SuperLine & IMPLANTIUM
Surgical / Prosthesis Manual

DentiumUSA
Developed by Clinicians for Clinicians
S.L.A. Surface

- Higher bone-to-implant contact
- Faster bone formation on the surface

Surgical Drilling Sequence

Drilling Sequence Guideline  (Final Drill)

Final Drill

First Guide Drill  Second Guide Drill  Countersink

Platform Ø 3.6
Body Ø 3.4

Platform Ø 4.0
Ø 3.8

Platform Ø 4.5
Body Ø 4.3

Platform Ø 5.0
Body Ø 4.8

Platform Ø 6.0
Body Ø 4.8

Platform Ø 7.0
Body Ø 5.8
30~45 N-cm torque at 20rpm is recommended for fixture insertion.

- Countersink Drills are made for use in cases where dense bone is encountered to ensure passive fit of the implant neck into the surgical site. These drills are designed to enlarge the crestal area of the implant site in the area of dense cortical bone.
- If the bone density is D1~D2, it is recommended to use the Countersink Drill after the final drilling.
- The actual diameter of the Countersink Drill is 0.1 mm larger than the fixture platform.

**Determination of Fixture Top Level**

- Top level of fixture needs to be located 0.5mm below the marginal crestal bone level to minimize bone loss after placing the implant.
- Final Drills are 0.7mm longer than corresponding fixture

**Depth Indication**

- Use the Depth Gauge after First Drill / Lindemann First Drill to check depth of drilling.
- Place the Depth Gauge against the wall of the osteotomy.
Drilling Depth Guide

**Platform: Ø3.6 / Body: Ø3.4**  
(1000rpm / 30–45N-cm)

**Platform: Ø4.0 / Body: Ø3.8**  
(1000rpm / 30–45N-cm)

**Platform: Ø4.5 / Body: Ø4.3**  
(1000rpm / 30–45N-cm)
Platform: Ø5.0 / Body: Ø4.8
(1000rpm / 30~45N-cm)

First guide drill
Second guide drill
Final drill Ø3.6
Final drill Ø4.0
Final drill Ø4.5
Final drill Ø5.0
Countersink Ø5.0
- FX platform Ø

10mm
FX 5010 SWC
FX 4810 MLC
Ø5.0
Ø5.0
Ø4.8
0.5mm

Platform: Ø6.0 / Body: Ø4.8
(1000rpm / 30~45N-cm)

First guide drill
Second guide drill Ø3.6
Final drill Ø4.0
Final drill Ø4.5
Final drill Ø5.0
Countersink Ø6.0
- FX platform Ø

70mm
FX 6010 SWC
Ø6.0
Ø4.8
0.5mm

Platform: Ø7.0 / Body: Ø5.8
(1000rpm / 30~45N-cm)

First guide drill
Second guide drill Ø3.6
Final drill Ø4.0
Final drill Ø4.5
Final drill Ø5.0
Countersink Ø6.0
Final drill Ø7.0
Countersink Ø7.0
- FX platform Ø

10mm
FX 7010 SWC
Ø7.0
Ø5.8
0.5mm

*Note: Instead of using Lindemann Guide Drill, Guide Drill in the Denailum SuperLine & Implantum Product Catalog in page 48 may be used.
Instead of using Lindemann First Drill, First & Pilot Drill in the Denailum SuperLine & Implantum Product Catalog in page 48 may be used.
*Do not use Pilot Drill when placing 3.0 platform diameter / 3.4 body diameter fixture.
Refer to SuperLine & Implantum Product Catalog (page 48), for more information regarding drills.
Fixture Connection

Caution: When opening the fixture pack, hold the fixture container upward and engage the adapter into the fixture.

By hand-piece
20 rpm / 35 N·cm

By ratchet

Directions Using the Hand-piece / Ratchet Adapter

SuperLine
Hand-piece Adapter
Ratchet Adapter

Connection

The Hand-piece Adapter/Ratchet Adapter must be connected firmly together with the internal hex inside the fixture.
Installation Procedure & Warnings

Cover Screw

Healing Abutment

Warnings

Dental implant surgery and restoration involve complex dental procedures. Appropriate and adequate training in proper technique is strongly recommended prior to use.

- Improper medical examination and/or treatment plan can result in implant failure and/or loss of supportive bone.
- Improper initial stability and/or excessive occlusal forces during healing period may lead to osseointegration failure.
- Excessive insertion torque may lead to mechanical failure or implant biologic failure due to bone compression and necrosis.
- When forces or loads are greater than its design, implant or abutment fracture could happen. Therefore clinicians should make careful decisions with regards to clinical treatment planning to minimize the risk of fracture. Appropriate implant quantity, occlusal interface and a nightguard are essential. Potential excessive loading conditions may include the following:

  01 Inadequate number of implants are placed.
  02 Implant width and/or length are inappropriate for a treatment site.
  03 Prosthesis which has excessive cantilever length due to inadequate biomechanical design
  04 Continuous occlusal force is generated by incomplete connection between implant and abutment and/or abutment screw loosening.
  05 Direct Cast Abutment angles are greater than 30° from the vertical axis of the implant.
  06 Occlusal interferences causing excessive lateral forces
  07 Patient parafunctions such as bruxism
  08 Inadequate dental laboratory casting procedures
  09 Improper prosthesis fit
  10 Trauma from patient habits or accidents
  11 Excessive marginal bone loss caused by inadequate bone width and/or advanced peri-implantitis
Surgical Kit Maintenance

Manual Cleaning and Sterilization Procedure

It is important to use protective clothing and face shield while cleaning contaminated instruments. Always wear protective glasses, mask, gloves, etc. for your safety.

- Please follow legal regulations, as well as hygienic guidelines to prevent contamination and infection through prevention.
- Please remember that you are responsible for the maintenance and sterility of your medical/dental products/device. It is important to use and follow proper cleaning, disinfection and sterilization procedures.
- It is also important to follow the manufacturer's recommendation on the usage of drills. Please keep a log as to how many times the drills are used.
- Drills are used per implant placed not per patient. Bone density determines the life of the drills.
- Replace white and red o-rings on adapters and hex drivers, if worn and dried.
- Drills should be considered for replacement after around 40 uses based on bone density.

Cleaning

1. Rinse instruments immediately after use under running tap water (<40°C) for a minimum of one (1) minute to remove all debris including extraneous body fluids, bone debris and tissue.

2. Soak all instruments immediately after rinsing in an enzymatic cleaning solution* for 10 to 20 minutes (Do not soak overnight).
   
   * Follow manufacturer's instructions and observe recommended cleaning solution concentrations (enzymatic detergent with a pH level between 7-10 and temperature not to exceed 40°C). Do not use incompatible cleaning solutions to clean instruments.

3. For internal irrigation drills, use a 1mL syringe and a 25 gauge needle to clean the drill irrigation hole with a minimum of 0.2 mL of the prepared cleaning solution. Repeat this step two (2) more times for a total of three (3) rinses.

4. Scrub with a soft brush for a minimum of 1 (one) minute to remove any debris inside the drill irrigation hole.

5. Rinse the instruments under running tap water (<40°C) for a minimum of 1 minute. Use a 1mL syringe and a 25 gauge needle with a minimum of 0.2 mL of tap water to forcefully flush inside the drill irrigation hole. Repeat flushing of drill irrigation hole two (2) more times for a total of three (3) flushings.

6. Place instruments into an ultrasonic cleaner with neutral detergent**. Keep instruments inside the ultrasonic bath for 15 minutes using a frequency of 25-50 kHz. Ensure multiple instruments placed within the bath remain separated.

   ** Follow manufacturer's instructions and observe recommended neutral detergent solution concentrations (neutral detergent with a pH level between 7-10 and temperature not to exceed 40°C). Do not use incompatible neutral detergent solutions to clean instruments.

7. Rinse instruments thoroughly with running tap water (<40°C) for a minimum of one (1) minute until all traces of neutral detergent solution are removed. Rinse inside drill irrigation hole using a 1mL syringe and a 25 gauge needle with a minimum of 0.2 mL of tap water. Repeat rinsing drill irrigation hole two (2) more times for a total of three (3) rinses.

8. Gently wipe instruments with a soft lint-free cloth or place the instruments in a drying cabinet (60°C for less than 10 hours) until fully dry. Blow residual water from drill irrigation hole using a 1mL syringe and a 25 gauge needle. Visually inspect instruments in a well-lit area to ensure they are clean, dry and free of residue.

9. Clean instrument trays with a germicidal cleaner prior to returning instruments into the Kit.

10. Always check for damage or corrosion after rinsing and drying.
**Sterilization**

Dentium recommends either the Pre-vacuum or Gravity autoclave methods for sterilization under the conditions described below. However, autoclave performance can affect the efficacy of this process. Healthcare facilities should validate their sterilization processes employing the actual equipment and operators that routinely sterilize instruments.

All autoclaves/sterilizers should be regularly validated, maintained and checked in accordance with EN 285/EN 13060, EN ISO 17665, ANSI AAMI ST79 to ensure compliance with these and related standards. Make sure packaging is suitable for steam sterilization.

**Recommended Sterilization Parameters**

<table>
<thead>
<tr>
<th>Method-Moist Heat Sterilization</th>
<th>Pre-vacuum</th>
<th>Gravity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set Point Temperature</td>
<td>132 °C</td>
<td>132 °C</td>
</tr>
<tr>
<td>Exposure time</td>
<td>4 minutes</td>
<td>30 minutes</td>
</tr>
<tr>
<td>Drying time</td>
<td>20 minutes</td>
<td>40 minutes</td>
</tr>
</tbody>
</table>

**Maintenance Period for Surgical Drills**

All surgical drills shall be replaced after approximately 40 uses based on bone density.

- **Guide Drill (First / Second)**
  - 1000rpm, 30–45N-cm with Irrigation
- **Final Drill**
  - 1000rpm, 30–45N-cm with Irrigation
- **Countersink Drill**
  - Depending on bone density, the rpm could be adjusted.
PROSTHESIS MANUAL

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Understanding the Implant and Prosthesis

- If the cement retained restoration requires retrieval, making a hole in the occlusal surface will allow access to the Abutment Screw to remove the final prosthesis.
- To achieve the proper abutment positioning, a radiograph is required after making an impression and abutment seating.
- For Non-hex abutment positioning, a positioning jig is required.

Biological Connection
- The tapered conical hex connection between the implant and abutment interface provides virtually hermetic sealing.
- The biologic connection evenly distributes load to the fixture. Therefore, it helps minimize micro-movement and marginal bone loss.
- Implant fixtures with various diameters share the same internal hex. One abutment screw fits all abutments and fixtures.

Recommended Torque

<table>
<thead>
<tr>
<th>Type of Product</th>
<th>Recommended Torque (unit: N-cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cover Screw</td>
<td>5–10</td>
</tr>
<tr>
<td>Healing Abutment</td>
<td></td>
</tr>
<tr>
<td>Abutment Screw</td>
<td></td>
</tr>
<tr>
<td>For Dual Abutment</td>
<td></td>
</tr>
<tr>
<td>Dual Milling Abutment</td>
<td></td>
</tr>
<tr>
<td>Ti-Base Custom Abutment</td>
<td></td>
</tr>
<tr>
<td>Angled Abutment (15°/25°)</td>
<td></td>
</tr>
<tr>
<td>Direct-Casting Abutment</td>
<td></td>
</tr>
<tr>
<td>Metal-Casting Abutment</td>
<td>25–30</td>
</tr>
<tr>
<td>Combi Abutment</td>
<td></td>
</tr>
<tr>
<td>Ball Attachment</td>
<td></td>
</tr>
<tr>
<td>Screw Abutment</td>
<td></td>
</tr>
<tr>
<td>Angled Screw Abutment (15°/30°)</td>
<td></td>
</tr>
<tr>
<td>Ti-Retaining Screw</td>
<td></td>
</tr>
<tr>
<td>For Screw Abutment Cylinder</td>
<td>25–30</td>
</tr>
<tr>
<td>Abutment Screw</td>
<td></td>
</tr>
<tr>
<td>For Temporary Abutment</td>
<td>25–30</td>
</tr>
</tbody>
</table>
Types of Abutment  
(Aboutments are available in various diameters & gingival heights)

<table>
<thead>
<tr>
<th>One-Piece</th>
<th>Two-Piece</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abutment Level</td>
<td>Fixture Level</td>
</tr>
<tr>
<td>Combi Abutment</td>
<td>Dual Abutment</td>
</tr>
<tr>
<td>Hex</td>
<td>Non-Hex</td>
</tr>
<tr>
<td>Screw Abutment</td>
<td>Angled Screw Abutment</td>
</tr>
<tr>
<td>Hex</td>
<td>Non-Hex</td>
</tr>
<tr>
<td>Screw Abutment Cylinders</td>
<td>Hex</td>
</tr>
<tr>
<td>Hex</td>
<td>Non-Hex</td>
</tr>
</tbody>
</table>

- Straight abutments are Dual Abutment and Combi Abutment.
- The Angled Abutment or Direct / Metal Casting Abutment can be used depending on the insertion angle and position of the fixture.
- The Screw Abutment can be used when prosthetic retrieval is anticipated.

**Abutment Size Selection Guideline**
To achieve the ideal emergence profile for full arch

![Abutment Size Selection Diagram]
Dual Abutment

- The Dual Abutment may be used when the implant position is optimal and the gingival levels are flat.
- An impression can be made at both fixture level (open tray technique) and abutment level (closed tray technique).
- A Dual Abutment can be interchanged with a Combi Abutment.
- The same prosthetic procedures are applied to both Dual and Combi Abutments for abutment level impression.
- The abutment is selected on the casting model directly for fixture level impressions.
- It is important to make a precise positioning jig for abutment for fixture level impressions if non-hex abutment is used.
- Hex abutments are used as an anti-rotational mechanism for any abutment that might rotate (e.g., single unit crown) or when using splinted crowns that are cement-retained prosthesis.
- If a cement retained restoration requires retrieval, cutting a hole in the occlusal surface may allow access to the screw to be removed dependent on the angle of the implant.

Necessary steps for Hex / Non-hex abutment

<table>
<thead>
<tr>
<th>Steps</th>
<th>Hex</th>
<th>Non-hex</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positioning Jig</td>
<td>Unnecessary</td>
<td>Required</td>
</tr>
<tr>
<td>Radiograph</td>
<td>Required</td>
<td>Unnecessary</td>
</tr>
</tbody>
</table>

Dual Abutment (Hex / Non-hex) Line up

<table>
<thead>
<tr>
<th>Diameter</th>
<th>G/H</th>
<th>Vertical Angle (A°)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ø4.5</td>
<td>1.0mm, 1.5mm, 2.5mm, 3.5mm, 4.5mm, 5.5mm</td>
<td>5°</td>
</tr>
<tr>
<td>Ø6.5</td>
<td>1.5mm, 2.5mm, 3.5mm, 4.5mm, 5.5mm</td>
<td>6°</td>
</tr>
<tr>
<td>Ø6.5</td>
<td>1.5mm, 2.5mm, 3.5mm, 4.5mm, 5.5mm</td>
<td>7°</td>
</tr>
</tbody>
</table>
Combi Abutment

- The Combi Abutment may be used when the implant position is optimal and the gingival levels are flat.
- If the abutment selection has to be made within the mouth, check the thickness of mucosa with the Depth Guege to measure the gingival height and select the appropriate abutment(s).
- The impression is made using Impression Coping(s).
- Combi Abutment will remain in the mouth after the impression is made. (DO NOT REMOVE OR CHANGE THE ABUTMENT POSITION)
- Tighten abutment screw to 25-30 N·cm (retighten again before seating final prosthesis).
- Short Combi Abutment is also available for cases with insufficient occlusal space.

Combi Abutment Line Up

<table>
<thead>
<tr>
<th>Diameter</th>
<th>G/H</th>
<th>Vertical Angle (A°)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ø4.5</td>
<td>1.0mm, 1.5mm, 2.5mm, 3.5mm, 4.5mm, 5.5mm</td>
<td>5°</td>
</tr>
<tr>
<td>Ø5.5</td>
<td>1.5mm, 2.5mm, 3.5mm, 4.5mm, 5.5mm</td>
<td>6°</td>
</tr>
<tr>
<td>Ø6.5</td>
<td>1.5mm, 2.5mm, 3.5mm, 4.5mm, 5.5mm</td>
<td>7°</td>
</tr>
</tbody>
</table>
Ti-Base Custom / Dual Milling Abutment

Ti-Base Custom Abutment
- Impression is made at fixture level.
- Precise seating jig positioning is mandatory when using a non-hexed abutment.

<table>
<thead>
<tr>
<th>Diameter</th>
<th>G/H</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ø4.5</td>
<td>0.5mm, 1.5mm</td>
<td></td>
</tr>
<tr>
<td>Ø5.5</td>
<td>1.0mm, 2.0mm</td>
<td>Hex / Non-hex</td>
</tr>
</tbody>
</table>

Dual Milling Abutment
- Impression is made at fixture level.
- Precise seating jig positioning is mandatory to deliver abutment to the mouth in the correct position.
- Hexed abutments are used as an anti-rotational mechanism for any abutment that might rotate (e.g. single unit crown) while non-hexed abutments are used when prosthetic units are splinted together. (e.g. a bridge or bar)
- If a cement retained restoration requires retrieval, cutting a hole in the occlusal surface would allow access to the screw to be removed dependent on the angle of the implant.

<table>
<thead>
<tr>
<th>Diameter</th>
<th>G/H</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ø4.0</td>
<td>1.0mm</td>
<td></td>
</tr>
<tr>
<td>Ø4.5</td>
<td>1.5mm</td>
<td></td>
</tr>
<tr>
<td>Ø5.5</td>
<td>1.5mm, 2.5mm</td>
<td>Hex / Non-hex</td>
</tr>
<tr>
<td>Ø6.5</td>
<td>1.5mm, 2.5mm, 3.5mm</td>
<td></td>
</tr>
<tr>
<td>Ø7.5</td>
<td>2.5mm, 3.5mm</td>
<td></td>
</tr>
</tbody>
</table>
Angled Abutment

- The Angled Abutment is recommended when the restoration path of insertion is not feasible in either anterior or posterior sites.
- Depending on the situation, abutment milling can be done either in Lab or Chairside.
- Precise seating jig positioning is mandatory when using a non-hexed abutment.
- Retention force can be increased through milling process.

**Angled Abutment Line Up**

<table>
<thead>
<tr>
<th>Diameter</th>
<th>G/H</th>
<th>Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ø4.5</td>
<td>1.5mm 2.5mm 3.5mm</td>
<td>15° / 25°</td>
</tr>
<tr>
<td>Ø5.5</td>
<td>1.5mm 2.5mm 3.5mm</td>
<td></td>
</tr>
</tbody>
</table>
Direct-Casting / Metal-Casting Abutment

Direct-Casting Abutment

- Excellent for either single or bridge/bar.
- Used as an esthetic custom-made abutment.
- Used when restoration insertion is not ideal and/or a standard abutment cannot be used.
- Used when there is inadequate interarch distance between the upper and lower jaw and a prefabricated abutment is not feasible.
- Used when a final prosthesis is needed to support the soft tissue contours.
- Precise seating jig positioning is mandatory when using a non-hexed abutment.

<table>
<thead>
<tr>
<th>Diameter</th>
<th>G/H</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ø4.5</td>
<td>1.0mm</td>
<td>Hex / Non-hex</td>
</tr>
</tbody>
</table>

Metal-Casting Abutment

- Equivalent results for a fraction of the price
- Our highly affordable metal alloy replaces expensive gold to alleviate financial burden to all.

<table>
<thead>
<tr>
<th>Diameter</th>
<th>G/H</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ø4.5</td>
<td>1.0mm</td>
<td>Hex / Non-hex</td>
</tr>
</tbody>
</table>
Temporary Abutment

- Temporary Abutments are available with titanium or plastic.
- The titanium abutment comes in both hex and non-hex with a gingival height of 1.0mm.
- The plastic abutment comes in diameters (Ø4.5, 5.5, 6.5) with a gingival height of 2.0mm.

<table>
<thead>
<tr>
<th>Abutment</th>
<th>Diameter</th>
<th>G/H</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ti-Temporary</td>
<td>Ø4.5</td>
<td>1.0mm</td>
<td>Hex / Non-hex</td>
</tr>
<tr>
<td>Plastic Temporary</td>
<td>Ø4.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ø5.5</td>
<td>2.0mm</td>
<td>Hex / Non-hex</td>
</tr>
<tr>
<td></td>
<td>Ø6.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Screw Abutment

If prosthesis repair is desired, a Screw Abutment retained prosthesis enables easy retrieval.

- Useful for connecting multiple units and cases with a screw retained prosthesis.
- Useful when respective long axes of implants are different. Each side tapers by 30° and this permits up to 60° divergence between two abutments.
- Useful if the prognosis of an adjacent restoration is not ideal. It allows for easier retrieval and modification of the restoration.

Ti-Retaining Screw (1.8mm - body diameter)

- Reduces chances of screw loosening, thanks to the larger occlusal contact space.
- Endures masticatory force.
- 25–30 N·cm of torque is recommended for Ti-Retaining Screw.

### Screw Abutment Line Up

<table>
<thead>
<tr>
<th>Diameter</th>
<th>G/H</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ø4.5</td>
<td>1.0mm, 1.5mm, 2.5mm, 3.5mm, 4.5mm, 5.5mm</td>
</tr>
<tr>
<td>Ø5.5</td>
<td>1.5mm, 2.5mm, 3.5mm, 4.5mm, 5.5mm</td>
</tr>
</tbody>
</table>

### Angled Screw Abutment Line Up

<table>
<thead>
<tr>
<th>Diameter</th>
<th>G/H</th>
<th>Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ø4.5</td>
<td>1.0mm 2.0mm 3.0mm</td>
<td>15°, 30°</td>
</tr>
<tr>
<td>Ø5.5</td>
<td>1.0mm 2.0mm 3.0mm</td>
<td></td>
</tr>
</tbody>
</table>
Points to Consider in Abutment Selection

Considerations in Selecting an Abutment

- Esthetic requirement
- Implant angulation
- Implant location
- Fixture installation depth (Gingival height)
- Interarch distance
- Types of prosthesis
- Dentist & dental technician’s preference

Abutment Impression Recommendation

Impression can be made either at abutment or fixture level depending on the case.

<table>
<thead>
<tr>
<th>Abutment</th>
<th>Type</th>
<th>Impression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dual Abutment</td>
<td>Cementation type, screw-cementation type</td>
<td>Fixture level impression or abutment level impression</td>
</tr>
<tr>
<td>Combi Abutment</td>
<td>Cementation type</td>
<td>Abutment level impression</td>
</tr>
<tr>
<td>Angled Abutment</td>
<td>Cementation type, screw-cementation type</td>
<td>Fixture level impression</td>
</tr>
<tr>
<td>Screw Abutment</td>
<td>Screw retained type</td>
<td>Abutment level impression</td>
</tr>
<tr>
<td>Direct-Casting Abutment</td>
<td>Cementation type, screw-cementation type</td>
<td>Fixture level impression</td>
</tr>
<tr>
<td>Metal-Casting Abutment</td>
<td>Cementation type, screw-cementation type</td>
<td>Fixture level impression</td>
</tr>
<tr>
<td>Dual Milling Abutment</td>
<td>Cementation type, screw-cementation type</td>
<td>Fixture level impression</td>
</tr>
</tbody>
</table>

Connection verification using X-Ray

Improper Engagement

Proper Engagement:

- It is recommended to take an X-ray before making impression after seating the abutment, and after the final restoration to verify the abutment is seated properly. No visible gap between the implant-abutment interface of the internal conical connection is allowed as shown above.
- The gap at the bottom of the Abutment Screw should not be bigger than two fixture threads. Gap of three or more fixture threads indicate improper engagement.
Minimum Height Requirement for SuperLine Prosthetic Abutment

* Diagram above indicates the minimum height required for SuperLine prosthetic abutment.
* The minimum height specified is to ensure the abutment or abutment screw will not be damaged.

**Maximum Reduction for Adjustment**

**Combi Abutment**
Eliminate 3.0mm from the top level Combi Abutment (laser marking: 1.5mm)

**Caution:** It may cause damage to the abutment screw if the abutment is reduced to less than 2.5mm above the gingival height.

**Dual Abutment**
- Guideline for maximum reduction depending on the gingival height

<table>
<thead>
<tr>
<th>Gingival Height</th>
<th>Maximum Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5mm</td>
<td>2.0</td>
</tr>
<tr>
<td>2.5mm</td>
<td>3.0</td>
</tr>
<tr>
<td>3.5mm</td>
<td>4.0</td>
</tr>
<tr>
<td>4.5mm</td>
<td>5.0</td>
</tr>
<tr>
<td>5.5mm</td>
<td>6.0</td>
</tr>
</tbody>
</table>

**Angled Abutment & Milling Abutment**
- Required minimum abutment height: at least 5.0mm above the Fixture Top.

**Direct-Casting Abutment & Metal-Casting Abutment**
- Required minimum abutment height: at least 5.5mm above the Fixture Top.

**Screw Abutment**
- The Screw Abutment cannot be modified, however the cylinder height may be reduced or eliminated based on various interarch distances; still the height of the Ti-Retaining screw should be considered in advance.
Prosthetic Procedure 1

**Dual / Combi Abutment**

**Abutment Level Impression**
- Closed Tray Technique

- **Combi Abutment**
  - Ø4.5 / Ø5.5 / Ø6.5

- **Dual Abutment**
  - Hex / Non-hex
  - Ø4.5 / Ø5.5 / Ø6.5

**Impression Coping**
- Transfer (Snap on)
- Ø4.5 / Ø5.5 / Ø6.5

**Analog**
- **Long**
  - Ø4.5 / Ø5.5 / Ø6.5

- **Short**
  - Ø4.5 / Ø5.5 / Ø6.5

**Burn-out Cylinder**

**Bridge**
- Rotational
  - Ø4.5 / Ø5.5 / Ø6.5

**Single**
- Non-rotational
  - Ø4.5 / Ø5.5 / Ø6.5

**Modification**

**Cemented Restoration**
Abutment Level - Dual Abutment

Clinical Procedure

Chairside

1. Remove the Healing Abutment after the soft tissue is formed.
2. Tighten it to 25–30N cm and Re-tighten after 15 minutes.
3. Select and insert the impression coping over the abutment firmly (Snap-on mechanism).
4. Inject impression material around the copings.
5. Impression making.
6. Impression Coping is retained within impression material.
7. Fabrication of provisional restoration or insertion of comfort cap.

Multiple Units
Abutment Level - Dual Abutment

Clinical Procedure

Lab Analog Connection
Cylinder
Crown Wax-up
Final Restoration Cementation Type

Labside

Insertion of Lab Analog into impression coping
Make sure analog seats securely into the impression cap. (line up the flat side of analog to the flat side of the cap)
Soft tissue model

Fabrication of master cast
Seat Burn-Out Cylinder securely into analog.
Based on inter-occlusal distance, modify Burn-Out Cylinder to its proper height

Fabricate Burn-Out Cylinder and plastic bar in preparation for wax up
Completion of wax-up
Fabricate metal framework
Abutment Level - Dual Abutment

[Multiple Units]

**SCRP:** Once an access hole has been created, it can be converted to a SCRP (Screw & Cemented Retained Prosthesis).

*Must use non-hexed abutments if this technique is to be employed in FDP.*
**Abutment Level - Combi Abutment**

**Chairside**

- Second stage surgery (uncovering)
- Following the 2nd stage surgery, soft tissue is healed around the Healing Abutment. Healing Abutment should be selected based on the size of abutment.
- Select abutment based on gingival height then tighten it to 25~30N-cm. Re-tighten after 15 minutes.
- Image of combi Impression coping and abutment assembly.
- Snap-on the plastic impression coping with the same sized diameter abutment.
- Inject impression material around the copings.
- Make impression.
- Impression Coping is retained within Impression material.
- Fabrication of provisional restoration or insertion of comfort cap.

**Labside**

- Insertion of Lab Analog into Impression Coping
- Make sure analog seats securely
- Soft tissue model
- Fabrication of master cast
- Seat Burn-Out Cylinder securely into the Lab Analog on the master cast.
- Based on inter-occlusal distance, modify Burn-Out Cylinder to its proper height.
Abutment Level - Combi Abutment

[Multiple Units]

Fabricate Burn-Out Cylinder and plastic bar in preparation for wax-up

Wax-up

Fabricate metal framework

Trim extended margin with rubber wheel

Metal framework and reamer

Eliminate the lip remnant caused by 'snap-on' mechanism using reamer.

Metal Framework after removal of the Lip remnant

Metal framework

Final prosthesis

Chairside

* If the combi analog is trimmed due to the limited inter-occlusal space by the lab, a reduction jig is necessary. A slight modification of the abutment in the oral cavity may be required to reduce the height of the abutment.

Seat final prosthesis and adjust the occlusion.
Prosthetic Procedure 2

Impression Technique and Restoration Selection

Dual / Custom / Milling / Angled / Direct-Casting / Metal-Casting / Ti-Temporary / Plastic Temporary Abutment

Fixture Level Impression

Impression Coping Pick-up
Open tray technique (Complicated case)
Ø 4.0 / Ø 4.5 / Ø 5.5 / Ø 6.5
Should match the diameter of the healing abutment.

Impression Coping Transfer
Closed tray technique (Simple case)
Ø 4.0 / Ø 4.5 / Ø 5.5 / Ø 6.5
Should match the diameter of the healing abutment.

Analog
Ø 4.0 / Ø 4.5

Dual Abutment
Hex / Non-hex
Ø 4.0 / Ø 4.5 / Ø 5.5 / Ø 6.5

Ti-Base Custom Abutment
Hex / Non-hex
Ø 4.5 / Ø 5.5

Direct-Casting Abutment
Hex / Non-hex
Ø 4.5

Metal-Casting Abutment
Hex / Non-hex
Ø 4.5

Milling Abutment
Hex / Non-hex
Ø 4.0 / Ø 4.5 / Ø 5.5 / Ø 6.5 / Ø 7.5

Angled Abutment
Hex / Non-hex
15° / 25°
Ø 4.3 / Ø 5.5

Ti-Temporary Abutment
Hex / Non-hex
Ø 4.3

Plastic Temporary Abutment
Hex / Non-hex
Ø 4.5 / Ø 5.5 / Ø 6.5

Modification

Cemented Restoration

Screw-Retained Restoration
**Fixture Level [Pick-up Type] - Dual Abutment**

**Clinical Procedure**

- Healing Abutment
- Impression Coping Pick-up Type (Open Tray)
- Fixture Level Impression Pick-up Type (Open Tray)

**Chairside**

1. Select & seat Impression Coping which has same diameter as Healing Abutment
2. After connection of Impression Coping
3. Inject impression material around Impression Coping
4. Inject impression coping material on the impression tray
5. Making impression (individual tray with holes)
6. Unscrew the Impression Coping Screw before removing the impression tray
7. Inner surface of impression (Impression Coping picked up with tray)
Fixture Level [Pick-up Type] - Dual Abutment

Clinical Procedure

Lab Analog Connection  Height Modification of Dual Abutment  Burn-out Cylinder  Crown Wax-up  Final Restoration Cementation Type

Labside

Connect Impression Coping with analog firmly

Fabricate soft tissue model

Fabrication of master cast

Select abutment with proper diameter and gingival height

Verify the selected abutment by surveying (preparation is possible if necessary)

Fabricate positioning jig

Fabricate cap with pattern resin

Wax-up

Metal framework
Fixture Level [Pick-up Type] - Dual Abutment

[Multiple Units]

**Chairside**

- Final prosthesis
- Use positioning jig to transfer the abutment in cast to oral cavity then tighten it to 25-30N.cm. Retighten after 15 minutes.
- Seat the final prosthesis and adjust occlusion

*In the process of seating the prosthesis, the prosthesis can be rebound by gingival tissue. In this case it is advised to apply occlusal load on the prosthesis for 10–15 minutes.*

**SCRP- Labside**

- Make access hole in the resin cap by using a long impression coping transfer screw
- Wax-up
- Metal framework

**SCRP- Chairside**

- Final prosthesis
- Use positioning jig to transfer the abutment in model to oral cavity then tighten it to 25-30N.cm. Retighten after 15 minutes.
- Seat the final prosthesis and adjust occlusion. Place Teflon into screw hole of abutment to protect screw head and then composite resin.

*In the process of seating the prosthesis, the prosthesis can be rebound by gingival tissue. In this case it is advised to apply occlusal load on the prosthesis for 10–15 minutes.*
Fixture Level [Transfer Type] - Dual Abutment

Clinical Procedure

Healing Abutment

Impression Coping Transfer Type [Closed Tray]

Fixture Level Impression Transfer Type [Closed Tray]

Chairside

Remove Cover Screw (in case of second stage surgery) and attach Healing Abutment

Soft tissue is formed around Healing Abutment

Transfer type Impression Coping

*Seat the Impression Coping which has the same diameter as Healing Abutment

After connection of Impression Coping

Inject Impression material

Make impression

Inner surface of the impression material. Notice the flat side left on impression.

* If multiple implants, remove one Healing Abutment at a time and place an Impression Coping immediately to prevent soft tissue from slumping in.
**Fixture Level [Transfer Type] - Dual Abutment**

**Clinical Procedure**

- **Lab Analog Connection**
- **Height Modification of Dual Abutment**
- **Burn-out Cylinder**
- **Crown Wax-up**
- **Final Restoration Cementation Type**

**Labside**

1. Remove the Impression Coping from oral cavity and connect it with Analog firmly.
2. Attach the Impression Coping to the Analog and insert into the impression.
3. Fabricate soft tissue model.
4. Fabricate master cast.
5. Soft tissue condition after the removal of Impression Coping.
6. Measuring gingival height with depth gauge.
7. Select Dual Abutment with proper diameter and gingival height.
8. Verify by surveying the selected abutment (preparation is possible if necessary).
Fixture Level [Transfer Type] - Dual Abutment

[Multiple Units]

Seat the cap with pattern resin

Wax-up

Metal framework

Chairside

Final prosthesis

Use positioning jig to transfer the abutment in model to oral cavity then tighten it to 25–30N cm. Retighten after 15 minutes.

Seat the final prosthesis and adjust occlusion

SCR-P- Labside

Make an access hole in the resin cap by using a long impression coping transfer screw.

Wax-up

Metal framework

SCR-P-Chairside

Final prosthesis

Use positioning jig to transfer the abutment in model to oral cavity then tighten it to 25–30N cm. Retighten after 15 minutes.

Seat the final prosthesis and adjust occlusion. Place Teflon into screw hole of abutment to protect screw head and then composite resin.

* In the process of seating the prosthesis, the prosthesis can be rebounded by gingival tissue. In this case it is advised to apply occlusal load on the prosthesis for 10–15 minutes.
**Fixture Level [Transfer Type] - Dual Milling Abutment**

**Clinical Procedure**

- Healing Abutment
- Impression Coping Transfer Type (Closed Tray)
- Fixture Level Impression Transfer Type (Closed Tray)

**Chairside**

1. Remove Cover Screw (in case of second stage surgery) and attach Healing Abutment
2. Soft tissue is formed around Healing Abutment
3. Seat the Impression Coping which has the same diameter as Healing Abutment
4. After connection of Impression Coping
5. Inject impression material
6. Make impression
7. Inner surface of the impression material. Notice the flat side left on impression.

*If multiple implants, remove one Healing Abutment at a time and place an Impression Coping immediately to prevent soft tissue from slumping in.*
Fixture Level [Transfer Type] - Milling Abutment

Laboratory Procedure

Lab Analog Connection  Dual Milling Abutment Connection  Modification  Crown Wax-up  Final Restoration Cementation Type

Labside

Remove the Impression Coping from oral cavity and connect it with Lab Analog firmly.

Select Dual Milling Abutment with proper diameter.

Fabricate soft tissue model.

Abutment after milling process.

Fabricate master cast.

Fabricate positioning jig.

Fabricate cap with pattern resin.

Wax-up.

Metal framework.

Chairside

Final prosthesis.

Use positioning jig to transfer the abutment in model to oral cavity then tighten it to 25–30 N·cm. Retighten after 15 minutes.

Seat the final prosthesis and adjust occlusion.

* In the process of seating the prosthesis, the prosthesis can be rebound by gingival tissue.
* In this case it is advised to apply occlusal load on the prosthesis for 10–15 minutes.
**Fixture Level [Pick-up Type] - Angled Abutment**

**Clinical Procedure**

15°  25°

Angled Abutment  | Impression Coping Pick-up Type (Open Tray)  | Fixture Level Impression Pick-up Type (Open Tray)

**Chairside**

1. Pick up type impression coping
2. Seat the impression coping
3. Inject impression material
4. Make the impression (individual tray with holes)
5. Unscrew the impression coping screw before removing the impression tray
6. Inner surface of impression (Impression Coping is picked up with tray)

**Laboratory Procedure**

1. Lab Analog Connection
2. Angled Abutment Connection
3. Modification
4. Crown Wax-up
5. Final Restoration Cementation
Fixture Level [Pick-up Type] - Angled Abutment

[Single Unit]

Labside

Connect Impression Coping with Analog firmly

Fabricate soft tissue model

Unscrew the Impression Coping Screw, separate Impression Coping from the model

Fabricate master cast

Select and seat proper Angled Abutment in the master cast.

Modify Angled Abutment properly and fabricate positioning jig.

Fabricate cap with pattern resin.

Wax-up

Metal or zirconia framework

Chairside

Final prosthesis

Seat the Angled Abutment using the positioning jig, then tighten it to 25-30Ncm. Retighten after 15 min.

Insert final prosthesis and adjust occlusion
Fixture Level - Direct-Casting Abutment

Laboratory Procedure

LabSide

Select and seat proper Direct Casting Abutment in the master cast
Complete customized abutment
Fabricate positioning jig
Fabricate cap with pattern resin
Wax-up
Metal framework

Chairside (Cement Retained Restoration)

Final prosthesis
Seat the customized abutment using the positioning jig, then tighten it to 25–30N-cm. Retighten after 15 minutes.
Insert final prosthesis and adjust occlusion
Fixture Level - Metal-Casting Abutment

[Single Unit]

Laboratory Procedure

Lab Analog Connection | Metal-Casting Abutment Connection | Modification | Abutment Wax-up | Final Restoration Cementation Type

LabSide

Select and seat proper Metal Casting Abutment in the master cast
Complete customized abutment
Fabricate positioning jig

Fabricate cap with pattern resin
Wax-up
Metal framework

Chairside

Final prosthesis
Seat the customized abutment using the positioning jig, then tighten it to 25–30N·cm. Retighten after 15 minutes.
Insert final prosthesis and adjust occlusion
Fixture Level [Pick-up Type] - Temporary Abutment

Provisional restoration [Single Unit]

Ti-Temporary Abutment
Plastic Temporary Abutment

<Using Ti Abutment>
<Using Plastic Abutment>

Consider the opposing teeth height before seating the Temporary Abutment. Modify the abutment if needed. Seat the Temporary Abutment using the positioning jig, then tighten it to 15–20N cm and re-tighten after 1.5 minutes. Complete the Temporary Abutment prosthesis with direct resin.
**Prosthetic Procedure 3**

Impression Technique and Restoration Selection

**Screw Abutment**

**Abutment Level Impression**

**Open tray technique**

- **Impression Coping Pick-up**
  - Single / Bridge
  - Ø 4.5 / Ø 5.5 / Ø 6.5

**Closed tray technique**

- **Impression Coping Transfer**
  - Single / Bridge
  - Ø 4.5 / Ø 5.5 / Ø 6.5

**Analog**
- Ø 4.5 / Ø 5.5

**Burn-out Cylinder**
- Single / Bridge
  - Hex / Non-hex
  - Ø 4.5 / Ø 5.5

**Gold Cylinder**
- Single / Bridge
  - Hex / Non-hex
  - Ø 4.5 / Ø 5.5

**Metal Cylinder**
- Single / Bridge
  - Hex / Non-hex
  - Ø 4.5 / Ø 5.5

**Ti Cylinder**
- Single / Bridge
  - Hex / Non-hex
  - Ø 4.5 / Ø 5.5

**Ti Temporary Cylinder**
- Single / Bridge
  - Hex / Non-hex
  - Ø 4.5 / Ø 5.5

**Polishing Protector**
- Ø 4.5 / Ø 5.5

**Provisional Restoration**

**Ti-Retaining Screw**

**Screw-Retained Restoration**
Abutment Level [Transfer Type] - Screw Abutment

Clinical Procedure

Chairside

- Screw Abutment with delivery holder.
- Select and seat an appropriate Screw Abutment with delivery holder.
- Tighten it to 25-30N cm with adapter for Screw Abutment, and re-tighten after 15 minutes.

Impression Coping [transfer type] for Screw Abutment

Seat Impression Coping on Screw Abutment

Inject Impression material

Make impression

Inner surface of the impression material. Notice the flat side left on impression.

Seat Comfort Cap on the Screw Abutment
Abutment Level [Transfer Type] - Screw Abutment

Lab Analog Connection | Cylinder Connection | Modification | Crown Wax-up | Final Restoration Screw Retained

Laboratory Procedure

- Remove the Impression Coping from oral cavity and connect it with Analog firmly.
- Attach the Impression Coping to the Analog and insert into the Impression.
- Fabricate soft tissue model.
- Fabricate master cast.
- Removal of Impression Coping.
- Connect the Screw Abutment cylinder then tighten it to 25–30Nm with Ti-Retaining screw.
- Consider the distance of opposing teeth, modify cylinder to its proper height if needed.
- Fabricate Burn-Out Cylinder and plastic bar in preparation for wax-up.
- Wax-up.
Abutment Level [Transfer Type] - Screw Abutment

[Multiple Units]

Fabricate metal framework

Eliminate the lip remnant caused by 'snap-on' mechanism using reamer.

Metal framework after removal of the lip remnant.

Seat the final prosthesis and adjust occlusion. Tighten it to 10N-cm with Ti-retaining Screw.

Place Teflon into opening of the screw hole to protect screw head and composite resin.

Final Prosthesis
Cementation Repair Method (SCRP)

In Light of Implant Prosthesis:

- A screw type restoration helps to simplify prosthesis repair, including insertion and removal of the prosthesis if necessary.
- Cement type restoration tend to have a stable occlusion and may enhance the adaptability. However, the weak point is that it cannot be removed after permanent cementation.
- A Dual Abutment can be cemented or screw retained.
- Combi Abutments are cement retained and no occlusal hole is necessary for a more esthetic restoration.

In Case of Screw Loosening or when Prosthesis Repair is Needed

1. In case of screw loosening and/or prosthesis repair is needed.
2. In order to unscrew, make access hole on the occlusal surface with bur.
3. Unscrew, then remove the prosthesis from the oral cavity.
4. Both cemented prosthesis and abutment are removed.
5. Finish the repair then re-seat into the oral cavity with a new Abutment Screw.
6. Tighten the prosthesis with 25–30N-cm by a screw driver.
7. Fill the access hole with Teflon.
8. Fill the access hole with resin composite and polish.
9. Final prosthesis
Cementation Repair Method (SCRP)

**Prosthesis Separation from Abutment due to Cement Loss**

1. Completely remove the screw using 25–30N·cm and remove prosthesis from the oral cavity.
2. Apply cement to the prosthesis.
3. Place it back into the oral cavity.
4. After the cement setting, unscrew and remove the excessive cement.
5. Finish the repair and seat it inside the oral cavity.
6. Tighten the prosthesis with 25–30N·cm with a Screw Driver.

**Adding to the Interproximal Contact Surface due to Prosthesis Loosening**

1. Adding to the interproximal contact due to loosening
2. Make access hole
3. Unscrew, then remove the cemented prosthesis with abutment in the oral cavity.
4. Add resin to the contact if needed.
5. Finish the repair then re-seat into the oral cavity with a new Abutment Screw.
6. Insert the prosthesis in the oral cavity and screw it in. Afterwards, perform light curing, then polish the contact area.
   * It is recommended that the abutment screw is re-tightened after 15 minutes.
Prosthetic Procedure 4

Impression Technique and Restoration Type

Overdenture Procedure

Ball Attachment

Ball Abutment
Ø 3.5

Abutment Level Impression

Ball Impression Coping
Ø 3.5

Ball Analog

Socket Spacer
Ø 4.05 / Ø 4.85

Female Socket / O-ring
Ø 4.05 / Ø 4.85

Ball and Socket Attachment for Overdenture
Overdenture Procedure - Ball Attachment

Chairside

1. Connect Ball Abutment then tighten it to 25~30Ncm, and re-tighten after 15 minutes.
2. Seat Impression Coping onto Ball Abutment.
3. Make Impression for the production of individual tray.
4. Prepare individual tray for denture impression.
5. Inject Impression material.
6. Make Impression with individual tray.

Labside

1. Remove the tray from the oral cavity.
2. Inner surface of the Impression material.
3. Insert Analog onto Impression coping.
4. Ball Analog.
5. Fabricate master cast.
7. Fabricate denture following standard technique.
Ball Attachment

Case 1: Preferred Procedure

**Chairside**

- Using a round bur, reduce denture inner surface to insert Female Socket.
- Connect the Female Sockets to the Ball Abutment in oral cavity and block out undercuts. Then align / parallel metal housings.
- Apply small amount of the resin into holes.
- Seat the denture onto socket in oral cavity.
- Remove denture from oral cavity after initial seating of resin.
- After the resin sets, trim the remnant resin from the denture and polish it.

Case 2

**Chairside**

- Using a round bur, create holes for the placement of Female Socket.
- Connect the Female Sockets to the Ball Abutment in oral cavity and block out undercuts. Then align / parallel metal housings.
- Examine the interference between inner surface of the holes and the Female Sockets.
- Apply the resin into the holes to secure Female Sockets.
- Seat the denture onto socket in oral cavity.
- Remove denture from oral cavity after initial setting of resin.

- Install rubber dam with a small hole over each O-Ball Abutment to prevent resin from gluing lower surface while attaching denture to Female Sockets.

- After the resin sets, trim the remnant resin from the denture and polish denture both sides.

- Add resin as needed, with brush around the Female Socket.
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07.02.2002
Post-op

11.29.2002
Final Prosthesis

06.02.2004
1 Years 2 months
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