straumann

SYNOCTA® PROSTHETIC SYSTEM

FOR BAR-BORNE RESTORATIONS

COMMITTED TO
SIMPLY DOING MORE
FOR DENTAL PROFESSIONALS

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ITI International Team for Implantology

Straumann is the industrial partner of the ITI (International Team for Implantology) in the areas of research, development, and education.

PLANNING

Planning principles

Implant-borne full dentures require thorough planning of the surgical and restorative procedures. The number and positions of the implants as well as the design of the denture and occlusion should take the anatomical, functional, and hygienic aspects into account. The static/dynamic conditions govern the-selection of the retentive units (Besimo, 1993).

Bar retention systems for implant-borne lower hybrid dentures subject the implant abutments to the lowest stress (Jäger and Wirz, 1993).

Recall appointments

Hybrid dentures with resilient retention units must be examined at intervals of approximately 3 months to ensure harmful excursions of the denture are eliminated in their early stages (possible methods: relining, activating/replacing the matrix, checking the occlusion).

In cases of poor oral hygiene, the patient should undergo thorough scaling and polishing, as well as re-instruction and motivation to maintain the necessary high level of oral hygiene. If the patient is cooperative, the interval between check-ups can be increased.

BAR-BORNE RESTORATIONS

Introduction

The functions of a bar restoration:

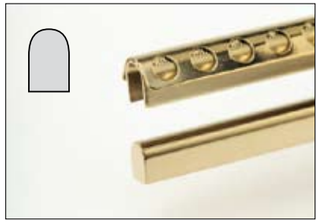
- Stabilization and primary splinting of implants
- Countering the forces that would dislodge the denture
- Distribution of shear forces
- Resilience compensation through degrees of freedom

Description/functioning

Most common types of bar:

***Dolder® bar (egg-shaped cross-section), normal and mini versions:**
The Dolder® bar is a retention unit allowing three degrees of freedom (translateral and rotary movements).

Dolder® bar attachment, "U"-shaped cross-section:
The bar attachment is a rigid retentive unit with no rotational freedom.



Round bar:
The round bar is a retention unit permitting only one degree of freedom (translateral movements).

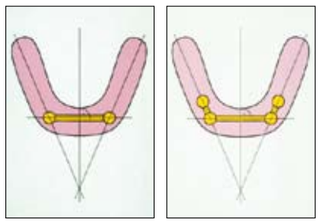
** Dolder® is a registered trademark from Prof. Eugen Dolder, former director, School of Dentistry, University of Zurich*

The following guidelines must be followed when fabricating implant-borne hybrid dentures:

Freedom:

"If riders are placed on more than one bar segment, the denture is retained, but has no degree of space freedom regardless of the cross-section of the bar." (Wirz, 1994)

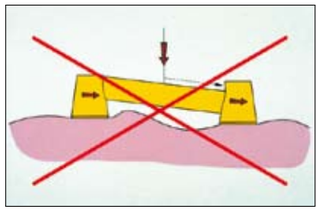
"If a rider is placed on the anterior-most bar segment only, a round bar creates 1 degree of space freedom, an egg-shaped cross-section 3 degrees of freedom and a bar attachment (or milled bar) no freedom." (Wirz, 1994)

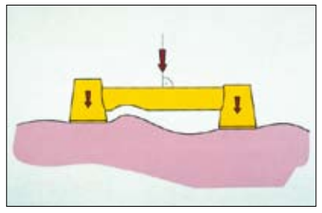


Bar positioning:

The anterior bar is positioned perpendicular to the median line of the two halves of the alveolar ridge. (Wirz, 1994)

The bar must be horizontal – even if the ridge varies in height. The bar must never be allowed to slope as this would impede the correct functioning of the bar attachment and create undesirable horizontal forces. (Wirz, 1994)





Planning the bar restoration

Early loading of the implant or fabrication of the restoration once the healing period has elapsed

Straumann implants can be immediately loaded in cases where four or more implants are splinted together.

In cases where implants will not be loaded until they are fully osseointegrated, two implants can be used.

When used in the linear and front areas, the Dolder® bar joint, with its three different degrees of space freedom, places the least load on the abutments regardless of the number of abutments. If, however, the-abutments are spaced regularly in the-anterior region, and the denture is retained on all bar segments using several riders the dynamics of the denture are lost completely (regardless of the cross-section of the bar). This creates a purely rigid type of retention with no freedom whatsoever.

FABRICATION OF AN IMPLANT-BORNE BAR IN THE LOWER JAW USING THE SYNOCTA® PROSTHETIC SYSTEM

"Patient" – initial situation:
Edentulous lower jaw, with 4 Straumann dental implants in tooth positions 29–20.

Important: synOcta® can be used only with implants that have the internal octagon (identified by article number 043.XXXS).

Impression-taking with the synOcta® prosthetic system:
Two versions are available for the impression procedure: the closed tray technique and the open tray technique. The closed tray can be regarded as the standard and can be used in the majority of cases. The open tray technique is particularly indicated where the implant shoulder lies very deep.

To help prevent the risk of confusion, the transfer system is color-coded. The positioning cylinder, analog, and open tray impression cap are color-coded red in the synOcta® prosthetic system.

RN synOcta® positioning cylinder
Art. No. 048.070V4

RN impression cap
Art. No. 048.017V4

RN = Regular Neck (implants that have a Ø 4.8 mm restorative platform)

A. Closed tray impression procedure

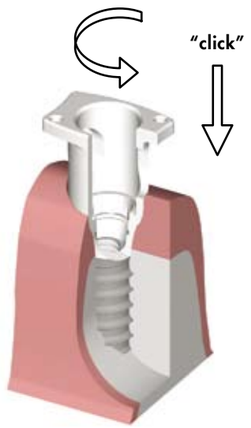
All parts of the transfer system are supplied non-sterile. They can be disinfected, as required, using standard commercial disinfectants for plastic products. (Please follow the manufacturers' directions.)

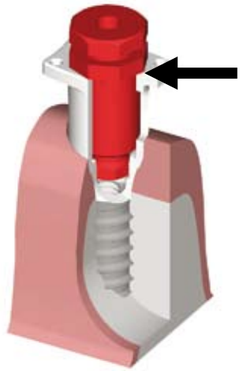
Caution: The plastic parts are designed for single use only. They must not be sterilized in the autoclave.

To prevent damage to the plastic components (loss of elasticity, embrittlement), they must be protected from heat and light.

The implant shoulder and interior must be thoroughly cleaned prior to the impression procedure. The impression cap (048.017V4) is pushed onto the implant until the shoulder snaps into place. The impression cap is turned gently in order to check that it is in the correct position. When the cap is in the correct position, it can be rotated on the implant.

Important: To avoid errors during the impression procedure, it must be ensured that the shoulder and the margin of the impression cap are not damaged.





The octagon on the positioning cylinder must be aligned with the internal octagon on the implant and be inserted into the impression cap until it is flush with the top of the impression cap.

The impression should be taken using an-elastomeric impression material (polyvinylsiloxane or polyether rubber).

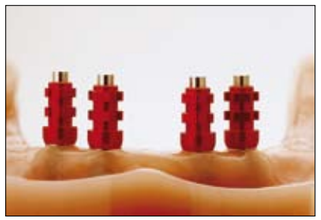
Important: Due to its insufficient tensile strength and inadequate elastic recoil, hydrocolloid is not suitable for this application.

B. Open tray impression procedure

A custom tray with perforations is required for this application.

The implant shoulder and interior must be thoroughly cleaned prior to the impression procedure. The impression cap (048.010 or 048.090) is placed on the implant and is tightened with the integral positioning screw. Precise positioning of the octagon of the impression cap into the octagon of the implant is important. Should only a limited amount of space be available, the occlusal aspect of the cap can be reduced by one retention ring (once the positioning screw has been removed).

Important: Only the integrated screw must be used. The margin and octagon must not be damaged in order to prevent any errors during the transfer process. For this reason, the impression caps are for single use only.



RN synOcta® impression cap
Art. No. 048.010

RN synOcta® impression cap with handle
Art. No. 048.090

The impression should be taken using an elastomeric impression material (polyvinylsiloxane or polyether rubber) in accordance with the manufacturer's directions.

Once the material has set, the positioning screws are loosened, and the impression is removed.

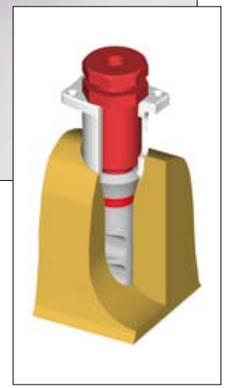
Important: Due to its insufficient tensile strength and inadequate elastic recoil, hydrocolloid is not suitable for this application.

After impression-taking, the healing caps are repositioned on the implants.

Fabricating the master cast

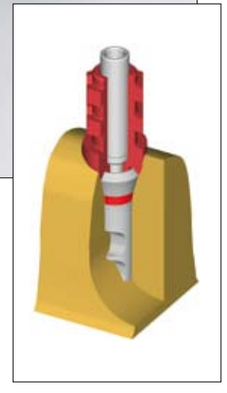
The closed tray version:
The red positioning cylinder indicates to the dental technician that the RN synOcta® analog (with the red stripe) must be used. In the laboratory, the analog (048.124) is repositioned in the impression, and the shoulder must click audibly into place.
The analog must not be rotated in the impression.

RN synOcta® analog
Art. No. 048.124



The open tray version:
The analog is secured in the impression using the integral positioning screw.
The red impression cap indicates to the dental technician that the RN synOcta® analog (with the red stripe) must be used.

Important: When tightening the screw, grasp the retentive section of the analog in order to prevent the impression cap from rotating. This is especially important if the cap has been shortened.

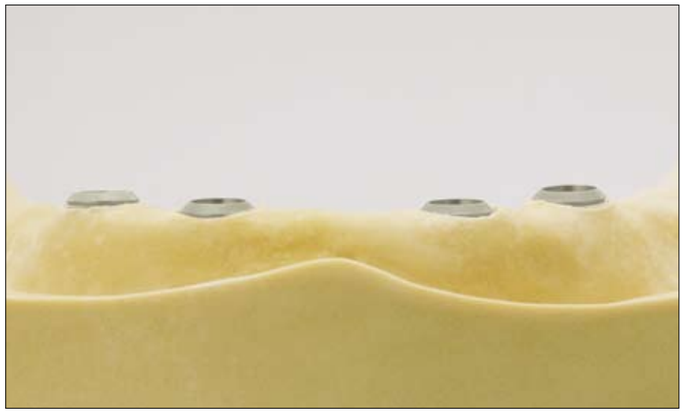


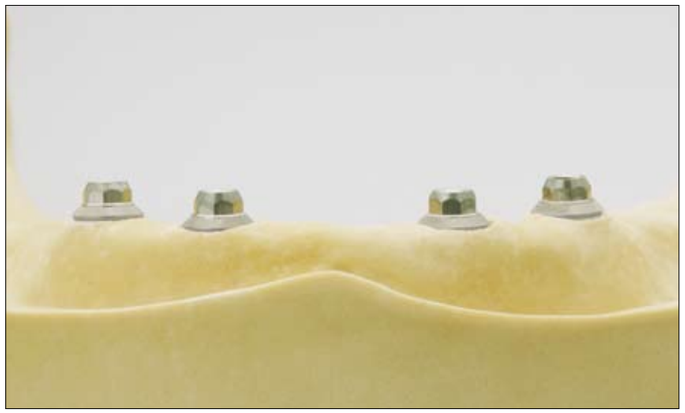
Fabricate the working master cast in the conventional way using Type 4 plaster (DIN 13911).

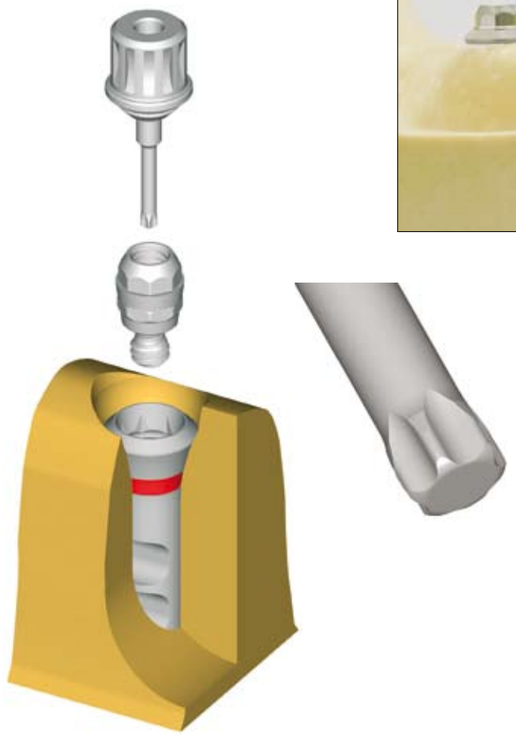
The RN synOcta® 1.5 abutment (048.602) is placed in the analog and aligned in the octagon.

Important: The abutment must be positioned in the octagon before the screw is tightened.
The screw is hand-tightened using an SCS screwdriver.

RN = Regular Neck (implants that have a ∅ 4.8 mm restorative platform)







Fabrication of the joint gold bar

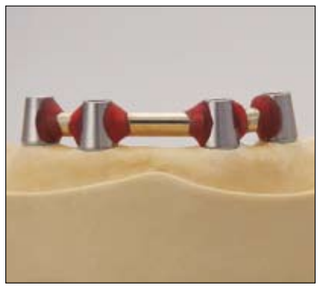
The prefabricated gold coping bar for the synOcta® prosthetic system without an internal octagon (048.204) consists of a non-oxidizing, high-melting alloy (Ceramicor; Au 60%, Pt 19%, Pd 20%, Ir 1%; melting range 1400–1490 °C). It is screwed onto the analog/synOcta® abutment with the 4.4 mm SCS occlusal screw (048.350V4). The gold coping is 6.0 mm high and can be shortened 1.5 mm occlusally.

The individual bar segments are placed between the abutment units. Attention should be paid to the space between the bar and gingiva (min. 2.0 mm) to facilitate adequate cleaning and to prevent changes in the mucosa.

Important: To achieve a good joint, the gap should be as small as possible.

Type of joint

The prepared bar can now be soldered or laser-welded, as desired. Laser-welding takes place directly on the plaster model and therefore takes less work. Larger gaps are filled with wire made from the same type of material (see also page 18, Fabrication of laser-welded bars with titanium components).



Soldered gold bar:
The gold copings and prefabricated bar segments are secured in place with a residue-free, burn-out plastic. The SCS occlusal screws must not be covered.

Tip: Overwaxing of the plastic compounds ensures good access of the flame later on in the soldering investment.

Once the SCS positioning screws have been loosened, the bar framework is carefully removed. Stabilization pins (048.208V4) are available for retaining the RN synOcta® bar gold copings in the soldering investment and are screwed into place with the SCS positioning screws.

The positioning screws ensure that the gold copings are anchored accurately in the soldering investment during soldering.

To prevent possible distortion of the bar-due to uneven preheating with the flame, the hardened soldering investment is preheated to 930–1100 °F (500–600 °C) in a preheating furnace.

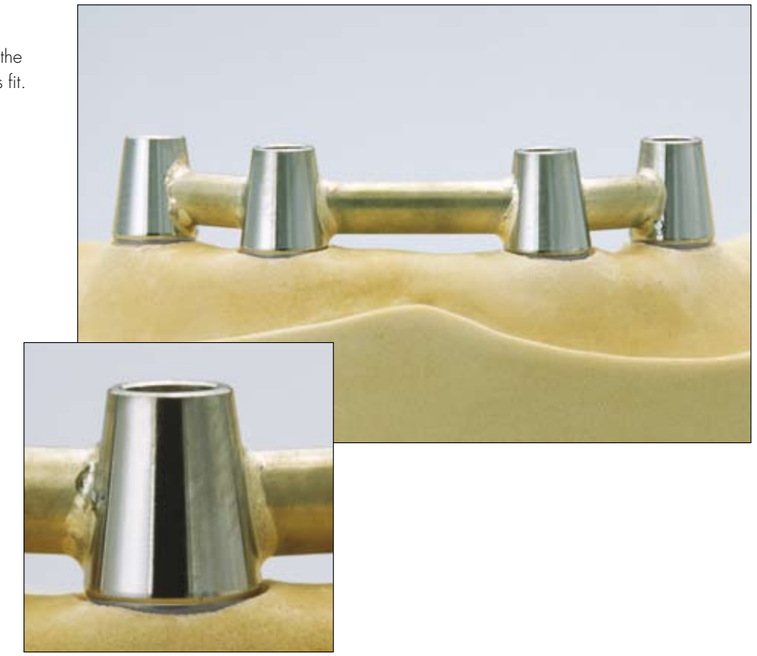
After the invested bar has been preheated, it is ready for soldering. Once soldering has been completed, the investment should be cooled to room temperature.

Tip: To protect the margins, a polish protector (046.245) or an analog can be screwed on during polishing. This reduces the risk of damage to the margins. It is advisable to work under a stereo-microscope.

The bar must be devested and cleaned in-an ultrasonic bath. The oxides and soldering flux residues are then removed in an acid bath.

Important: Due to the high precision of the prefabricated caps, increased caution is required during polishing. Therefore, under no circumstances, should a sandblaster be used.

It must be possible to reposition the cleaned bar without tension on the analogs, without it being secured with the SCS occlusal screws when checking its fit.



Important: The SCS occlusal screws that were used for soldering will be extremely oxidized and must not be used to secure the bar in the mouth. The bar must be secured in place with new SCS occlusal screws.

The finished synOcta® bar on the plaster model.

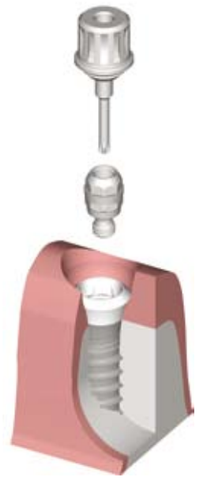
Insertion of the bar construction in the mouth

The restoration is delivered to the dentist with the original abutments.

The healing caps are removed and the interior of the implant is thoroughly cleaned and dried.

The superstructure is removed from the master cast and the abutment is unscrewed from the analog.

Torque = 35 Ncm

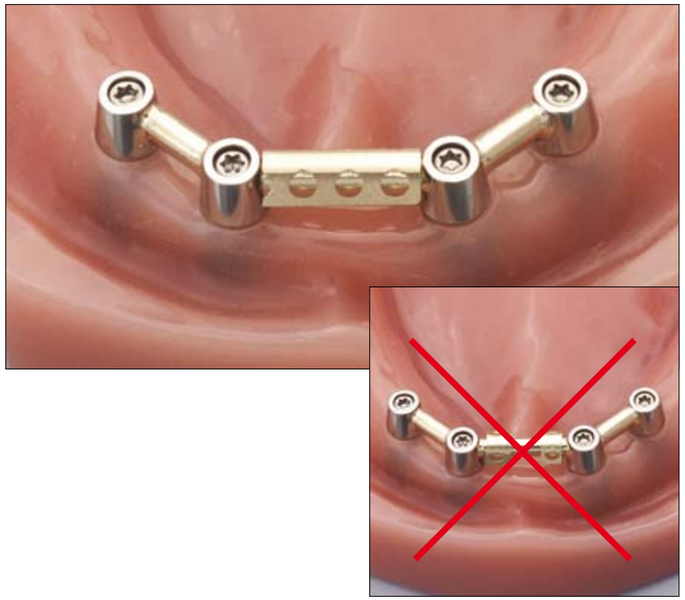


The **cleaned RN synOcta® 1.5 abutment** is positioned **without cement** in the internal octagon. The abutment screw is tightened using an SCS screwdriver, ratchet (046.119) and torque control device (046.049).

Important: The abutment must be positioned in the octagon before the screw is tightened.
After osseointegration of the implants, we recommend a **tightening torque of 35 Ncm** when inserting the abutment screws.

The **SCS occlusal screws** are tightened with **15 Ncm** on the RN synOcta® abutment.

The bar *in situ* with the new SCS occlusal screws.



Positioning the bar matrix

The matrix must make use of the entire length of the bar. This helps absorb horizontal forces better. (Wirz, 1994)

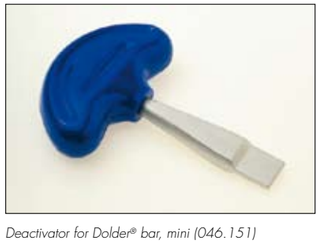
Important: Placing the matrix should always be carried out with the spacer before fabrication of the prosthesis. This is the only way to ensure vertical translation of the prosthesis to the bar.

Varying the retention force of the bar matrix:
Only the appropriate instruments may be used for activating/deactivating the bar matrix.

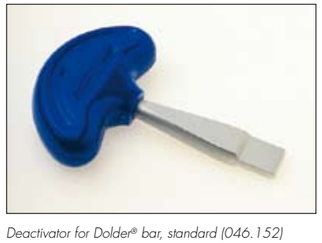
- To **activate** the matrix, press its walls together with the activator.

- To **deactivate** the matrix, press its walls apart with the deactivator.

Activator set for all bar matrices (046.150)



Deactivator for Dolder® bar, mini (046.151)



Deactivator for Dolder® bar, standard (046.152)

INITIAL SITUATION EDENTULOUS: BAR ON SYNOCTA®

Type of bar: soldered/laser-welded gold bar

Abutments and laboratory components

Insertion of abutment
RN synOcta® 1.5 abutment, 048.602

Impression procedure
Options:
RN synOcta® impression cap with integral positioning screw, 048.010

or RN synOcta® impression cap with built-in handle, 048.090

or RN impression cap, 048.017V4 with
RN synOcta® positioning cylinder, 048.070V4

Production of master cast
RN synOcta® analog, 048.124

040.195 RN synOcta® bar set, gold contains:
2 - RN synOcta® 1.5 abutments, 048.602
2 - RN synOcta® analogs, 048.124
2 - RN synOcta® gold copings, bar, 048.204
2 - SCS occlusal screws, 048.350

040.196 RN synOcta® bar set, titanium contains:
2 - RN synOcta® 1.5 abutments, 048.602
2 - RN synOcta® analogs, 048.124
2 - RN synOcta® titanium copings, bar, 048.214
2 - SCS occlusal screws, 048.350

040.197 RN synOcta® bar set, plastic contains:
2 - RN synOcta® 1.5 abutments, 048.602
2 - RN synOcta® analogs, 048.124
2 - RN synOcta® plastic copings, bar, 048.227
2 - SCS occlusal screws, 048.350

Production of superstructure
RN synOcta® gold coping, bar, 048.204

RN synOcta® titanium coping, bar, 048.214

RN synOcta® plastic coping, bar, 048.227

Dolder® bar, egg-shaped cross-section, mini, 048.411

Dolder® bar matrix, mini, 048.413
includes spacer

Dolder® bar, egg-shaped cross-section, standard, 048.412

Dolder® bar matrix, standard, 048.414
includes spacer

Stabilization pin, 048.208V4

SCS occlusal screws, 048.350V4

Insertion of final restoration
SCS occlusal screws, 048.350V4

Instruments

SCS screwdrivers:

For ratchet:

Length 15.0 mm: 046.400

Length 21.0 mm: 046.401

Length 27.0 mm: 046.402

For handpiece adapter:

Length 20.0 mm: 046.410

Length 26.0 mm: 046.411

Length 32.0 mm: 046.412

Activator set, 046.150

Deactivator, mini, 046.151

Deactivator, standard, 046.152

RN = Regular Neck (Ø 4.8 mm restorative platform)
V4 = 4 components per pack

Fabrication of laser-welded bars with titanium components

In addition to the gold variant, the bar can also be composed of prefabricated titanium parts using a laser-welding technique.

The bar segments **are fitted to the master cast, allowing a minimum gap.** Larger gaps are offset by the addition of more titanium

The segments are welded together with adequate argon gas rinsing.

Important: The soldering points must not show any blue discoloration. This type of discoloration indicates inadequate argon gas ventilation and therefore oxygen uptake by the metal. This makes the weld brittle and therefore weakens the bar construction. The laser device operating instructions must be followed.

The finished polished titanium bar.

FABRICATION OF THE DEFINITIVE BAR PROSTHESIS WITH METAL REINFORCEMENT

Once the bar has been tried in, the denture with metal reinforcement can be fabricated. The teeth are set up according to modern full denture principles (e.g. Gerber et al.).

Once the wax-up denture has been tried in, the teeth are secured in a plaster or silicone index. To enable the index to be repositioned accurately on the duplicate model, grooves are made in the ground labial surface of the master model.

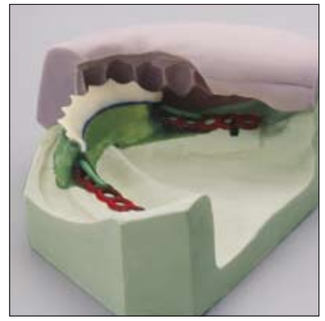
The bar is then blocked out for duplicating. In order to do so, the bar is fitted onto the master model.

Important: Before the bar sleeve is positioned, the spacer must be fixed to the bar. This ensures vertical translation of the denture.

The bar is then coated with a 0.4 mm thick wax sheet, which acts as a spacer. Labially and lingually, the wax is only extended to the mucosa. Stops of approximately 4.0 x 3.0 mm must be cut out to coincide with the height of the premolars and the second molar.

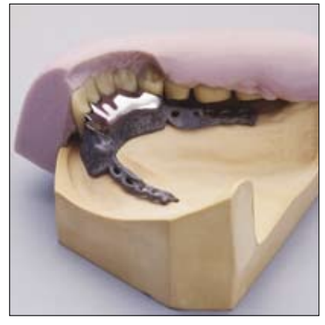
When the duplicating mold has been removed, the index can be fitted to the duplicate model. The plastic teeth are integrated into the index and matched to the duplicate model.

The dimensions and thickness of the lingual surfaces of the teeth to be built up are governed by the prevailing anatomical conditions. The retainers for the sleeve or rider should also be positioned to provide good mechanical retention.



The areas of the bar rider and strengthener which contact the denture acrylic must be silanized (e.g. Rocatec, Silicoater) or be pretreated with a primer.

Important: The bar sleeve and rider must not be soldered to the metal framework as this would prevent them from being replaced at a later date. Also, any heat treatment would adversely affect the elastic properties of the lamellae.



The finished metal-reinforced jointed bar.

MODIFICATION OF AN EXISTING FULL LOWER DENTURE IN AN IMPLANT/BAR-BORNE HYBRID DENTURE

If the implant-borne anchorage of an existing full denture is necessary, this can be fitted with a bar construction after implantation and the relevant healing time.

In this case, impression-taking is carried out with the existing denture in combination with one-part plastic impression caps (048.093V4) for a closed tray impression or metal transfer copings (048.009) for an open tray impression.

RN impression caps, one-part for bar construction
Art. No. 048.093V4

Important: The caps are suitable only for impression-taking of Regular Neck implants.

First, the healing caps are removed from the implants and the impression caps, which are fitted with a snap-on mechanism, are clicked into place. The relevant part of the existing denture is hollowed out.

Important: It must be possible to fit the denture over the impression caps without making contact.

After adjusting the denture, the impression is taken with the integrated caps, using an elastomeric impression material (polyvinylsiloxane or polyether rubber).

To protect the implant shoulder, the healing caps are screwed back onto the implants after the impression-taking.

The master cast is fabricated using special hard plaster. One-part RN synOcta® analogs (048.108) are available.

These are placed in the plastic impression caps situated in the denture, and the master cast is then fabricated in the conventional way using special hard plaster, type 4 (DIN 13911). It is important to fix the bite height, as is usual with, for example, a denture relining.

After removing the denture and the impression material from the plaster master cast, the bar construction procedure is decided, and the denture is hollowed out accordingly.

The bar is fabricated as described on pages 11–14 and/or 18–19.

RN synOcta® analog, one-part for bar construction
Art. No. 048.108

The bar matrices with the spacer (denture resilience) are positioned on the finished bar construction, and the undercut points and outside of the matrices are blocked out with wax (to ensure that they can be activated/deactivated). The denture is then adapted to the bar construction by polymerization of the matrices. The denture is then checked for **surplus plastic** in the region of the matrices and **for function.**

Important: This step is essential, because only in this way can the optimum function of the integrated bar matrices (incl. ability to activate/deactivate them) be ensured. Unremoved plastic residue may damage the bar construction/implants.

Before the bar is fitted, the RN synOcta® 1.5 abutments (048.602) are screwed into the implants with a **force of 35 Ncm.**

RELINING AN IMPLANT-BORNE BAR DENTURE

Hybrid dentures with resilient retention units should be examined at intervals of approximately 3 months to enable harmful excursions of the denture to be eliminated in their early stages.
If the alveolar ridge resorbs after a prolonged wearing time, the bar-borne denture sinks. This leads to a loss of resilience of the matrices and so to greater stress on the retentive elements/implants. Relining then becomes necessary.

Relining is carried out with the bar in position.

First, the occlusal screws (048.350V4) are replaced by fixing pins (048.073V4). These fixing pins are made from plastic and have a snap-on mechanism. They are used only to secure the bar on the implants when taking a relining impression with the denture. The fixing pins are intended for single use only.

Important: To preserve the resilience of the denture, the corresponding spacer must be inserted between the bar and matrix before impression-taking.

Fixation pin for bar construction
Art. No. 048.073V4

After impression-taking, the bar stays in the denture, and the dental technician inserts the one-part RN synOcta® analog (048.108) into the bar caps.

The master cast is fabricated and prepared for relining in the conventional way.

Before relining, the bar is secured to the master cast with the SCS occlusal screws, the undercut points are blocked out with wax, and the corresponding spacer is fixed in the bar matrix. Relining is then carried out in the conventional way.

After relining, the spacer is removed and the matrices are checked for surplus plastic and for function.

RN synOcta® analog, one-part for bar construction
Art. No. 048.108

Important: This step is essential, because only in this way can the optimum function of the relined, implant-borne bar denture be ensured. Interference with the functioning of the joint mechanism may damage the implant or bar construction.

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www.straumann.com

International Headquarters
Institut Straumann AG
Peter Merian-Weg 12
CH-4002 Basel, Switzerland
Phone +41 (0)61 965 11 11
Fax +41 (0)61 965 11 01

North American Distributors
Straumann USA, LLC
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