Transitional to Final Dentures: A Detailed Process for the Fabrication of Complete Dentures—Part 1

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Abstract

Complete denture fabrication and esthetics has been essentially overlooked with the arrival of cosmetic dentistry and dental implants. The procedures in diagnosis and analysis for complete immediate denture rehabilitation and the techniques involved are discussed in this article. Before the creation of maxillary prosthesis, a complete extra- and intraoral examination should be performed. Along with impressions of the existing dentition and soft tissue, diagnostic occlusal bite registration is performed before processing the final prostheses. This is article is just Part I in a two-part series. In this article, treatment of a patient with periodontal disease, failing dentition and an old, ill-fitting mandibular denture was restored with an immediate complete maxillary denture. Part II follows next month with the restoration of the oral complex with new complete maxillary and mandibular dentures. Photographs illustrate the removal of the remaining dentition, placing a soft denture liner, and creating an esthetic smile.

Learning Objectives

After reading this article, the reader should be able to:

- explain failing dentition and treatment plan for complete immediate dentures.
- make use of proper diagnostic methods with evidence based dentistry before treatment to assist in the fabrication of an immediate denture prosthesis.
- use and place current dental materials properly for pre- and postinsertion of the denture prosthesis.

Thanks to recent exposure in the media, advances in technology, and professional enthusiasm, there is a new public awareness of esthetic procedures. Television shows such as *Extreme Makeover* and *The Swan* focus mainly on plastic surgery; when esthetic dentistry is addressed, the emphasis is on whitening and porcelain veneers. Unfortunately, this kind of phenomenon has virtually ignored the denture-wearing public. Advancements in denture technology have made dentures better than ever. Dentists who provide patients with quality dentures can make dramatic improvements in esthetics and function, as well as overall improvement of their lives.

According to the *Journal of Dental Research* (1996), about 25% of age 65 are completely edentulous and 44% of people age 75 are edentulous. About 17% of the adult population (30 million people) are edentulous in at least one arch. **[QA. Please provide references for these figures. Referring to the JDR is not enough. We need specifics in the reference section.]** On average, most of the authors' new denture patients have worn the same dentures for far longer than the recommended 3 to 5 years. These dentures are typically more than 10 years old.

A denture that does not fit or teeth that do not function effectively can make it difficult to chew food properly. As a result, many nutritious and harder-to-chew foods are missing from the diet. In these cases, digestion and general health can be negatively affected. Furthermore, old, ill-fitting dentures can create a weak look and even can a person look older. Obviously this can have an adverse effect on a person's emotional well being, their self-confidence.

Oral structures change naturally over time. Even a denture that started out perfect eventually will not fit the same way it used to. One set of dentures is not a permanent solution. Dentures eventually need to be relined, rebased, or replaced; just like everything else in life. Nothing lasts forever, and neither do dentures. Dentures that no longer fit properly can cause friction in the soft tissues, which could lead to sores, which in turn are prone to infections. An older denture is also more likely to harbor more bacteria. Recent studies by Dr. Morse, **[QA. Need first name and degrees. I found a Timothy Morse, PhD, CPE online. Is this him?]** University of Connecticut School of Dental Medicine, have shown that disinfectants will not eliminate microorganisms such as *Escherichia coli*, *Staphylococcus aureus*, and *Candida albicans*. The best way to eliminate the microorganisms from an old denture is to make a new one. **[QA. Need more information for reference. Must be included in reference section.]**

Oral Cancer

According to the American Cancer Society, oral cancer is the sixth most common cancer and accounts for almost 4% of all cancers diagnosed. There are an estimated 40,000 new cases reported annually in the United States alone. **[QA: Must provide reference here.]** According to the Oral

Figure 1—*Preoperative full face.*

Figure 2—*Preoperative smile.*

Figure 3—*Preoperative maxillary occlusal.*

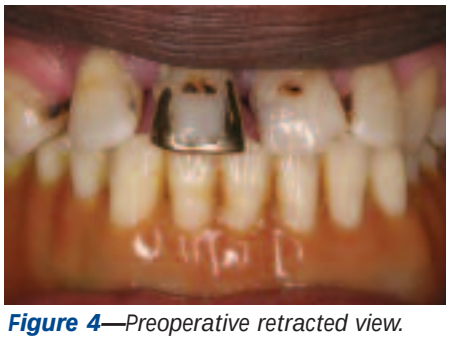


Figure 4—*Preoperative retracted view.*

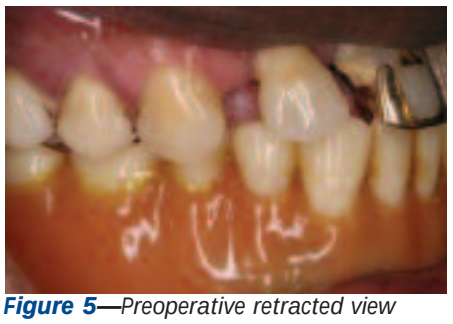


***Figure 5**—Preoperative retracted view right lateral.*

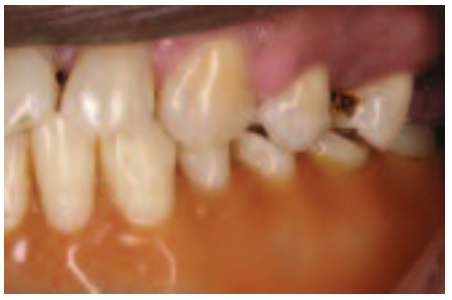


***Figure 6**—Preoperative retracted view left lateral.*

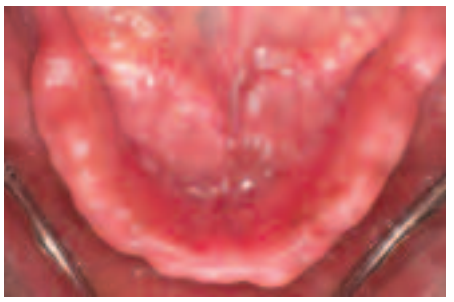


***Figure 7**—Mandibular edentulous occlusal view.*

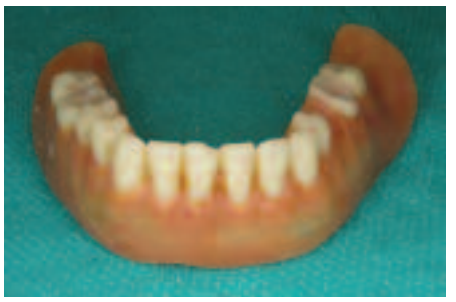


***Figure 8**—Cameo surface of existing denture.*

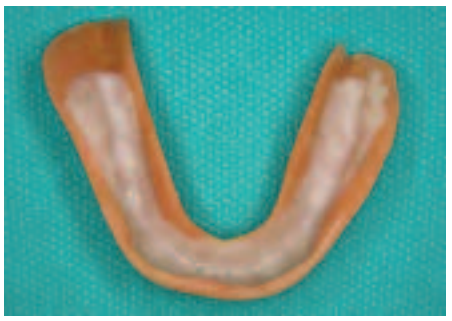


***Figure 9**—Intaglio surface of existing denture with Sea-Bond.*

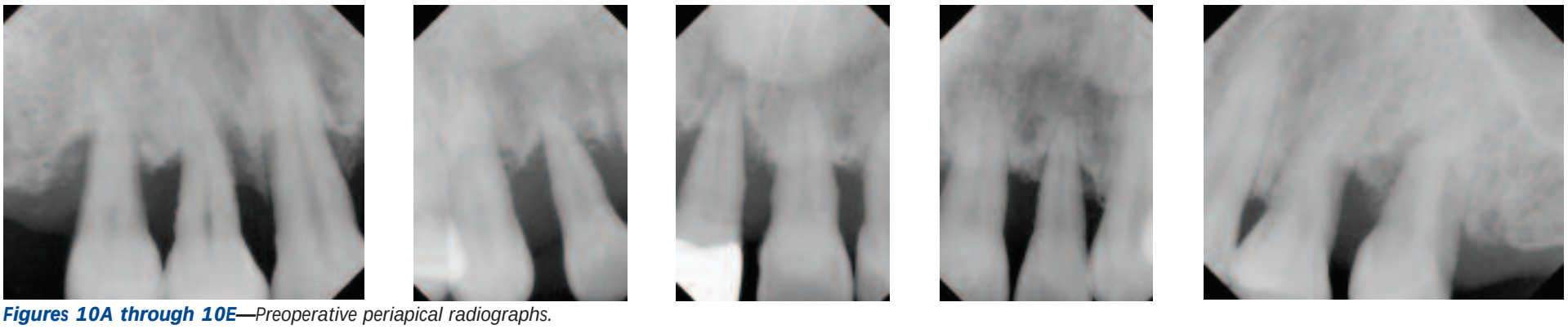
Cancer Foundation, 8,000 Americans die of oral cancer each year. **[QA: Must provide reference here.]** The vast majority of oral cancer occurs in people older than 45, with men twice as likely as women to develop the disease. **[QA: Must provide reference here.]** The use of tobacco and alcohol are important risk factors for oral epithelial dysplasia. This is a histopathological diagnosis that is associated with an increased risk of oral cancer; and denture patients may be the most at risk. **[QA. Please explain]** Therefore, the Oral Cancer Foundation recommends that all denture patients get regular oral cancer screenings. **[QA: Must provide reference here.]**

A Clinical Case

This article is the first of two parts. Part I details the transition from the partially edentulous maxilla to an immediate transitional denture. Part II will appear next month with the restoration of the oral complex with new complete maxillary and mandibular dentures.

The Patient

For many, the Internet has become the primary source for accurate, unbiased information. This energetic 53-year-old man found the authors' practice through www.denturewearers.com, specifically the "Find Your Local Denture Doctor" section. He was concerned about



Figures 10A through 10E—*Preoperative periapical radiographs.*

Figure 11—*Digital image of proposed treatment.*

Figure 12—*Calipers in place to assist in placement of canines.*

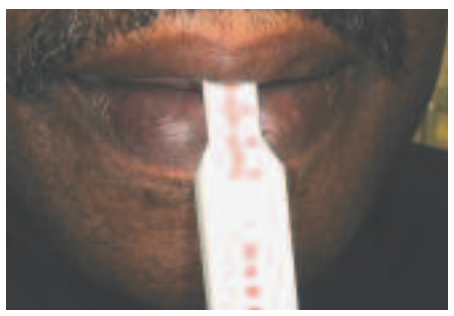


Figure 13—*Papillometer in place to assist in vestibular depth.*

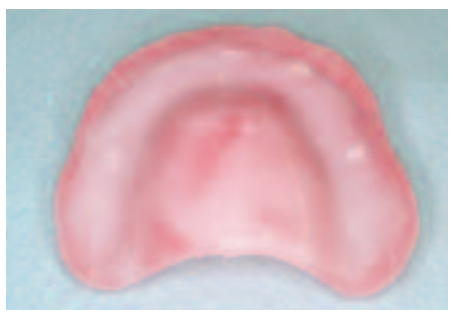


Figure 14—*Hydro-Cast before placement and trimming.*

his "very loose teeth" and he wanted a better-looking smile. He had not been to a dentist in more than 10 years, when his lower teeth were extracted and replaced with a lower denture.

The extraoral examination showed no locking, deviation, restriction of movement, crepitus of the temporomandibular joint, or pain on palpation[1] (Figure 1). He had a protrusive profile with an Angle class III **[QA. Should the word 'malocclusion' be inserted here?]**. According to House, his facial form was ovoid and brachycephalic.[2] His musculature and functional tone were within normal limits. He had a supported lip and low smile line (Figure 2).

Intraorally, his soft tissues were inflamed and irritated. Fortunately, he did not have any signs of oral carcinoma. Most notably, he had advanced and generalized periodontitis in the maxillary arch (Figure 3). These loose and unattractive teeth were his chief concern. He wore an old, ill-fitting mandibular denture (Figures 4 through 6). He was missing teeth Nos. 1 through 3 and 14 through 16. Tooth No. 8 was restored with a 7/8-in gold crown. He was edentulous in the mandibular arch. This is classified as a favorable class I arch by House[1] (Figure 5). His mandibular denture was past its prime, loose, and discolored. In fact, he always wore it with a Sea-Bond insert (Combe Incorporated) (Figures 8 and 9).

Radiographically, he had normal bone trabeculation in the mandibular arch, but suffered from advanced generalized periodontitis in the maxilla. This resulted in excessive bone loss (Figures 10A through 10E).

Treatment Options

The challenges associated with treating this patient included generalized periodontitis in the upper arch with severe horizontal bone loss around the remaining dentition, edentulous areas, a skeletal class III **[QA. Again, add 'malocclusion'?]**, and, most important, the patient's expectations. The treatment goals were removing the remaining infected dentition, providing for adequate function and phonetics, restoring an ideal occlusal plane to prevent more degenerative changes, and creating an esthetic smile. The treatment options were extractions and immediate transitional denture followed by conventional dentures, implant-supported maxillary and mandibular prostheses, a combination of both, or nothing. After discussing the options with the patient, the treatment plan was formulated, beginning with the fabrication of an immediate transitional maxillary denture. After an appropriate amount of healing time and adjustments, treatment will continue with new upper and lower dentures (Part II).

The treatment options were extractions and immediate transitional denture followed by conventional dentures, implant-supported maxillary and mandibular prostheses, a combination of both, or nothing.

When fabricating an immediate denture, teeth and gingival shades, as well as lengths, should be selected based on the individual's characteristics and desires. Digital photographs can be most helpful at this stage in patient communication. Esthetic imaging can also be a useful tool in helping patients' understand needed dental treatment. This kind of visualization helps the patient "see" what esthetic dentistry can do for their appearance. In this case, the authors and the patient chose R-2 L-1 from the Smile Style Guide (Digident, Inc). That means round canines, square round lateral incisors, square centrals, and even length (Figure 11).

Treatment

All treatment begins with proper records. A caliper was used to measure the ala of the nose (Figure 12) to assist in the placement of the maxillary canines. A papillometer (Figure 13) was used to measure the vestibule to the tip of the lip. The authors took initial impressions of the mandibular denture and the maxillary arch. Because the incisors were so mobile, they were splinted together with light-cured Paint-On Dental Dam (Den-Mat Corporation) before an upper Silgimix (Sultan Healthcare, Inc) impression was taken. Siligimix, a polyvinyl siloxane alginate substitute, was chosen for its ability to provide excellent flow and detail with minimum tear strength. The authors did not want to remove any teeth with the impression. After the impression, the resin was removed.

A bite registration to relate the opposing occlusal surfaces was made with Genie Bite Fast Set (Sultan Healthcare, Inc). It has been this authors' experience that Genie Bite has a consistency that stays where it is placed, does not slump, and approaches almost no resistance to closure. This is very helpful when

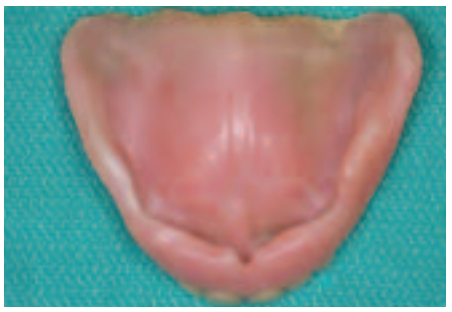


Figure 15—*Trimmed Hydro-Cast on immediate.*

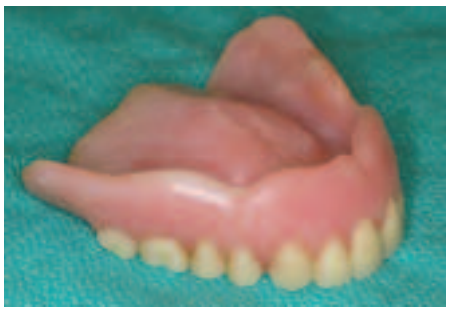


Figure 16—*Trimmed Hydro-Cast on immediate, lateral view.*

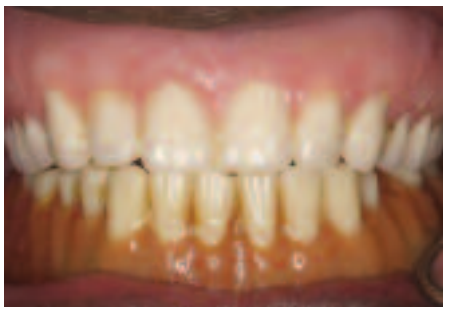


Figure 17—*Final retracted view.*

Figure 18—*Final smile.*

there are large edentulous areas as in the posterior of this case. When set, it does not compress or flex. This helps the dentist position the models with exceptional precision, even without rims.

A maxillary custom tray and bite rim was fabricated for the next appointment. After the liquid rubber dam was placed around the remaining teeth and light-cured, a regular body vinylpolysiloxane (VPS) impression with Genie Impression Material (Sultan Healthcare, Inc) was taken using border molding techniques.

According to the manufacturer, the Genie VPS impression material is chemically engineered to produce remarkably detailed and precise impressions every time. Because of its ultrahydrophilicity, Genie is extremely forgiving in the oral environment. It has been the authors' experience that Genie's flow and flexibility gives great detail, and yet the impression can be easily removed from the mouth. This is very important because of the mobility of the teeth involved. Again, the authors did not want to remove any teeth unplanned. The authors' practice uses this product routinely for removable as well as fixed prosthodontics. The authors had also noticed that Genie helps eliminate pulling out restorations along with the impression. The natural occlusion was verified with the bite rim and Genie Bite (Sultan Healthcare, Inc).

Laboratory Work

In the laboratory, each tooth on the cast, starting from the central incisor and going distal, was cut 2 mm gingival to the cementoenamel junction **[QA. Edit okay?]** and replaced by the artificial one. Teeth were set one at a time. Any slight change in tooth length, even 1 to 2 mm, can make the smile line too long or too short. Slight diastemas and overlapping help create a natural effect; however, final decisions should be left to the patient. In this case, he wanted "nice, straight, white teeth." Posterior teeth function better with a slight lingual version. The immediate transitional denture was then processed for delivery at the surgical appointment.

Delivery

His maxillary teeth were extracted atraumatically. The immediate transitional denture was relined with Hydro-Cast (Sultan Healthcare, Inc) tissue treatment material (Figure 14). The fingerlike extensions in the sockets were clipped with surgical scissors and the borders were trimmed with a scalpel (Figure 15 and 16). The immediate denture was delivered (Figures 16 and 17) and the occlusion was adjusted.

It has been this authors' experience that tissues in the edentulous mouth react to stresses caused by immediate dentures as well as old, ill-fitting dentures. This results in pain, inflammation, swelling, and tissue displacement (denture stomatitis). This situation is uncomfortable for the patient and can delay the fabrication of new dentures. Hydro-Cast is a temporary soft denture liner that has been proven to reduce the clinical symptoms of denture stomatitis; it helps the tissue return to a state of normal health and is the only tissue conditioning resin with long-term clinical research demonstrating its efficacy.[3] The edentulous tissue surface was recorded in a dynamic functional impression as the gingiva returns to health. Early functional stimulation through the use of a tissue conditioner under an immediate denture is the key to good ridge formation. Tissue covered in this way will generally appear more rounded, smoother, more resilient, and thicker.

According to Kelly and Sievers, immediate complete dentures contain the edema and mold the tissues for the first 2 days only.[4] The patient was instructed not to disturb the surgical area, rinse vigorously, or probe the area with any objects or fingers. Though this patient was not a smoker, all patients are told not to smoke for at least 72 hours. Smoking can be detrimental to the healing process. It is important to maintain a healthy diet to promote healing, gain strength, have less discomfort, and feel better. For approximately the first 48 hours, he was instructed to eat a soft diet, such as eggs, yogurt, and soup, to make him feel more comfortable. He was to avoid salty, spicy, or extremely hot foods as well as chips, nuts, popcorn, or anything with sharp edges.

The Transitional Stage

The patient was made aware that an immediate denture is a trial denture and part of the process. The occlusion was equilibrated to fit the opposing arch. Thanks to the two-bite registrations at the two preliminary appointments, the adjustments were minimal. After an appropriate period of 8 to 12 weeks for healing, the old mandibular denture and new immediate transitional maxillary denture was to be remade. He physically felt better about himself and he loved his new smile. **[QA. Edit okay?]** He was even wondering why he needed to return for follow-up treatment.

Summary

In this article, treatment of a patient with periodontal disease, failing dentition and an old, ill-fitting mandibular denture were restored with an immediate complete maxillary denture. Part II follows next month with the restoration of the oral complex with new complete maxillary and mandibular dentures. ■

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1. De Leeuw R, Boering G, Stegenga B, et al. Clinical signs of TMJ osteoarthrosis and internal derangement 30 years after non surgical treatment. *J Orofac Pain*. 1994;8(1):18-24.
2. House MM. The relationship of oral examination to dental diagnosis. *JPD*. 1958;8:208-219. **[QA. Please verify reference or please provide a more current one.]**
3. Tassarotti B. A clinical and histologic evaluation of a conditioning material. *J Prosthet Dent*. 1972;28(1):13-18.
4. Kelly E, Sievers R. The influence of immediate dentures on tissue healing and alveolar ridge form. *JPD*. 1959;9:738-742. **[QA. Please verify reference or please provide a more current one.]**

Product References

Product: Sea-Bond insert
Manufacturer: Combe Incorporated
Location: White Plains, New York
Phone: 800.873.7400
Web site: www.combe.com

Product: Smile Style Guide
Manufacturer: Digident, Inc
Location: Dallas, Texas
Phone: 800.741.7966
Web site: www.digident.com

Product: Paint-On Dental Dam
Manufacturer: Den-Mat Corporation
Location: Santa Maria, California
Phone: 800.445.0345
Web site: www.denmat.com

Products: Silgimix, Genie Bite Fast Set, Genie Impression Material, Hydro-Cast, Genie Bite `
Manufacturer: Sultan Healthcare, Inc
Location: Englewood, New Jersey
Phone: 800.637.8582
Web site: www.sultanintl.com

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1. What percentage of 75 year olds are edentulous?
- a. 17%
- b. 25%
- c. 44%
- d. 57%

2. What is the best way to eliminate the microorganisms from an old denture?
- a. Soak in detergent
- b. Soak in bleach
- c. Place it in an ultrasonic unit
- d. Make a new one

3. Oral cancer accounts for almost what percent of all cancers diagnosed?
- a. Less than 1%
- b. 4%
- c. 10%
- d. 95%

4. What were the challenges associated with treating this patient?
- a. Severe horizontal bone loss
- b. Skeletal class III
- c. Patient's expectations
- d. All of the above

5. In fabricating an immediate denture, what can be most helpful in terms of patient communication?
- a. Verbal discussion
- b. Education models
- c. Digital photographs
- d. Video presentation

6. What did the treatment begin with?
- a. Health history
- b. Radiographs
- c. Financial discussion
- d. Proper records

7. In the laboratory, each tooth on the case was cut:
- a. 4 mm gingival to the cementoenamel junction.
- b. 2 mm gingival to the cementoenamel junction.
- c. at the cementoenamel junction.
- d. 2 mm supragingival to the cementoenamel junction.

8. In the edentulous mouth, pain, inflammation, swelling, and displacement is:
- a. a sign of malignancy.
- b. termed denture stomatitis.
- c. common in patients under age 45.
- d. usually because of a yeast/fungal infection.

9. Immediate complete dentures contain the edema and mold the tissues for:
- a. approximately 1 to 2 hours.
- b. the first 2 days only.
- c. 4 to 6 months.
- d. as long as the denture is worn.

10. The patient should be aware that an immediate denture is:
- a. a trial denture.
- b. usually realigned after 3 months.
- c. usually realigned after 6 months.
- d. usually realigned when clinically determined to be necessary.

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