

The Diagnostic Wax-up in Full Mouth Rehabilitation-A Review

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Introduction

The diagnostic wax-up should probably be labeled a diagnostic work-up because it is the most foolproof way to work up a treatment plan that will result in a three-dimensional visualization of the end result of a “best choice” of treatment. The diagnostic wax-up is the process by which programmed treatment planning is utilized step-by-step to determine the best choice of treatment. It is how we plan the sequence that must be followed to achieve a visualized end result.

The ideal person to do the diagnostic wax-up is the dentist who did the complete exam and therefore the one who has an understanding of what the patient wants and needs. This person will be responsible for the end result and must help the patient understand what needs to be done and why. Dentists who learn the necessary skills will find that the benefits from doing their own treatment planning have a huge payoff in case acceptance and higher productivity.

The Purpose of the Wax-up

The purpose of the wax-up is to fulfill all the requirements for stability. It starts with the first requirement of stable holding contacts on all teeth. At the examination, the dentist should determine if any requirements for stability are unfulfilled or have been substituted for (such as a tongue substitute for anterior contact). The dentist should have observed the relationship of the upper anterior teeth to the lip-closure path, phonetics, and the neutral zone. These are important observations that cannot be discerned from diagnostic casts alone but have a profound importance when deciding on the position, inclination, and contour of anterior teeth. Likewise, treatment decisions regarding the height of gingival margins cannot be properly decided on without knowing how much teeth and gum is exposed at high lip position—something that can't be discerned from casts. As the dentist works through the decision-making process on the casts, it is at this stage that options for treatment must be selected for each requirement for stability.

Selecting the Best Treatment Option

On mounted casts, it is possible to recontour teeth by adding wax to reshape incisal edges or to build up occlusal surfaces. It is also possible to recontour teeth by equilibration or other forms of reductive reshaping. On the casts that show the jaw-to-jaw relationship of the arches in centric relation, it will often be apparent that the best treatment choice is to move teeth into a better relationship. This can be done on the casts. Many problems can be solved using a realistic set of choices. Choices include narrowing teeth (stripping) so they can be moved into a better alignment before restorations are used to complete the perfected esthetics. In the chapters that follow regarding all the different types of occlusal problems, it will be apparent how the process of making treatment decisions on mounted diagnostic casts is such a practical approach.

Advantages

1. Working through a clearly defined treatment plan gives the dentist an unmatched level of confidence when presenting the treatment plan to the patient.
2. The diagnostic wax-up is the best visual aid used to help the patient understand the goals of treatment. When combined with a set of digital photos of the existing condition, the need for treatment becomes clear to the patient. It also demonstrates the dentist's thoroughness in deciding what treatment is in the patient's best interest.
3. The comparison of unaltered casts with the treatment planned casts is the perfect aid for explaining to specialists about the treatment goals. It facilitates co-diagnosis for total clarification of a treatment sequence and opens the door to suggestions for alternative treatment approaches that may better serve the patient.
4. The corrected diagnostic casts serve as models for fabrication of provisional restorations. A putty silicone matrix is made on the corrected casts and can be

ready when tooth preparations are completed.

5. If orthodontic tooth movement is indicated, the three dimensional model of the treatment objective can be used to design the mechanics for moving teeth to a specific new position.
6. Because the jaw-to-jaw relationship is correct on centric relation mounted casts, surgical decisions can be aided regarding movement of dento-alveolar segments or complete arches.

Procedure

Steps in the Diagnostic Wax-up

Step 1: Mount upper and lower casts with centric relation bite record and facebow. Duplicate the casts to preserve the original conditions.

Step 2: Verify the accuracy of the mounting.

Step 3: Examine the occlusal relationship on the casts. Note the first tooth contact. Note the relationship of all other teeth when the first tooth contacts at centric relation. (fig 1)

Objective: To achieve centric relation contact on all teeth. However, one should start by determining what must be done to achieve contact of the anterior teeth.

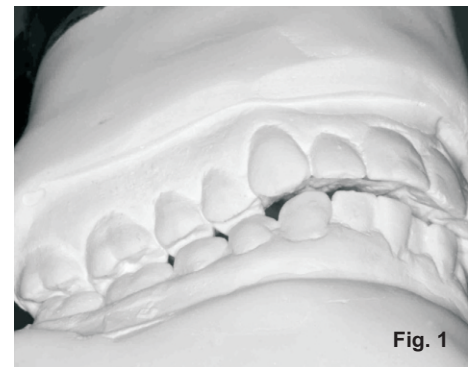


Fig. 1

Step 4: Lock the centric latch when observing the casts. Determine what would be the best choice of treatment to get the back teeth out of the way. Start with equilibration.



Step 5: Determine the correct vertical dimension. Unlock the centric latch and close the teeth into maximum intercuspation. This is the vertical dimension established by the elevator muscles. Lower the incisal guide pin so it touches the guide table.

Step 6: Return the condyles to centric relation and lock the centric lock. Observe the incisal pin in relation to the guide table. This will show the amount of closure needed to achieve the same vertical dimension of occlusion (VDO) in centric relation.

Objective: Occlusal interferences should be eliminated by selective grinding on the casts until the incisal pin contacts the guide plate. (fig 2)

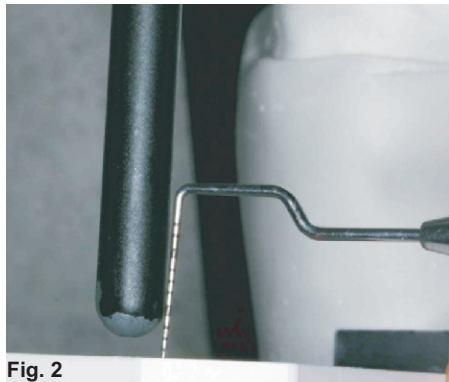


Fig. 2

Step 7: Observe the teeth that were reshaped. If reductive reshaping is mutilative to teeth that do not need restoring, consider one of the other options for achieving centric relation contact on all of the teeth.

Step 8: Remove unsavable teeth from the casts. From the clinical exam, all teeth that cannot be saved are marked with an X. At this stage of treatment planning, do not remove any teeth that can be maintained. (fig 3)

Objective: Removing hopeless teeth from the cast often changes the entire treatment-planning process. It permits use of the cut off teeth in repositioning decisions to achieve holding contacts or improved incisal plane. It also simplifies decisions regarding treatment choices of fixed versus removable prostheses or selection of implants.



Fig. 3

Step 9: If decisions have been made at the exam to use certain types of restorations, mark this on the cast. For example, (fig 4) the two upper molars have been predetermined to need crowns (C). Also note any teeth that are questionable. If they will not lend anything to the long-term stability of the finished treatment,

they can be removed.

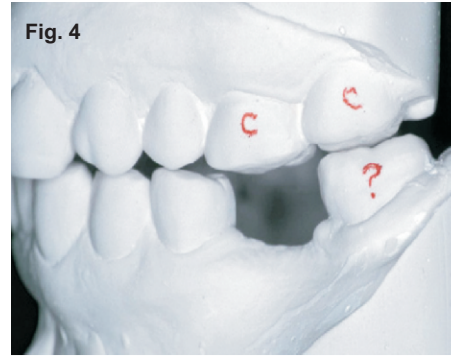


Fig. 4

Step 10: Equilibration is the first treatment option to explore.

Objective: To see if anterior contact in centric relation can be achieved by equilibration without mutilating teeth that would not otherwise need restorations.

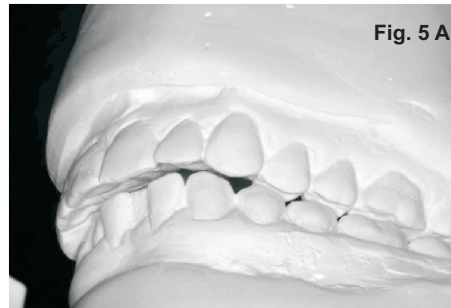


Fig. 5 A

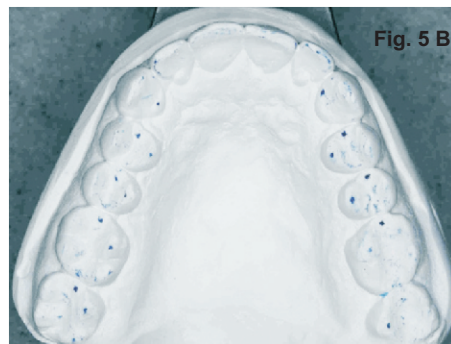


Fig. 5 B

Fig 5A, The jaw-to-jaw relationship at the first point of tooth contact in centric relation. Equilibration of the casts (fig 5B) clearly shows that reshaping the teeth is a good choice of treatment because contact with the canines is achievable by selective grinding away of the deflective interferences. This also shows that in this mouth, equilibration will not achieve contact on the incisors.

Step 11: Examine the plane of occlusion. If the occlusal plane is slanted in the mouth (yellow line) fig 6A, it will be slanted on the articulator (red line) fig 6B.

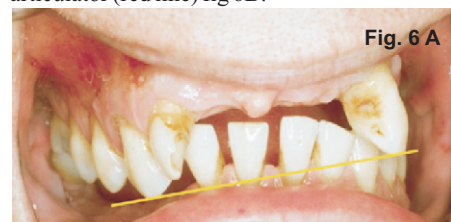


Fig. 6 A

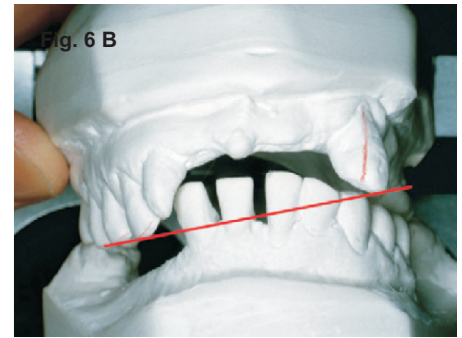


Fig. 6 B

The occlusal plane established by the simplified occlusal plane analyzer (SOPA) (fig 7A, 7B).

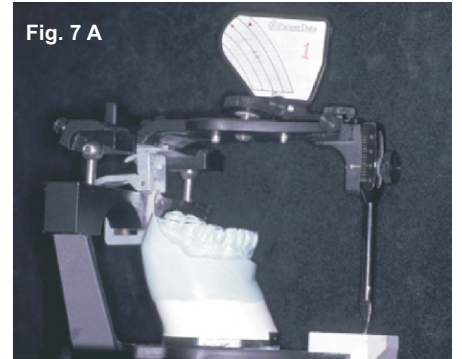


Fig. 7 A

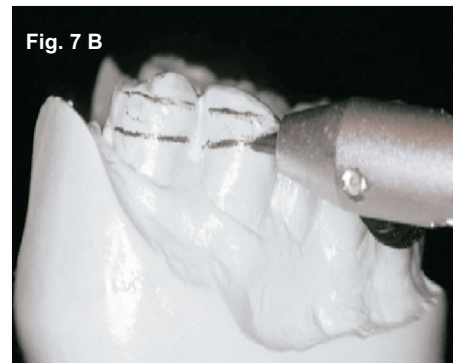


Fig. 7 B

The model is trimmed back to the established new occlusal plane. The completed wax-up. These corrected casts are now used to form a putty matrix for fabrication of provisional restorations. They are also the perfect visual aid when presenting the treatment plan to the patient. (fig 8A, 8B)

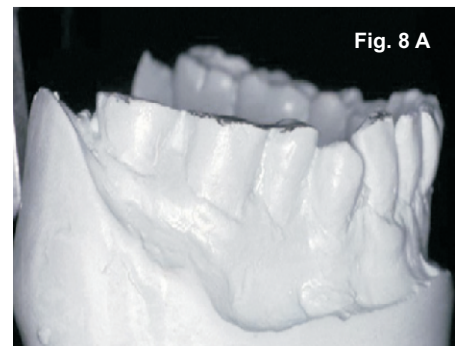


Fig. 8 A

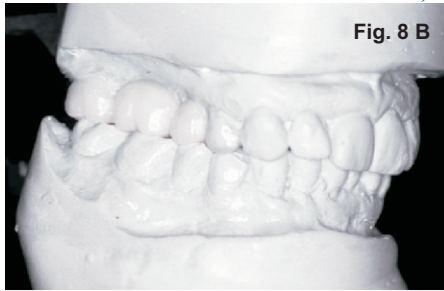


Fig. 8 B

Step 12: Establish stable holding contacts on the anterior teeth. This is one of the most important steps in the diagnostic wax-up (work-up).

Step 13: Correct lower incisal edges if needed. This refers to both position and contour. If the position of the lower incisors does not permit anterior holding contacts, the correction may involve the contour and position of both the upper and lower anterior teeth.

Step 14: Start with the lower anterior teeth. Objective: To establish correct incisal edge contour. That means a definite labio-incisal line angle . . . the leading edge. It also means ideal esthetic contour of the lower incisal edges. Anterior incisal edges that have worn the leading edge to a slanted contour must be restored to provide a stable holding contact with the upper anterior teeth. It is during this wax-up procedure that some important treatment decisions can be made. Determine the type of restoration Remember that the leading edge of the lower incisors must have a definite labio-incisal line angle. Determine the position and contour of the incisal edge. (fig 9A, 9B)



Fig. 9 A

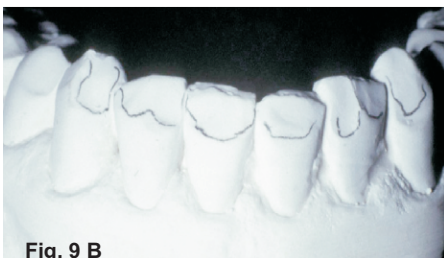


Fig. 9 B

Step 15: Re-evaluate the total occlusion with the upper cast to see how it can be adapted to occlude with the lower arch. It may require some modification of the lower wax-up, but it is usually a minimal correction.

Step 16: Establish holding contacts on the upper anterior teeth. The same five treatment options can be considered to achieve an ideal occlusal relationship.

Casts of a patient with a tight neutral zone

that positioned the upper anterior teeth with a lingual inclination. This diagnostic wax-up positioned the incisal edges forward and also made the teeth longer. (fig 10A, 10B)

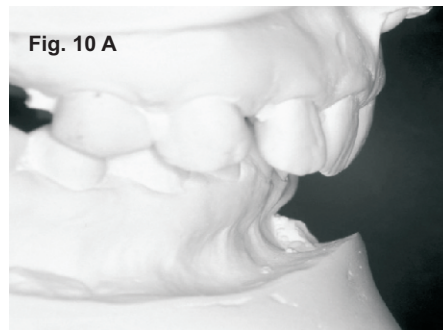


Fig. 10 A

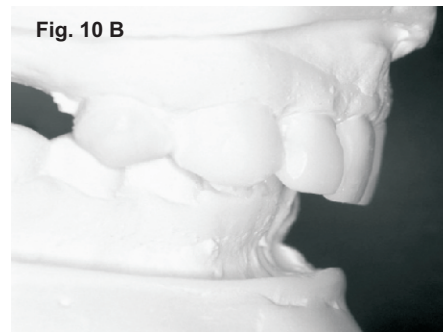


Fig. 10 B

A digital photograph (fig 11) of the patient shows the incisal edges in line with the inner vermilion border of the lower lip. It also shows a lingual inclination of the upper anterior teeth. Fig 12 shows how the provisional restorations made from the wax-up had to be recontoured back to achieve a comfortable lip closure path and phonetics.



Fig. 11



Fig. 12

working through the treatment-planning process. Working with mounted casts to develop a three-dimensional treatment plan is the best way to make treatment decisions that set a framework for start to finish. It gives the dentist confidence that raises the level of doctor patient communication. It provides the contour for provisional restorations. It is the perfect communication aid for consultations with specialists. It is the best of all possible ways for deciding the best choice of treatment. The learning curve for developing expertise in doing the diagnostic wax-up is exactly the same learning curve for developing expertise in diagnosis and treatment planning. It is truly time well spent.

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Conclusion

The value of the diagnostic wax-up is directly proportional to the understanding of complete dentistry. If the process is based on the principles of programmed treatment planning, there will be an orderly sequence in

