8. Finishing & Polishing

Once resin cement has hardened, remove all luting screws and then remove any prosthetic retaining screws so that the prosthesis can be lifted from the model. Attach polishing protectors of correct diameter to each of the fitting surfaces of the cemented titanium rings (fig. B). Remove excess extruded resin cement (fig. C) using a sharp blade, probe or hand scaler. (Extruded Ceka Site breaks away easily in large pieces from the outer polished surfaces of the structure and titanium ring) Polish the remaining cement line using a fine edged, lens shaped rubber wheel and blend the casting into the titanium ring where needed. You will notice that the cement line is often not of constant thickness. This variation is indicative of the extent of casting misfit which existed and has now been corrected by the cement space of the Passive Abutment.

Once polishing is completed, remove protector caps and replace the casting on the cleaned model analogues to inspect and verify the quality of fit obtained. (Resin cement is best cleaned from analogues using a brush with alcohol) The fit would be expected to be excellent in all areas, but, in the unlikely event that a luting error has occurred, the offending titanium ring may be removed, cleaned and recemented to the prosthesis as required. A titanium ring can easily be removed by forcing a sharp blade into the cementline, or by punching out the ring using the shaft of a lab handpiece drill applied through the screw access hole (place the bridge rings down on a folded towel for padding and give the drill shaft a sharp tap).

VERY IMPORTANT: as this technique relies absolutely on the accuracy of the master model to achieve passive fit of the prosthesis, it is vital that accurate impression techniques be used and that the quality and condition of the model and analogues be maintained at all times.

Try-in procedures

Once complete, follow standard laboratory practice when delivering the prosthesis - no special treatment needed.

Repairs

If one needs to put a ceramo-metal Passive case back into the furnace for repair, a gradual heating cycle is used to drive out moisture from the ceramic (usually 600ºC for 6-8 hrs). During this heating phase, the cement will be degraded, allowing the rings to be easily removed from the structure. (A higher temperature of 800ºC will burn out the cement, if required). This is a convenient advantage of the system, as the rings can be recovered for re-use. If the user feels that the condition of the rings is not ideal, one may decide to use new rings for the recementation. It is an advantage of the Passive system that the fitting surfaces can be removed from the casting to avoid damage by heat cycles during the repair process and then be refitted. (It is essential to always keep the master model)

Custom made Prosthetics

Do not manufacture custom prosthetics without approved products or data approved by Southern Implants (Pty) Ltd.

Passive Abutments for Implants

External Hex

Passive Abutments

Implant Diameter	Passive Code - Hexed	Passive Code - Non-Hexed
Ø4.0mm	SB16	SB-17-TT
Ø5.0 / Ø7.0mm	SBA16	SBA-17-TT
Ø6.0 / Ø8.0mm	SBBB16	SBBB-17-TT
Ø9.0mm	SMAX9h	SMAX9nh

Compact Conical Abutments

Abutment	Passive Code
ABNMC	PA-MC-48
AMC	PA-MC-48
ABAMC	PA-MC-60
ABAMC17D / 30D	PA-MC-48
ABBBMC	PA-MC-60
ABBBMC17D / 30D	PA-MC-60

Tri-Nex

Passive Abutments

Implant Diameter	Passive Code - Engaging	Passive Code - Non-Engaging
Ø3.5mm	PA-EL-35	PA-NL-35
Ø4.3mm	PA-EL-43	PA-NL-43
Ø5.0 / Ø7.0mm	PA-EL-50	PA-NL-50
Ø6.0 / Ø8.0 / Ø9.0mm	PA-EL-60	PA-NL-60

Compact Conical Abutments

Abutment	Passive Code
MC-L-35	PA-MC-48
MC-L-43	PA-MC-48
MC-L-50	PA-MC-60
MCN-L-50	PA-MC-60

PROVATA (Internal Hex)

Passive Abutments

Implant Diameter	Passive Code - Engaging	Passive Code - Non-Engaging
Ø3.7mm	PA-EM-S	PA-NM-S
Ø4.2mm		
Ø5.0mm		

Compact Conical Abutments

Abutment	Passive Code
MC-M	PA-MC-48

Deep Conical (DC Range)

Passive Abutments

Implant Diameter	Passive Code - Engaging	Passive Code - Engaging
Ø3.0mm	PA-DC3	PA-DNC3
Ø3.5mm	PA-DC4	PA-NDC4
Ø4.0mm	PA-DC4	PA-NDC4
Ø5.0mm	PA-DC5	PA-NDC5

Compact Conical Abutments

Abutment	Passive Code
MC-DC3-1/3	PA-MC-48
MC-DC4-1/3	PA-MC-48
MC-DC4-1/3	PA-MC-48
MC-DC5-1/3	PA-MC-60

IT (Internal Octogon)

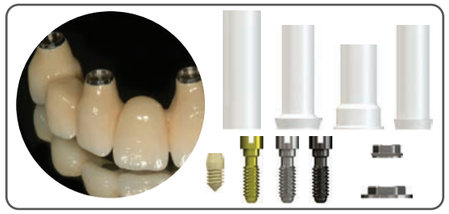
Passive Abutments

Implant Diameter	Passive Code - Engaging	Passive Code - Non-Engaging
Ø4.8mm	ITS-PA	ITS-PA-ne
Ø6.5mm	ITS6-PA	ITS6-PA-ne

SOUTHERNIMPLANTS

Passive Abutment Instruction Manual

The Passive Abutment is unique to Southern Implants and has been proven in clinical use since 1996.



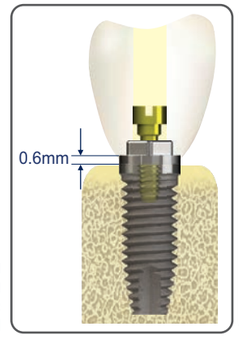
The Concept

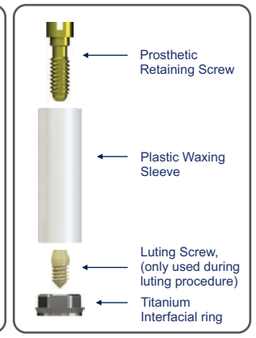
The Passive Abutment concept allows one to achieve predictable passive fit of milled and cast structures in a practical and repeatable way and thus eliminates the need for complex and intensive laboratory procedures usually undertaken to improve the fit e.g. sectioning and soldering of frameworks. Passive fit is achieved by luting a pre-machined titanium interface component into the finished prosthesis, using the laboratory master model as the blueprint for fit. No additional clinical steps are required.

Description

The Passive Abutment consists of four components:

1. **Plastic cylinder** - this component is incorporated into the wax-up of the structure and thus becomes part of casting. It is not needed for milled structures.
2. **Titanium interfacial component** - this pre-machined component forms the final interface between the casting and the implant.
3. **Luting screw** - this small screw is used to clamp the interfacial component onto the laboratory analogue during the process of luting the casting onto the interfacial component.
4. **Prosthetic screw** - this screw retains the completed prosthesis to the implant at final placement and provides a compressive force across the cement line.





Overview of Use

The plastic cylinder is incorporated into the wax-up and becomes part of the cast structure. The casting may then undergo further laboratory processing e.g. ceramic firing, finishing and polishing before being assembled with the interfacial component. ***The titanium interfacial component*** is kept separate from the manufacturing of the casting and is therefore not subjected to degradation by heat-cycles or de-vesting and finishing procedures as a cast-to gold cylinder would. The integrity of the machined part is therefore maintained in original condition.

The finished cast structure is assembled with the interfacial ring by luting before placement in the patient's mouth. For assembly, the titanium interfacial component is clamped to the analogue on the master model by means of the luting screw. The luting screw ensures that the interfacial component is held in full contact with the analogue.
The finished prosthesis is then luted to the clamped interfacial ring using a resin cement. In this way the resin cement serves as a space filler between the casting and the interfacial ring, thus compensating for any minor casting and finishing discrepancies, so eliminating misfit of the casting to the implant. At placement in the mouth, the prosthetic screw retains the prosthesis to the implant and maintains a compressive force over the cement line. ***The cement line is therefore not responsible for retention of the prosthesis, but is merely a space filler. The luting screw is discarded after the luting procedure.***

For milled structures, the plastic cylinder is replaced with a STL file which dictates the geometry to the interfacial component, the screw access hole and screw seating position.

The Application

The Passive Abutment is intended for use in fabrication of implant-supported SCREW-RETAINED CASTINGS (e.g. crowns, bridges, mezo-structures, cast bars, custom posts) on one or more implants where excellent prosthetic fit is desired. The use of a burnout plastic cylinder allows freedom of choice in choosing the casting alloy. The complexity of laboratory procedures is greatly reduced when compared to complex castings incorporating gold cylinders.

The Passive Abutment System is available for direct connection to all Southern Implants product ranges. Passive Abutments are also available for connection to Compact Conical Abutments.

For direct connection to all implants, both non-hexed / non-engaging and hexed / engaging versions are available:

1. **Non-hexed / engaging versions** are indicated for multi-implant cases. The non-hexed / engaging interfacial component has an internal taper fit to allow for non-parallelism of implants of up to 14° per abutment ie. 28° between 2 implants.
2. **Hexed / engaging versions** are indicated for single implant cases and multi-unit custom abutment cases.

Problems of Conventional Cast Structures

Frameworks incorporating cast-to gold cylinders are very commonly used in implant reconstruction, as are castings fabricated using plastic burnout cylinders. These castings, however, are subject to significant difficulties as follows.

1. Significant deterioration of the fitting surface of the cast structure occurs as a result of laboratory procedures ie.
   - sandblasting of the casting to remove investment material will degrade the fitting surface and therefore degrade the inter-implant passivity of fit.
   - the casting is subjected to repeated high temperature cycles during casting and porcelain firing procedures. This results in oxidation of the fitting surfaces and further deterioration of fit.
   - the gold fitting surface is deteriorated by multiple "fittings" on the model, especially if the analogues are not kept clean.

The larger and more complex the casting, the greater the likely degree of discrepancy of fit. Hence, larger castings with fit discrepancies are often cut and soldered, or laser-welded. It is commonly reported that these attempts to improve the fit result in even greater fitting problems and may be amplified by porcelain firing.

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www.southernimplants.com

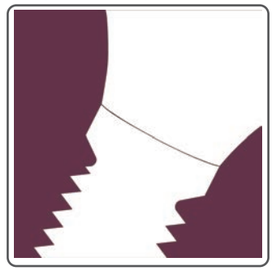
2. Clinical implications of misfitting implant structures

Discrepancies in fit are extremely difficult to detect clinically, if not impossible where the interface is subgingival. Vertical misfits will only be detected on x-ray if the misfit occurs interproximally and the x-ray beam is oriented perpendicular to the interface. If the discrepancy is in the bucco-lingual plane, it will not be detected on x-ray. Even gross discrepancies may be missed where x-ray techniques are not optimal.

Vertical gap-type discrepancy

Gross discrepancy, perfectly perpendicular x-ray

Same gross discrepancy, 6° out-of-true x-ray



Most importantly, poorly fitting prostheses can result in:

- bacterial accumulation at the prosthetic/implant interface
- mechanical strain being applied to the implant, which may result in bone loss
- poor preload of retaining screws and thus more frequent screw loosening
- fatigue loading of the retaining screws, culminating in screw fracture

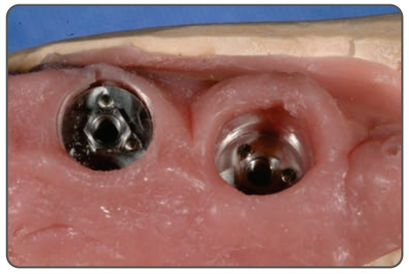
The Laboratory Procedure

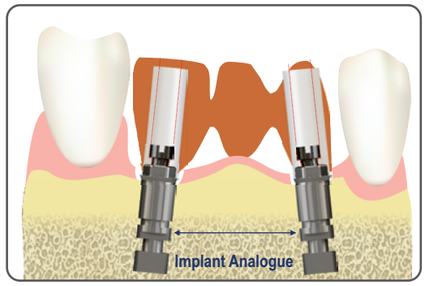
1. Model preparation:

The appropriate analogues must be selected and the model prepared using a silicon or rubber soft tissue mask. The highly recommended use of a removable soft tissue mask will allow easy access to the analogues for further lab procedures and will greatly ease later assembly procedures.

2. Wax-up:

The Titanium Ring and Waxing Sleeve are assembled on each implant analogue, using the brass equivalent of the prosthetic screw to hold them in place. Do not over tighten, so as to avoid distortion of the plastic. The waxing sleeve can be cut back or added to as needed. The wax-up is completed and sprued before removing the wax-up from the model.





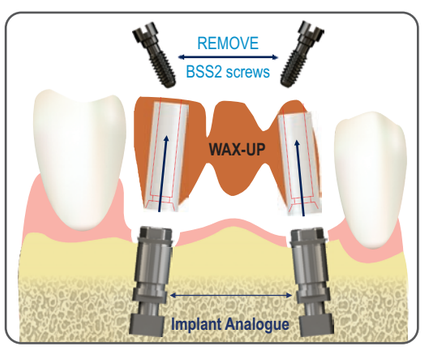
NOTE:
Brass retaining screws secure wax-up to model

3. Investing and Casting:

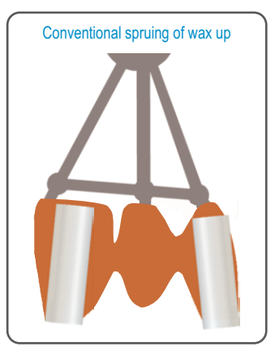
The retaining screw must be removed to allow the wax-up with plastic cylinders to be lifted from the model, leaving behind the loose titanium interfacial component. Standard procedures are used for investing and casting. An appropriate casting alloy must be chosen, depending on whether a ceramic veneered bridge or cast bar is being manufactured. Alloys that are commonly used are:
Degunorm, Argipal, Begopal 300, Begocer-G, Pors-on 4, Degudent G etc.

Complete burn-out. The plastic cylinder requires an oven temperature of about 820°C for at least 45 minutes.

As with all implant work, it is best to devest ultrasonically as opposed to blasting with sand or glass beads. This helps preserve the sharp edges and fitting surfaces of the casting.



Conventional spruing of wax up

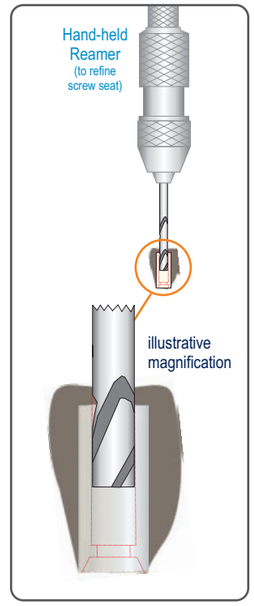


4. Refining the screw seat:

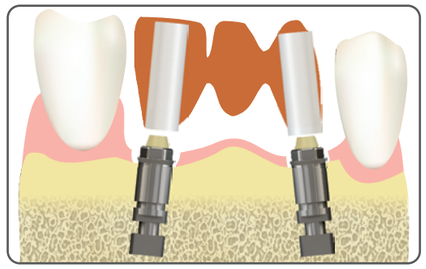
The screw seat is the internal ledge in the casting where the head of the screw will seat. The cast surface of the screw seat will likely be rough due to the casting procedure and must therefore be refined using special hand-held reamers. (LT18-2.4, LT18-2.6 or LT18-2.8) The correct diameter of reamer must be chosen. This is an important step to ensure proper seating and tightening of the prosthetic screw.

5. Fitting the casting to the model:

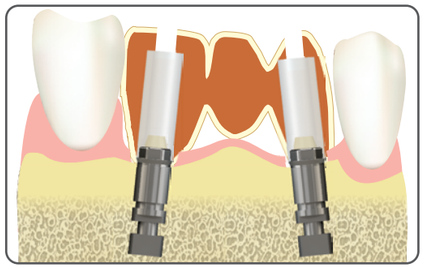
The titanium interfacial components are secured to the analogues using the small luting screws. Do not over tighten, as this may result in the head of the Peek luting screw breaking off. The casting can then be placed over the secured interfacial components. The casting can be easily fitted and removed from the model without the need to remove and replace the luting screws. If the prosthesis needs to be screw-retained on the model, then one or more of the small luting screws can be exchanged for a prosthetic screw (the prosthetic screw secures the prosthesis to the analogue, while the short luting screw has a smaller head and can only retain the titanium interfacial component to the analogue.)
The peek screw has a 1.22mm hex broached deep into the screw. It also helps to remove the screw in the event that cement does not totally lock the screw in position.



Luting screws secure interfacial rings to analogues.



Casting fits over luting screws & interfacial rings

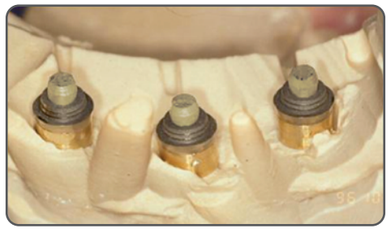


6. Luting the prosthesis to the titanium interfacial component:

After completing the fabrication of the prosthesis, sandblast the fitting surface of the casting and the top surface of the titanium ring. The titanium ring is best clamped to an analogue by the short luting screw for ease of handling whilst sandblasting. This also protects the fitting surface of the titanium ring. Avoid sandblasting the polished collar of the titanium ring.
After sandblasting, it is very important to disassemble and ultrasonically clean the following:

- the titanium interfacial components
- the short luting screws
- the fitting surfaces of the prosthesis

Also clean the analogues (Implant Replicas) in the model by brushing with soap and water or steam cleaning to remove any debris which may interfere with perfect seating of the interfacial components.

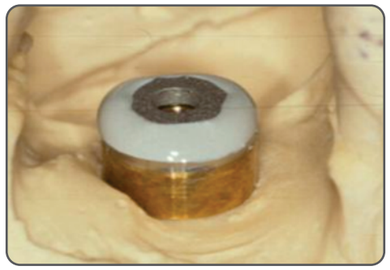


Luting of the prosthesis to the titanium rings will now take place on the master model.

- attach the titanium rings to the model with the short luting screws
- apply Ceka Site or similar self cure resin cement or dual cure resin cement (eg. Unicem by 3M) to the sandblasted surface of all of the titanium rings.

(NB refrigeration of self cure resin cements will usually lengthen working time for ease of use on multi-unit structures)

In the event that cement locks the luting screw in position, a diameter 1.5 or thereabouts, round burr is rotated into the hex of the screw. This usually separates the screw head from the shaft and frees the prosthesis. Take care not to damage the components. The prosthesis can then be removed.



IMPORTANT: Limit the amount of resin cement being applied to the angle between the sandblasted horizontal plane and vertical plane of the titanium ring. This will avoid excess cement extruding upwards through the screw hole in the casting and so inadvertently locking the luting screw into the cement. Definitely avoid placing any cement in the area immediately around the head of the luting screw.

Fit the prosthesis over the titanium rings and settle the prosthesis firmly into place with finger pressure to extrude excess cement. Arch castings can be left seated under their own weight to allow cement to harden. Smaller bridges or single units need to be held lightly in place by using one or more prosthetic screw in place of a chosen luting screw, to allow cement to harden. (e.g. use the middle screw in a three-unit structure)

VERY IMPORTANT: do not over tighten the prosthetic screw being used to retain the prosthesis during cement hardening as this may result in distortion of a multi-unit structure.

Fig. A

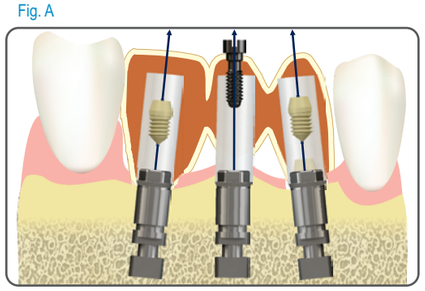


Fig. B Fitment of polishing protectors

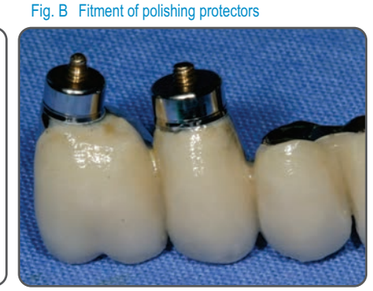


Fig. B - After setting of cement, first remove all luting screws, then remove brass screw to allow prosthesis to be lifted off model.