



# The Ankylos SynCone Concept

## Gentle Immediate Loading

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Nowadays, high-grade, patient-specific prosthetics are hardly possible without the use of implants. While functional and aesthetic restoration is the primary benefit of implant-supported prosthetics, another important advantage for both patients and dentists is the reduced time required, especially the chairside time.

## Background

Ledermann already proved in 1979 that a restoration can be fitted to implants postoperatively - in this case, four implants were placed in an edentulous mandible and splinted with a bar. The rapid functional and aesthetic rehabilitation of the patient, the fact that no further operations are required, and the reduction in patient stress are the main advantages of such an approach. However, the original concept involving a bar-borne restoration is not perfect. Considerable amounts of material and lengthy laboratory procedures are required and the 12 - 24 hour delay is unpleasant for the patient. The stress for the patient can only really be reduced by placing the immediate restoration while the anaesthetic is still effective. The wound dressing effect and consequent reduction in swelling is only achieved by placing the restoration soon after the operation.

## Current systems

Current immediate loading systems cannot be used without laboratory-fabricated mesiostructures. Thus, considerable time passes and the anaesthesia will have worn off before the restoration can be fitted, which is usually painful for the patient. In addition, they require very invasive, complex surgical procedures and/or a special implant and instruments. This represents a further cost factor since there is no allowance for flexibility during the operation in the event that immediate loading is contraindicated.

## Requirements

Continued development of this attractive approach to treatment must meet the following requirements:

- Optimum consideration of the requirements of an immediate treatment concept for geriatric patients
- Curtailed total treatment time
- Simplification of technical procedures through prefabricated components for the chairside procedures
- Inclusion in an implant system with multiple indications
- Freedom to choose alternative conventional treatment

## The Ankylos SynCone concept

is this revolutionary advancement. It combines the capability of Ankylos implants to withstand immediate loading, proven with animal experiments and clinically, with an innovative telescopic crown technique.

It has long been reported that full dentures can be retained with telescopic crowns (1/2/3). The most important advantages of the telescopic crown technique are the excellent three-dimensional immobilization of the restoration, defined release force, flexibility of design and optimum access for oral hygiene.

However, the high costs and labour-intensive laboratory procedures required for telescopic crowns often hindered application of this superior concept. The Ankylos Implant System is a significant move toward the symbiosis of technical precision and economic prosthetics.

## Prerequisites

It is not only essential that the endosseous section of the implant can be loaded immediately, but also that it supports the restoration dependably. The conical connector joins the abutment to the implant extremely firmly and has proven highly reliable even for highly loaded non-splinted, single posterior implants. The conical connector is the basis for the success of the SynCone concept (4). Only conical geometry complies with the important demand that an angled abutment can be aligned wherever required through 360 degrees to compensate for non-parallelism and ensure high rotational stability. Unless intermediate structures are fitted, the torkelcone principle, essential for angled abutments, can only be attained with the smooth-sided joint/retention geometry of a conical connector. The superstructure splints the implants as required for immediate loading. There is much more to the Ankylos conical connector than is apparent at first glance: **The SynCone concept.**

The procedure described here is based on 4 implants placed interforaminally. As no reliable clinical data are available on the use of higher/lower numbers of implants or SynCone abutments in the maxilla, it is not advisable to deviate from the following procedure.

## Many things work - but some only work using Ankylos.



Graphics:  
[www.medical-block-art.de](http://www.medical-block-art.de)

To read more about this subject, see the article by Dr. D. May and Dr. G.E. Romanos in the March 2001 issue of Quintessence, or order a reprint.

### Bibliography

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2. Heckmann S, Farmand M, Wahl G: Erste Erfahrungen mit Resilienzteleskopen bei der prothetischen Versorgung enossaler Implantate.  
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# Ankylos SynCone, clinical application

## Basic requirements

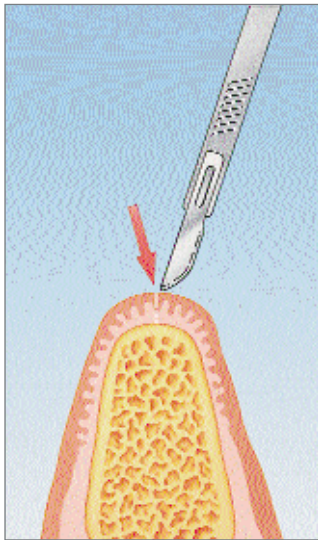
During the preoperative diagnostic examination, it is important to ensure that only patients in a generally good state of health plan to undergo this procedure. Anatomical requirements of the mandible for placing implants: at least 11 mm, preferably 14 mm. If the SynCone concept is to be employed successfully, the denture must fit and occlude optimally and the SynCone abutments must be parallel. Overextended functional peripheries may prevent the restoration fitting the tegument properly.

## Preliminary steps

A surgical drilling template is fabricated using the study model impression or by duplicating the existing denture. The titanium guide tube must be positioned parallel in the template to ensure that the twist drill is guided exactly when drilling the pilot site.

## Surgical procedure

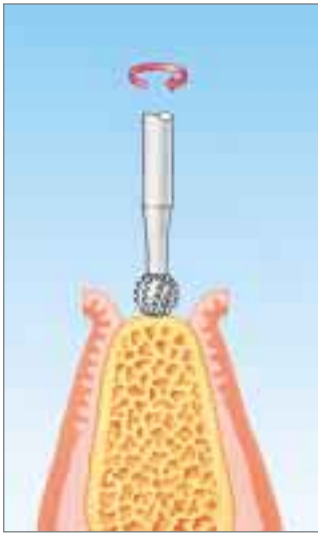
For this type of therapy, i.e. four immediately loaded Ankylos implants placed interforaminally in an edentulous mandible, the following surgical procedure should be employed:



### ◀ Type of incision and anaesthesia

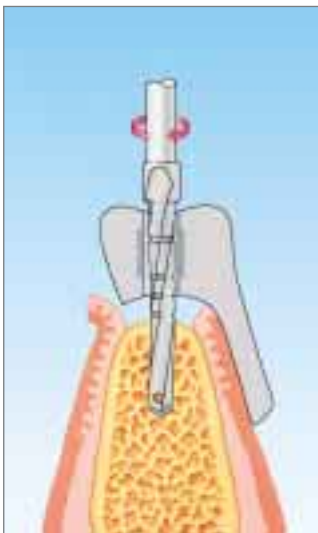
After administering peripheral infiltration anaesthetic, a crestal incision is carried out to ensure adaptation of the flaps after the operation. The remaining median tissue bridge also reduces the risk of dehiscence.





### ◀ Smoothing the bone

Expose the interforaminal alveolar ridge of the mandible and level it if necessary. If required, plane the bone with the internally irrigated round bur.



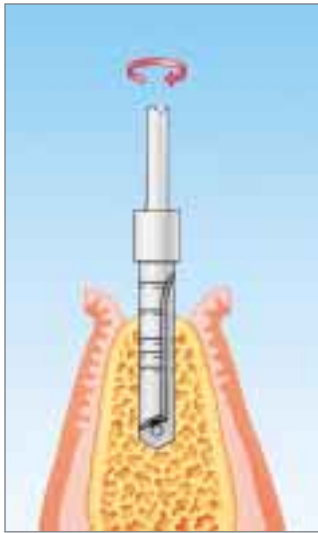
### ◀ Creating a purchase point and pilot site

Place the drilling template in position and use a twist drill (option: Lindemann drill) to mark the implant position on the bone. The pilot site prepared with the twist drill establishes the axial alignment of the implant. This procedure requires that the implants be aligned with their axes as parallel as possible. A drilling template with titanium guide tube may help guide the drill.

Simultaneous augmentation is not recommended when using SynCone abutments.



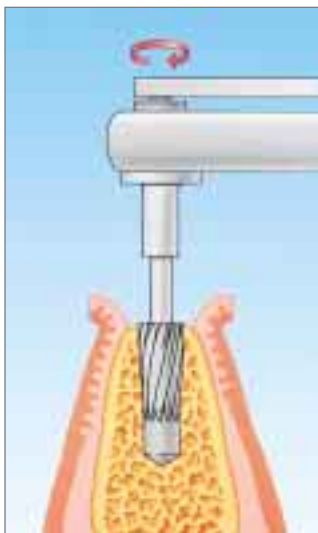
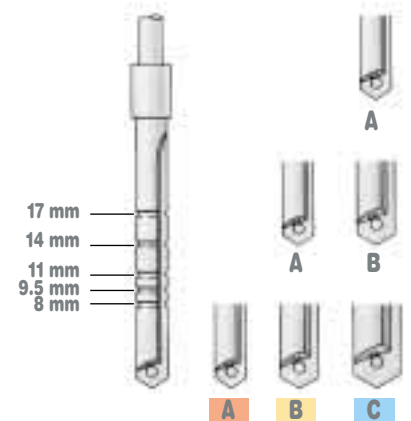
# Ankylos SynCone, clinical application



## ◀ Widening the site

The sites are widened with the colour-coded internally and externally irrigated drills. They are inserted to the correct depth to ensure that the implant can be placed slightly subcrestally. Paralleling pins are inserted in each pilot site to ensure that the parallel drill is aligned correctly.

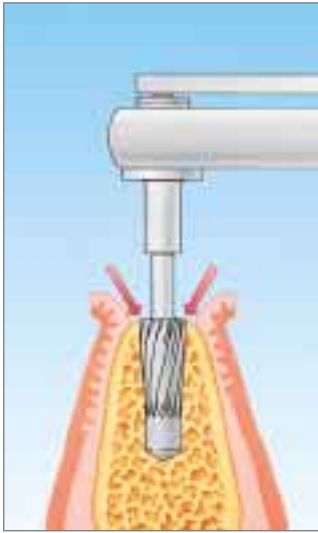
$$\text{Actual drilling depth} = \text{Implant length} + \begin{matrix} 0.4 \text{ mm} \\ 0.5 \text{ mm} \\ 0.6 \text{ mm} \end{matrix}$$



## ◀ Reaming the site

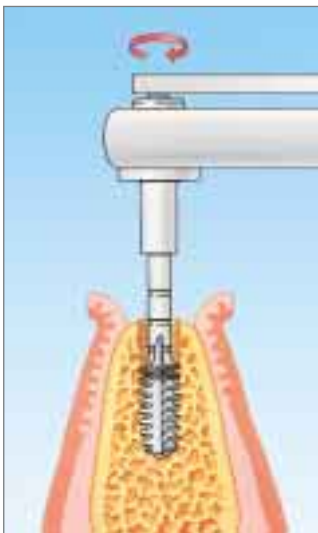
The first stage of manual preparation involves reaming the site to a taper. A separate tapered reamer is available for each type of implant. Assemble the correct length of reamer and ratchet insert for instruments and insert them into the ratchet. Insert the tapered reamer into the site and begin preparing, but without exerting pressure. The cutting edges are designed to pull the reamer into the site while rotating. Slight pressure should only be exerted while reaming the last quarter of the site. The safe-tip prevents the site being deepened excessively.





### ◀ Measuring

The reamer is used for measuring the implant site. After widening the site, the upper edge of the reamer must be approximately 0.5 mm below the surface of the bone. If this is not the case, the site should be deepened with the parallel drill used last. Remove the reamer and rinse the site with physiological saline solution.

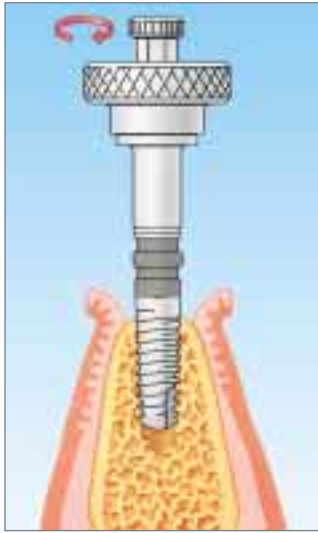


### ◀ Tapping the thread

Select the tap according to the implant diameter. Assemble the correct length of ratchet insert for the instruments and pick it up with the finger wheel or ratchet. Prepare the special Ankylos thread. Use the depth-markings to check the depth. The tap jams on reaching the bottom of the site. Should this occur, never continue turning the tap as this would strip the thread. Once the thread has been tapped properly, rinse the cavity again with physiological saline solution.



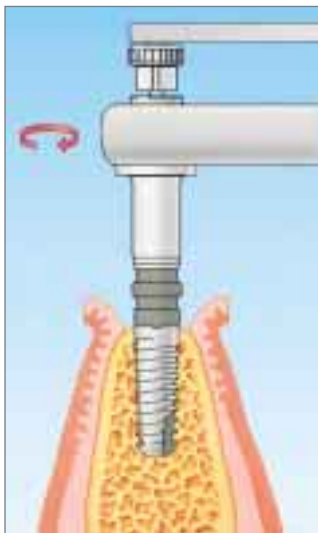
# Ankylos SynCone, clinical application



## ◀ Seating the implant into the site

Implant selection: At least 11 mm, preferably 14 mm

Wind the implant into the jaw until the lower edge of the polished section contacts the bone. Make sure not to trap any fibrous or epithelial tissue in the implant site. Should the implant become difficult to turn before the polished section reaches the bone, unwind the implant and rinse or tap the site again.



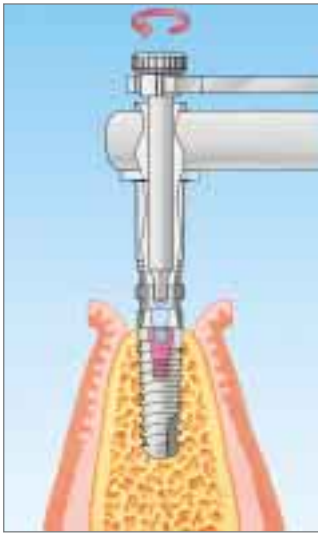
## ◀ Final positioning

Instead of the finger wheel, fit the reversible ratchet to the ratchet insert for implants. Guide the ratchet insert with the stud on the open-end wrench. Once the implant reaches its final position, increased force must be exerted to move the ratchet.

**Caution:**  
In high density bone (increased resistance) rotate the implant especially slowly due to the risk of overheating







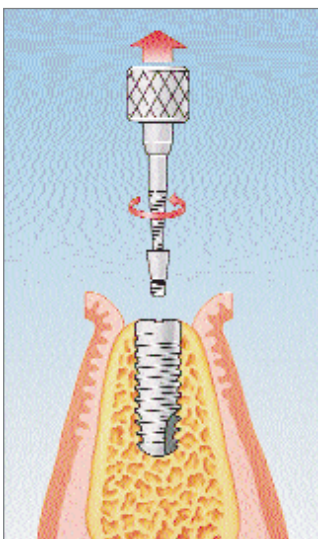
### ◀ Dismantling

Once the endosseous section of the implant has reached its final position, check that it fits firmly. Use the screwdriver in the placement device to unscrew the retaining screw from the adapter. First use the open-end wrench to loosen the screw and then turn the knurled end by hand until the placement device has been unscrewed from the implant completely (illustration on the right). Then remove the placement device, adapter and ratchet from the mouth (1).

Press the knurled screw on the screwdriver to release the adapter from the placement device and pull it off (2). Should the adapter screw catch on the hexagon of the screwdriver, pull it off too (3). The placement device is then ready for picking up another implant.



Dismantling adapter



### ◀ Removing the cover screws

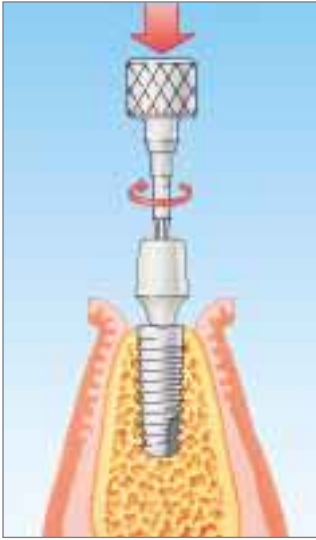
Once the implants have been placed, remove the cover screws.

#### Important!

If the implants become loose when the cover screws are removed, initial stability was inadequate and the implants must not be loaded immediately. The Ankylos system must then be used with the subgingival technique.



# Ankylos SynCone, prosthetic procedure



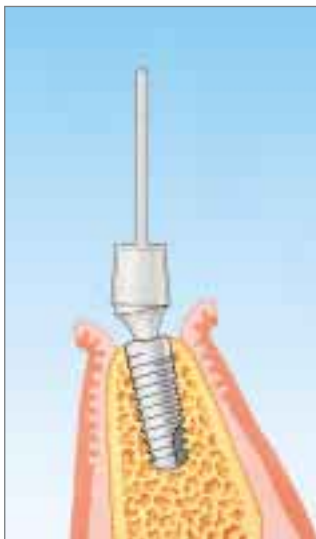
## ◀ Inserting SynCone abutments

The blue trial abutments in the Standard Abutment System can be used for selecting the sulcus height and angulation in advance. Sterilize\* the pre-fabricated SynCone abutments (4° taper) - they are available with sulcus heights of 1.5 mm, 3.0 mm and 4.5 mm to accommodate the various thicknesses of the mucosa. Then wind in the SynCone abutment using the torque wrench (3103 3625) with a hex socket or a torque-controlled contra-angle.

The recommended torque for the straining screw is 15 Ncm. Before inserting the abutment, make sure that the inner cone of the implant is carefully rinsed and dried. If the SynCone concept is to be employed successfully, the SynCone abutments must be parallel.



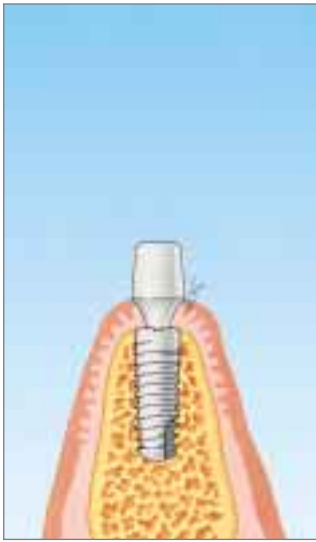
\*) please refer to the „Care of instruments“ manual



## ◀ Optional: Non-parallel implants

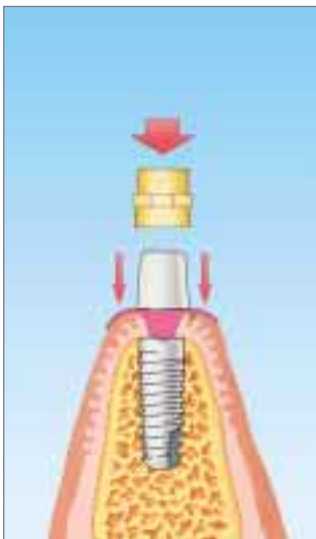
The SynCone paralleling devices are easily used for checking the axes of the abutments, even if the implant axes differ by up to 30°. Please note that on some implants the abutments are not aligned parallel. This may compromise the retention as the parallel sides of various abutments may cancel out the retentive effect of the cone. If the implants have not been placed parallel to one another, the pre-angled SynCone abutments (15°) can be used to compensate for the different angles of insertion of the abutments.





### ◀ Closing the wound

The edges of the wound should be sutured carefully to keep out the saliva. The convergent sulcus section of the abutment allows the mucosa to form a tight seal around the implant - the edges of the wound adapt closely to the transmucosal zone of the abutment which is protected against irritation. A firmly retained connective tissue margin forms after a short time.



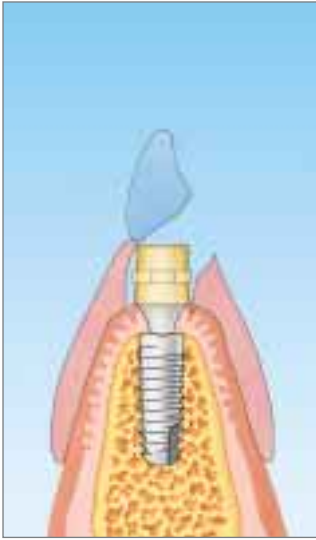
### ◀ Placing the SynCone cap

The flexible SynCone polymerization sleeves are slipped over the SynCone abutments, engaging the widest diameter of the abutment. This prevents the cold-curing resin running into the sulcus region of the SynCone abutment and protects the wound region. The same can be achieved using a rubber dam with an arched incision. The prefabricated Degunorm/SynCone cap is then disinfected and placed securely on the SynCone abutment. The raised retainer grips the cap in the acrylic denture.

**Caution:**  
Ensure that no cords are trapped when placing the SynCone abutment in position.



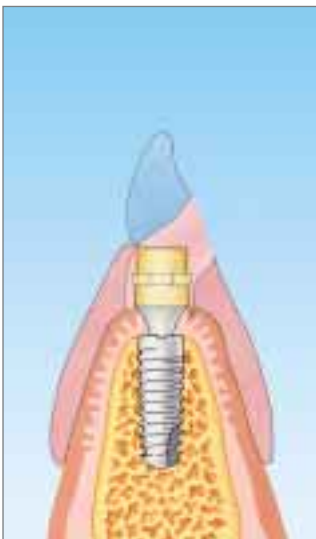
# Ankylos SynCone, prosthetic procedure



## ◀ Preparing the denture

The denture must have functioned properly prior to placing the implants. An inaccurately fitting denture will still not fit accurately after the implants have been placed. Trim out openings in the denture as wide as necessary to prevent it interfering with the caps. The drilling template can be used as a guide. After suturing, an alginate impression can be taken of the implants to allow the denture to be relieved to fit the model, once it is cast. This procedure is especially recommended for dentures with metal bases. To prevent excessive polymerisation shrinkage, ensure that as little acrylic as possible is trimmed out.

Before fixing the denture in place, check that the caps fit firmly.



## ◀ Polymerization phase

To ensure that the SynCone caps are retained in the denture base long-term and firmly, they must be totally enveloped with viscous, cold-curing acrylic (e.g. Dentsply DeTrey Selectaplus) which is free of bubbles. To prevent the caps being displaced in the denture and subsequent changes in the occlusion, it is essential that the denture is not dislodged transversely and/or vertically while the acrylic is polymerising. The clinical procedure involves asking the patient to iclose the mouth carefully (in acquired centric relation) and keep the teeth firmly in contact (centric jaw relation) but only exerting minimal pressure while the acrylic polymerises. Exerting excessive pressure while closing may press the denture into the resilient soft tissue, which would prevent the denture being replaced in exactly the same position. This may lead to a loss of friction between the SynCone abutments and caps. Simply stabilizing the denture with your fingers may lead to changes in the occlusion.





### ◀ Fitting the denture

Before removing the denture from the mouth, ensure that the cold-curing acrylic has cured absolutely thoroughly. Remove the denture from the mouth and trim/polish the areas around the SynCone caps. Remove all traces of acrylic from the margins of the caps. While the patient is still anaesthetized, check that the occlusion and articulation are free of interferences. The force required to remove the denture must not impede handling. If the SynCone concept is to be employed successfully, the denture must fit and occlude optimally and the SynCone abutments must be parallel. Overextended functional peripheries may prevent the restoration fitting the tegument properly. The peripheries can be reduced in any case as this makes the denture more comfortable in the mouth and the SynCone caps retain it on the SynCone abutments.



## Two year postoperative clinical findings



07.06.1999

06.02.2001

### ▶ Radiological findings

# Aftercare treatment

## Advice to patients

- Wear the fixed denture continually for one week
- Eat soft foods only for 14 days
- Antibiotic prophylaxis is usually administered for one week. The patient should also use germ reducing mouthwash after meals. Both measures provide anti-infection prophylaxis as the implant sites are deprived of manual oral hygiene during this period.

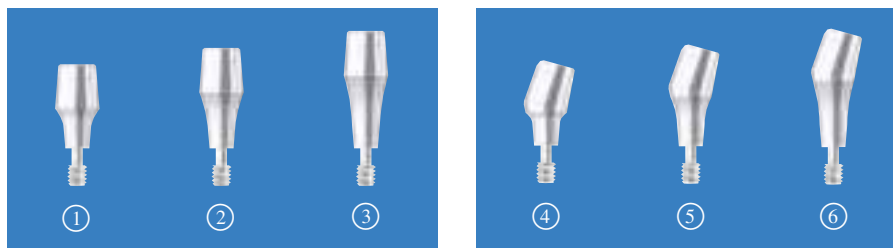
## After the implant has healed

One week following removal of the sutures, the denture is removed from the mouth for the first time and then worn again for two consecutive three-day periods. At the end of these two weeks, the patient is instructed fully on how to maintain oral hygiene, including the denture, and handle the lower denture properly. After this time, there are no further restrictions on eating. The usual regular recall examinations are required to determine changes due to atrophy, especially the congruency between the denture base and tegument, at an early stage and take appropriate corrective measures (reline).

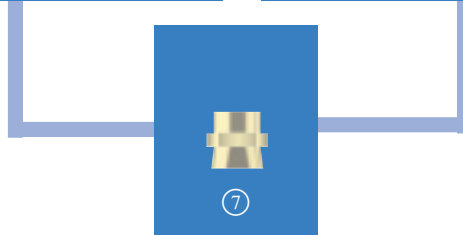


# Ankylos SynCone, list of products

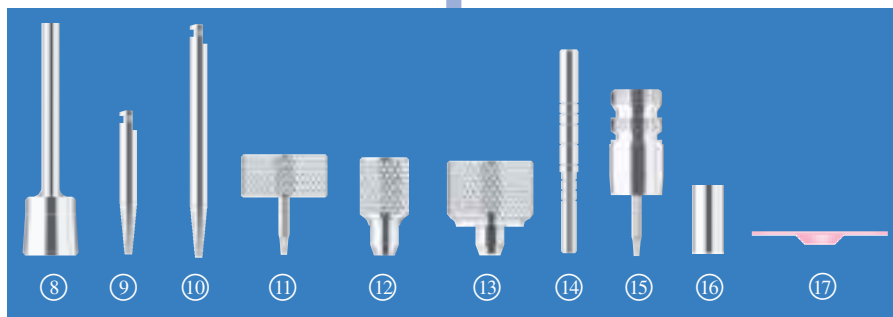
## SynCone abutments



## SynCone cap



## Instruments



## Product guide - ANKYLOS SynCone

Product No.	Description	Material	Illu.
<b>SynCone abutments</b>			
3102 1712	SynCone abutment, 1.5, straight, 4°	Ti 6Al 4V	①
3102 1722	SynCone abutment, 3.0, straight, 4°	Ti 6Al 4V	②
3102 1732	SynCone abutment, 4.5, straight, 4°	Ti 6Al 4V	③
3102 1772	SynCone abutment, 1.5, 15°/4°	Ti 6Al 4V	④
3102 1782	SynCone abutment, 3.0, 15°/4°	Ti 6Al 4V	⑤
3102 1792	SynCone abutment, 4.5, 15°/4°	Ti 6Al 4V	⑥
<b>SynCone cap</b>			
3102 1752	SynCone Cap 4°, immediate loading	Degunorm	⑦
<b>Instruments</b>			
3103 3620	SynCone paralleling pin	Ti 6Al 4V	⑧
3103 3434	Cover screw remover, short	Surgical steel	⑨
3103 3435	Cover screw remover, long	Surgical steel	⑩
3103 3400	Hexagon screwdriver, 1.0	Surgical steel	⑪
3103 3410	Finger wheel for screwdriver, standard, Ø 7 mm	Surgical steel	⑫
3103 3415	Finger wheel for screwdriver, standard, Ø 12 mm	Surgical steel	⑬
3103 3026	Parallel gauge for twist drills	Surgical steel	⑭
3103 3625	Torque control device for prosthetic ratchet	Surgical steel	⑮
3104 5490	Titanium sleeve for drilling template	Ti 6Al 4V	⑯
3102 1405	SynCone curing sleeve	Dental silicone	⑰

	Au	Pt	Pd	Ag	Cu	Zn	Ir	In	CTE
* Degunorm	73.8	9.0		9.2	4.4	2.0	0.1	1.5	16.8



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