Removable Options for Edentulous Patients

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The smile line is a curve whose path follows the incisal edges of the central incisors through the tips of the canines and this curve is in harmony with the upper border of the lower lip


The illusion of the smile line
The only true curve is in the occlusal plane
The “smile line” is primarily created by tilting the occlusal plane upward or downward

TILTING THE PLANE upward posteriorly OR downward anteriorly INCREASES THE CURVE

TILTING THE PLANE downward posteriorly OR upward anteriorly REVERSES THE CURVE

**Occlusal plane angle and facial esthetics**

Examining facial images of dentate subjects with digitally altered occlusal plane angles, observers preferred smiles with angles between 5 and 15 degrees and a 0 degree angle was judged as the most unattractive.


Removable Edentulous Options

**Mandible**

1. Complete denture
2. Two implant overdenture (no bar)
3. Four implant overdenture (no bar)
Removable Edentulous Options

Maxilla
1. Complete denture
2. Four implant overdenture (no bar)
3. Six implant overdenture (bar)

Removable or Fixed?
- Cost – in MOST (not all) cases, a removable restoration is less costly
- Vertical space – removable (without bar) least, metal-ceramic more, bar framework most (about 10 to 12 mm from implant platform to incisal edge)
- Planned implant numbers – >4 to 5 for fixed
- Masticatory efficiency – increased efficiency and forces with fixed

Removable or Fixed? (cont)
- Opposing arch – fixed restorations generally result in increased masticatory forces, may place undue forces in opposing arch
- Bone preservation – Better with fixed, important in resorbed ridge
- Hygiene – fixed generally more difficult, consider patient age and dexterity
Removable or Fixed? (cont)

- Adjustment disorder – removable prostheses feel less like patient's own teeth
- Vanity/Patient desires and expectations – patients who don't like thought of removing teeth
- Treat to your abilities – removable less complex

Edentulous Mandible

1. Complete denture

Lingual flange

If patient complains that they can't access the buccal surfaces of teeth with their tongue and teeth are too long, make sure it isn't an overextended lingual flange that is limiting tongue movement
Final impression for mandibular denture

- Preliminary cast with alginate or alginate substitute
- One layer of baseplate wax to borders
- 3 stops; 1 anterior and 2 on posterior ridge
- Peripheral molding with GC ISO Functional
- First impression with fast setting Kettenbach Panasil or Identium PVSE light body
- Relieve pressure areas and re impressions

Make digital images and provide explicit instructions to lab

Following smile line not always esthetically appealing

Increasing VDO

Considering the limitations, it can be concluded that whenever indicated, permanent increase of VDO is a safe and predictable procedure. Patients can adapt to an increase of VDO of up to 5 mm.

Mandibular denture
pros/cons

- Low initial cost
- Instability
- Significant decrease in chewing efficiency
- Continued bone loss
- Maintenance

Edentulous Mandible

2. Two implant overdenture

As a Minimal Treatment Objective: Mandibular Two Implant Overdentures as First Choice Standard of Care for Edentulous Patients

The McGill Consensus Statement on Overdentures, J of Prosthodont 2002;17(4).

The Annual Conference of the British Society for the Study of Prosthetic Dentistry


“A standard of care and can be recommended routinely in general practice”

Attachment retention

- Model of edentulous ridge
- ERA, O-ring, Locator and Ball attachments
- Framework with 1-4 implants
- Only Locator and Ball attachments had values for sufficient retention


Chairside Locator attachment

VOCO Quick Up for attachment
Held in place by dentist, preferable to having patient close

Shortest appropriate attachment
Less torque on implants/abutments
Easier removal with chairside attachment
More intact denture teeth
Stronger base

Too distal placement of implants for 2-implant overdenture may create an anterior cantilever and unstable prosthesis
Mandibular “smile line”

- Mandibular teeth often overlooked in smile line evaluation
- Have patient open and observe horizontal balance between teeth and lower lip
- Occlusal plane dips posteriorly-indicative of reverse smile line, check incisal edge position and retromolar pad
- Posterior plane rises posteriorly-exaggerated smile line
- Look for balance from side to side

LOCATOR® Abutment
For Certain® Implants

- 1, 2, 3, 4, 5 and 6 mm collar heights
- One piece abutment, does not engage hex
- Interfaces at collar margin area of implant
- Tripod drive feature
- Plastic Delivery Tool
- Recommended torque of 20 Ncm

LOCATOR® Abutment
Core Tool  Abutment Driver and Driver Tip

- All in one instrument
- Drives abutment
- Used to torque abutment with 0.50 mm hex tip
- Removes male from housing
- Inserts male into housing
**LOCATOR® Abutment**

Impression Coping for the Indirect Technique

- New design
- Transfers position of the abutment to the master cast
- Fits all LOCATOR abutments
- Pick-up impression coping with an elastomeric material
- Black nylon male included
- Fits directly onto LOCATOR abutment

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**Chairside Locator Technique**

1. Refine basal surface of overdenture and confirm seating
2. Seat white ring over Locator abutments and then place metal Locator housing with black processing insert
3. Create recesses, with mechanical undercuts, in overdenture coronal to Locator attachments (or use impression spacers from Zest)
4. Use PIP or other indicator to be sure denture is passive and attachments are not touching recesses
5. Apply adhesive to Locator holes

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**Chairside Locator Technique**

7. Fill recess 2/3 with Quick Up
8. Seat gently, but accurately and hold for 3 minutes
   - Having patient close into occlusion is unpredictable
   - If patient closes with too much force, entire ridge becomes irritated
   - If patient closes too lightly, prosthesis will pivot around attachments
9. Reduce excess from intaglio and seat
Nylon Locator Males

- Clear - 5.0 lb. I use only on worn abutments
- Pink - 3.0 lb. Light Retention
- Blue - 1.5 lb. Extra Light Retention
- Green - 4.0 lb. Extended Range
- Orange - 2.0 lb. Extended Range
- Red - 1.0 lb. Extended Range Extra Light
- Gray - 0.0 lb. Zero Retention

Locator Maintenance

- 65 patients received maxillary dentures and mandibular 2-implant overdentures with Locators, Southern plastic or Straumann gold
- Prosthetic success highest with Locator (90%, 88%, 75%)
- Locator nylon matrix loses retention more frequently than some attachments, but it is easily replaced with minimal chair time


Locator abutment/housing replacement

- Test existing abutments with new males
- If necessary, replace with new abutments (not always the same height as original)
- Tighten to specified torque
- If changing height of abutments, remove housings with trephine bur (Komet 227 B RA 070)
- Trephine preserves housing and results in less removal of resin base
Locator abutment/housing replacement

- Use #8 round bur or #37 inverted cone bur to remove flash and create mechanical undercut
- Place block out rings and new housings
- Check for interferences to seating with QuickUp Test Fit and adjust as needed
- Block out additional undercuts using Test Fit and small syringe tip
- Place adhesive into receptacles

Locator abutment/housing replacement

- Inject QuickUp resin to fill receptacles about 2/3
- Hold in place or have patient gently close for about 4 minutes and then remove
- Trim flash
- Remove processing males with core removal tool
- Place least retentive male
- Recheck fit, retention and occlusion

Mandibular 2-implant overdenture: pros/cons

- Significant increase in retention and stability over complete denture (Heydecke G, et al. Quintessence 2008)
Bar vs. solitary attachments for mandibular overdenture

- No difference in implant prognosis (Naert I, et al. JPD 1994)
- Much higher cost with bar (Walton JN, et al. IJP, 1996)
- Relines are more difficult with bar
- Difficulty in tooth arrangement
- Weakens resin base and teeth

Bar vs. solitary attachments for mandibular overdenture

- No improvement in retention or stability with bar (Naert I, et al. IJOMI, 2004)
- Hygiene more difficult with bar (den Dunnen et al. JPD, 1997)
- Cost of 4 implants and bar approaches that of FDP with no significant improvement in bone preservation or patient comfort (Visser A et al. Clin Oral Impl Res 2005)

Edentulous Mandible

3. Four implant overdenture
Mandibular 4-implant overdenture
pros/cons

- Implant retained and supported
- Better bone preservation than 2 implants?
- More stable than 2-implant overdenture?
- Greater comfort?
- Removable prosthesis with greater cost than 2 implants

Locator overdenture:
Objectives for optimal use

- Place implants as parallel as possible
- More predictable retention
- Less wear of abutments and attachments
- Place shortest Locator abutments possible
- Eliminate risk of locking prosthesis during attachment
- Stronger prosthesis
- Less hollow grinding of teeth
- Less torque on implants and abutments

Locator overdenture:
Objectives for optimal use

- Use least retentive males that provide adequate retention
- Less wear of abutments and males
- Less frequent replacement
- Easier manipulation by patient
- Chairside attachment for individual implants
- Dentist has better control of fit
- Saves laboratory fees
- Use materials designed for their placement
- Vent holes not necessary
Locator overdenture: Objectives for optimal use

- Laboratory attachment for bars
- Risk of capturing undercuts with chairside method
- Record the exact size of Locator abutments
- No guesswork when replacement required
- If not recorded, measure length and subtract 1.8 mm
- Vent holes no longer necessary
- Short abutments
- Block out undercuts

Implant assisted RPD’s

- Implant-assisted RPD’s with Locator attachments demonstrated high retention
- Conventional clasping can be eliminated in esthetic zone


Conclusions: Mandible

- Stability, retention, and comfort may be difficult to achieve with mandibular complete dentures
- Time and cost considerations make 2-implant overdentures first choice for edentulous mandibles
- Current attachment systems make bars for removable prostheses nearly obsolete
Edentulous Maxilla

1. Complete denture

Digital caliper

- Measures
  - Sizes and proportions of teeth
  - Sizes and proportions of waxings
  - Implant spaces
  - Orthodontic spacing
  - Edentulous spaces
  - Interarch space
  - Sizes for denture tooth selection

Not all edentulous patients can be restored to a Class I occlusion. If, for example, they are Cl II division 2, they should remain that way in denture or implant prosthesis

Tooth position, color and size are secondary to occlusal plane angle.

Denture occlusion
Review of 5,166 articles, 7 RCTs. “Recent research has shown that conventional DCs can function successfully without a balanced occlusion. The conception of BBO was not based on rigid scientific methods.”

Horizontal overlap critical
• Particularly in posterior teeth, minimal overlap will result in cheek biting.
Avoid Embarrassment Denture (AED)

- Inexpensive duplicate of completed denture
  - Indicated particularly for older patients: those with some memory loss, dementia, Alzheimer’s
  - Patient’s prone to fracture and need of frequent repairs
  - Vanity: patients who want security of a backup
  - Also an insurance policy for treating dentist: patient has a backup if repairs needed, no need for “emergency” appointment

Do not let opposing arch dictate a compromise.
Attempt to idealize the prosthesis and conform the opposing arch to your ideal

Maxillary denture vs. implant prosthesis

- “Patients satisfied with their current maxillary complete denture have been found to have almost no significant improvement in general satisfaction, stability, retention, esthetics, mastication, or speech when restored with an implant overdenture.”

- Only 7% of patients recruited for one study of maxillary implant overdentures were inclined to participate because of satisfaction with maxillary complete dentures

Mini-implants

Implant alignment is more critical with mini-implants than with conventional implants because angle and length correction is not possible.

Mini implants

- 19 edentulous patients, 114 mini-implants evaluated over 24 months.
- Mean vertical bone loss 1.93 mm in full palatal coverage, 5.38 mm in partial.
- Survival rate 78% in palatal coverage, 54% in partial palatal coverage.


Edentulous Maxilla

2. Four implant overdenture
Chairside attachment placement


- Preferable to using impression copings and lab attachment
- Individual Locators-chairside attachment is most accurate when done properly
- Locators on bar-laboratory attachment preferable (risk of engaging undercut with bar)

Chairside attachment placement

- Select and place shortest possible Locator attachments
- Place impression spacers
- Custom tray with peripheral molding and impression
- Indicate palatal extension on cast
- Bead the extension if open palate
- Indicate posterior palatal seal of close palate

Chairside attachment placement

- Wax, try-in and confirm tooth arrangement
- Process open palate, metal reinforced prosthesis
- Confirm seating, adjust pressure spots and refine occlusion
- Place Locator housings and processing rings
- Remove interferences to seating using Quick Up fit test and then place undercuts in recesses
Chairside attachment placement

- Block out undercuts using Quick Up Fit Test
- Apply adhesive to recesses
- Fill recesses about 2/3 with Quick Up resin
- Seat and hold overdenture in place for about 3 minutes (alternatively have patient close)
- Voids filled with Quick Up LC
- Use least retentive males that provide adequate retention

Speech and implant prostheses

Speech tested in 30 edentulous patients

Maxillary implant overdentures with and without palates enable patients to produce more intelligible speech than fixed prostheses


Speech and implant prostheses

In patients rehabilitated with oral-implant-supported prostheses speech disorder is more frequently observed than in subjects with a natural dentition, particularly with fixed prostheses in the upper jaw

Private practice data

- 15 patients from 1 to 10 years
- 4 implants in 10 patients, 6 implants in 3 patients, 5 and 3 in one each
- Open palate in all, but 1 prosthesis
- 2 implant failures prior to restoration
- 0 implant failures following restoration

(Cavallaro et al. IJOMI, 5 patients, 12 to 48 months, 0 failures)

(Eccelente, et al. Quintessence Int, 2011, 45 patients, 180 implants, 27 months, 97.5% implant survival and 100% prosthesis survival)

Recommendations for maxillary 4-implant overdenture

- Always reinforce palate with metal framework
- Increased occlusal forces could lead to soreness and fracture in opposing arch
- Place implants as parallel as possible
- Wide distribution of implants
- Locator attachments, shortest ones indicated
- If more implants or bar, FDP similar to mandibular arch

Edentulous Maxilla

3. Implant bar overdenture
Recommendations for maxillary implant overdentures

- Primary, secondary and tertiary bars no longer necessary
- Single bar with attachments achieves same results with much lower cost
- 4 parallel Locator attachments
- Use highly accurate CAD/CAM as opposed to cast bars (Drago C, et al. IJOMI 2010)

Recommendations for maxillary implant overdentures

- 6 splinted implants is a “belt and suspenders” approach (Fischer K, et al. IJOMI 2006, 100% success at 3 years)
- Resin-metal FDP can be made at same or even lower cost

Conclusions

- A consonant smile line is an objective of any complete oral rehabilitation
- Removable options may be the treatment of choice for selected edentulous patients
- Bars are usually unnecessary in the mandible and may be unnecessary in the maxilla
- Current implant attachment systems are effective yet convenient
- These alternative make implant dentistry more affordable and accessible to a larger segment of the population