Implant Assisted Removable Prosthodontics

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I. Course Synopsis
   A. Different Types of Overdentures
   B. Implants with RPDs
   C. Treatment Planning Overdenture Locations and Attachment Type
   D. Partial Denture Framework Design
   E. Combination RPDs with Attachments or Implants

II. Terminology – We realize that Anatomy is Very Important
   A. Retention – Influenced by Adaptation, Anatomy
   B. Stability – Influenced by Anatomy and Limitations of Existing Prosthesis
   C. Support – Influenced by Anatomy and Limitations of Existing Prosthesis

III. Definition of an Overdenture
   A. Implant Retained Overdenture – A patient removable prosthesis that receives retention and limited stability from retained roots [natural or man-made (implants)]. Support should come from the denture bearing mucosa, not much from the roots – or not at all from the roots.
      1. Typically fewer implants and located in the anterior
   B. Implant Supported Overdenture – A prosthesis that is fixed in place with attachments and/or locks, yet is removable by the patient for hygiene access. Implants provide all retention, stability and support – just like a fixed bridge. The denture bearing mucosa provides no support all.
      1. Required more implants – placed under anterior & posterior teeth
   C. Fixed Bridge – Hybrid Prosthesis, Fixed-Detachable, Patti Bridge, Profile Prosthesis, or All-On-Four all the same thing – a dentist removable fixed bridge. The patient cannot remove this option.

IV. Why do we do overdentures?
   A. Less bone loss
   B. Improved chewing function: Bars & Balls > Magnets > F/F Dentures
   C. Improved patient satisfaction
   D. Intermediate restoration before complete edentulism

V. How Do We Make Overdentures? Make Good Dentures
   A. Three Main Steps: A well extended and well adapted denture with poor occlusion has no chance to succeed, but even a poorly extended denture with ideal centric and good occlusion can be successful.
      1. Impression Techniques – Implant Retained Overdentures require excellent border extensions and a well adapted base
      2. Records – CR Record Is Most Important Step (gives you occlusion)
      3. Occlusal Design – Lingualized is easy to deliver

VI. What Makes a Good Denture:
   A. The Big Three: Retention, Support and Stability – Stability is Key
   B. Next Two: Esthetics and Phonetics
   C. Main One: Occlusion – Excellent Occlusion overcomes poor borders.

XV. Treatment Planning – Evaluate Overdenture cases just as complete denture cases.
    Use Completely Edentulous Classification as a guide (see page 2).
    A. Record Collection – Understand the patient’s chief complaint and desires
       1. Prosthetic Findings (see page 3) for Anatomic Limitations
XVII. Overdenture Attachment Selection
A. Retention – Bars > Balls, ERA, Locator > Magnets
B. Maintenance – Balls, ERA, Locator > Bars
C. Bars – Rotational or Non-Rotational
   1. Rotational Bars allow mucosal support – only if they don’t bind!
   2. Non-Rotational Bars support the occlusal load without sharing
   3. Both bars can be made resilient, but it’s not desired with Non-Rotational bars
   4. Clips are 10 mm or more wide, need solder joints on either side so we’ll need 12 to 14 mm from implant edge to implant edge (for surgeons: 16 to 18 mm center-to-center), but the total bar length should be less than 26 mm due to strength issues
D. Implant and Root Attachments – To be considered a resilient attachment, it must provide vertical movement between 0.3 mm and 0.6 mm
   1. ERA – Resilient: Great for implants, not as great with teeth
   2. Locator – Non-Resilient: Great for teeth, less so for implants
   3. Requires more frequent relines due to lack of resiliency
   4. Implant Manufacturer Balls – Each are proprietary – ask
      a) Nobel Biocare Ball (new smaller ball) no vertical resiliency so the implants will be loaded vertically
      b) Nobel Biocare Ball (old larger ball) had blue spacer to preserve vertical resiliency & get more mucosal support
   4. OSO Balls – Non-Resilient
   5. Bredent Ball – Resilient, for use over retained natural tooth roots

XVIII. Overdenture Implant Abutment Position Selection – Canine areas are most common due to favorable anterior fulcrum points (except for “V” shaped arches, then use the lateral incisor location). Combining canines & first premolars can work in a four implant overdenture see below – otherwise avoid premolars. Second molars are also very desirable due to favorable posterior fulcrum points (like Kennedy Class III RPDs). Symmetry helps, unilateral hurts.
A. Mandibular Arch
   1. Two Implants – can be bar clip or individual balls, Locator or ERA – requires posterior ridge height for lateral stability
      a) Bars are More Complex than ERA, Locators, but have fewer post operative complications and repairs
      b) No cantilevers from 2 implants: not bars, ERAs, or Locators
      c) Cantilevers should be avoided on Anterior and Posterior
   2. Four Implants – all splinted, but clip in anterior only, ERA attachments cantilevered off the back
      a) Creates Three Points of Contact: Across the Clip, ERA, ERA
      b) Four Individual Attachments can create a fulcrum point
   4. Three Implants – Triangulated Design is Non-Favorable
      a) Consider Using a Bar Across the Front of the Two Posterior Implants and behind the One Anterior Implant with Clips now placed Parallel to Condyles.
B. Maxillary Arch
   1. Four Implants – all splinted, but clip in anterior only, cantilever ERA attachments off the back
   2. Two Implants is under designed in maxilla due to soft bone
C. Fixed Bridge Requirements – for Patti Bridge, All-On-Four, Six, etc
   1. Four implants – Bicortical stabilization in mandible and sinus wall engagement in the maxilla (Some maxillary cases are All-On-Six)
   2. Maximized A-P spread (anterior to posterior implant distance)
   3. Minimizes Cantilever by tipping posterior implants
   4. Mesial marginal ridge of first molar is goal of posterior implant
   5. Longer Implants (Mandible: at least 13 mm; maxilla: 15 mm)

XIX. Overall Overdenture Attachment Conclusions
   A. Non-Resilient Attachments – AVOID PREMOLAR LOCATIONS
   B. Resilient Attachments can be placed anywhere, but should still provide rotation - across a fulcrum line parallel to the condyles for mucosal support
   C. Bars – Rotational or Non-Rotational
      A. Rotational Bars allow forces to be transferred to mucosa
   D. Implant and Root Attachments –
      A. ERA – Resilient: Great for implants, not as great with teeth
      B. Locator – Non-Resilient: Great for teeth, less so for implants
      C. Implant Manufacturer Balls – Each are proprietary – ask
         1. Nobel Biocare Ball (new smaller ball) not resilient
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XX. Fixed Bridge Solutions – Four implants are sufficient for a fixed bridge
   A. All-On-Four design with two posterior implants tipped to decrease the cantilever and increase stability of the prosthesis.
   B. Can be done with Nobel Guide Prosthetically driven Planning software
   C. Generate Nobel Guide surgical guide that provides the opportunity to have provisional fabricated in advance.
      1. Generate Provisional to Deliver same day as implants.
   D. Select any of Patti Bridge, All-on-Four, Nobel Guide or Immediate load (TIAH)
      1. They can all be mixed or matched. Use them all or any combination
   E. Latest Development: Treating Patients who need to be edentulated: “Clear Choice” type treatment – Extract remaining teeth, Place implants and provisional bridge all in one day. Centers around the USA. Soon to be in your area if not there already
      1. Fabricate an Immediate Denture (use protocols for fabrication of immediates)
      2. Extract Teeth/Place Implants (use protocols for All-On-Four – or Six)
      3. Drill Holes in Immediate Denture and Pick Up Titanium Cylinder Attachments Direct to the Implants or onto Multi-Unit Abutments
         a) Process the Attachments into the Denture with Acrylic
            (1) Use Rubber Dam to Keep Extraction Sites Clean
            (2) Remove From the Mouth - Paint Chairside to fill Gaps
         b) Pressure Pot for Twenty Minutes
         c) Polish Flanges and High Shine then Deliver Same Day as Edentulation
   F. ClearChoice runs full page color ads in the paper, commercials on radio and TV – even thirty minute infomercials you can view on their website. Patients will have a heightened knowledge of dental implants and this treatment option – ready for that?
I. RPD Case Completion - Start to Finish (short outline - detail follows)
   A. Initial Models – Diagnosis and Offers Patient Treatment
   B. Implant Placement – Canines and Second Molars
   C. Prep and Impress – Guide Planes, Rest Preps, Impression
   D. Frame Trial – Use Disclosing, Centric Bite
   E. Wax Trial – Confirm Esthetics and Bite – lab processes case
   F. Reline at Delivery – PVS, Rubber Base or Microseal & Hydrocast
   G. Delivery – Confirm Centric and Balance
   H. One Week – Confirm Centric and Balance

II. Combination Case – Start to Finish Detailed Steps
   A. First Visit: Initial Models – Diagnosis
      1. Basic Study Casts – Staff can make these, but consider making them
         yourself as a “Trial Run” for the final impression.
      2. Design Free End Saddle framework or Rotational Path frame
         a) Free End Saddle Frame for Kennedy Class I, II, III (ignore last tooth
            and then clasp at the end of your design process) and Class IV (free-
            end saddle turned around)
      3. Plan Implant Locations – Second Molars create Tooth Borne RPDs out
         of Free-End Saddles. Canines can help rotate and retain.
         a) Nearly All Labs Can Assist, But Call and Discuss
   B. Second Visit and more: Caries Control, Endo & Perio PRN, C&B
      1. Implant Placement as needed
      2. First Complete all caries control, endo, perio and other treatments
   C. Visit: Deliver Crown and Bridge – Impress for RPD Framework
      2. Prep Guide Planes on any other teeth in the arch First
      3. Prep Rest Seats on any other teeth in the arch second
      4. Impression Options for RPD Framework
         (1) Best Technique –seat Locator/ERA Black males – then
            complete RPD Frame Impression
            (a) Now lab knows exactly the shape of our pick up will be
            and they build up a flange around the male
            (b) Now we can complete the pick up after the frame is
                adjusted – and before the case is processed.
            (c) Order a separate wax rim for records
         b) System 2 Technique with Locator/ERA Attachments
            (1) My preferred technique
            (2) Measure water for System 2 syringe gel and tray gel
            (3) Clean and clear intra-oral abutment
            (4) Seat Locator/ERA BLACK MALE (with metal housing)
(5) Make and Remove the System 2 Imp
(6) Remove Locator/ERA BLACK MALE, save, but don’t place in impression
(7) Pour the impression immediately – vacuum mix stone.
(8) Send to the lab to fabricate RPD framework. The lab will cast the frame with “Thickened” latticework around the stone where the ERA Black Males were positioned. During the Frame Trial, you’ll need to seat the Black Males again, and pick them up with GC Pattern Resin before making any centric relation records. Read on for recommendations.

D. Visit: Frame Trial – Most Important Step
1. Use Occlude Spray
   a) Clear rest seats and any attachments of food debris
   b) Dry frame, spray with Occlude, dry teeth, seat, rock across fulcrum line
      (1) Remove and check for shiny areas on the frame where the partial denture binds. Adjust rest seats and indirect retainers more than guide planes to achieve full seating of rest seats into the teeth.
   c) Pick up attachments today if you did that impression technique
      (1) Seat the Black Males again, and pick them up with denture repair acrylic before making any CR records.
2. Complete wax records – a GREAT trick is to ask the lab to fabricate a separate baseplate and wax rim from the same model that the framework was made. That will allow you to check the framework for proper fit without baseplates attached to it AND we can do the Record visit the same day as the frame trial AND we can use an intra-oral tracing device if this is the upper by having an acrylic palate.
   a) Trim wax to be just below the proper occlusal plane
   b) Carve notches into bite rim on all edentulous areas
   c) Make CR record – Intra-oral tracing devices are ideal
3. Complete tooth selection

E. Visit: Wax Trial – Confirm Esthetics and Bite
1. Last chance to make changes without a fee

F. Visit: Free-End Saddle Registration – Done 100% of the time – always better to reline than to evaluate if you need a reline.
1. Reline at Delivery – If Locators/ERAs were used, the Black Males need to be in place now.
   a) PVS, Polyether, or Rubber Base gives you 30 seconds of border molding versus 24 hours with Hydrocast technique

G. Visit 11: Delivery – If ERAs were used, seat White Males in RPD. With Locators, seat Blue Males in RPD
1. Centric Occlusion
   a) Use Occlusal Indicator Wax to eliminate prematurities.

2. Eccentric Occlusion – Use horseshoe paper for group function
   a) With Blue/Blue Horseshoe Paper – Slide side-to-side and Obliterate Upper Molar Buccal Contacts and Lower Premolar Buccal Contacts

H. Last Visit: One Week Post Delivery Adjustment – Confirm Centric and Balance and Check for Sore Spots - most are occlusally created
1. Use PIP to locate sore spots, but adjust occlusion, not intaglio
   a) Crestal Marks – Adjust centric prematurities with wax
   b) Non-crestal Ridge Marks – Adjust eccentrics with paper

2. One post op is all that is scheduled unless major changes were made
Clinical Fabrication of an Overdenture – Four Different Techniques

1. Pick Up Attachments in Framework then Process Denture
2. Impress Abutments in Final Impression for Denture
3. Impress Abutments in Reline Impression
4. Retro-Fit Existing Denture

1. Pick Up Attachments in Processed Base then Process Denture (my preferred technique)
   A. Advantages – Essentially Making a Denture, Only One Final Impression, Easiest Pick Up of Attachment, Most Natural Final Impression
   B. Disadvantages – Requires Processed Base - Cost of Processed Base with Extra Clinical Step
   C. Clinical Step-By-Step for ERAs, Locators
      a) Make a Denture – Only to Wax Trial
         (1) Duplicate Wax Up for Surgical Stent
      b) Place Implants, Relieve Existing Denture for Osseointegration
         (1) Don’t relieve support area over the buccal shelf
         (2) Reline denture with tissue conditioner
      c) Expose Implants, Reline Denture Over Healing Abutments
         (1) Make an initial impression with healing abutments in place
         (2) Fabricate a custom tray for a complete denture patient (ignore the implants) with internal wax spacer
         (3) Order implant abutments and Black Males with metal housing
      d) Final Lower Denture Impression With Implants
         (1) Add 30 minutes to conventional impression time
         (2) Seat abutments and torque to recommended level
         (3) Snap Black Locator/ERA male and housing onto abutment
         (4) confirm custom tray fits properly over abutment height – adjust PRN
         (5) Border mold the custom tray as usual
         (6) Remove wax spacer, trim border mold, add adhesive
         (7) Make final wash impression right over the black males
         (8) Remove impression – if black males come out in the impression remove before pouring master cast to create a stone “replica” of the black male
         (9) Reline provisional denture over new abutment and release patient
         (10) Order processed base (or framework) with a solid collar to fit up and around black male.
      e) Frame Delivery and Attachment Pick Up
         (1) Seat black male and housing on abutments. Seat processed base (or framework) and adjust to ensure the base doesn't bind anywhere.
(2) With one hand, gently hold the base in place (too much or too little pressure can cause difficulties). With the other hand, use Denture Repair Acrylic to lute the base to the metal housings. Allow to set for 4 minutes.

(3) Send the wax rims, the centric record, tooth selection and the processed base (or framework) with the luted Locator/ERA black males to the lab.

(4) Have the lab grind off the black male stone “replicas” to allow the frame to seat again now that the actual black males have been picked up clinically. They need to ensure the frame still seats properly.

(5) The lab will add a wax rim directly over the processed base or frame

f) Wax Records – Use Intra-Oral Tracing Device for CR
   (1) Complete wax records appointment standardized for complete dentures
   (2) Select Teeth and Posterior Occlusal Design
   (3) The lab will mount the case and set the denture teeth for a wax trial.

g) Wax Trial Appointment
   (1) Wax Trial

h) Process Denture
   (1) The lab will need to block out INSIDE and around the Locator/ERA male housings. Otherwise they will process conventionally.
   (2) The black Locator/ERA males should be removed and blue (Locator) white (ERA) males seated

i) Deliver Denture

j) Cost is a conventional denture plus implant parts plus a lab fabricated framework that varies greatly for two or four implant cases plus two hours extra chairtime

k) May be as high as 3 or 4X conventional denture fee