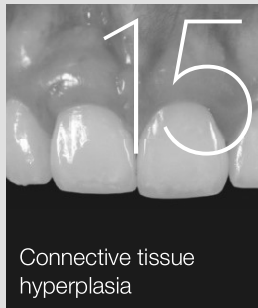
Full arch



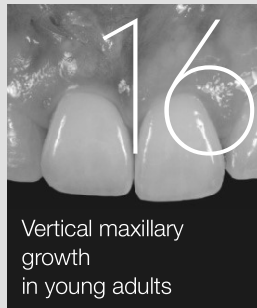
Retreatment 1



Retreatment 2



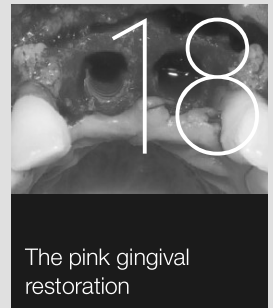
Connective tissue hyperplasia



Vertical maxillary growth in young adults



Vertical maxillary growth and implant removal

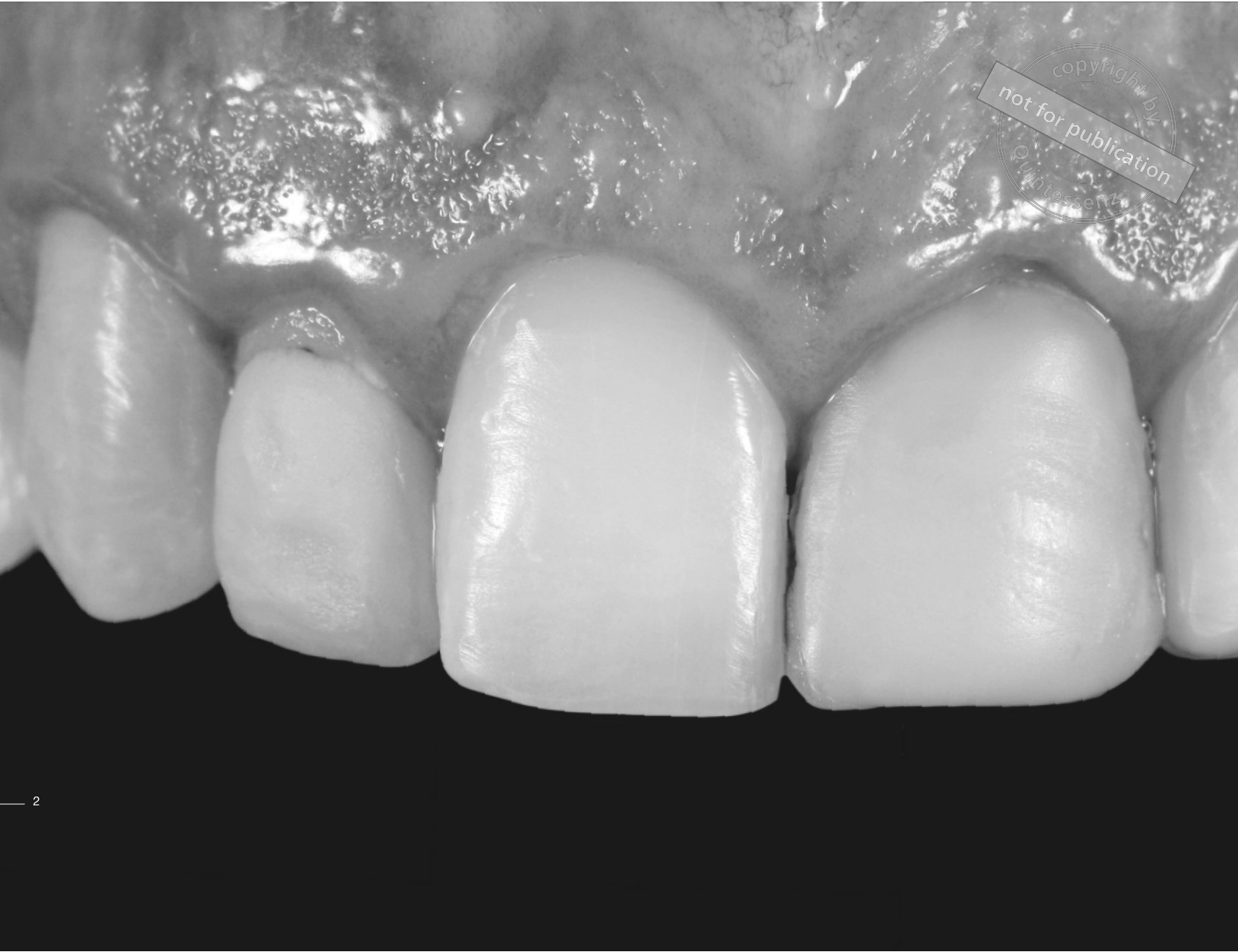


The pink gingival restoration



# Esthetic analysis

## **Conventional smile design**





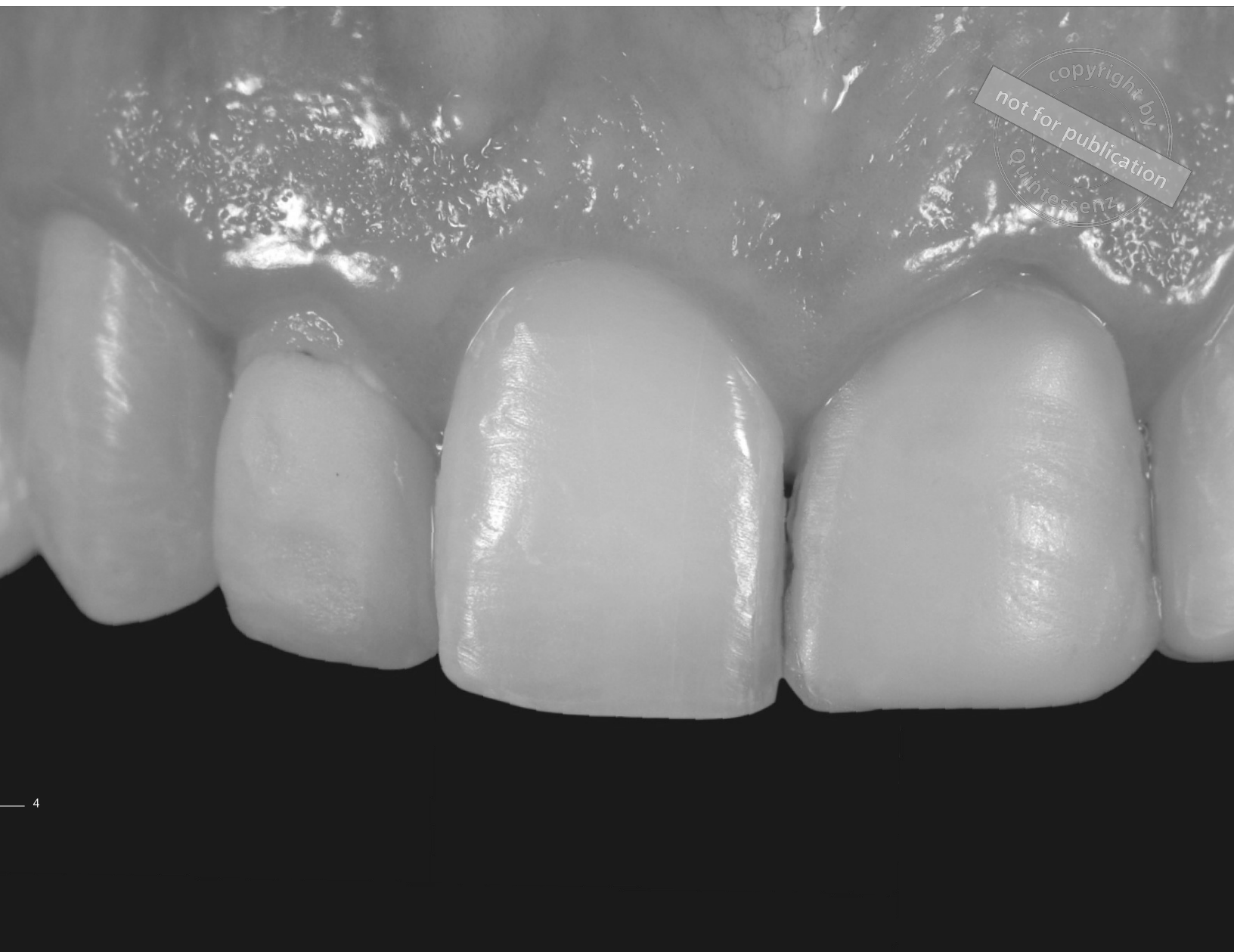
## Introduction



successful outcome depends on a well-organized and step-by-step approach, a meticulous treatment planning protocol, and basic knowledge of prosthetic and surgical concepts. The entire treatment sequence for the patient can be divided into four equally important steps:

- **The first step** is about clinical examination, periodontal assessment, collection of the data needed to treat the case, and esthetic analysis to establish a proper diagnosis and to transmit the correct information to the laboratory; receiving accurate information from the clinician is important so that the occlusal plane is not skewed, the midline is not canted, and functional problems are not incorporated into the diagnostic wax-up that will be used to build the esthetic project.
- **The second step** is to build the ideal design for the patient and validate it with a mock-up to get the patient to approve treatment.
- **The third step** includes all the sequences of treatment needed to reach this goal.
- **The fourth step** is the final prosthetic rehabilitation.

A final step should be added to all treatment plans, that is, maintenance and hygiene; the last part of this book is all about the long-term challenge we face with our rehabilitations and focuses on these issues.





## Clinical situation

A 42-year-old woman was referred to our clinic by an orthodontist. Her main complaints were the unesthetic appearance of her smile, particularly the anterior segments, and sensitivity in her left central incisor. Her goals in seeking treatment were to improve the esthetics and create balance and harmony in her smile.

Because she had been complaining about sensitivity in her left central incisor, she was referred to an endodontist for evaluation before any further treatment. The endodontist confirmed a root fracture in the left central incisor; that tooth should be planned for extraction and implant placement.





## Step one Observe

### Backgrounds

- 42-year-old woman
- Referred by her orthodontist
- Left central incisor planned for extraction

### Complaint

- Improve the esthetics
- Create balance and harmony in her smile

### Face

- Harmony: substantial canting of the maxilla
- Symmetry: deviation of the midline
- Substantial canting of the anterior segment

### Smile

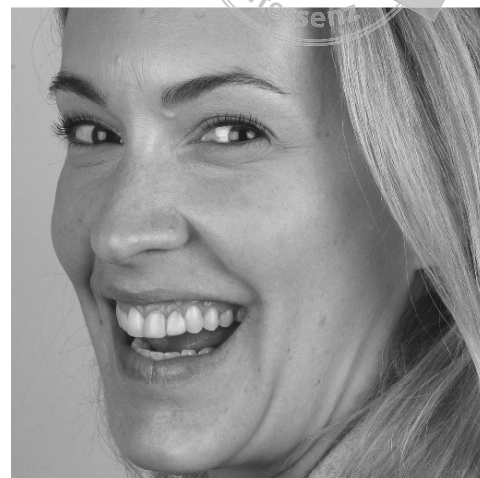
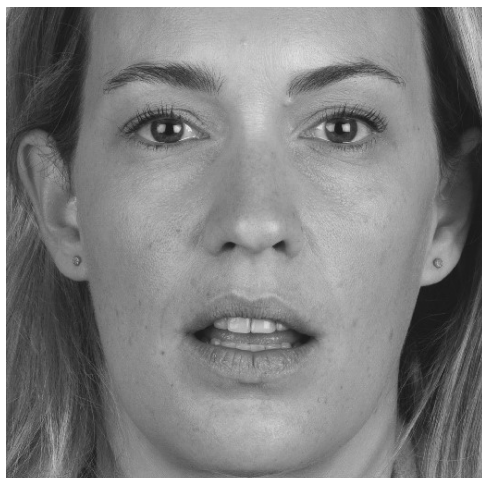
- Slight gummy smile
- Asymmetry in the form of the central incisors
- Old discolored composite material

“ The observation always starts with the patient’s face, then little by little we focus on smaller and smaller details. Relating the smile and the tooth display to the face of the patient is crucial for a proper smile design. ”



# Record

Key elements for the development of the esthetic and functional treatment plan



Extraoral frontal view perfectly centered to avoid any distortion; extraoral lateral views



Extraoral close up of the smile

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# 1. Extraoral photographs



“ At this step, video recording can be useful to have a full understanding of the lip dynamics of the patient. ”

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“ It is essential to think like an architect  
before you act like a dentist. ”



## Step one Record

*Key elements for the development of the esthetic and functional treatment plan*

### 2. Intraoral photographs

- Frontal view perfectly centered to avoid any distortion
- Lateral views
- 12 o'clock picture

### 3. Intraoral radiographs

- Apical radiolucency around the roots of the left central and lateral incisors

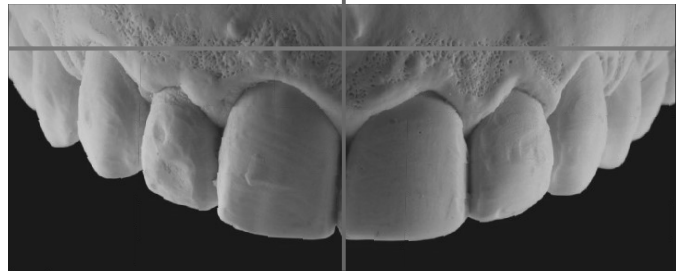
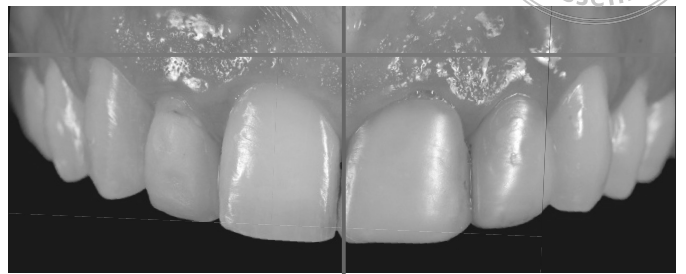
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## 4. Impression

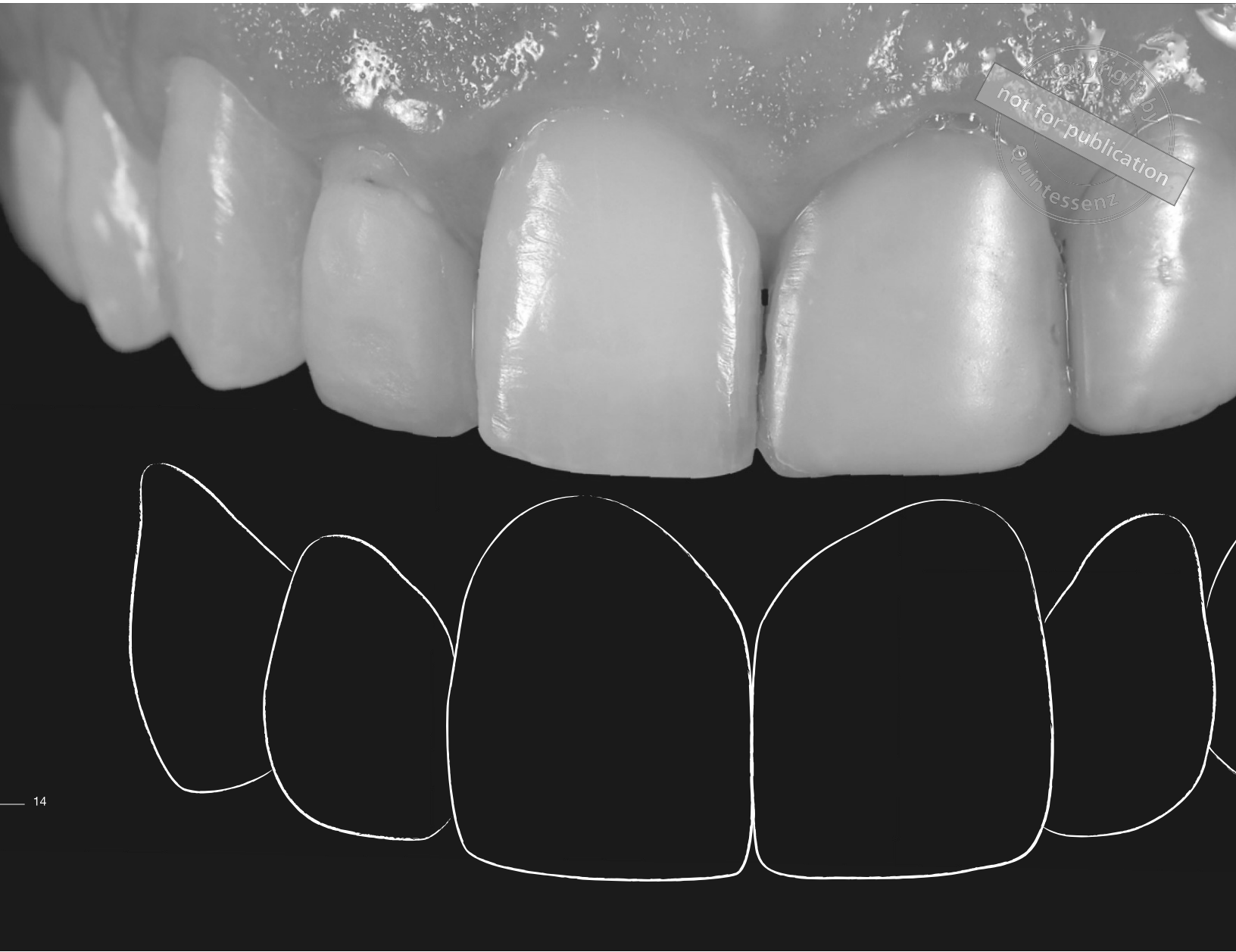


“ Special attention must be paid to the impressions needed to obtain the study casts to ensure that the information is transmitted faithfully to the laboratory. ”

## 5. Facial references



“ The easiest way to transfer this canting of the midline to the laboratory is to draw two lines on the intraoral photograph. First, a horizontal line should be drawn parallel to the pupillary line. Second, a midline should be drawn, preferably perpendicular to the horizontal line. The two same lines are then drawn on the study cast. ”

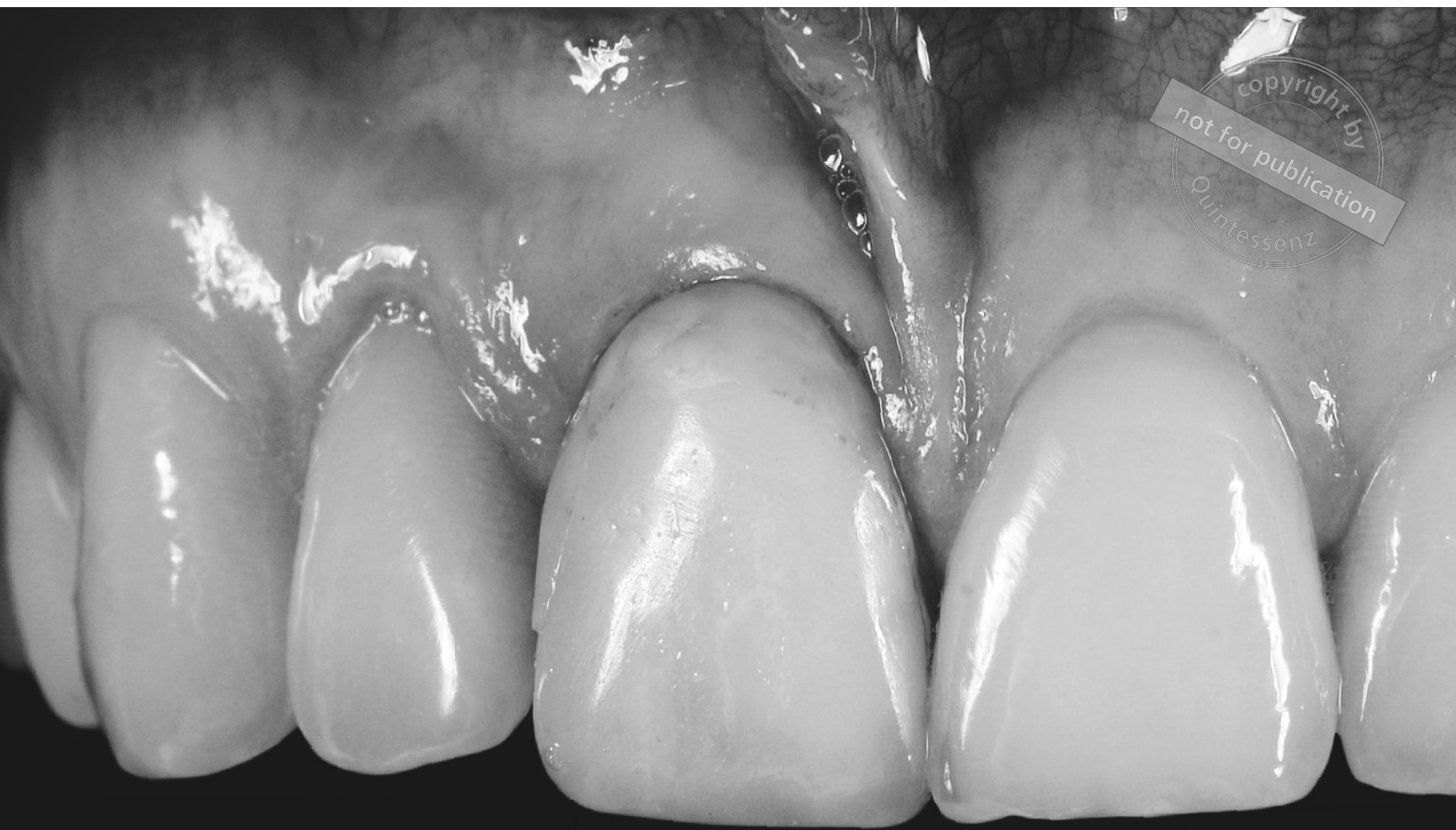








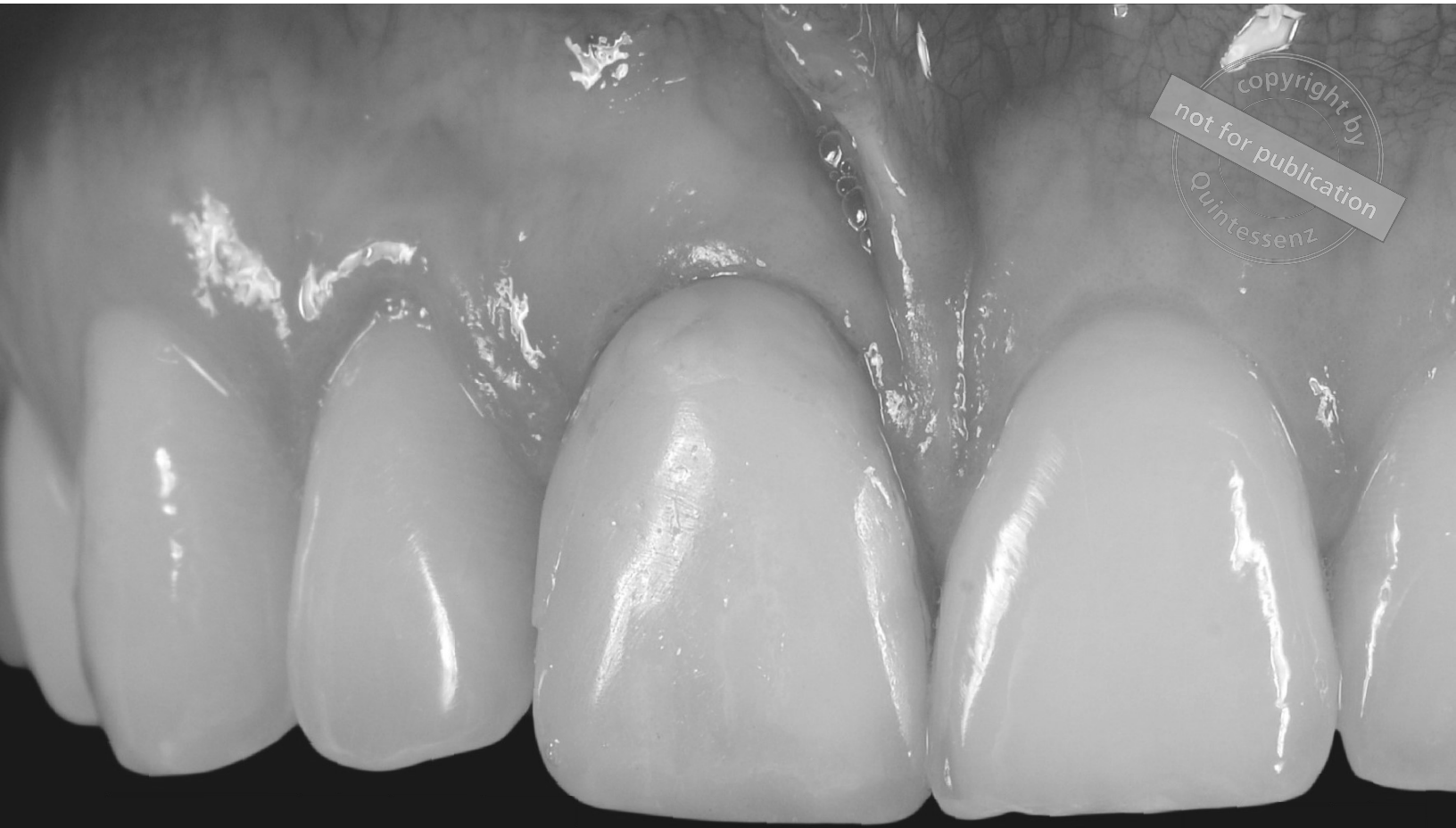
Nonsurgical soft tissue  
management  
**Reshaping 3D  
root configuration**





## Introduction

Historically, implant restorations were the first to benefit from the design-induced healing. Indeed, implants are always surmounted by prosthetic parts that allow to model the peri-implant mucosa. These parts were initially premanufactured, resulting in standardized healing; with the introduction of cervical contouring by Bichacho, we began to produce individualized parts based on a working model with the desired modifications and were thus able to model and measure the peri-implant tissues. These modifications were in most cases purely subtractive at the tissue level, but we began to understand the effect of subtractive techniques at the level of the designs themselves and understood that we could work with the tissue in both directions: a subtractive technique at the level of the prosthetic element allows us to obtain a gain of gingival volume and a displacement of tissues in the coronal direction, whereas an additive technique at the level of the prosthetic element (identical to the subtractive technique carried out on the model during cervical contouring) causes a decrease of gingival volume and tissue displacement in an apical direction. The two clinical cases described in this chapter perfectly illustrate this treatment approach.

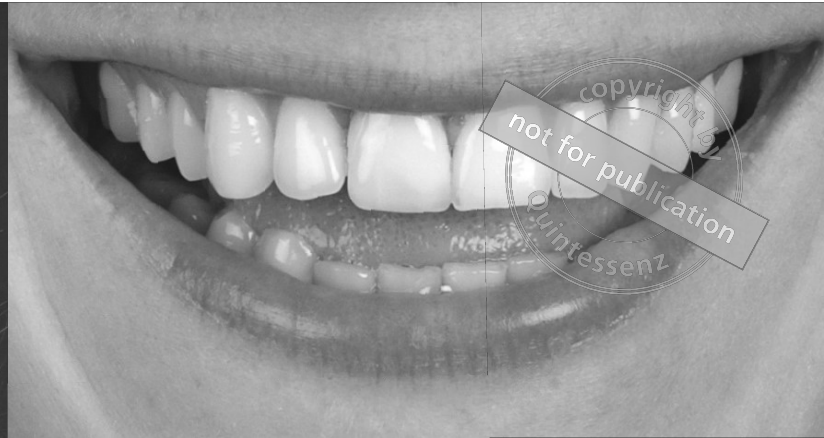


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## Clinical situation 1

This 27-year-old patient was referred to us for replacement of her right maxillary incisor. She is particularly concerned about the mobility of her right incisor. She would also like to improve the esthetic aspect of her incisor but her first motivation is clearly not to remain without teeth. Her practitioner has already discussed the implant with her and she would like to avoid a transitional removable prosthesis as much as possible.



“ The observation always starts with the patient's face, then little by little we focus on smaller and smaller details. Relating the smile and the tooth display to the face of the patient is crucial for a proper smile design. ”



## Step one Observe

### Backgrounds

- 27-year-old woman
- Referred by her orthodontist
- Left central incisor planned for extraction

### Complaint

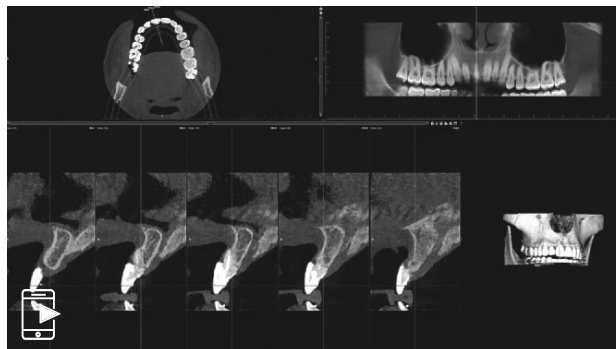
- Improve the esthetics
- Create balance and harmony in her smile

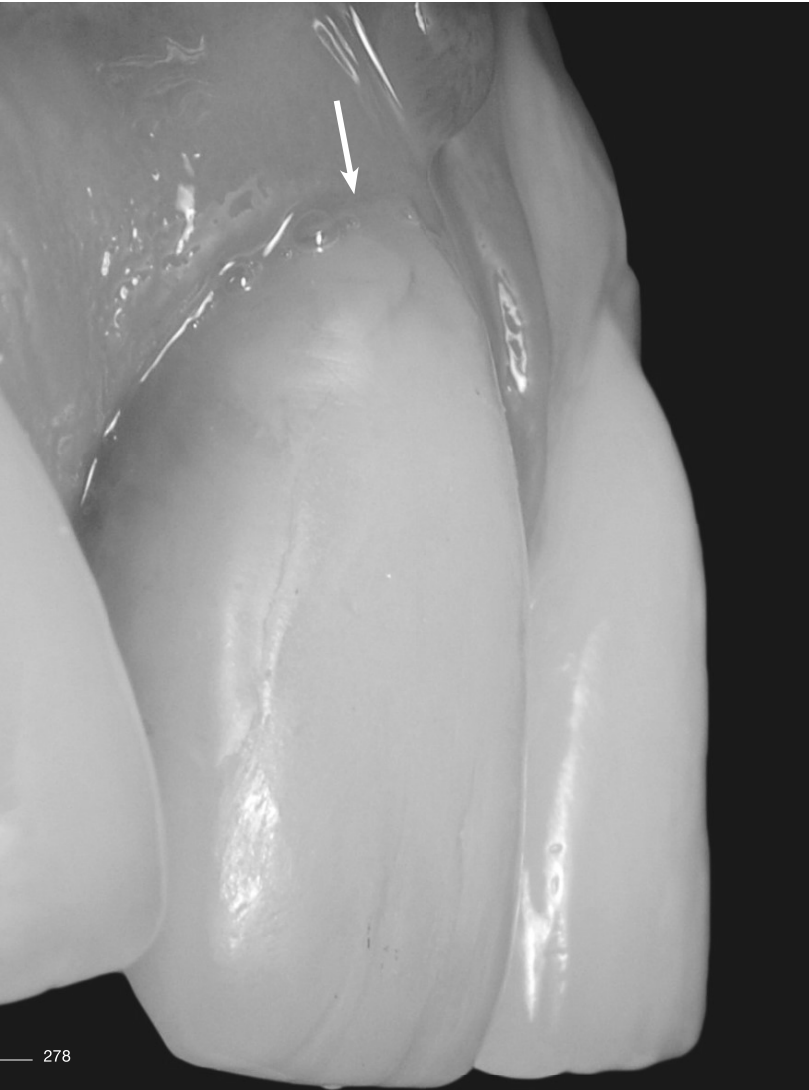
### Face

- Harmony: substantial canting of the maxilla
- Symmetry: deviation of the midline
- Skin

### Smile

- Forced smile, physiologic rest
- Lips
- Teeth: discrepancies in shape and size of the incisors





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Altering the gingival profile and contour







## Step two

# Altering the gingival profile and contour

On closer examination, we can see that the patient has a recession on the right maxillary lateral incisor, the necks of the two central incisors have shifted, and we can note a deficit of vestibular tissue on the right maxillary central incisor, as well as a thickness defect on its distal papilla. Starting treatment with these parameters, it is risky to fix a defect at the time of extraction and it is also risky not to locate the

implant platform at the right level in the vertical plane. It is therefore essential in this type of situation to start correcting the periodontal environment even before extraction by reworking the dental substrate. This is an extremely simple procedure from a technical point of view and this 3D reconfiguration of the emergence of the tooth will allow an extremely important simplification of the situation.

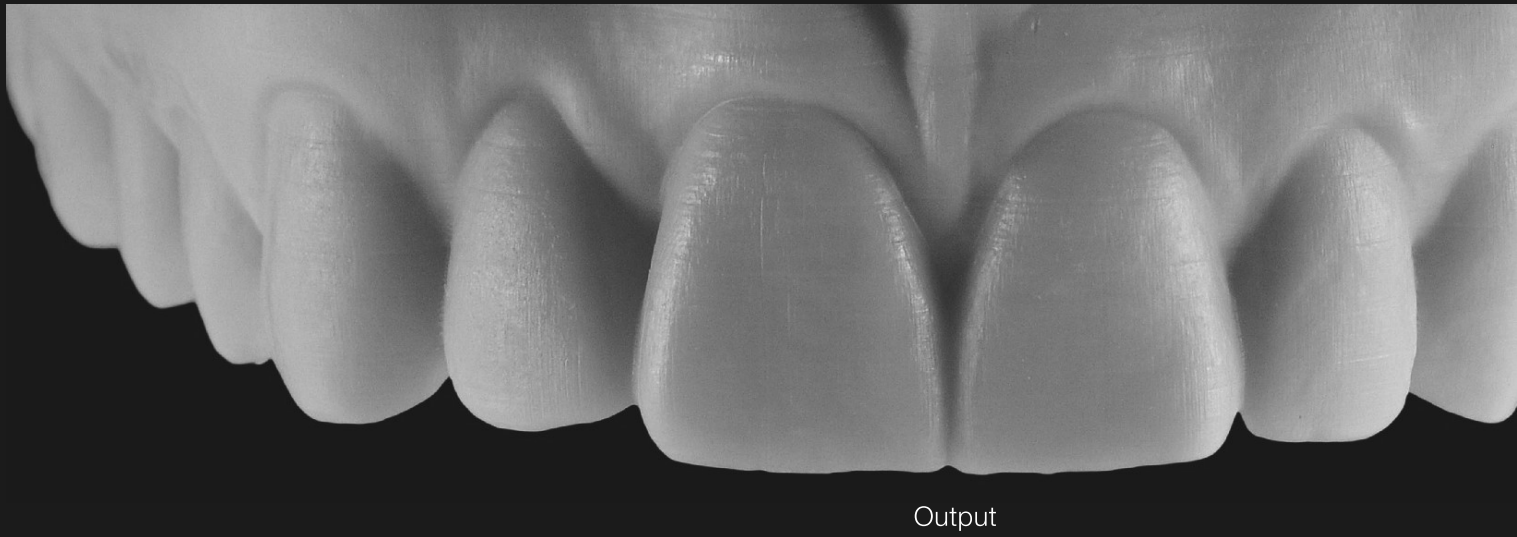
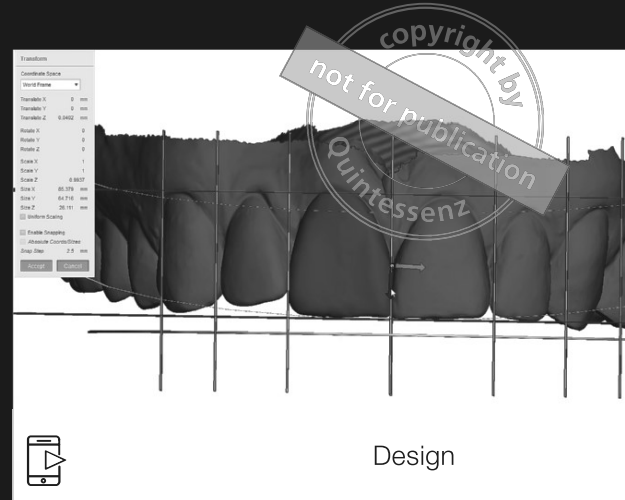
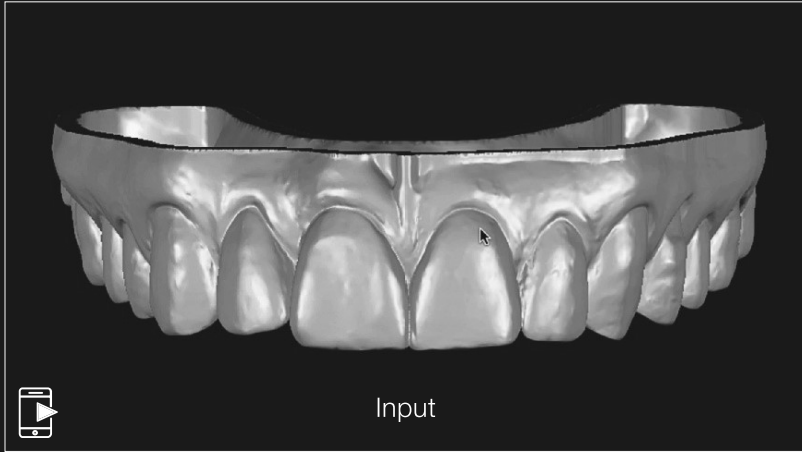
“ Visualizing the final design before performing any surgical or prosthetic procedure is key to success and will allow formulation of the right treatment plan for your patient. ”

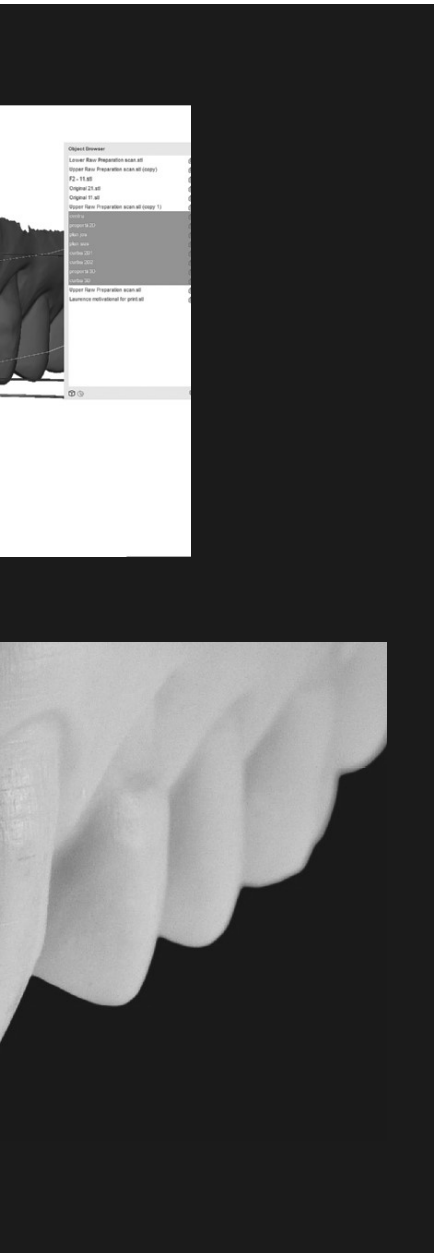
“ Altering the gingival profile and contour is an extremely simple clinical procedure that in some situations leads to a radical change in the clinical situation. Here, we can observe that the two necks of the maxillary central incisors are aligned and that the vestibular tissue deficit has also decreased; only the thickness defect at the distal papillary level remains. ”



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Step two

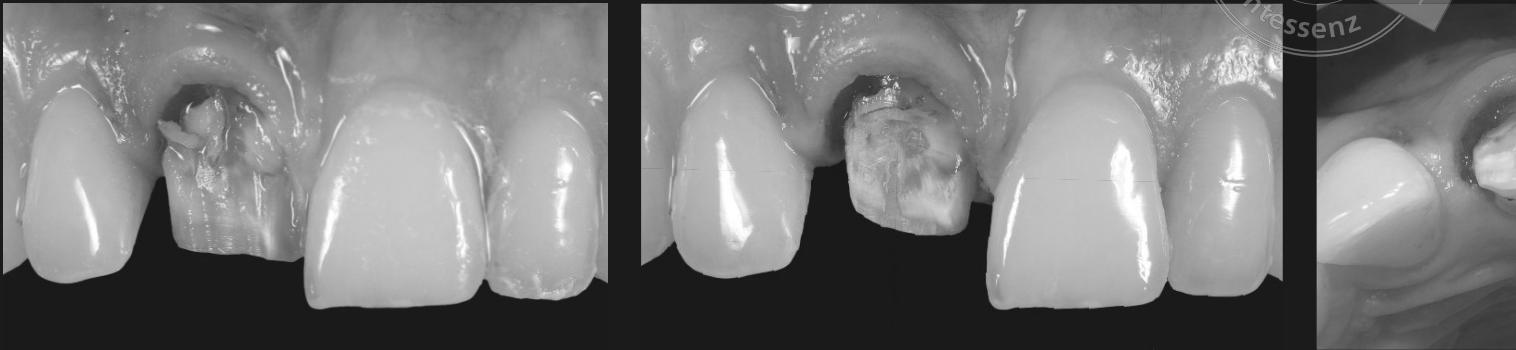
## Initial design

One of the major benefits of digital dentistry is the introduction of copy and paste dentistry. In situations where the goal is to integrate in the finest way with the existing environment, the ideal shape is at hand and is now extremely easy to reproduce. In this case, it is the shape of the left maxillary central incisor that can be easily selected and adapted to the site of the right maxillary central incisor. Quickly and efficiently, the laboratory technician can obtain

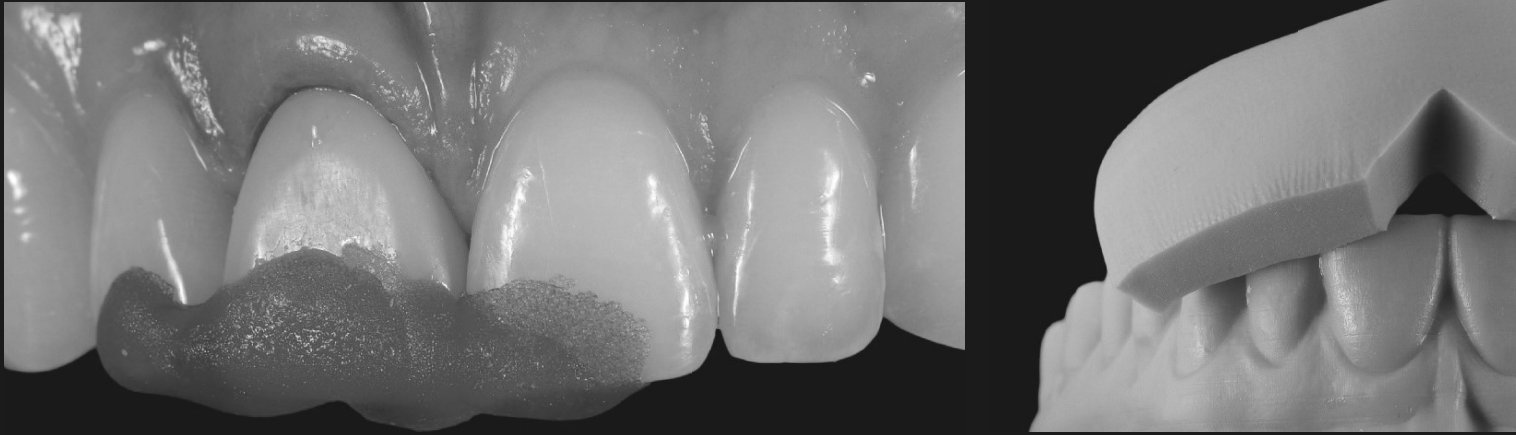
the ideal design for this tooth to be replaced, with the guarantee that it will easily fit into its new environment. The study of this design also determines the amount of tissue still missing around the tooth and will guide the connective tissue graft that will heal itself according to the established design. Once finalized, this ideal design can be printed and a silicone key will provide the ideal mock-up.

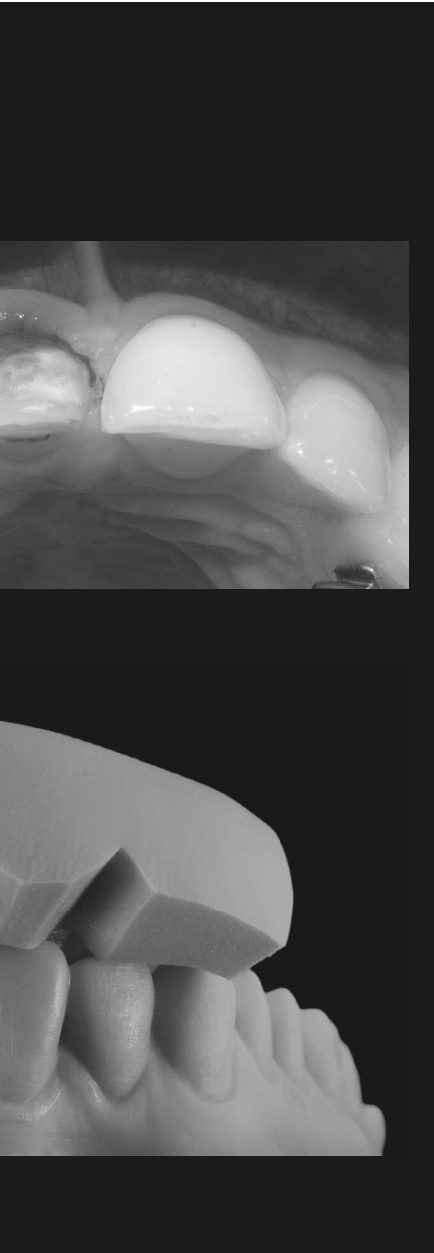
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Initial preparation and removal of composite



Ideal 3D position of periodontic–prosthodontic interface





## Step two Mock-up

At this stage, the composite is deposited and the tooth is roughly prepared with the sole objective of providing sufficient space for the mock-up. The mock-up is made using the silicone key created on the printed model, and good integration of the final design is validated.

A Duralay resin index is made, which allows the prosthetic tooth to be repositioned in an exact 3D position during the extraction and implantation procedure. Another way to do this would have been to have a provisional made with distal and mesial fins for temporization at the implant stage.

“ Visualizing the final design before performing any surgical or prosthetic act is key to success and will allow you to right treatment plan for your patient. ”

## Tips and tricks





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“ The key made of Duralay resin allows us to keep all the information of the 3D position of the temporary tooth; thus, all the benefits of the ideal design will be transferred to the temporary tooth on the implant. ”

Eric Van Dooren | Florin Cofar  
Victor Clavijo | Gustavo Giordani | Venceslav Stankov



# Interdisciplinary Esthetic Dentistry

# —synergies

**Optimising  
complex cases**

Volume 2

The  
**big**  
Picture



## Interactive videos

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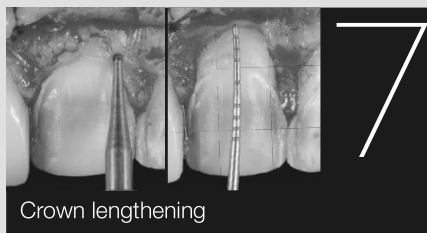
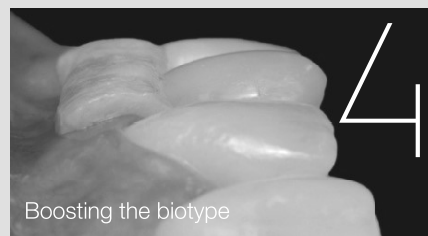


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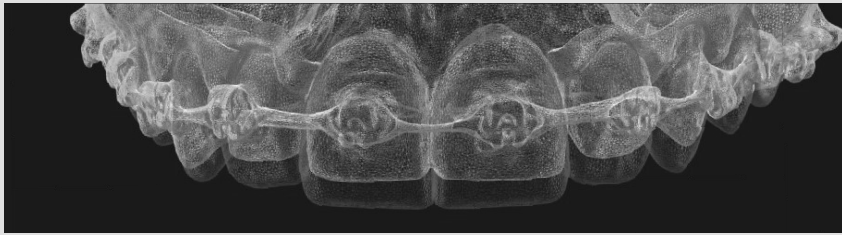
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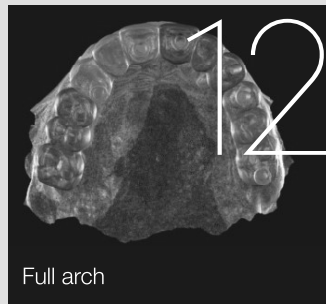
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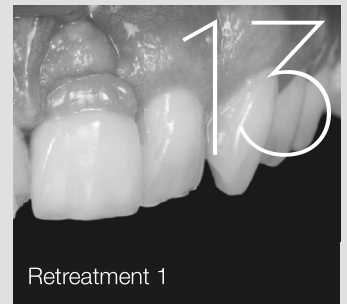
Delaying implant



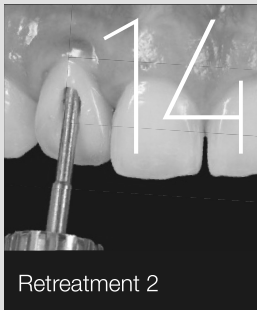
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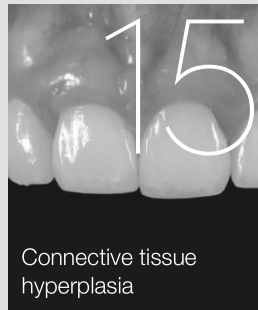
Full arch



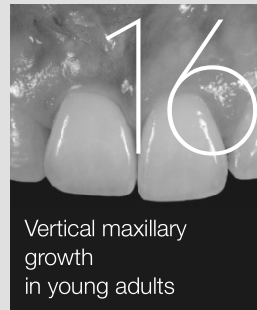
Retreatment 1



Retreatment 2



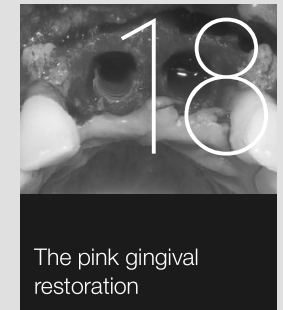
Connective tissue hyperplasia



Vertical maxillary growth in young adults



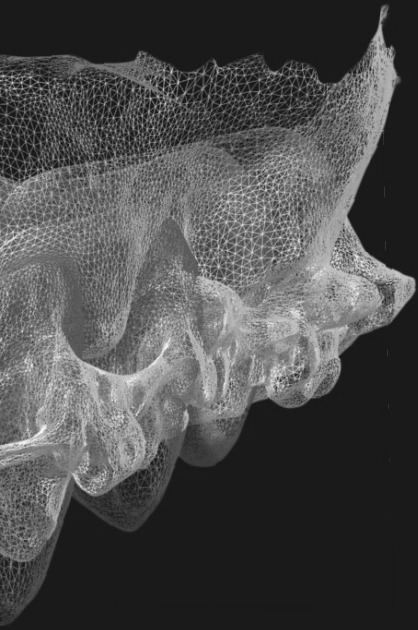
Vertical maxillary growth and implant removal



The pink gingival restoration



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# Orthodontics considerations





# Interdisciplinary orthodontics classes

This classification is meant to help define the goal of an interdisciplinary treatment that requires orthodontics. The classification can be applied at the level of a full treatment, an arch, or even a tooth.

It is a decision based on what is more important between the following four choices:

- the optimal tooth position of the natural tooth;
- the optimal position of the future restored tooth;
- the architecture of the papillae of the future restored tooth;
- moving the entire dentoalveolar complex.



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Class I	<b>Dental</b>	Final esthetics or function or both can be achieved with or without minimum restorative treatment.	569
Class II	<b>Cementoenamel junction (CEJ)</b>	Final esthetics or function or both cannot be achieved without restorative treatment.	659
Class III	<b>Bone levels</b>	Final esthetics or function or both cannot be achieved without restorative treatment; defects in the papillae or asymmetry or both are present.	695
Class IV	<b>Skeletal</b>	Final esthetics or function or both cannot be achieved without skeletal or surgical orthodontics.	797

---



# Class I



# Dental

## Aligning teeth

Class I is the default orthodontic treatment, which focuses on aligning the existing teeth, specifically their incisal edges. This is always the case when dealing with natural dentition and where no or very minimal prosthetics is planned.

This class has minimal interdisciplinary interactions and the main problem, whether it is esthetic, functional, or both, derives from misalignment of the existing teeth. However, teeth are intact, or with minimal damage, and no major skeletal issues or tissue defects are present.



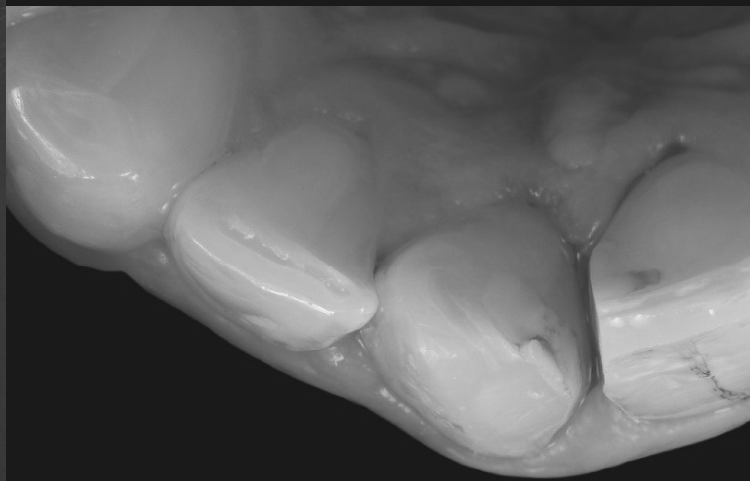


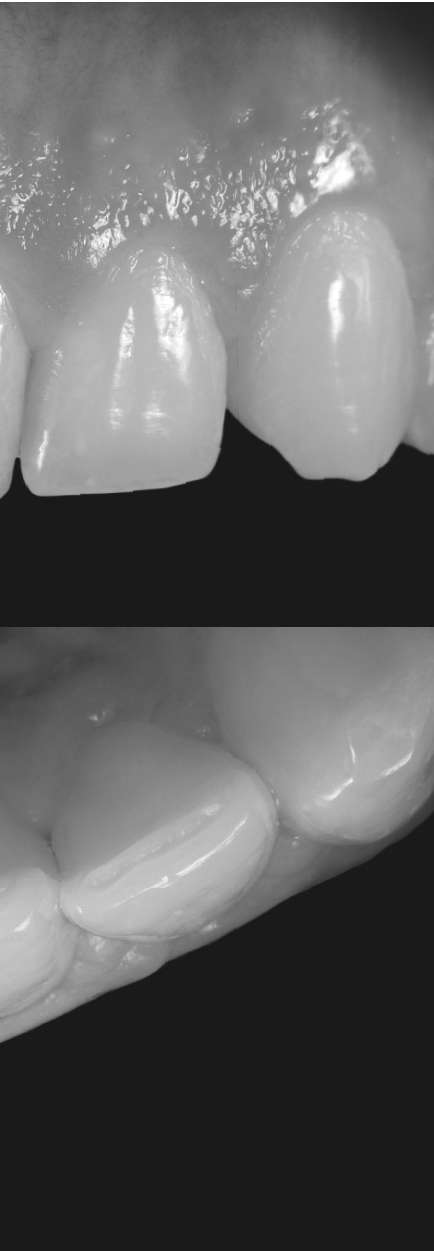
## Clinical situation 1

This 28-year-old patient consulted our practice with the aim of improving the aesthetics of her smile. She had undergone orthodontic treatment when she was very young, but it seems to have failed in all its objectives, and the patient is not at all happy with her aesthetic appearance.

The large crowding in the anterior teeth led her previous dentist to try to mask the problem with composites, but the result was even worse than the initial situation.

The majority of patients in this type of situation want a quick solution to their problems, because of the multiple treatments they have already undergone. In these cases, however, it's very difficult to solve the problem with a purely prosthetic approach, and it's often essential to resort to further orthodontic treatment to achieve the desired alignment. It is extremely interesting to understand the pragmatic and chronological approach to these complex situations.





## Step one

# Observe

### Backgrounds

- 28-year-old female
- Previous dentist tried to solve the problem with composite restorations

### Complaint

- Unhappy with esthetic appearance

### Face

- Deviation of the midline
- Bilateral buccal corridor could be improved
- Crowding of anterior teeth with lack of restorative space

### Smile

- Old composite restorations with marginal leakage
- Besides the composite restorations on the two central incisors, the patient has a virgin dentition
- Short interincisal papilla between the right and left central incisor because of lack of interdental space
- Root canal treatment on the right central incisor
- Convergent roots

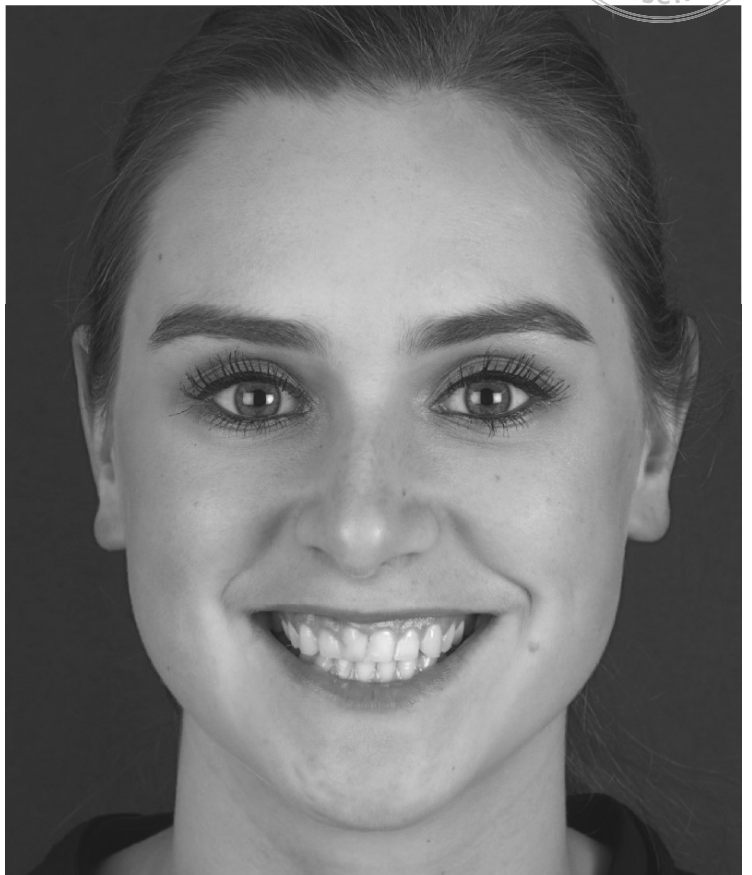


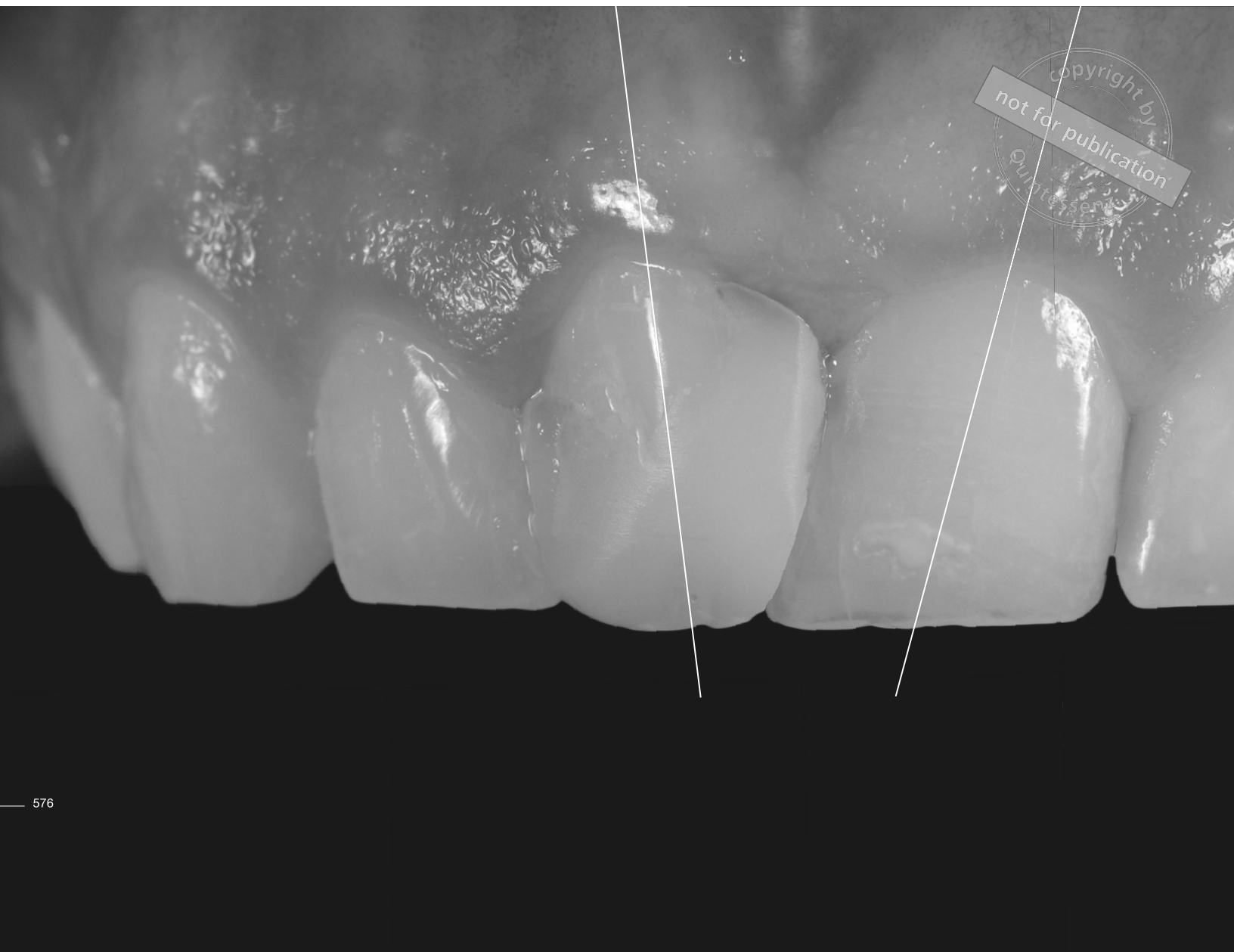
# Record

*Key elements for the development of the esthetic and functional treatment plan*



# 1. Extraoral photographs







## Step one Record

### 2. Intraoral photograph

- Frontal view perfectly centered to avoid any distortion
- Convergence of the centrals roots

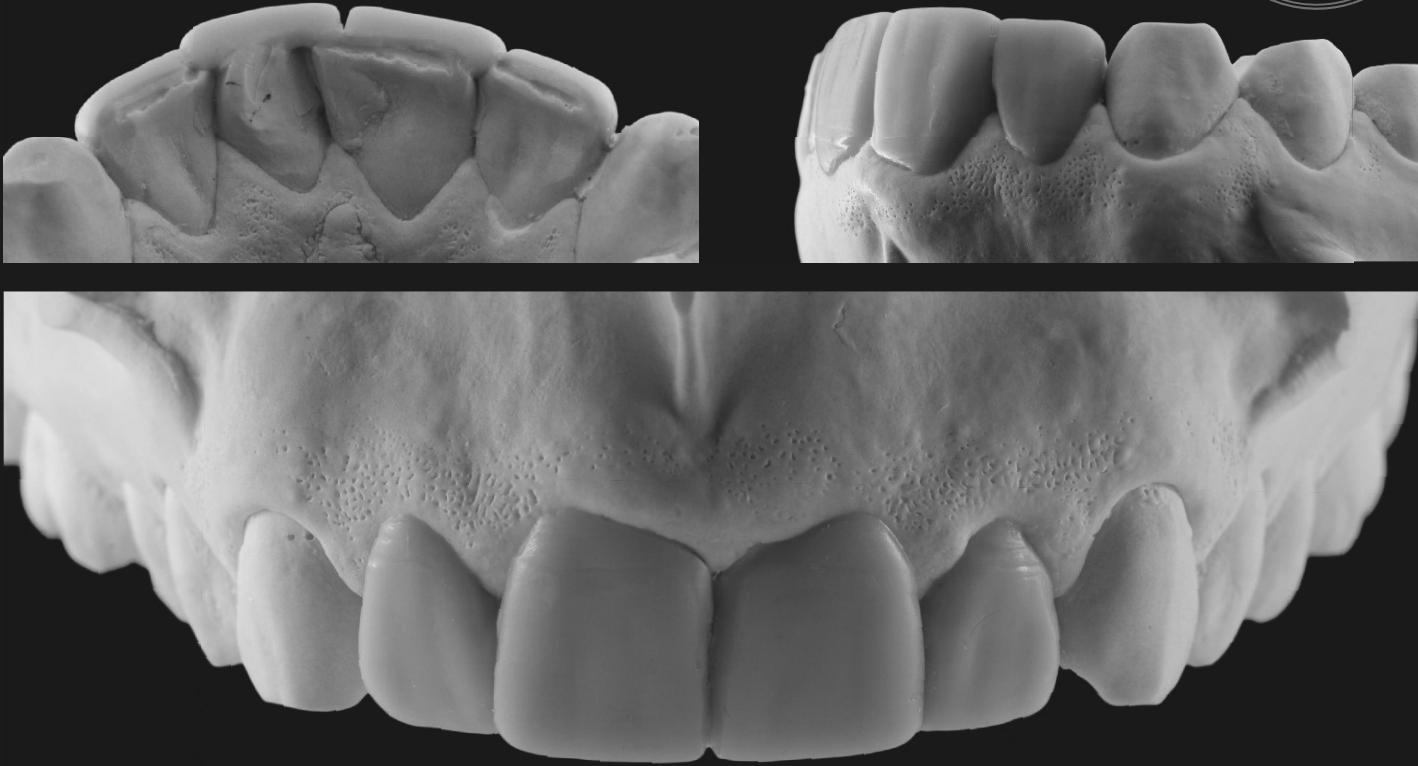
### 3. Intraoral radiographs

- Endodontic treatment on the right central incisor

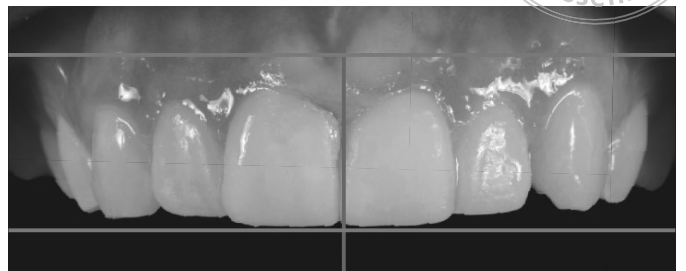
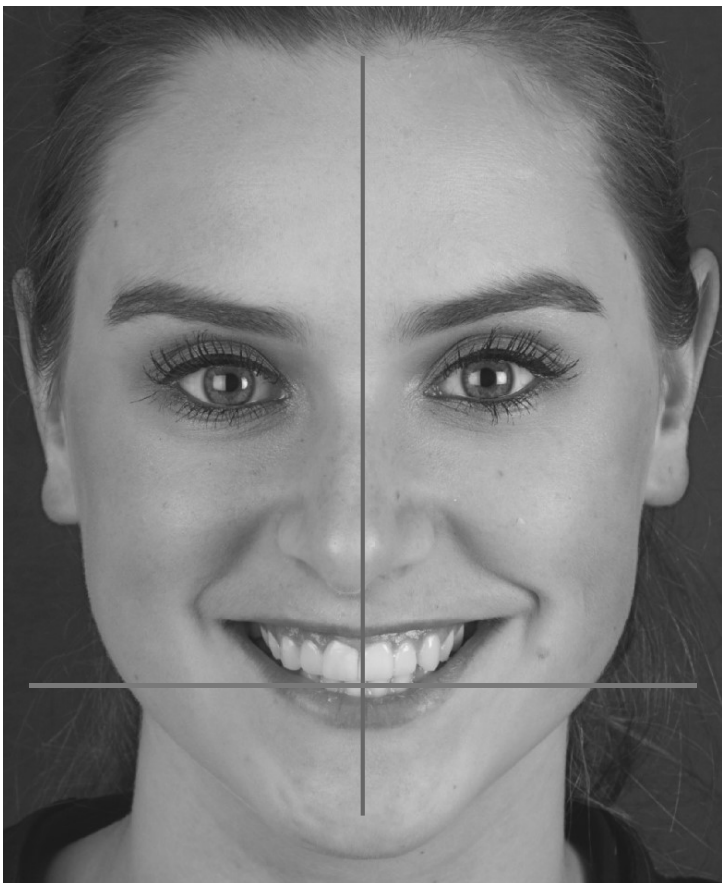


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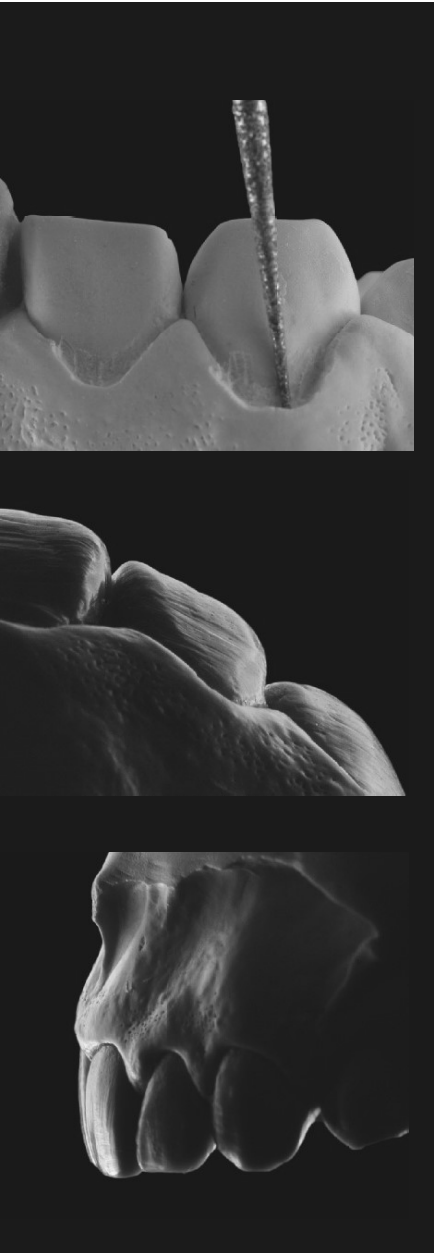
#### 4. Initial design



## 5. Facial references



“ A purely additive wax-up was made to obtain the patient's consent and to validate the need for orthodontic treatment. The wax-up was designed according to the facial reference lines. Already on the palatal view on the model with the wax-up, it is clear that without orthodontics, it will be impossible to obtain a harmonious and acceptable esthetic result. The mock-up allows the patient to visualize the final design even before starting any treatment and will result in a comprehensive interdisciplinary treatment plan. ”



## Step three

# Building the final project

The changes resulting from the orthodontic treatment were obvious and the restorative space was improved. The need for flapless crown lengthening on the right lateral incisor and canine can easily be simulated. A gingival reduction on the plaster model will allow the dental technician to make the ideal wax-up.

The detail that was not optimized when finalizing the orthodontic treatment was the space between the roots of the two central incisors. We will need that space to allow the papilla height to improve.

# Mock-up

## Visualize the project

Almost 1.5 years after the start of orthodontic treatment, the wax-up is transferred intraorally with a silicone key. This will allow us to visualize the final mock-up. This mock-up can only be inserted precisely after minor flapless crown lengthening on the right canine and maxillary lateral incisor. Validation of the project was obtained

from the patient after comparing the face pictures. On the basis of this mock-up, it was decided not to touch the left maxillary canine. The treatment plan consists of two crowns on the central incisors, two veneers on the lateral incisors, and a partial veneer on the right central incisor.



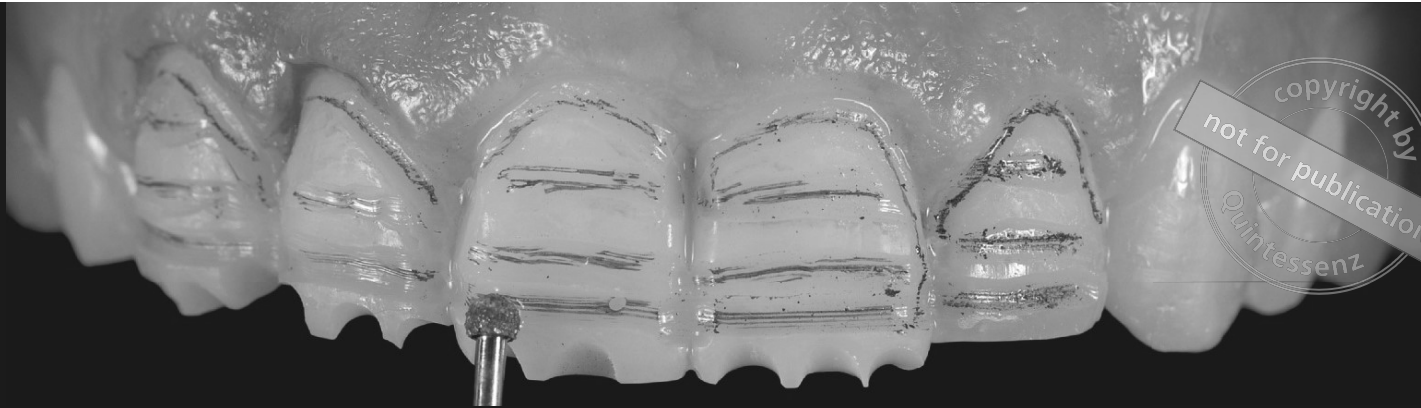
“ In the framework of treatment in analog mode, the first visualization of the final design, which is a reactionary design, occurs at best 1 or 1.5 years after the beginning of the treatment. ”



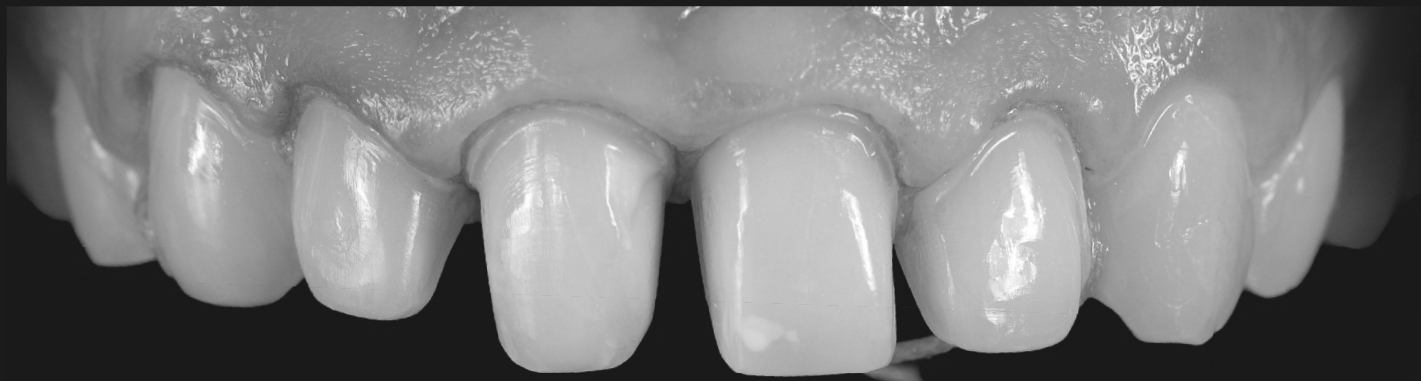
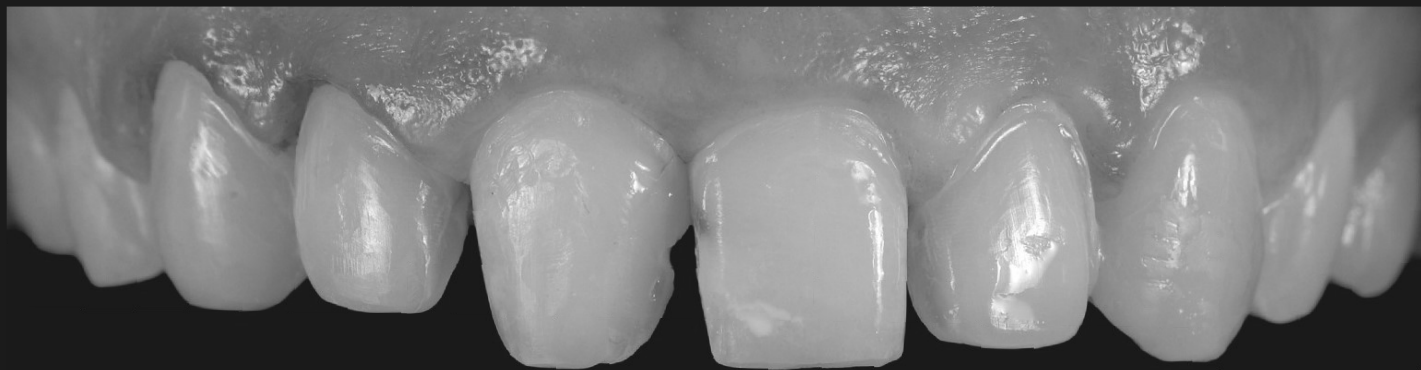


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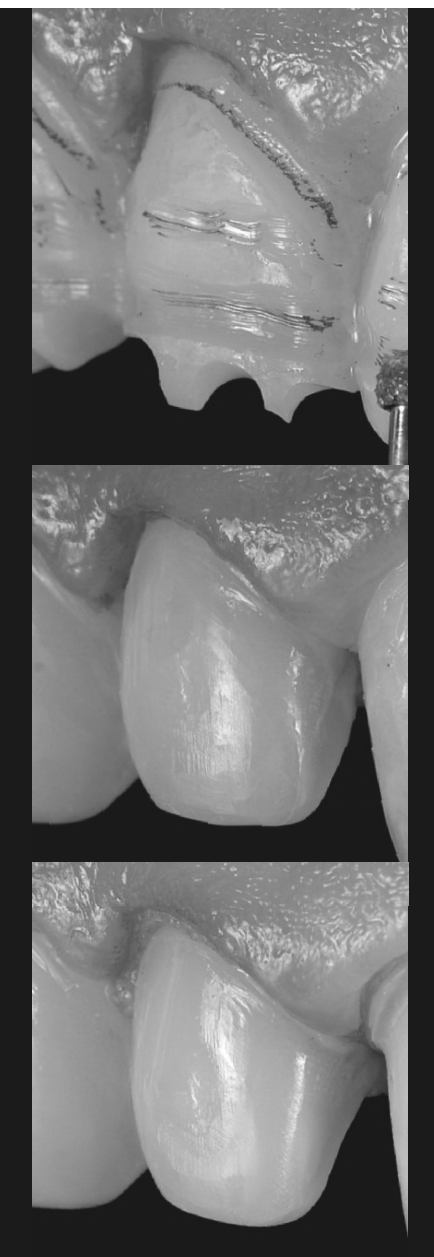


## Step four

# Final prosthetic rehabilitation

Final preparations are guided by the mock-up. Special attention is paid to the position of the prosthetic margins in relation to the marginal gingival levels determined by the mock-up, and must therefore take into account the crown lengthening procedure achieved on the right lateral incisor and canine. The initial preparation must follow the gingival contours and remain within 1 mm of them. Once the retracting cords have been placed, the clinician must take care to follow his or her initial line and not the distortions

caused by the retracting cords. Space is created between the roots of the two central incisors at the cemento-enamel junction, and the level of proximal preparation is related to the height of the future interdental papilla. Probing the bone level at this point is crucial in determining the level of preparation. Regeneration of the interdental papilla will then be guided by the prosthetic design of the future crown and the height created between the prosthetic contact point and the interdental bone level.

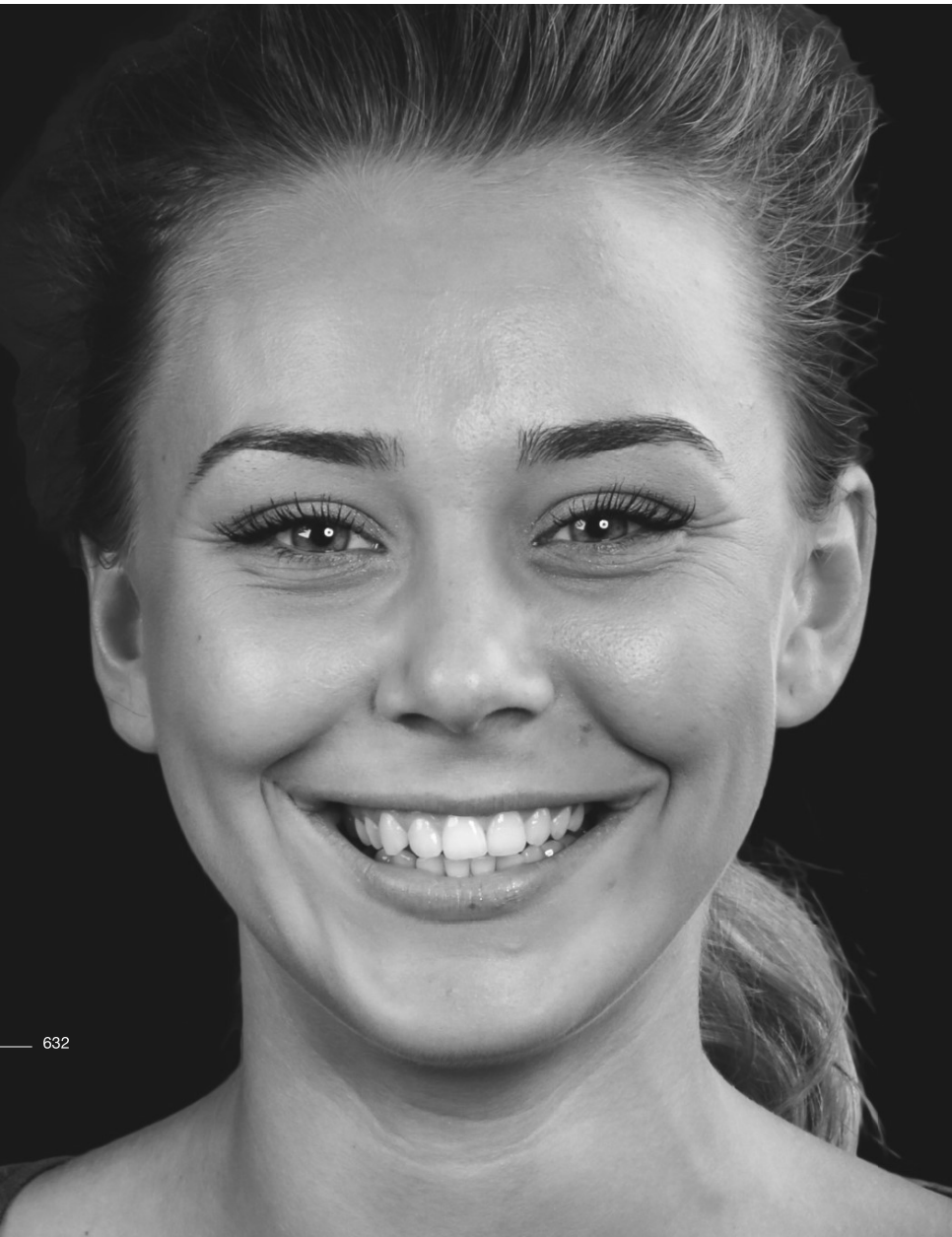




## Clinical situation 3

A 26-year-old female patient came to our practice for an esthetic consultation. She had a congenitally missing canine and a significant smile asymmetry. Her chief concern was to balance the appearance of her smile, if possible in a minimally invasive way, preserving her natural appearance.

A restorative treatment may seem like an alternative at first glance, but it is far from ideal, as it would not address the patient's main concern, namely the midline shift. In addition, it would violate her second concern, namely the minimally invasive nature of the procedure. In view of all the above, orthodontic treatment becomes mandatory to achieve the treatment objectives.





## Step one Observe

### Backgrounds

- 26-year-old female
- Referred for veneers

### Complaint

- Balance smile
- Minimally invasive treatment

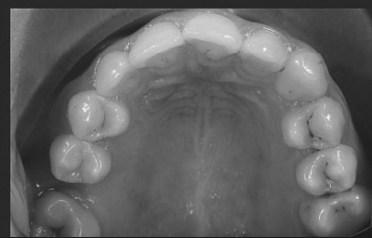
### Face

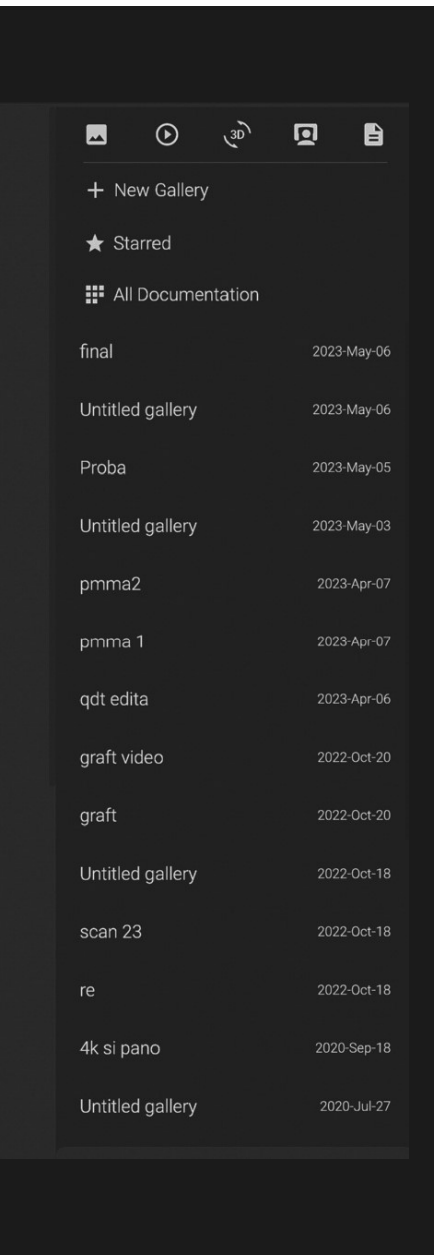
- Significant smile asymmetry
- Significant midline shift

### Smile

- Periodontally healthy
- No functional pathology
- Congenital missing canine

☰ 2014.07.14 ...





## Step one Record

Standardized records are a prerequisite for interdisciplinary cases. Ideally, the records should include the standard information for all the specialties involved, which will create a common perspective of the problems between specialists, as well as saving the patient unnecessary trips. While using a centralized collaboration platform such as Smilecloud, access to data can be instantly granted to the people involved in treating the case.



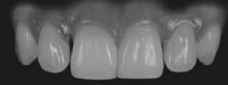
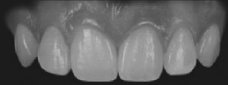
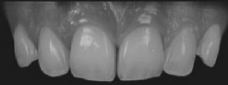
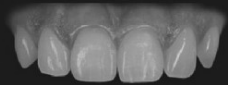
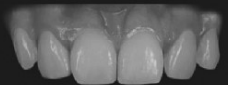
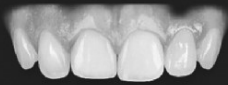




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## Step one Analyze

The scope of the smile design process in this case is to help the orthodontist plan the treatment according to the face. Smile design is equally relevant for orthodontic treatment as it is for prosthetic treatment, if not more relevant. In this scenario, the esthetic success of the treatment depends on correctly planning the relationship to the face. This is a perfect example of a class I interdisciplinary case, in which the orthodontist will focus on aligning the incised edges, as little to no restorative treatment is planned in this case.



Eric Van Dooren | Florin Cofar  
Victor Clavijo | Gustavo Giordani | Venceslav Stankov



# Interdisciplinary Esthetic Dentistry

# \_complications

**Retreatments  
and maintenance**

The  
**big**  
Picture

Volume 3



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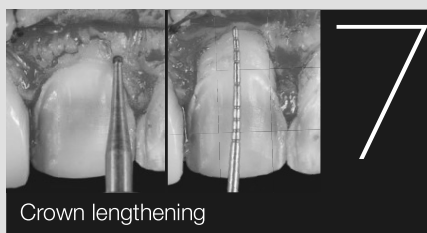
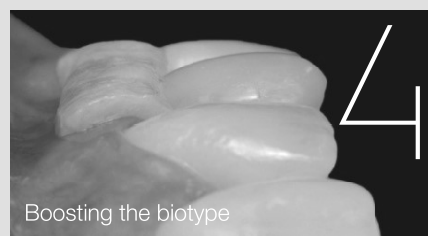
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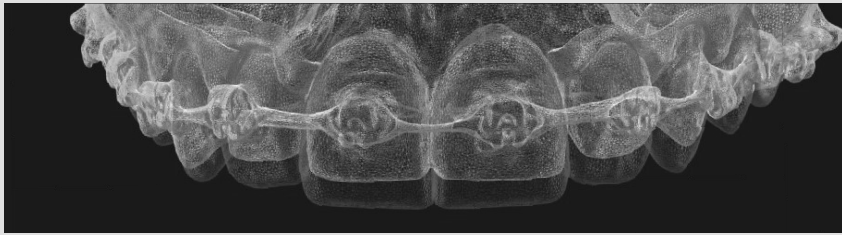
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**\_synergies** Optimising complex cases – Volume 2



Orthodontics considerations

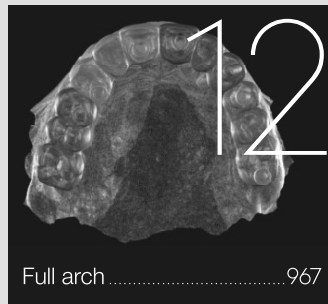
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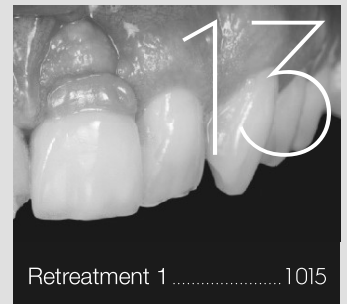
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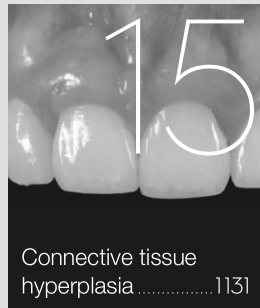
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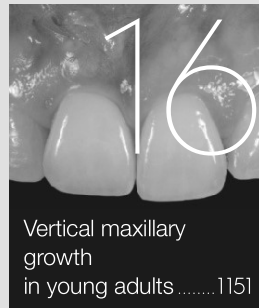
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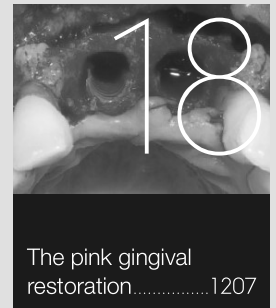
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## Step one Observe

### Backgrounds

- 22-year-old male
- Dental trauma 10 years ago with avulsion of the left central incisor

### Complaint

- Unesthetic appearance of the left central incisor

### Face

- Low smile line
- Infra-position of his left central incisor

### Smile

Cases of ankylosis have many characteristics in common with the long-term outcome in cases of implant placement in young adults with craniofacial growth:

- shorter crown (incisal edge);
- higher gingival margins than the adjacent teeth;
- thinner soft tissue around the ankylosed tooth;
- buccal position of the ankylosed tooth compared to the adjacent teeth;
- open contact points (more in the posterior teeth).

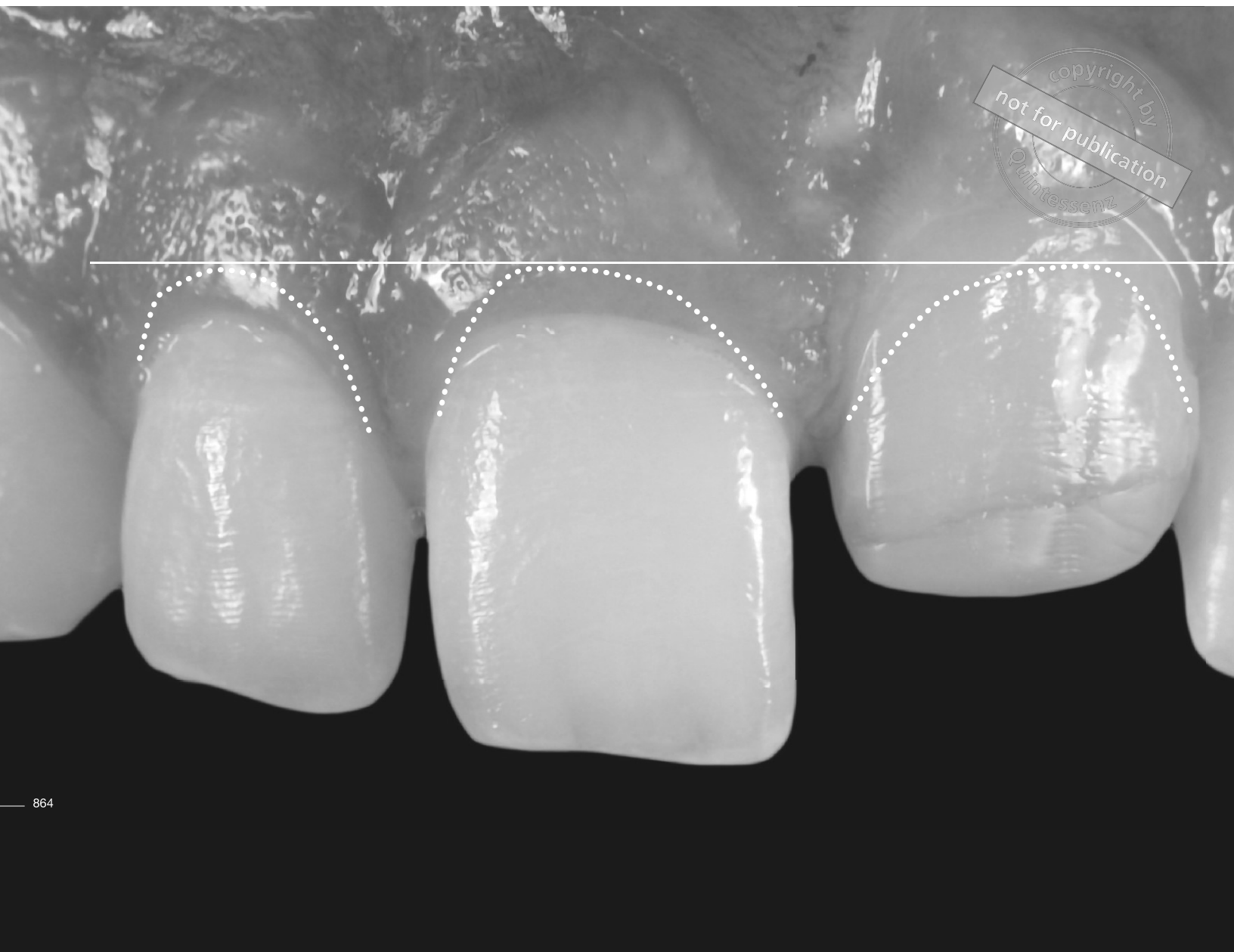
### Radiologic findings

- Even if there is a severely resorbed and short root, the tooth is still very stable.

“ Due to the process of continuous vertical maxillary growth, teeth and bone continue to grow whereas an ankylosed tooth or implant stays in place together with the surrounding dentogingival complex. ”









Step one

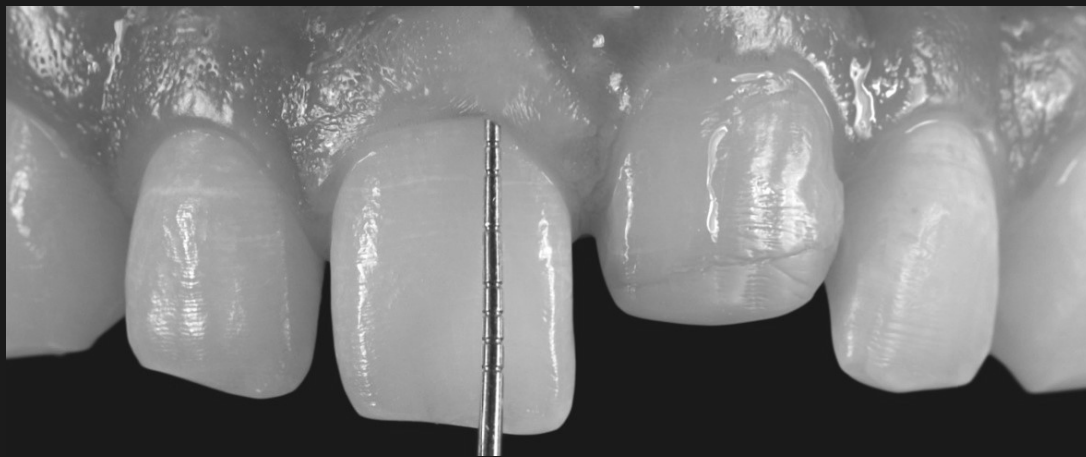
## Start with the end result in mind

In cases with vertical gingival defects, the most difficult part is to address the vertical component during the grafting procedure, in this case the grafting of the left central incisor, to create harmony in the gingival levels. In general, the rule is that we can graft and gain vertically as much as half of the height of the shortest papilla, in this case, the distal papilla of the left central incisor.

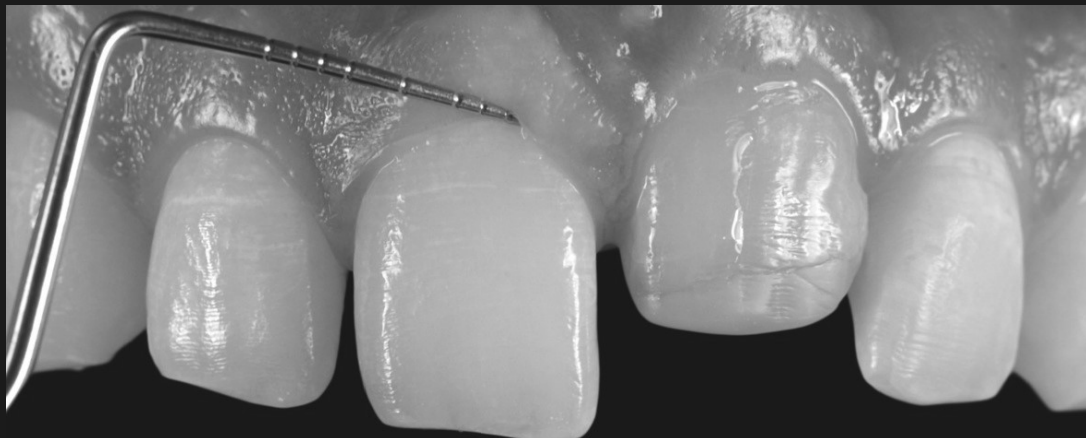
If we think in terms of the blood supply for the connective tissue graft, we need to be realistic in terms of our expectations. This is exactly why, when having a vertical defect, we always first evaluate the neighboring teeth. In this case, crown lengthening of the right central and right lateral incisor would allow us to compensate for the amount of connective tissue grafting that is needed.

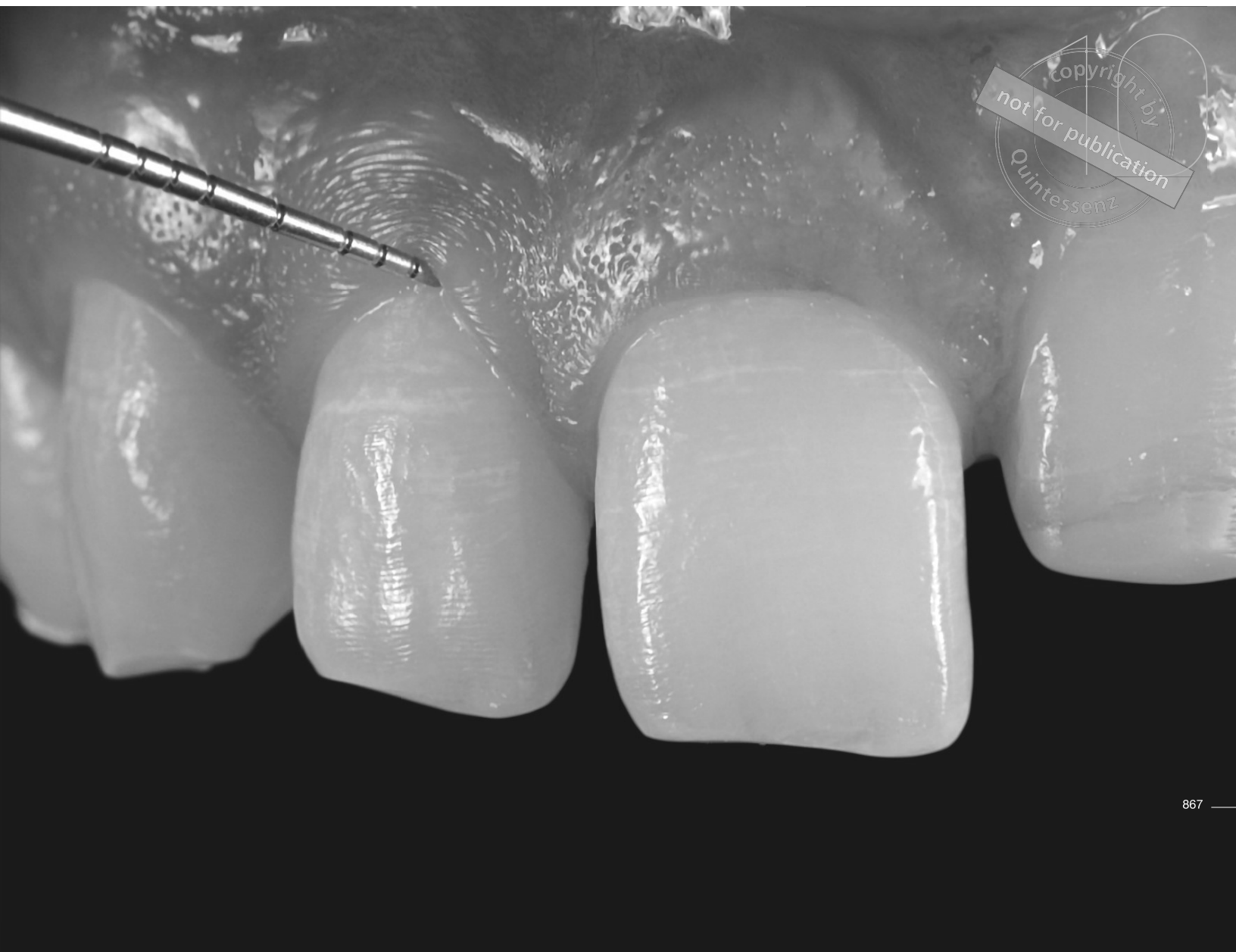
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## Periodontal evaluation



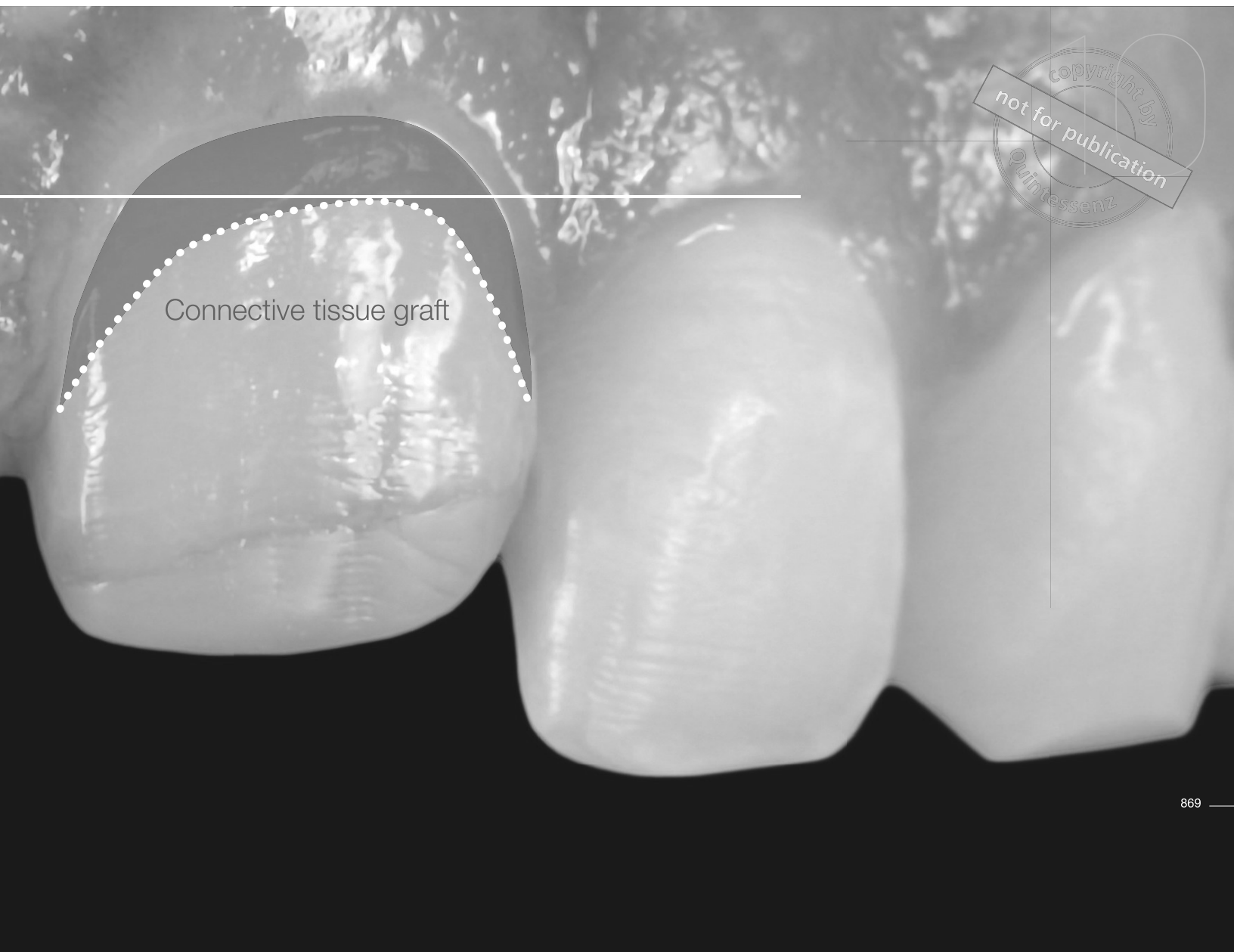
“ Precise probing and periodontal evaluation of the cementoamel junction and bone will give the clinician an idea of how much they can crown-lengthen the teeth and if flapless surgery is an option. ”





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Crown lengthening



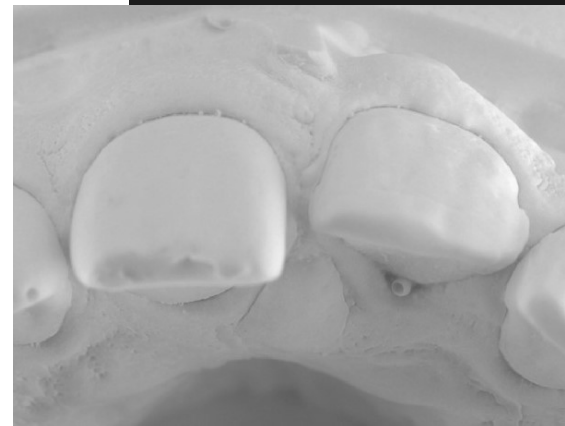
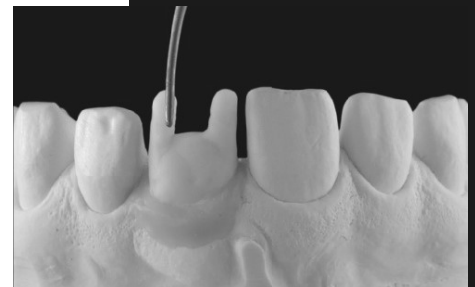
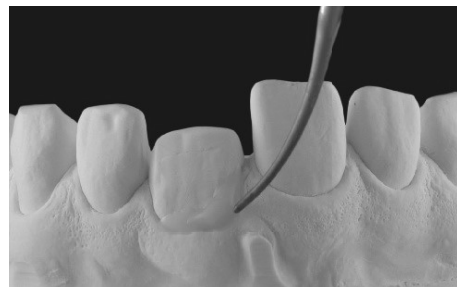
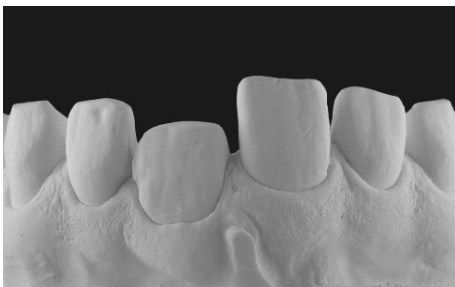
Connective tissue graft

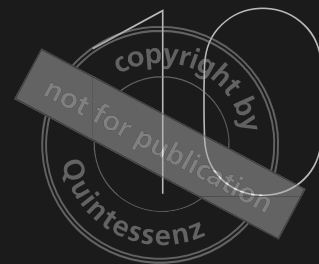
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## Step two Building the project

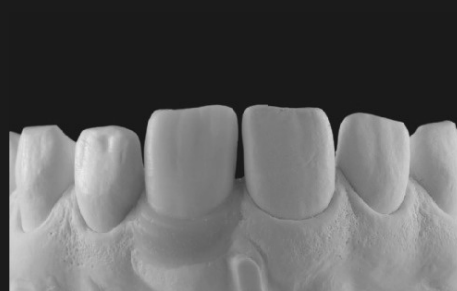
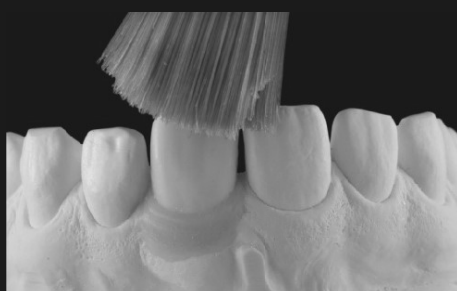
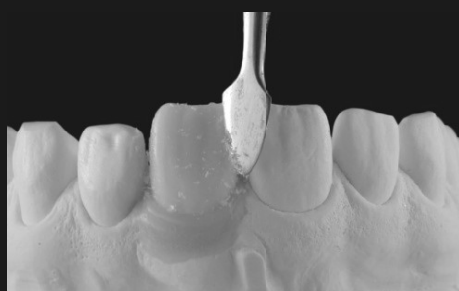
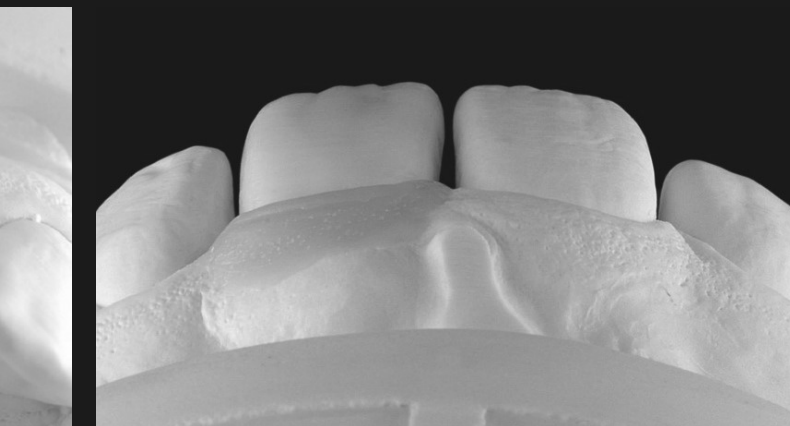
As the left central incisor is labially positioned, simulation of the correct tooth form and position is only possible after reduction of the tooth on the plaster model. The tooth and gingival volume are reduced because of this buccal position. It is important to simulate on the model the desired gingival augmentation in pink wax for two reasons:

- to verify that the planned augmentation is realistic and technically feasible;
- to reduce the existing tooth and make a wax-up of a tooth with a correct form, position, and especially a correct emergence profile of 10–15 degrees. Visualization of the emergence angle is only possible with the correct gingival profile in place.



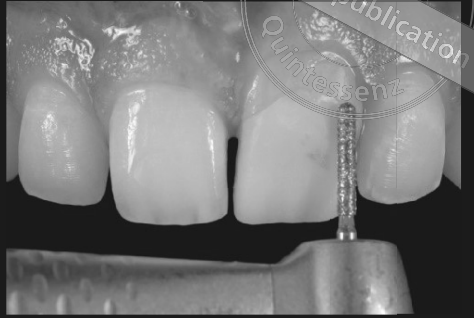


“ The evaluation of this emergence profile is extremely important because the emergence profile of the future tooth will guide the healing of the graft. ”





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“ The three-dimensional (3D) root configuration can easily be modified to fit the needs of the surgery and the optimal prosthetic configuration. ”

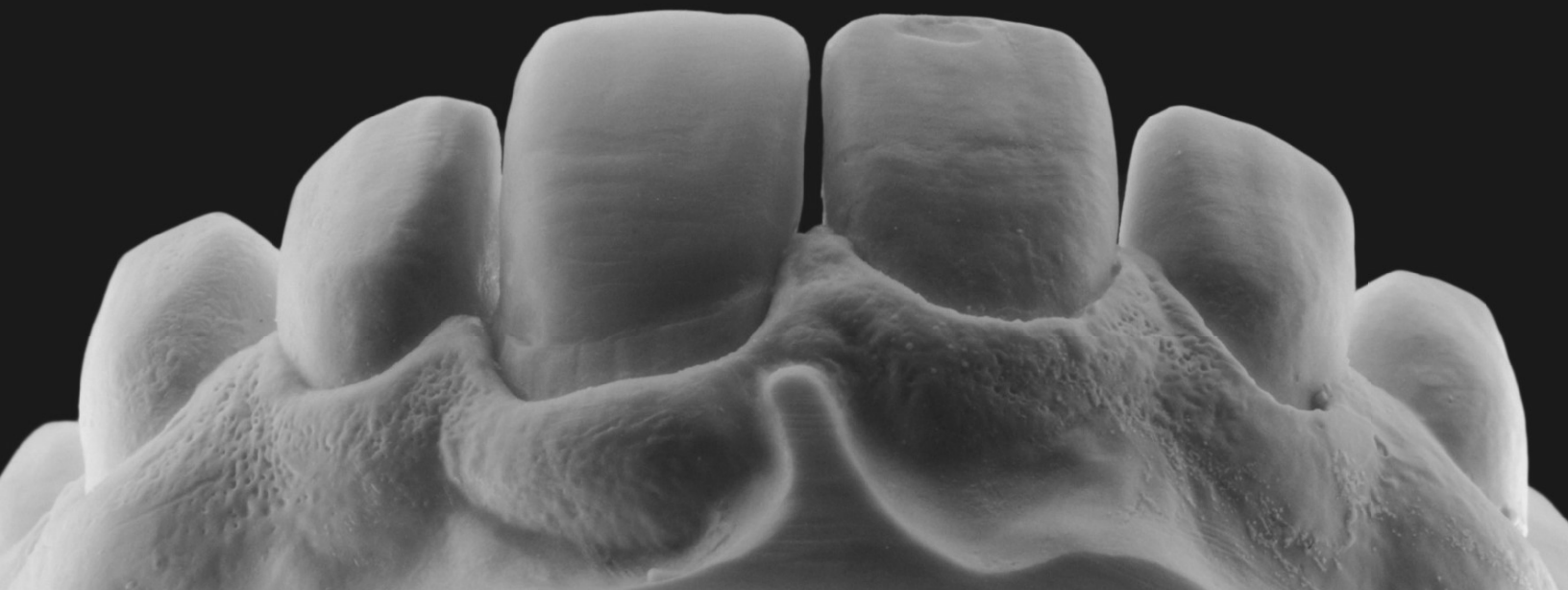
## Step three Preparations

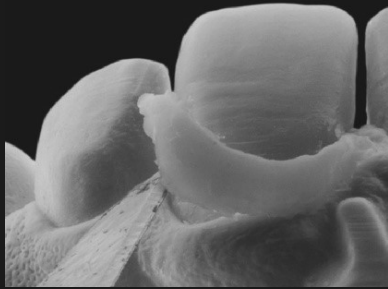
After crown lengthening of the right central and lateral incisors, a symmetrical preparation was performed on the left central incisor. Care was taken to have a correct zenith position and to open space between the left lateral central and lateral incisors. The opening of the distal space allows the coronal migration of the distal papilla. The buccal surface was reduced from the new preparation outline into the sulcus to

compensate for the buccal version of the tooth and to reduce the pressure on the marginal gingiva in preparation for surgery. Because of the reduced retention, but also because of the small amount of enamel remaining after removal of the old composite, a slight extra incisal anchorage was performed. Retraction cords were only needed for an accurate impression in the papillae areas.

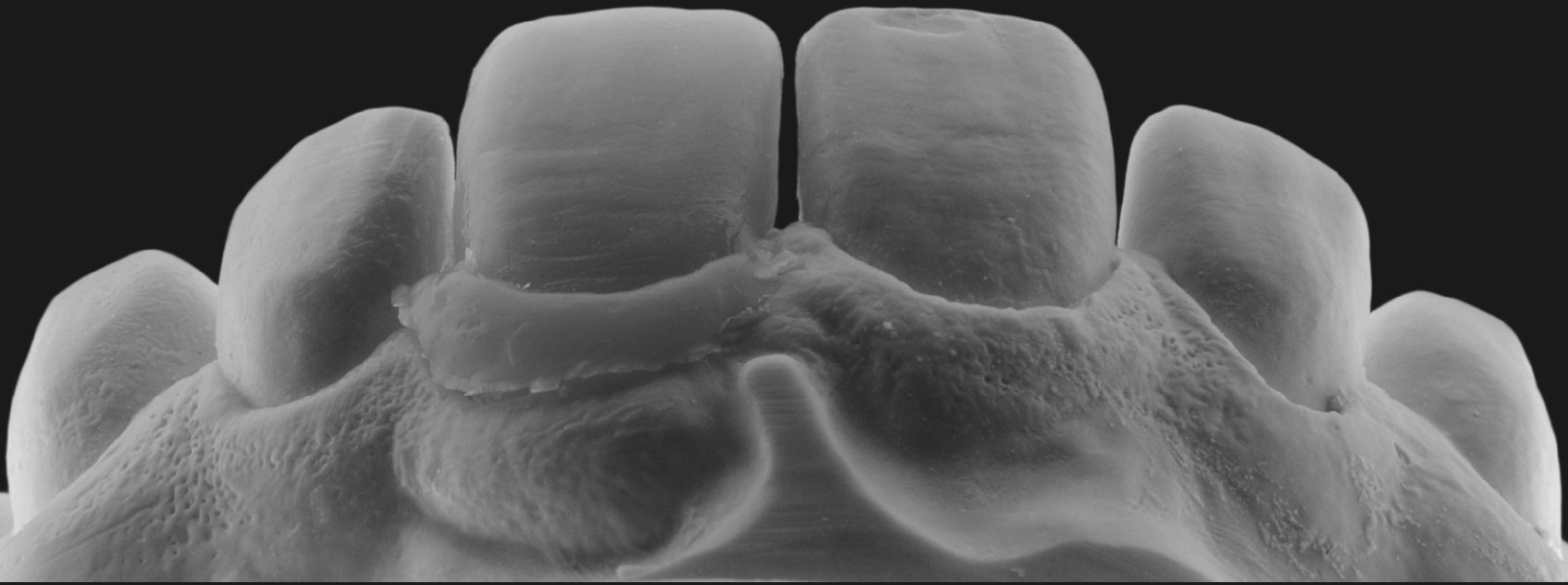


# Laboratory work





“ Special attention is paid to the emergence profile of the tooth. The removable pink wax-up allows us to visualize the root coverage procedure on the model and facilitates the evaluation of the wax-up. ”



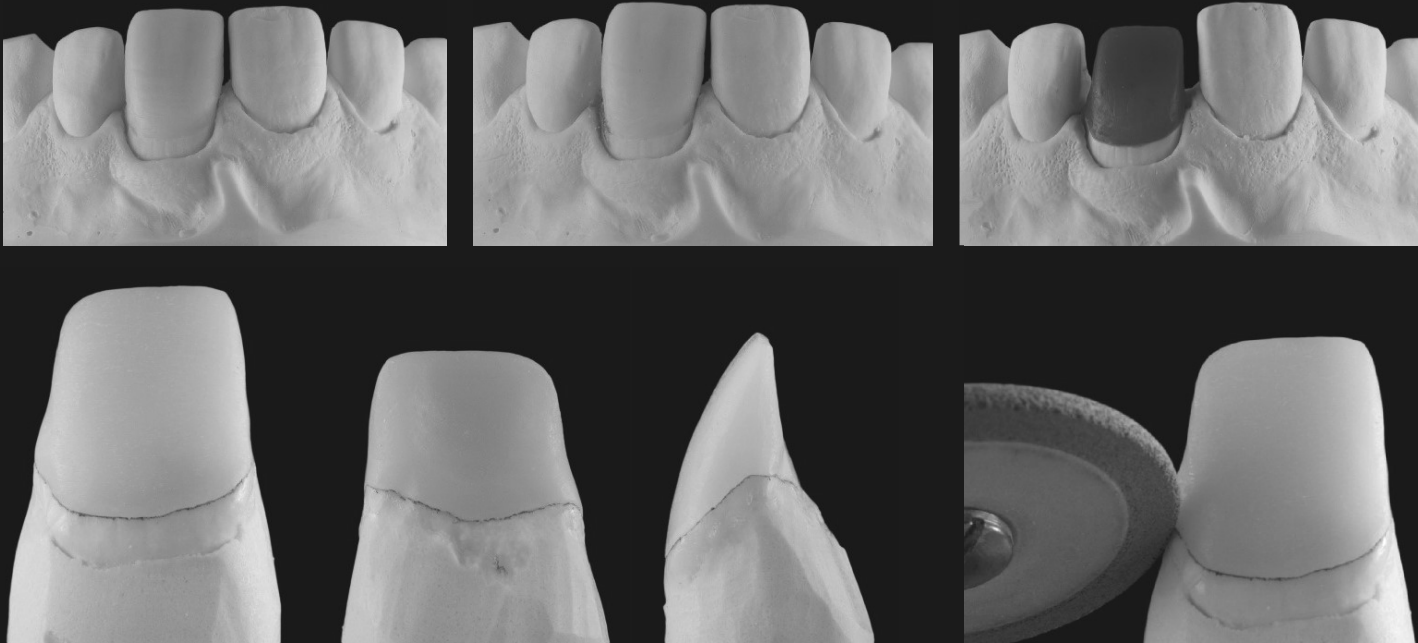
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# Laboratory work

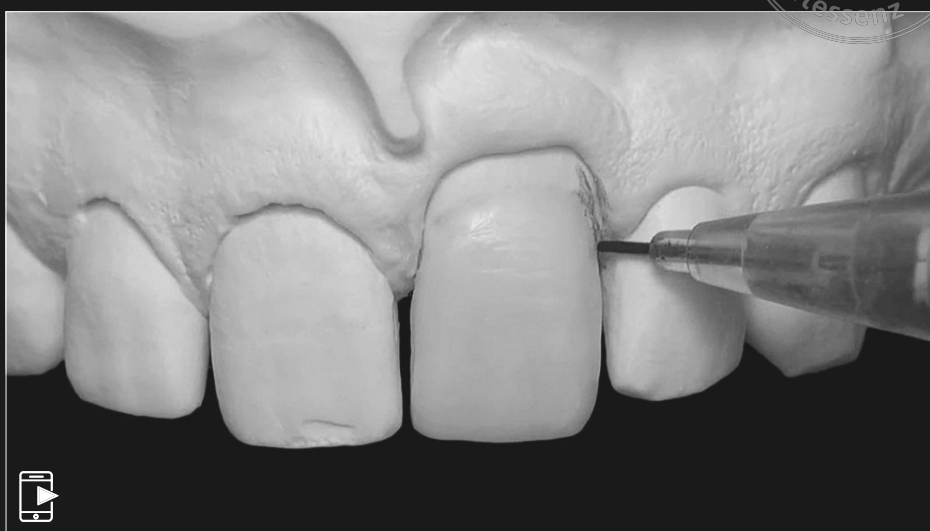
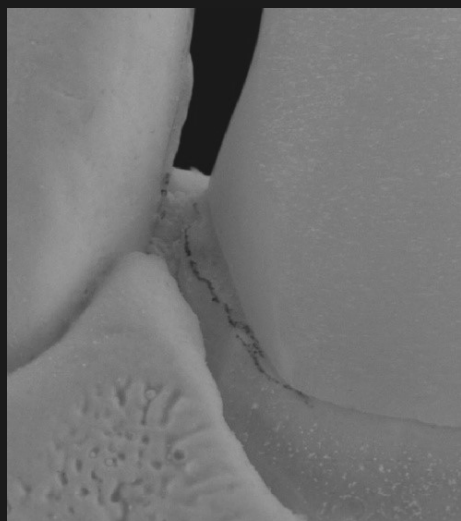
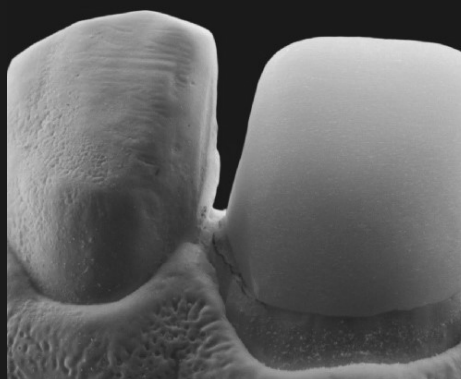
It is always possible to slightly reconfigure the root profiles on the working model and implement these when trying in the second bake of the crown before the final glazing. In this specific case, for example, insufficient space was provided for the papilla at the time

of preparation and the impression between the roots of the lateral and central incisors. As the position of the ankylosed tooth was distalized compared to the ideal wax-up, the technician simulated the ideal root recontouring on the model, removing the volume of the e.max

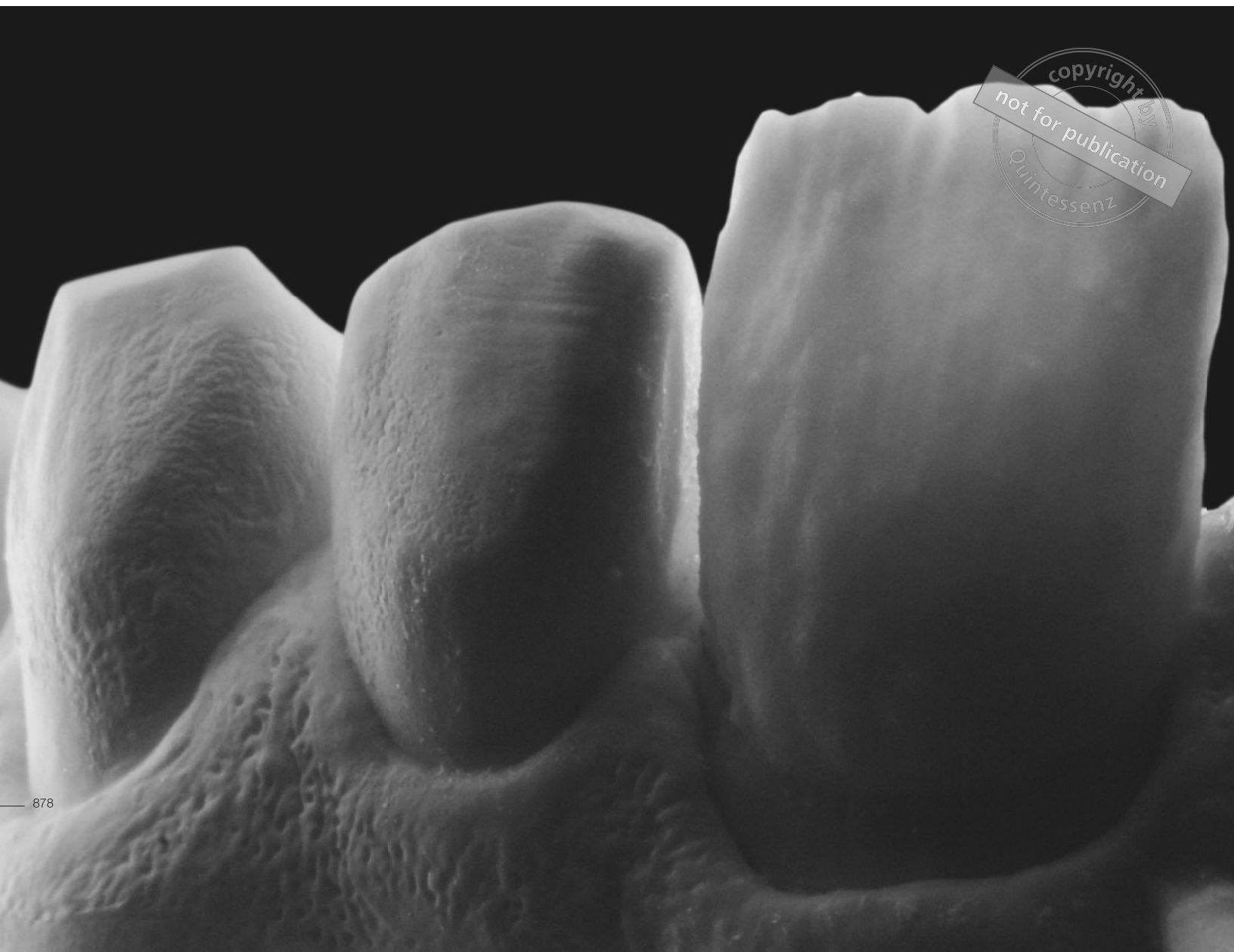
coping and plaster die exactly where the space was needed. Because the solid model does not allow us to copy the recontouring done on the individual die, the e.max crown will have a step between the coping and the original preparation.



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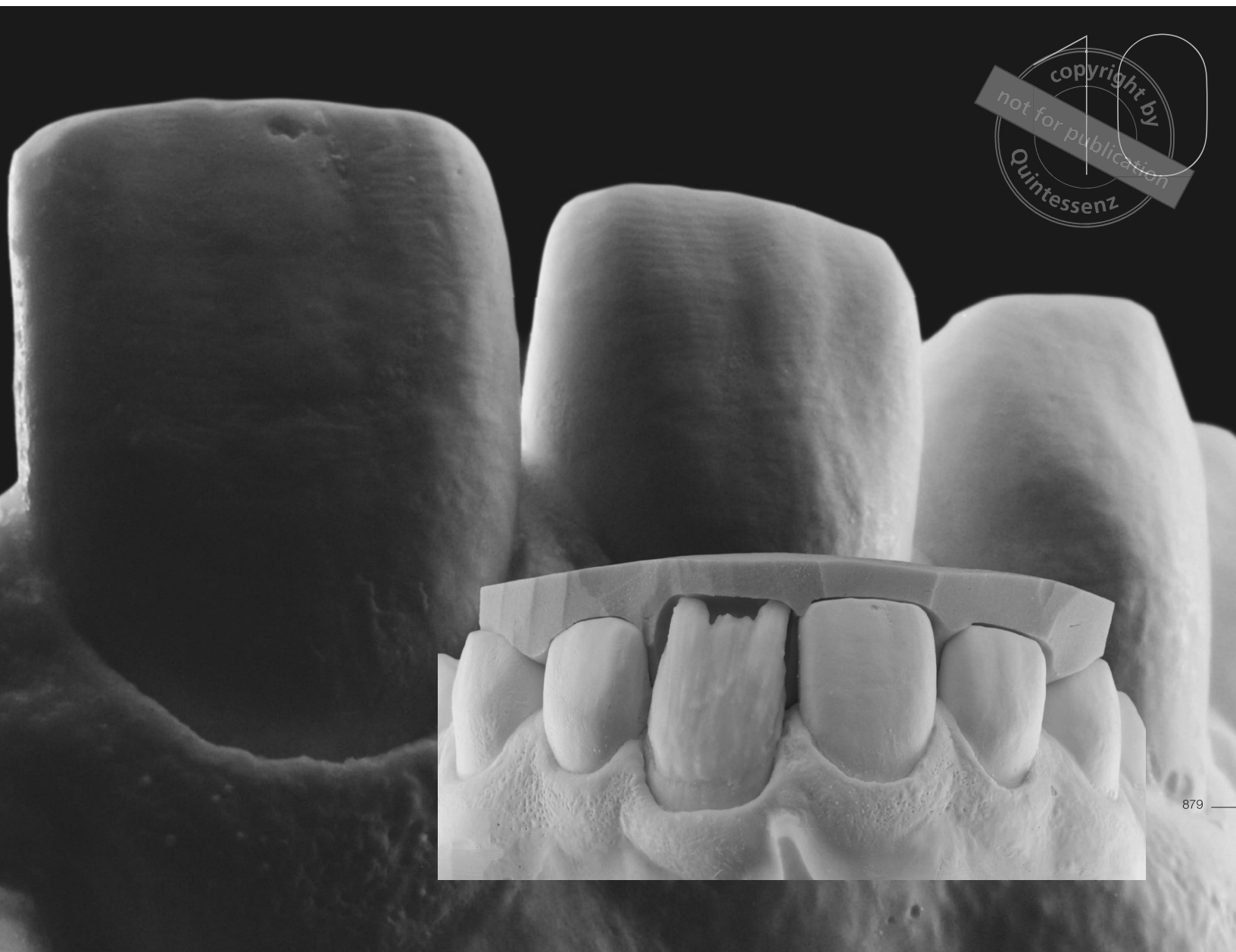


“ Because the solid model does not allow us to copy the recontouring done on the individual die, the e.max crown will have a step between the coping and the original preparation. ”



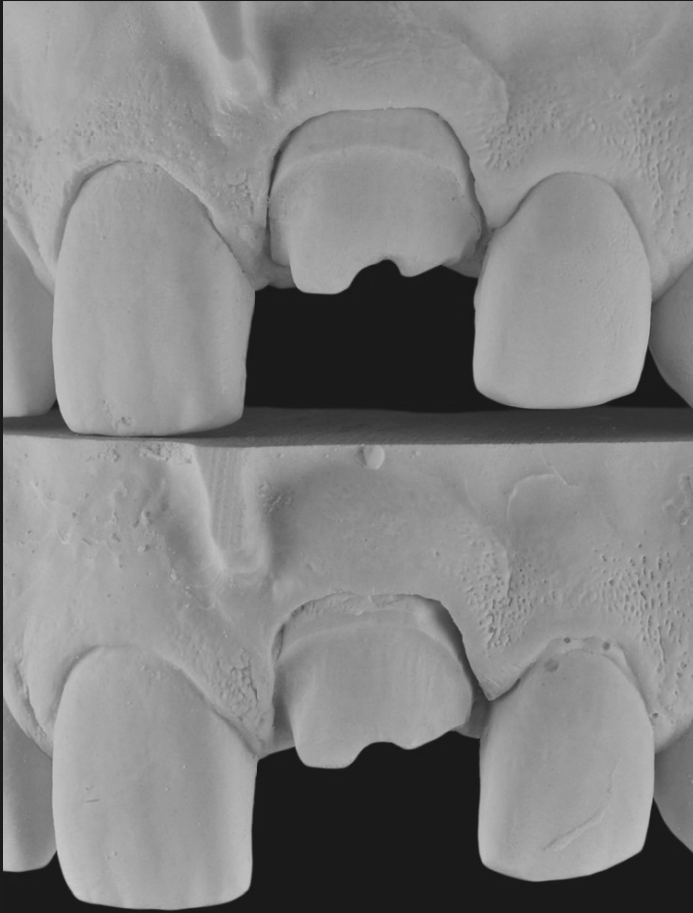
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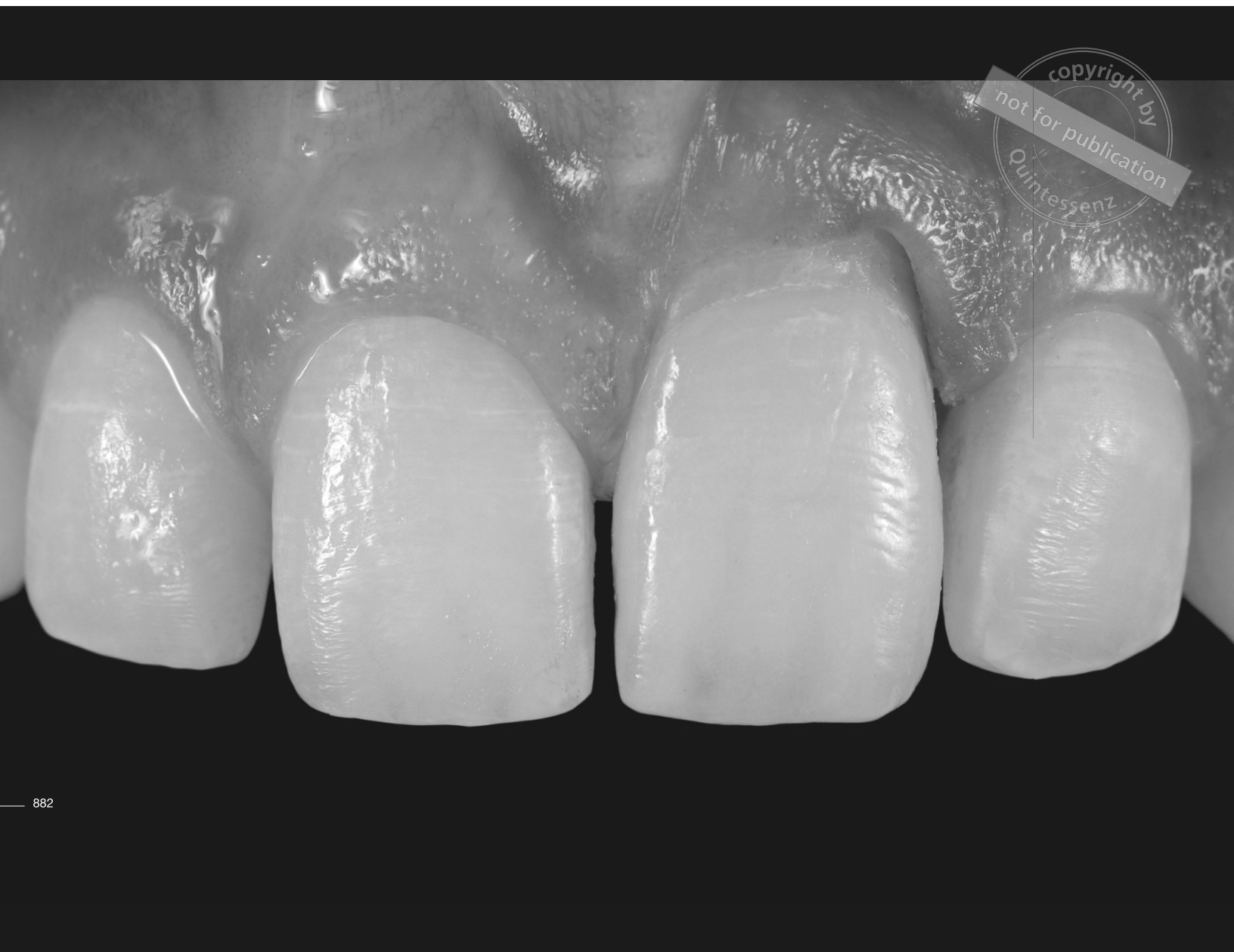


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“ While securing the non-glazed crown in position, the interdental root profile is reshaped with a diamond burr. Space is created for gaining adequate papillary volume and height. In this specific case and for educational purposes, a new model was made after root reshaping. It clearly shows the difference after the interdental root recontouring procedure. ”





Step four

# Final prosthetic rehabilitation

After final glazing of the crown to obtain the optimal color, texture, and form, the pressed and layered e.max crown is cemented with dual-curing cement. After cementation, the zone apical to the cementation line will be conditioned with a round burr.

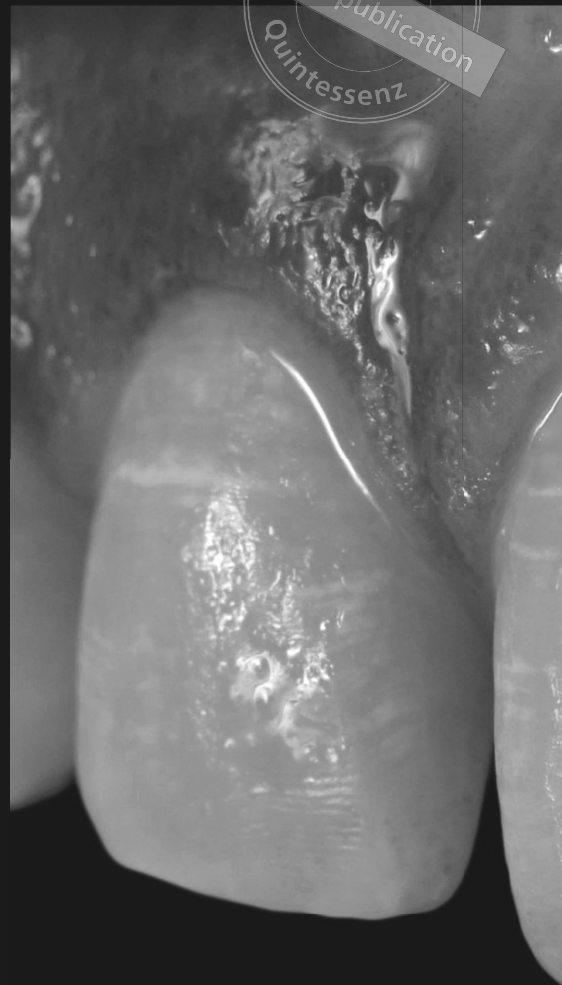


Try-in

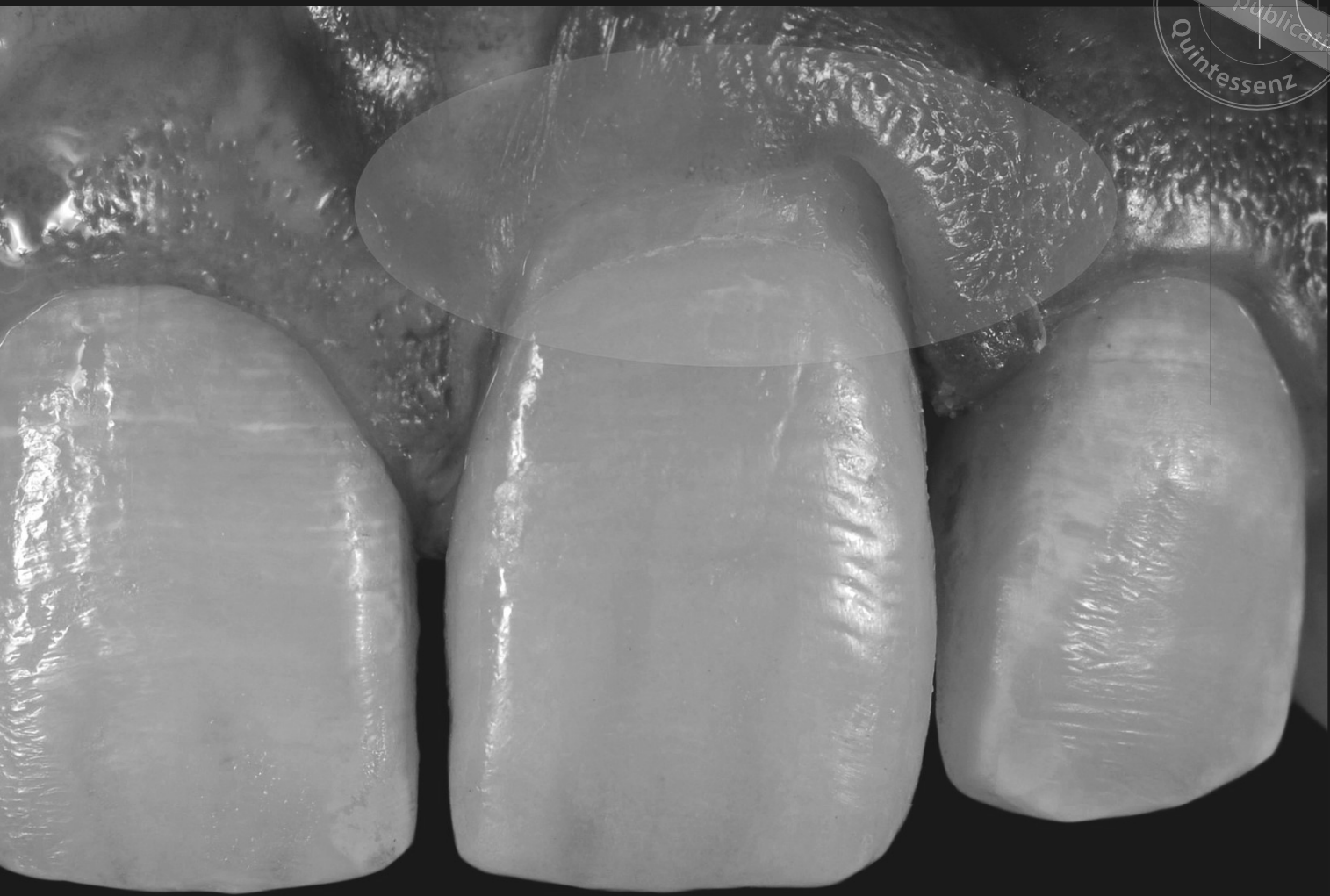


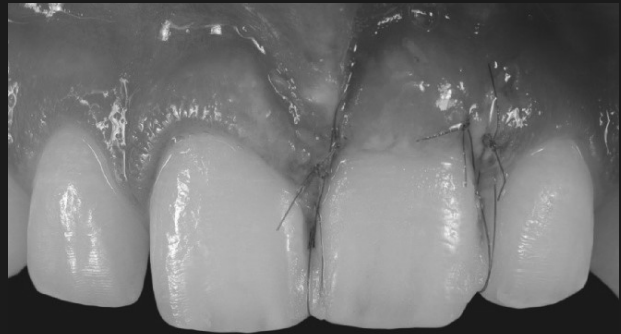
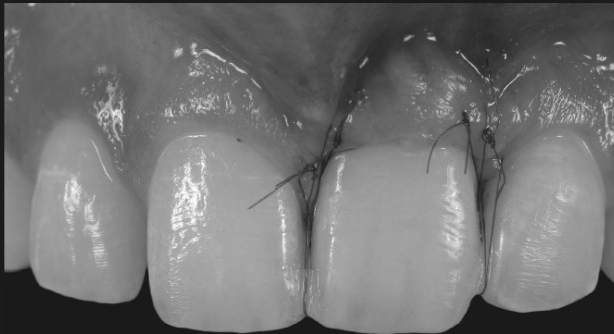
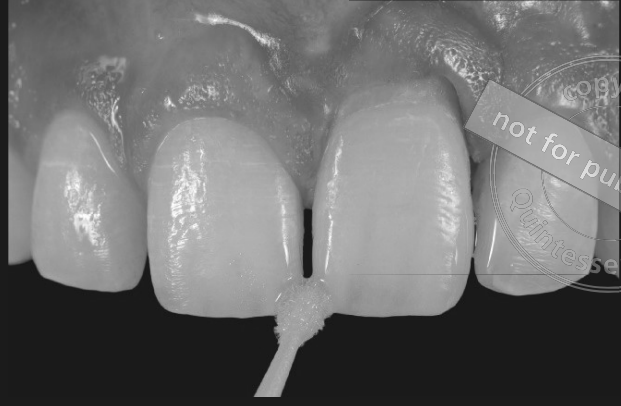
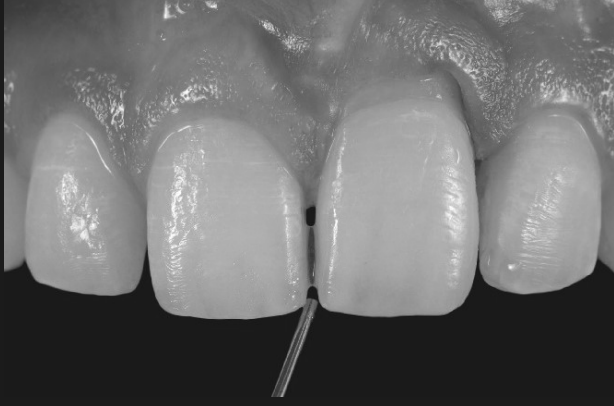
After cementation and rootplasty

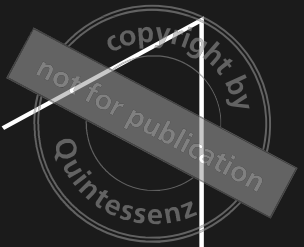
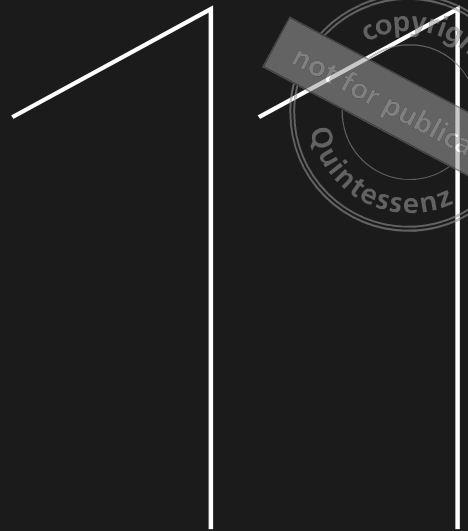
“ It is important to create a concavity with a round burr apically to the cemented crown. This will allow for symmetry in thickness of the grafted area, removal of the enamel, and will provide a receptor bed for the graft. ”



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# The central-lateral incisor dilemma







## Introduction

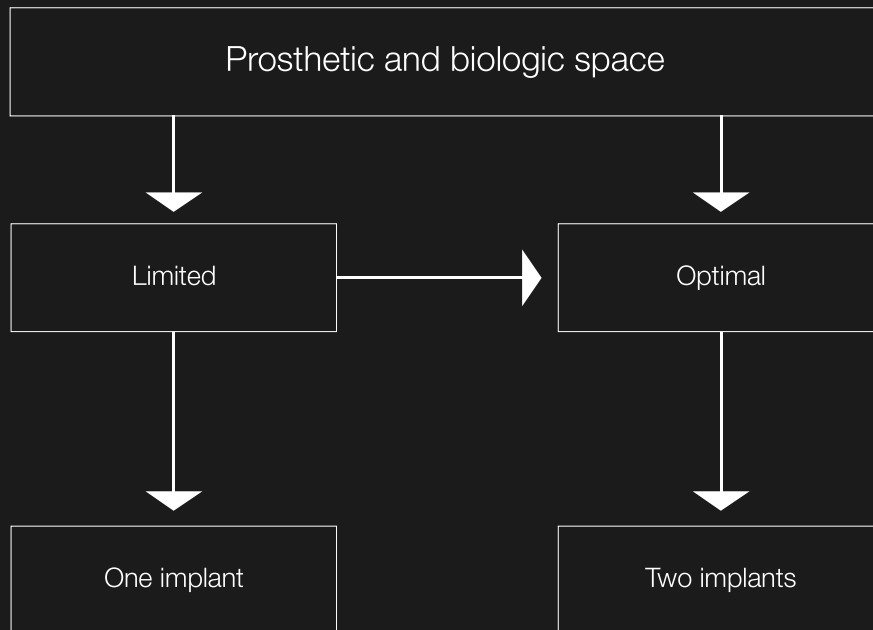
The simultaneous replacement of lateral and central incisors with dental implants can be a source of concern for obvious reasons. Despite improvements in design, connections, and surface treatment, bone remodeling should always be expected after placement of an implant. When replacing two adjacent teeth with implants, this physiologic remodeling can result in unesthetic clinical results.

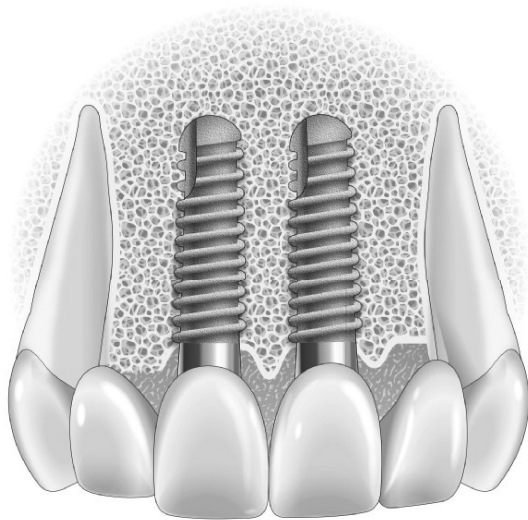
The clinician will almost always be faced with the difficult choice of placing one or two implants. Decision-making in this specific clinical situation is multifactorial, but the available mesiodistal space between implants and the tooth form are probably the most important factors.



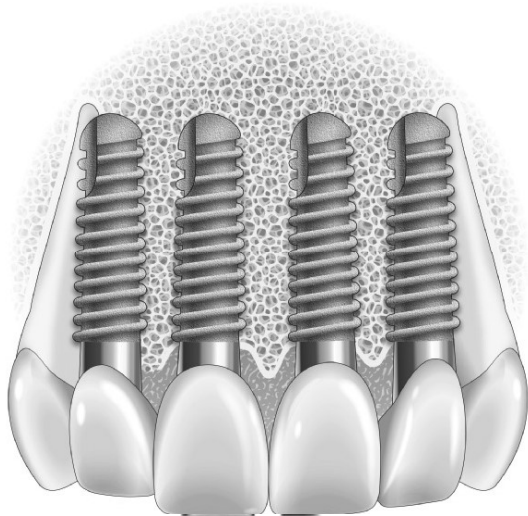
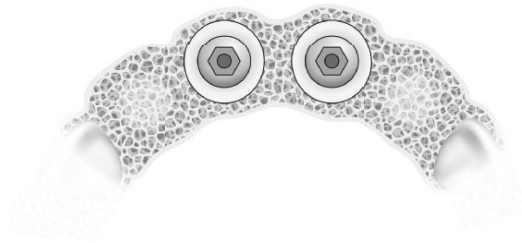
## Tips and tricks One or two implants?

This choice is often a choice between theoretical potential and pragmatic benefit. If **all conditions** are optimal, two implants will be better than one. If **any condition** is not optimal, one implant will be better than two. Keep in mind that conditions can be optimized. Orthodontics can be used to optimize prosthetic space. Guided bone regeneration (GBR) can be used to optimize biologic space. Theoretically, not having a connector **can** mean improved esthetics and cleanability. However this is only true under **optimal conditions**.

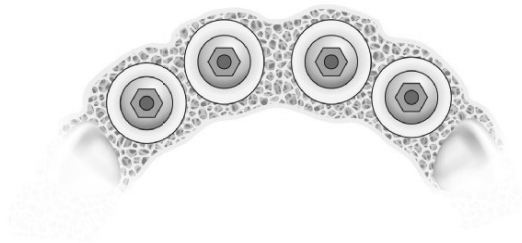




Limited space



Optimal space





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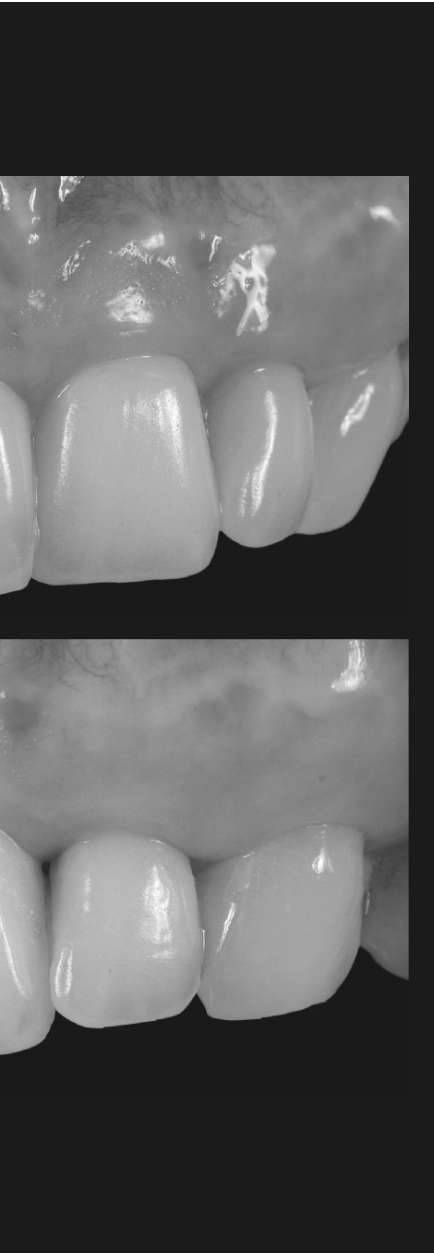


## Clinical situation 1

This 46-year-old female patient was referred for replacement of both lateral incisors and right central incisor. All three teeth had recurrent endodontic lesions associated with pain in the region of the apices. Besides this main complaint, the black triangles between the anterior teeth, probably caused by the old apicectomy, and the color of the soft tissue around the right central and left lateral incisors were worrying the patient.

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## Step one Record

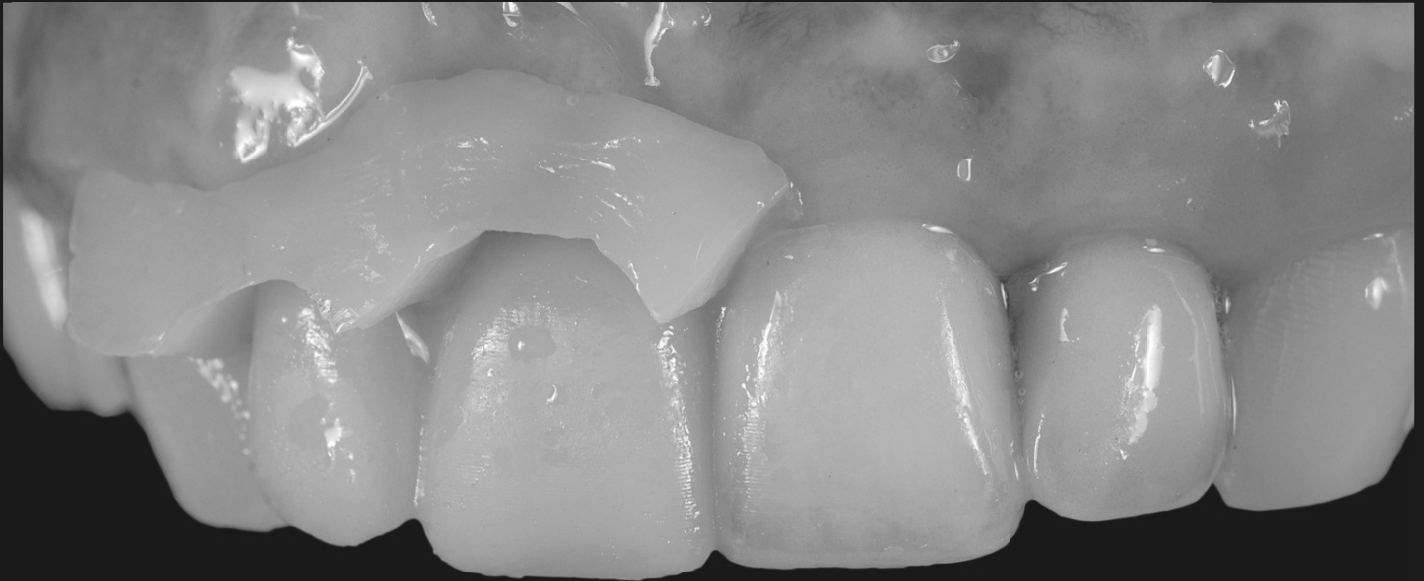
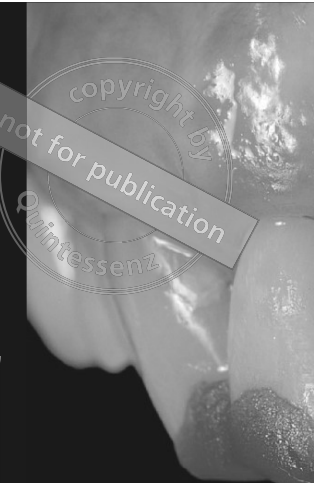
Cone beam computed tomography (CBCT) is essential for a proper diagnosis and to plan the guided surgery in this case because it allows to:

- visualize the three-dimensional (3D) bone configuration and extent of the endodontic lesions;
- measure bone height and thickness;
- measure the available bone apical to the roots and the endodontic lesion for implant stabilization;
- measure the distance between the existing roots and the available mesiodistal space;
- evaluate soft tissue. To evaluate the soft tissue, the authors recommend placing a cotton roll or a retractor between the teeth and the lip. This will separate the lip mucosa from the gingiva;

→ simulate implant placement and eventually relate it to the prosthetic design in any implant planning software.

For example, in this clinical case, it was very obvious, when looking at the CBCT section of the lateral incisor, that immediate implant placement (IIP) would not be possible without GBR and raising a flap, thus making the treatment more complicated and probably less predictable when it comes to the final esthetic result, especially in the inter-implant area.







## Step two The ideal provisional design

Before extraction, it is important to use the chamfer preparation on the natural tooth as a reference for the gingival form of the provisional bridge for both central and lateral incisors. The prosthetic soft tissue support should not be different for an implant restoration or a crown on a natural tooth. The transmucosal design of the implant restoration should ideally be a copy of the root in the first 1.5 mm. In order not to lose this important 3D reference after extraction and subsequent gingival collapse, a Duralay jig on both neighboring teeth was made.



## Step two Atraumatic extraction

This procedure should follow these guidelines:

- Use a periosteal elevator for the initial section of the periodontal fibers and gently initiate the luxation.
- Push the tooth in the alveolus first when engaging with forceps; it will cause rupture of the periodontal fibers and edema, which will facilitate the extraction.
- Use forceps to gently turn the tooth. Care must be taken to preserve the buccal bone and interdental bony septum.
- After extraction, a sharp curette should be used to clean the alveolus and remove all remnants of the endodontic lesion.
- Probe and map the buccal bone levels; this is important at this stage.
- Use a round diamond burr or scalpel to remove the sulcular epithelium.

