Predictable Prosthetics:

Using the All-on-4 Concept and CAD/CAM Technology to Deliver Restorative Excellence

September 21, 2012 - Huntersville, NC

The Goal

All-on-4™

Indications
- Currently edentulous mandible or maxilla.
- Simultaneous extraction of remaining teeth with implant placement and provisional restoration.

Surgical access
- Open flap.
- With NobelGuide™: flapless, mini-flap, or flap.

Available implant systems
- All Nobel Biocare implant systems with Multi-unit Abutments.
- NobelClinician/NobelGuide™: Prosthetic-driven diagnostics, treatment planning and guided surgery system.

All-on-4®

Principal:
- Implants (straight implants in the anterior and two angled implants in the posterior) supporting a provisional, fixed, and immediately loaded full-arch prosthesis as a potentially graftless solution.

Benefits
- Benefits of angled posterior implants:
  - Help avoid relevant anatomical structures and can be included in better quality bone.
  - Offer improved support of the prosthesis by reducing cantilevers with more optimal arch form distribution.
- Final restoration:
  - Full-arch restoration with only 4 implants.
- Efficient treatment flow:
  - Immediately loaded for shorter treatment times and improved patient satisfaction.

History

"All-on-Four" Immediate-Function Concept with Bränemark System™ Implants for Completely Edentulous Mandibles: A Retrospective Clinical Study
History

First Reported
2003 - Clinical Implant Dentistry and Related Research

Protocol
• Edentulous or Hopeless
  7 year follow up

• 4 Implants placed-40Ncm and 10mm-15mm

• Failures - success
  Immediately loaded - In
  2 hrs and at least 10 teeth

• Final Prosthesis within 6 months

Results
• 1 year follow up
• 176 Implants placed
  in 44 patients
• 5 Failures - success
  rate >97%

Prosthetic Success - 100%

"All-on-Four" immediate function concept with Brånemark System implants for completely edentulous mandibles: a retrospective clinical study.

History

Reported in 2005 - Clinical Implant Dentistry and Related Research

Protocol
• Edentulous Maxillae
• 4 Implants placed - 40Ncm and 10mm-15mm

• Failures - success
  Immediately loaded - Within
  3 hours

• Final Prosthesis within 6 months

Results
• 1 year follow up
• 128 Implants placed
  in 32 patients
• 3 Failures - success
  rate >97%

Prosthetic Success - 100%

All-on-4 immediate function concept with Brånemark System implants for completely edentulous maxillae: a 1-year retrospective clinical study.

The Science

Tilted Implants vs. Axially Loaded Implants

Tilting of splinted implants for improved prosthetic support: a two-dimensional finite element analysis.

Protocol
• FEA created using two
  3.75mm diameter 13mm
  long implants

• Splinted with Ti beam
  16mm long and 3mm in
  height

• Parallel vs. Distal
  fixture at 45 degrees

• Cantilever Length


"It has been shown by FEA that peak stress values appear at the interface at the most coronal bone-to-implant contact but do not extend to the surrounding region."
The Science

Results

- Crater-like defect at coronal bone-to-implant interface
- No differences in stress induced in tilted vs. axial interfaces
- Significant decrease in stress when cantilevers were eliminated

The Science


Planning for All-on-4

General considerations

- Ability to achieve primary implant stability (45-50 Ncm insertion torque) and no severe parafunctions.
- To diminish the cantilever, tilt the posterior implants to a maximum of 45°.
- For tilted posterior implants, plan the distal screw access holes to be located at the occlusal face of the 1st molar, 2nd premolar, or 1st premolar.
- The All-on-4™ treatment does not require a wider opening of the mouth than a normal straight position of the implants due to the angulation of the posterior implants.

Indicated for:

- Totally edentulous maxilla: min. bone 5mm width and 10mm height from canine to canine.
- Totally edentulous mandible: min. bone 5mm width and 8mm height between the mental foramina.
Planning for All-on-4

Treatment Planning
Benefits of Graftless Solutions

graft (graft n (uc)): a tissue or material used to repair a defect or deficiency—see ALLOGRAFT, ALLOPLASTIC G., AUTOGENOUS G., AUTOGRAPH, FULL THICKNESS G., HETEROGRAFT, HOMOGRAPH, ISOGRAFT, SPLIT-THICKNESS G., XENOGRAF

Benefits of Graftless Solutions

Issues with Grafting:
• Time: Several Visits and takes 6-12 months
• Cost: Adds $$$$$
• Fear: Number of Surgeries
• Graft Materials: Patients ideas on other Human or Animal Bone/Extra-oral Harvesting of Bone

“A decisive factor in patient care is simplification of treatment, which should be based on identifying and utilizing the enormous capacity of existing original anchoring tissues. When possible, one should avoid unnecessary advanced and complicated major grafting procedures.”

P.I Brånemark
Professor, MD, PhD, ODhc
Treatment Planning

Many Options for Type of Implants

Internal Hex Connection (NobelActive™)

External Hex Connection (Brånemark System® and NobelSpeedy™ Groovy)

Tri-Channel Connection (NobelReplace™, Replace® Select, and NobelSpeedy™ Replace)

Evolution of Nobel Implants

1997
1998
2001
2002
2005
2010
2011

Replace
External Hex

Replace
Select Straight

Replace
External Hex Tapered

NobelReplace
Conical Connection & Platform Shift

Surgery

All-on-4 can be performed in two ways

Flap
*All-on-4 using conventional flap procedure with traditional planning and a standardized All-on-4 Guide for predictable and optimal positioning of the implants.

Flapless
*All-on-4 with NobelClinician/NobelGuide™ using flapless technique, computer-based planning and a customized Surgical Template to correctly drill and position the implants.

Surgery

Conventional Flap Procedure

Guided Flapless Procedure

Photo Courtesy of MaloClinic, Lisbon Portugal
Provisional Prosthetics
Considerations

- No extensions over one tooth on each side for the immediate all-acrylic bridge, which should have a minimum of 10 teeth.
- If the patient’s removable prosthesis is in good condition, it may be used to fabricate the immediate all-acrylic bridge.
- For proper aesthetics and function, the final bridge should have 12 teeth.

With or Without Multi-Unit Abutments

- Wide Shoulder
- High Strength
Provisional Prosthetics
Considerations
Multi Unit Abutment

• Wide Shoulder
• High Strength
• Short Cone

Provisional Prosthetics
Considerations
Multi Unit Abutment

• Wide Shoulder
• High Strength
• Short Cone
• Wide Angle

Provisional Prosthetics
Considerations
Multi Unit Abutment

• Wide Shoulder
• High Strength
• Short Cone
• Wide Angle
• Multiple Heights

Provisional Prosthetics
Considerations
Multi Unit Abutment

Straight Abutments
Margin Heights: 1-5 mm
22° Cone Angle

Angled Abutments
Margin Heights: 2-5 mm
Angle Correction: 17° or 30°

Immediate (Early) Loading
Considerations

• Obtain Primary Stability on Implants to be Loaded (35-45Ncm)
• Cross-rich Stabilization
• Eliminate Cantilevers in Temporary Prosthesis (12 Teeth or less)

Provisional Prosthetics
Conversion

• Made Prior to Surgery if Guided approach is utilized
• Made Chairside Immediately after Implant placement
• Made in Laboratory and delivered within 48 hours
Provisional Prosthetics
2 Week Post Operative Check

Provisional Prosthetics
Guided Conversion

Provisional Prosthetics
Guided Conversion

Goals During Osseo-Integration
- Control Forces
  - Occlusion
  - Consistency of Food
  - Frequent Post-Op Checks
- Minimal Repairs
  - Extra Thickness
  - Metal Reinforcement

Definitive Restorations

3 Types
- Over-Denture with Bar
- Fixed Bone Anchor (Hybrid)
- Procera Implant Bridge (PIB)

"The CAD/CAM bars fabricated in the present study demonstrate better precision, with respect to volumetric misfit values, and with statistically significant differences when compared to the cast bar fabricated in this study with a conventional lost wax technique."
**Use the Technology**


Spark erosion, CAD/CAM, and framework bonding to prefabricated cylinders have great potential to overcome significant incertoies produced by the fabrication procedure and prefabricated implant frameworks with excellent fit. To date, CAD/CAM provides the most consistent outcome.

**Use the Technology**

NobelProcera on natural teeth, preservation and restoration of natural teeth with individually designed crowns, bridges and veneers. NobelProcera are unmatched in precision of fit, bio-compatibility, and esthetics.

NobelProcera on implants. For implant supported restoration. NobelProcera delivers a range of highly functional, bio-compatible and highly esthetic solutions including standardized and individualized crowns, individualized crowns and bridges.

NobelProcera fixed and removable solutions. According to patients needs and the clinical situation both, fixed or removable implant retention solutions can be provided.

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NobelProcera overdenture solutions. According to patients needs and the clinical situation both, fixed or removable implant retention solutions can be provided.

**Predictable Restorations**


Five zirconia framework brands performed equally well and were statistically comparable with metal frameworks at three years. Two leucite-containing veneer ceramics applied by means of pressing technique had the statistically lowest number of fractures.
Use the Technology


*Spark erosion, CAD/CAM, and framework bonding to prefabricated cylinders have great potential to overcome significant inaccuracies produced by the fabrication procedure and provide implant frameworks with excellent fit. To date, CAD/CAM provides the most consistent outcome.
How Do We Get There?

Use the Technology

Predictable Restorations
“None on 3”

Team Approach

RESTORATIVE DENTIST

SURGEON — LABORATORY

THANK YOU!!!

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