

Transitional to Final Dentures:

A Detailed Process for the Fabrication of Complete Dentures - Part 2

Abstract

Complete denture fabrication and esthetics have been essentially overlooked with the arrival of esthetic 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 a 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 article is Part 2 in a two-part series. In this article, the authors cover the restoration of the patient's 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. Part 1, which appeared last month, focused on the treatment of a patient with periodontal disease, failing dentition, and an old, ill-fitting mandibular denture who was restored with an immediate complete maxillary denture.

Learning Objectives

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

- ¥ explain failing dentition and the 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.



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Over time, the ridges in a denture wearer's mouth change. These changes result in dentures that no longer fit as well as they once did. This is when denture wearers typically begin to go to their drugstore instead of a dentist, seeking an easy-fix solution for a complicated problem; however, adhesives and cleaners will not help make their dentures fit or look any better when what they really need is a new denture. Denture problems can only be properly addressed by a dentist experienced in denture treatment, not over-the-counter cure-alls. The deterioration of a denture can be so gradual that denture wearers get used to it, forgetting how it used to be (ie, that it looked good, felt good, and was pain and worry free). Many of these patients do not realize that if a denture is designed and fabricated correctly, there is little need for adhesives to keep them in place. Typically, after 3 to 5 years, a denture will begin to function less effectively. In certain cases, they need to be replaced or relined even more frequently. Wearing the same dentures for more than their recommended allotted time can result in damage to the oral tissue that is often irreversible. For instance, an old denture can cause the ridges to shrink faster; this results in a loose denture. At that stage, it will then become much more difficult to fit a new denture.

So why is the denture-wearing segment of our population so grossly ignored by modern dentistry? Certainly these patients do not feel the need to see a dentist to get their teeth cleaned, and they are not very likely to have a toothache. Maybe it is a deeper societal issue of ignoring our older population. Whatever the reason, try to remember that many of these denture patients probably have not been to a dentist in a long time—maybe not since a dentist pulled their last tooth. Who can

blame them if they do not go back—especially if they do not know why and how a denture dentist can help them improve their lives?

Clinical Treatment

This article is Part 2 after an immediate maxillary denture placement after extractions. After 6 months, the patient was ready to have new maxillary and mandibular dentures fabricated (Figures 1 and 2). He presented with the maxillary immediate denture (Figure 3) the authors had fabricated and relined with Hydro-Cast (Sultan Healthcare, Inc). Hydro-Cast is a temporary soft denture liner that reduces the clinical symptoms of denture stomatitis and helps the tissue return to a state of normal health. The patient's man-

dibular denture was more than 10 years old. Because it was loose, he always wore it with a Sea-Bond insert (Combe Incorporated) (Figure 4). Photographs were taken of the approximate vertical dimension of occlusion (VDO) (Figure 5), the maxillary occlusal (Figure 6), the mandibular occlusal (Figure 7), and

siloxane, in custom trays. For the maxillary, light body was placed in the tray and heavy body Genie Magic Mix (Sultan Healthcare, Inc) was placed in the borders (Figures 10 and 11). The impression material produces remarkably detailed, precise impressions. This helps eliminate embarrassing, expensive remakes.

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the right and left lateral to show the patient's dental class III occlusal relationship (Figures 8 and 9). Impressions were then taken with Genie Impression Material (Sultan Healthcare, Inc), a standard-set polyvinyl-

Genie is extremely hydrophilic and reduces clinical concerns about moisture compromising an impression. The flow characteristics of the light wash material are excellent under pressure for better coverage of the



Figure 1—Full-face, transitional maxillary and old mandibular dentures.



Figure 2—Preoperative frontal close-up.



Figure 3—Existing transitional maxillary denture lined with Hydro-Cast.



Figure 4—Existing mandibular denture with Sea-Bond insert.



Figure 5—Retracted edentulous view.



Figure 6—Maxillary edentulous occlusal view.

palatal surfaces. The heavy body produces border molding. For the mandibular, the authors used a medium body (Figure 11). They routinely use Genie in all its various viscosities and setting times for all their final

is the resistance to forces that tend to displace or remove the denture from the mucous membrane. The denture is retained by the forces of adhesion, cohesion, and atmospheric pressure, as well as the plastic molding of the

stability of the denture is attained by using the surfaces of the maxilla and mandible that are at or near right angles to the occlusal plane. Support is based on the resistance to forces at right angles to the occlusal surface of a denture. The thickness of the soft tissues over the bone and the way in which the impression materials are carried against them can affect the support of the denture.¹

“The objectives of complete denture treatment are retention, stability, support, esthetic values, and preservation of the alveolar ridges.”

impressions for removable as well as fixed prosthetics. Finally, at this appointment, the authors also chose the shades of the teeth and gingiva (Figure 12).

The objectives of complete denture treatment are retention, stability, support, esthetic values, and preservation of the alveolar ridges. Retention

soft tissue around the polished surfaces of the dentures. Atmospheric pressure is effective primarily as a rescue force when extreme dislodging forces are applied to the denture. Stability is the resistance to horizontal movement, and is necessary to resist the forces of occlusion in both centric and eccentric functions. The

Jaw Relations

Occlusal wax rims assist the dentist and patient in determining the ideal vertical dimension of occlusion and future placement of the denture teeth (Figures 13 through 15). The patient sat up in the dental chair with his head in a reposed state in the correct postural position. He was



Figure 7—Mandibular edentulous occlusal view.



Figure 8—Left edentulous lateral view at approximate vertical dimension.



Figure 9—Right edentulous lateral view at approximate vertical dimension.

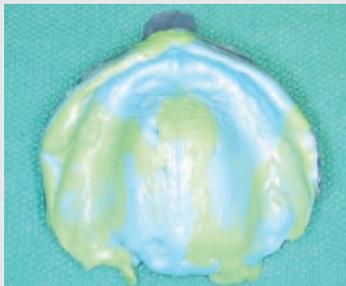


Figure 10—Maxillary impression taken with Genie Impression Material light and heavy body.

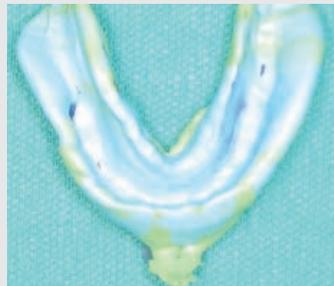


Figure 11—Mandibular impression taken with Genie Impression Material medium body.



Figure 12—Gingival shade taken.

instructed to initiate a swallowing action, move the mandible, moisten the lips with the tongue, and pronounce certain sounds, especially those with the letters “f” and “s.” Pleasure suggested maintaining 3 mm of interocclusal rest distance and, therefore, the VDO was the measured vertical dimension of rest minus 3 mm.² This space is the closest speaking space.²

Neuromuscular dentistry considers the entire system that controls the positioning and function of the jaw. The resting tonus of the elevators and depressor muscles depends on motor neuron activity related to the simple stretch reflex. The sources of impulses are the mesocephalic nucleus and the proprioceptors and exteroceptors in the mucous membrane, the peri-

odontal ligament, all the facial muscles, ligaments, and the capsule of the temporomandibular joint.³ The goal is to establish a three-dimensional (3-D) lower jaw position that is based on the harmonious relationship of the three main factors affecting occlusion: the teeth, muscles, and jaw joints.

In addition to the wax rims, the authors verified the natural neuromuscular position through the use of stable record bases and a central bearing pin using the Gothic Arch Tracing technique. Intraorally, a metal plate was luted in wax to the maxillary occlusal custom device. This was used against a mandibular central bearing device that allows the dentist and, most importantly, the patient to increase or decrease the

vertical dimension of occlusion as dictated by the position that is the most comfortable for the patient. The patient was then instructed to open and close his lower jaw.⁴ Then, in a closed position, the authors instructed the patient to move his mandible in all excursions.⁵ In this way, the patient was able to determine through comparison the different 3-D positions of the mandible.⁶

When the tracing was being done, the patient was instructed to move his jaw forward and back several times, then to each side and back several times. This scribed an arrow point in the ink on the strike plate. A plastic stop plate was then luted over the point on the strike plate. The larger side of the hole in the stop plate was placed to the top. The patient



Figure 13—Maxillary and mandibular wax rims at the ideal vertical dimension of occlusion.



Figure 14—Maxillary occlusal wax rim.



Figure 15—Mandibular occlusal wax rim.



Figure 16—Maxillary and mandibular tracers shown with eccentric movements.



Figure 17—Maxillary and mandibular tracers in place shown with ideal vertical dimension adjusted.



Figure 18—Genie Bite Registration impression material taken with ideal vertical dimension of tracer.

was instructed to close with the pin in the hole of the plastic stop, and then the space between the maxillary and mandibular tracers was filled with bite registration material (Figures 16 and 17). The centric relation record at the desired vertical dimension of occlusion was recorded with Genie Bite Registration Material Fast

Phonetics

In placing the maxillary anterior incisors, care was taken so that they looked as natural as possible and supported the upper lip. Maxillary incisors were placed first in the wax set-up in anatomic harmony to the bony structures and the esthetics of the patient. Most of the other teeth

upper and lower teeth when correctly angled as the patient says the “s” sound.⁷ In rehabilitating this denture patient, one of the goals was to mimic the missing dentition. The authors also wanted to improve his overall appearance.

When the upper anterior teeth are set too far posterior, the “sh” sound is produced instead of an “s” sound. This reduces tongue space. The lack of space can push a narrow stream of air to pass over the tip of the tongue past the central incisors. The air is pressed past all of the upper anterior teeth in a wider stream of air, thereby causing the “s” sound to resemble the “sh” sound. This is corrected by moving the anterior teeth forward. To have an ideal “f” or “v” sound, the length of the

“Whistling is produced when there is an abnormal interincisal space: the upper and lower anterior teeth of the dentures are not in their proper positions and/or are constricting the tongue during normal function.”

Set (Sultan Healthcare, Inc) (Figure 18). Genie does not compress, flex, droop, or resist. It has been the authors’ experience that this increases the accuracy of the bite registration.

positions were determined from this reference. Approximately 75% of patients exhibit the classic “s” position. Normally, there is 1 mm of space between the incisal edges of the



Figure 19—Anterior wax-up with tracers in place.



Figure 20—Retracted view of final prostheses.



Figure 21—Left lateral view of final prostheses.



Figure 22—Right lateral view of final prostheses.



Figure 23—Protrusive view of final prostheses.



Figure 24—Final smile.

maxillary central incisors should be placed at the wet/dry line of the lower lip.

Whistling is produced when there is an abnormal interincisal space: the upper and lower anterior teeth of the dentures are not in their proper positions and/or are constricting the tongue during normal function. These sounds can be produced if there is not sufficient vertical overlap of the anterior teeth, even when there is no interincisal space. Horizontal lines were drawn on the lower incisors and a measurement was made while the patient said the “s” sound.⁸ When a patient reads aloud rapidly from a magazine, no interincisal space should be present between the upper and lower incisal edges. Abnormal phonetic sounds can also be caused by incorrect form of the palatal part of the denture.⁹ Based on this, a diagnostic wax-up was done (Figure 19).

Esthetics

The authors always ask patients to bring a friend to confirm the esthetics at the wax-up try-in appointment. Any changes to the dentures are best done in wax. Before processing, the patient should be able to “see” and “feel” the denture. The occlusion was checked and a new occlusal registration was recorded to reverify the occlusion. Stable occlusion is necessary to prevent rocking. Wax contours should be correct because they influence the facial appearance. The lip line, gingival contour, and width of the front teeth should be natural and all in harmony. They should be neat and have an

“The buccolingual position of the lower posterior teeth should not be lingual to the mylohyoid ridge. Any unnecessary encroachment on tongue space or interference with tongue function should be avoided.”

attractive exposure of the teeth and basic, correct gingival form. Factors that influence the choice of the occlusal scheme are neuromuscular control, anterior-posterior jaw relationship, mediolateral jaw relationship, and esthetics.

Occlusion

The occlusal scheme chosen for the treatment was a bilaterally balanced, lingualized occlusion. The advantages included more centralized forces, forces over the ridge, and small areas of contact to reduce the potentially dislodging lateral forces. It was also a way to create an escape for food. It has been the authors’ experience that this will improve chewing function. The buccolingual position of the lower posterior teeth should not be lingual to the mylohyoid ridge. Any unnecessary encroachment on tongue space or interference with tongue function should be avoided.¹⁰

Lingualized occlusion was an attempt to maintain the esthetic and food-penetration advantages of the anatomic form while maintaining the mechanical freedom of the non-anatomic form. The lingualized concept uses anatomic teeth for the maxillary denture and modified nonanatomic, or “semianatomic,” teeth for the mandibular denture. The goal for bilateral balanced occlusion with lingualized occlusion should be to achieve smooth bilateral contact

with excursive movements of 2 mm to 3 mm away from centric relation, using a slight compensating curve.

With this patient, balancing and working contacts occurred only on the maxillary lingual cusp. Most of the advantages attributed to both the anatomic and non-anatomic forms were retained. Cusp form was more natural in appearance. Good penetration of the food bolus was possible. Bilateral balanced occlusion was readily obtainable. Vertical forces were centralized on the mandibular teeth; these can be used in most denture combinations. Complete dentures should provide good esthetics, harmonious function, and maintenance of hard and soft tissues, all of which are hard to relate to occlusal patterns specifically (Figures 20 through 23).

Conclusion

After delivering the dentures, the authors spoke with the patient about his treatment. He said that he had been highly reserved and nervous before having his teeth extracted and the immediate denture delivered. The fact that he was to have his remaining teeth extracted was unsettling for him. This is not uncommon for new patients in this situation. Combining the fear of the unknown, extractions, and false teeth can be very stressful. However, once the infected teeth were removed, he felt better physically. He was extremely happy with his

immediate denture and even more so with his final complete dentures (Figure 24). With his new outward appearance, he not only felt healthier but his friends also told him he was smiling all the time. 

Disclosure

Dr. Berland is a consultant for Sultan Healthcare, Inc. He the is owner of www.denturewearers.com.

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Product References

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

Products: Hydro-Cast, Genie Impression Material, Genie Bite Registration Material Fast Set, Genie Magic Mix
Manufacturer: Sultan Healthcare, Inc
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1. Typically after how long will a denture begin to function less effectively?
 - a. 3 to 6 months
 - b. 1 year
 - c. 3 to 5 years
 - d. 10 years
2. What produces border molding?
 - a. Stock tray
 - b. Light body
 - c. Medium body
 - d. Heavy body
3. What is resistance to forces that tend to displace or remove the denture from the mucous membrane?
 - a. Retention
 - b. Friction
 - c. Stability
 - d. Suction
4. Which is effective primarily as a rescue force when extreme dislodging forces are applied to the denture?
 - a. Adhesion
 - b. Cohesion
 - c. Atmospheric pressure
 - d. Plastic molding
5. Which is resistance to horizontal movement?
 - a. Retention
 - b. Friction
 - c. Stability
 - d. Suction
6. Support is based on the resistance to forces:
 - a. at right angles to the occlusal surface.
 - b. at approximately a 45° angle to the occlusal surface.
 - c. parallel to the occlusal surface.
 - d. wide of the occlusal table.
7. VDO was the measured vertical dimension of rest:
 - a. minus 6 mm.
 - b. minus 3 mm.
 - c. plus 3 mm.
 - d. plus 6 mm.
8. Which considers the entire system that controls the positioning and function of the jaw?
 - a. Neuromuscular dentistry
 - b. Stomatology
 - c. Holistic dentistry
 - d. Gnathology
9. Normally, there is how much space between the incisal edges of the upper and lower teeth when correctly angled as the patient says the "s" sound?
 - a. 1 mm
 - b. 2 mm
 - c. 3 mm
 - d. 4 mm
10. The buccolingual position of the lower posterior teeth should not be:
 - a. mesial to the mylohyoid ridge.
 - b. lingual to the mylohyoid ridge.
 - c. distal to the mylohyoid ridge.
 - d. buccal to the mylohyoid ridge.

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