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ESTHETIC REHABILITATION: A COMPREHENSIVE PROSTHETIC APPROACH

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Toronto Crown & Bridge Study Club
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DIAGNOSIS

- Medical case history
- **Dental case history:**
  - Restorative case history
  - Endodontic case history
  - Orthodontic case history
  - Periodontal case history
  - Craniofacial case history
- **Extraoral clinical examination:**
  - Facial analysis
  - Dentolabial analysis
  - Phonetic analysis
  - Craniofacial evaluation
- **Intraoral clinical examination:**
  - Tooth structure evaluation
  - Orthodontic evaluation
  - Periodontal evaluation
  - Occlusal evaluation
- **X-ray examination**
  - FMX – Orthopantomography – CAT – Arthrography
- **Stone casts**
  - Mounting in articulator

TREATMENT PLAN

- Multidisciplinary evaluation (endodontics, restorative, orthodontics, periodontics, implantology)
- Communication with the patient
- Operational sequence
- Communication with the laboratory

CLINICAL STEPS

- Facebow
- Occlusal registrations
- Stone casts mounted on the articulator ➔ Diagnostic wax-up
- Fabrication and integration of provisional restorations
- Any collateral therapies (endodontics, reconstructive, orthodontics, periodontology, implantology)
- Clinical and radiographic re-evaluation
- Choice of restorative material
- Preparations and final impressions
- Transfer of esthetic-functional information to the laboratory ➔ from provisional to final restoration
- Preventive simulation ➔ biscuit try-in ➔ finalization
- Restorative techniques and ceramic materials
**LABORATORY CHECKLIST**

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**DIAGNOSTIC WAX-UP: FUNCTIONAL INFORMATION**

- Stone casts
- Facebow
- Occlusal records
  - MI or CR
  - Vertical dimension
  - Protrusive or arbitrary (20 degrees)
  - Occlusal scheme

**DIAGNOSTIC WAX-UP: OBJECTIVES**

**FUNCTIONAL**
- Curves of Spee and Wilson
- Occlusal plane
- Occlusal stability
- Overjet – overbite
- Anterior guidance
- Posterior sector disocclusion

**ESTHETIC**
- Tooth shape and size
- Tooth-to-tooth proportion
- Tooth position and arrangement
- Tooth axes
- Interproximal areas
- Interincisal embrasures

**PROTO T Y P E F O R T H E P R O V I S I O N A L**
### IDEAL REQUISITES

- Easy removal during sessions in the office
- Resistance to fracture and decementation during normal masticatory function
- Resistance to abrasion
- Maintenance of tooth position and occlusal stability
- Optimal marginal adaptation
- Maintenance of gingival health
- Good working and polishing capabilities
- Color stability

### PROVISIONALS

### TRADITIONAL INDIRECT TECHNIQUE

**CONCERNS**

- Difficult to fit
- Poor marginal precision
- Undercontoured emergence profile
- Possible detachment of relining material
- Unsatisfactory esthetics

### MODIFIED INDIRECT TECHNIQUE (MIT)

**PROCEDURE**

- With a pencil, mark an overextension of the margin on the stone cast beyond the dentogingival border by roughly 0.5-1.0 mm
- Perform the diagnostic wax-up, extending it up to the pencil line
- Make a groove in the stone along the pencil line
- Fabricate the acrylic shell (overextension: 0.2-0.4 mm)
- Fit and reline the provisional, removing the excess material
- Refine and polish

**ADVANTAGES**

- Passive insertion
- Ideal fit
- Does not raise the bite
- Easy removal of excess material
- Easy penetration of the relining material into the sulcus
- Ideal marginal reading
- Shorter and much easier finishing phases
CLINIC — POSITIONING THE PROVISIONAL

ANTERIOR REHABILITATION

PROCEDURE
- Place the provisional inside the acetate matrix
- Verify the intimate contact of the acetate matrix with the nonprepared teeth to ensure the complete insertion of the shell.
- Use silicone paste to find interferences, and eliminate them
- Remove the acetate matrix
- Guided by occlusion (MI), fit and reline the provisional
- Check the occlusion, finish and polish

REHABILITATING A SINGLE ARCH

PROCEDURE
- Place the provisional inside the acetate matrix
- Verify the intimate contact of the acetate matrix with the anatomic reference points to ensure the complete insertion of the shell.
- Use silicone paste to find interferences, and eliminate them
- Remove the acetate matrix
- Fit and reline the provisional, guiding the patient in CR
- Check the occlusion, finish and polish

REHABILITATING TWO ARCHES

PROCEDURE
- Place the provisionals inside the acetate matrices
- Verify the intimate contact of the acetate matrix with the anatomic reference points to ensure the complete insertion of the two shells.
- Use silicone paste to find interferences, and eliminate them
- Remove the acetate matrices
- Stabilize the maxillary provisional in CR with silicone paste
- Reline the mandibular provisional
- Keep the mandibular provisional relined and proceed with relining the maxillary provisional
- Check the occlusion, finish, and polish
**FUNCTIONAL INTEGRATION**

**REQUIREMENTS**
- Occlusal stability: punctiform, synchronized and well distributed contacts
- Vertical Dimension: no fremitus and/or mobility in the anterior sectors
- Anterior guidance: adequate pronunciation of letter sounds “M” and “S”
- absence of any muscle fatigue
- adequate overbite and overjet
- no interference in the posterior sectors

**ESTHETIC INTEGRATION**

**REQUIREMENTS**
- Parallelism between incisal plane and horizon
- Harmony between convex outline of the incisal edge and lower lip curvature
- Congruous tooth exposure at rest
- Progression of interincisal angles
- Ideal shape, proportion, contour and tooth arrangement

**PREPROSTHETIC SURGERY**

**INDICATIONS**
- Exposure of healthy tooth structure due to:
  - coronoradicular caries
  - oblique coronoradicular fractures
  - radicular perforations (coronal third)
  - external or internal radicular reabsorptions (coronal third)
- gingival asymmetries
  - biologic: pre-existing restorations that have violated the connective tissue attachment
  - retentive: short prosthetic abutments
  - biomechanical: inadequate ferrule effect
  - mechanical: limited space in prosthetic connection areas
AVERAGE TISSUE MATURATION TIMES

- Gingivectomy with internal bevel with or without attachment resection → 6-10 weeks
- Buccal resective surgery → > 3 months *
- Resective surgery → > 6 months *

* monitor the patient and consider individual variability

PROSTHETIC FINALIZATION: TIME LINE

“NON SURGICAL” PROSTHETIC CASES

- Absence of inflammation → STAGE 1
  - final tooth preparations
  - final impressions
  - positioning and relining the provisional restoration

- Presence of inflammation → STAGE 1
  - removal of old restorations and preliminary preparations
  - positioning and relining the provisional restoration
  → STAGE 2
  (after 4 - 8 weeks)
  - final preparations
  - final impressions and relining of the new provisional restoration

“SURGICAL” PROSTHETIC CASES

- STAGE 1
  - preliminary preparations – positioning and relining of provisional restoration

- STAGE 2
  - preprosthetic or periodontal surgery

- STAGE 3
  - wait for tissue maturation (6 weeks to 9 months depending on type of surgery)
  - final preparations and relining of provisional restorations

- STAGE 4
  - wait 3-4 weeks → final impressions
**TOOTH PREPARATION**

**INTRASULCULAR PREPARATION**

**ADVANTAGES**

- Esthetic optimization
- Modification of tooth contour and closing interproximal spaces
- Increase in mechanical retention
- Invisible margin

**STEPS**

- Prepare at level of gingival crest
- Map the sulcus to select the size and type of cord
- Insert cord appropriate for the depth and tonicity of the sulcus
- Prepare again to the new apicalized gingival level
- Remove the cord and remargin the provisional restoration

**IMPRESSIONS**

**TWO-CORD TECHNIQUE**

- Carry out mapping to evaluate depth and tonicity of the sulcus
- Select cords with appropriate diameters
- Insert the first nonimpregnated cord into the sulcus
- Deepen the preparation margin in specific sites if necessary
- Position the second cord impregnated with buffered aluminum chloride
- For more than one abutment, first insert the impregnated cords into the distal areas, squeezing them tighter
- Wait at least 4-5 minutes after positioning the last cord before taking the impression
- Do not keep the impregnated cords in place for more than 10-15 minutes. Remove the second impregnated cord when the impression is taken
- Inject the light body impression material into the marginal areas with a syringe
- Blow air with the syringe and then apply a new layer of light body material
- Superimpose the light body material over the heavy body material on the impression tray to make the fluid material flow more easily
- Take the impression
FROM THE PROVISIONAL TO THE FINAL RESTORATION

OCCLUSOPALATAL INDEX (ONE or TWO ARCHES)

**STEPS**

- Mount the casts of the provisional restorations on the articulator
- Raise the articulator pin by 2 notches
- Place the silicone between the two arches while still soft
- Close the articulator until the pin stops on the incisal plate
- Remove all excesses and mark the tooth limits with a pencil

BUCCAL INDEX (ONE or TWO ARCHES)

**STEPS**

- Raise the articulator pin by 2 notches
- Place the silicone between the two arches while still soft to create the occlusopalatal index up to the buccal fornix of the opposing arch
- Sculpt the reference points for repositioning the buccal index
- With the cast of the provisional restoration in situ, take the silicone impression of the provisional and the reference points
- Detach the buccal index after polymerization
- Remove the cast from the provisional and check the stability between the two matrices
- Dissect the matrices to check the buccal thicknesses

CLINICAL AND LABORATORY STEPS

**OFFICE**

- Impression of the provisional restoration
- Impression of the antagonist
- Protrusive interocclusal record
- Facebow
- Final impression
- Occlusal registrations
- Color transmission
- Laboratory checklist

**LABORATORY**

- Mounting the articulator with a facebow
- Setting the articulator
- Customized anterior guidance
- Silicone indices
- Constructing the substructure
- Preventive simulation (PS)
- Finalization
DIAGNOSTIC WAX-UP: OBJECTIVES

FUNCTIONAL
- Single surgical stage
- Increased patient comfort
- Ideal shape and contour
- Easier management of provisionals
- Immediate support for the peri-implant tissues

ESTHETIC

SINGLE IMPLANT – IMMEDIATE FUNCTION

ADVANTAGES
- Single surgical stage
- Increased patient comfort
- Ideal shape and contour
- Easier management of provisionals
- Immediate support for the peri-implant tissues

WARNINGS
- Exclude parafunctional patients and those with deep overbite
- Achieve adequate primary stability (> 35 N)
- Ascertain the presence of at least 2 mm of buccal bone
- Check the buccal bone-implant distance (< 2 mm)
- Avoid any occlusal contact in both static and dynamic phases

ANTERIOR IMPLANTS: IDEAL PAPILLA HEIGHT

- Maintenance of an appropriate level of connective tissue attachment of the adjacent dentition
- Ideal distance between tooth and implant: > 1,5 mm
- Ideal distance between implant and implant: > 3-4 mm
- Proper soft tissue conditioning with the provisional restoration
- Appropriate replica of the transmucosal path design

CEMENTED vs TRANSOCCLUSAL SCREW-RETAINED IMPLANT RESTORATIONS

PARAMETERS TO EVALUATE
- Implant position and inclination
- Esthetics and occlusion
- Retrievability and retention
- Weakening of the metal-ceramic design
- Interarch distance
- Implant platform location
- Passive fit
- Technical complexity
THE PROSTHETIC EVOLUTION

CAD/CAM TECHNOLOGY

WHY?
- Access to new technology
- Almost defect-free
- Industrially prefabricated and controlled materials
- Increase in quality and reproducibility
- Data storage commensurate
- Standardized chain of production
- Improvement in precision and planning
- Increase in efficiency
- Reduction in cost
- Biological and aesthetic improvement

INDICATIONS
- Cemented and screw-retained crowns and bridges on teeth and implants in Alumina, Zirconia, Titanium, Cobalt-Chr
- Titanium and Zirconia abutments
- Implant bar overdenture
- Temporary acrylic restorations

SILICA BASED CERAMICS

FELDSPATHIC PORCELAIN – GLASS CERAMICS:
- Etchable:
  - Ideal translucency
  - Limited strength
- Indications:
  - Single restorations
  - Anterior bridges

HIGH-STRENGTH CERAMICS

ALUMINA – ZIRCONIA OXIDES:
- Not Etchable:
  - High strength
  - Limited translucency
- Indications:
  - Anterior and Posterior single restorations
  - Anterior and Posterior bridges and implant

MINIMALLY INVASIVE PROSTHETIC PROCEDURE (MIPP)
- Minimize tooth preparation
- Keep as much enamel as possible
- Bond the restorations
- Keep the monolithic ceramic in occlusion (Posteriors)
- Increase the V.D.O. (if at least one arch is prosthetically involved)