

Surgical technique

stellaris

Preservation in motion

Building on our heritage Moving technology forward Step by step with our clinical partners Towards a goal of preserving mobility

# Preservation in motion

As a Swiss company, Mathys is committed to this guiding principle and pursues a product portfolio with the goal of further developing traditional philosophies with respect to materials or design in order to address existing clinical challenges. This is reflected in our imagery: traditional Swiss activities in conjunction with continuously evolving sporting equipment.

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#### Remarks

Please make yourself familiar with the handling of the instruments, the product-related surgical technique and the warnings, the safety notes as well as the recommendations of the instruction leaflet before using an implant manufactured by Mathys Ltd Bettlach. Make use of the Mathys user training and proceed according to the recommended surgical technique.

### Introduction



The stellaris Cone Stem is designed for non-cemented fixation in demanding bone conditions at the proximal end of the femur as well as for more routine cases.

The implant is made of titanium alloy (TAV). Its rough-blasted surface promotes rapid osseo-integration.

The highly polished neck reduces the risk of soft tissue damage.

The stems are available in a standard (CCD angle 133°) and a lateral (CCD angle 126°) version in 14 sizes each version. The stems up to size 24 have a length of 117.5 mm and the stellaris Long Stems (size 24.5 to 29) have a length of 142.5 mm.

For a given size, the basic geometry of the standard and lateral version is identical. The only difference is the CCD angle as well as the length of the neck.

The cone angle of 5° together with the eight longitudinal ribs that are arranged on the circumference of the stem, promote a high degree of rotation and subsidance stability which guarantee an excellent primary stability of the prosthesis.

The longitudinal ribs penetrate several tenths of millimetres into the bone creating a continuous and homogenous load transfer over the whole length of the tapered prosthesis.

Depending on the diameter of the stem, the height of the ribs varies between 1 to 2.5 mm for the basic stellaris stems and between 0.95 to 2.45 mm for the stellaris Long stems.

The main area of fixation in the femoral canal is in the middle third of the stem. The medullary cavity is pre-reamed in a conical shape to give an optimal primary stability to the implant. This will ensure a good osseo-integration of the stem.



The proximal part of the Reamer has the same angle as the final implant. At the distal part the angle is reduced from 5° to 2° to prevent an early fixation of the stem in that area. The Reamer is slightly longer than the implant to prevent early running aground.

The level of the centre of rotation is marked on the Reamer, as a reference.



The dimensions of the Trial Stem are identical to the final prosthesis, except that there are only four ribs. This gives enough stability for the trial phase but leaves enough bone for the secure fixation of the final implant.

The Trial Stems are made out of stainless steel and the surface is electro polished.

An extraction hole is built into the neck, to assist easy extraction of the Trial Stem. The instrumentation foresees an Extraction Handle with a Modular Hook.



The special slot at the proximal shoulder of the stem combined with the stellaris Impactor allows an easy positioning and guiding of the stem during impaction. By using the special stellaris Adapter the angle of anteversion can be defined intraoperatively.



The philosophy and design of the implant allows a wide option of positioning of the anteversion, which is a very important feature for dysplastic hips or special proximal femur situations. The use of the stellaris Anteversion Adapter is highly recommended, even in routine cases, to avoid implantation with excessive anteversion.

# 1. Indications and contraindications

#### Indications

- Degenerative disease of the joint, such as primary or secondary coxarthritis
- Advanced loss of substance and/or functional loss of the hip joint caused by degenerative or post-traumatic arthritis or rheumatoid arthritis
- Avascular necrosis of the femoral head or fracture of the femoral neck
- After failed previous surgery, osteosynthesis, joint reconstruction, arthrodesis, hemiarthroplasty or total hip replacement
- Revisions with slight bone loss
- Dysplasia of the hip

#### Contraindications

- Insufficient bone substance and/or poor bone quality that could jeopardise stable anchoring of the implant
- Acute or chronic infection, whether local or systemic (or a corresponding case history)
- Allergy to the material to be implanted, above all to metal (e.g. cobalt, chromium, nickel, etc.)
- Severe soft tissue, nervous or vascular insufficiency that could jeopardise the function of the implant
- Patients for whom a different type of reconstruction surgery or treatment is likely to be successful

For more detailed information please see the instructions for use or ask your Mathys representative.

# 2. Preoperative planning

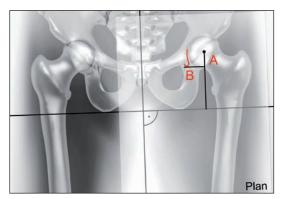


Fig. 1

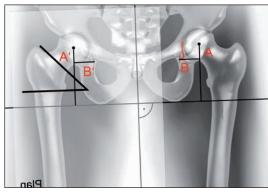


Fig. 2

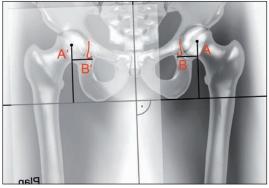


Fig. 3

# Determining the correct size and position for the implant

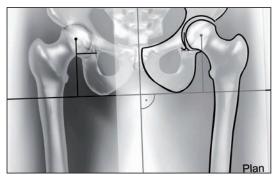
An A-P X-ray of the pelvis should be taken from a distance of 120 cm in order to give a magnification of 115 %.

- Draw a perpendicular line through the centre of the symphysis and the centre of the sacrum
- Align a horizontal tangent with the tip of the two sciatic tuberosities
- Then determine the centre of rotation of the head on the healthy side
- Draw a parallel line A, which corresponds to the distance from the sciatic tuberosity's horizontal line to the centre of rotation
- Draw in a parallel line B, which is limited medially by the teardrop
- Place a planning film against the central axis of the pelvis to mark the centre of rotation (Fig. 1)
- Transfer the centre of rotation to the affected side by drawing in the lines A' and B' (Fig. 2)
- To do this, turn over the planning film along the central axis of the pelvis
- Transfer the outline of the pelvis to the side due for surgery

Use the templates for the cup to determine the cup size required.

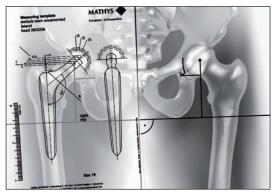
Draw the cup in the acetabulum at an angle of  $40^{\circ}$  to  $50^{\circ}$ .

Identify the future implant's position in reference to the bony landmarks (teardrop shape, craniolateral roof, osteophytes) (Fig. 3).



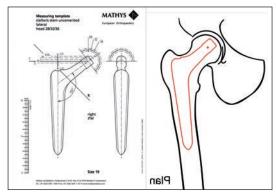
Place the planning film over the healthy side, with the two halves of the pelvis as closely congruent as possible. Trace the outline of the healthy femur on the film (Fig. 4).

Fig. 4



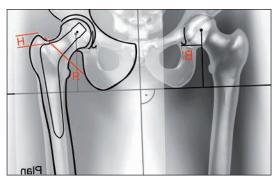
Use the prosthesis templates on the femur due for surgery to determine the stem size (Fig. 5).

Fig. 5



Mark in the appropriate stem using the template in the same abduction-adduction position as the femur drawn from the unaffected side (Fig. 6).

Fig. 6





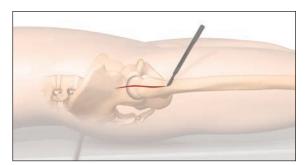
Draw in the femur due for surgery over the selected stem.

Draw in the resection level R.

Measure the distance H (Fig. 7).

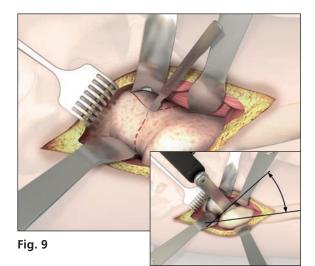
# 3. Surgical technique

The technique described here uses the transgluteal approach for the primary implantation of a total hip prosthesis. Other approaches are also possible.



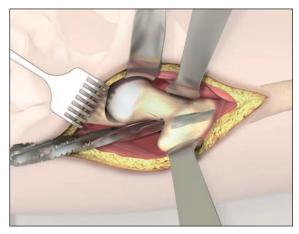
The patient is in the supine position. Lateral lengthwise incision centred over the trochanter major in a cranial to distal direction (Fig. 8).





Expose the joint capsule and the femoral head.

Perform the lateral osteotomy of the femoral neck, endeavouring to achieve an inclination of 45° and an anteversion of 15°. Remove the head (Fig. 9).



#### Option

Before resection of the femoral head the medullary canal is opened with a pointed Reamer by hand to give the **axial** direction of the femur to the further instruments (Fig. 10).

#### 3.30.349 Reamer Broad

Fig. 10

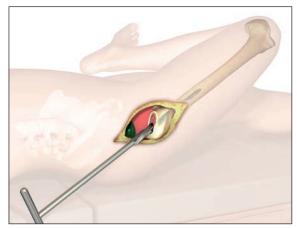
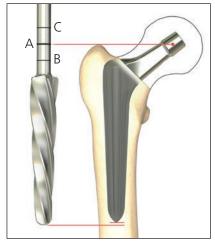


Fig. 11



Fig. 12





A trochanteric reamer or a burr can be used to remove bone from the medial portion of the greater trochanter.

The first Reamer should be inserted in deep enough to give the correct direction to the further instruments (Fig. 11).

#### 3.30.349 Reamer broad



The reaming procedure is only done by hand.

The femoral medullary canal is reamed step by step with the stellaris Reamers in the axial direction of the femur until noticeable resistance is reached. The reaming procedure is only done by hand (Fig. 12).



When changing from the basic length implants to the Long version (size 24 to size 24.5) the corresponding stellaris Long Reamers have to be used to adapt the length.

The Long Stems are by 25 mm longer. In these cases, it is highly recommended to ream deeper a second time with the size 20 and 21 stellaris Reamers to prepare the distal bed. **51.34.0204–51.34.0215 stellaris Reamer 51.34.0216–51.34.0219 stellaris Long Reamer** 

The thick laser marking (A) on the stellaris Reamer represents the level of the centre of rotation of the femoral head in a normal bone. As this mark is close to the greater trochanter, the level of the centre of rotation is clearly and easily checked (Fig. 13).

#### Remarks

Based on the cone design the lower mark (B) represents the next smaller size and the upper mark (C) the next bigger size implant (Fig. 13).

### Example

stellaris Reamer 18 corresponds to implant 18. If the stellaris Reamer can only be brought in to the lower mark (B) this represents the level of the centre of rotation of the implant size 17.

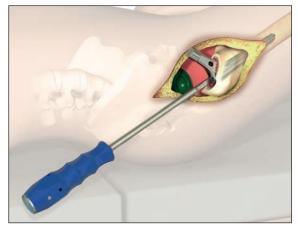
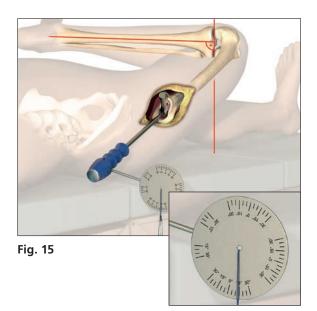


Fig. 14



As a recommended option the anteversion angle can be selected with the stellaris Adapter for Anteversion. The Adapter is fixed on the Impactor. The

The size of the stellaris Trial Stem corresponds to the size of the last used Reamer. Insert the Trial Stem into the femur until it is properly seated with the Impactor which is fixed in the corresponding slot. At the same time check for the

56.02.3210-56.02.3255 stellaris Trial Prostheses

angle is shown by the previously fixed suture and a weight (i. e. a foreceps) (Fig. 15).

56.02.3128 stellaris Adapter for Anteversion

The anteversion angle is determined by using the tibial axis as a reference. If the patient is in supine position, the tibia has to be aligned horizontally in space. The value shown on the stellaris Adapter for Anteversion is a relative value.

The range in a normal anatomical situation lies between  $10^{\circ}$  and  $15^{\circ}$ .

#### Remarks

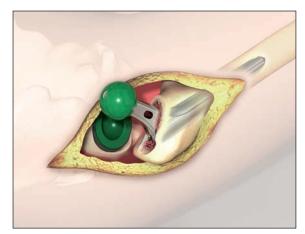
Trial reduction

desired anteversion (Fig. 14).

56.02.3816 stellaris Impactor

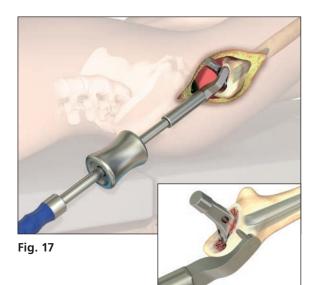
For the posterior approach the tibia is aligned vertically in space. The value shown on the stellaris Adapter for Anteversion is a relative value.

stellaris – **11** 



The trial reduction is carried out with the Trial Heads in order to check the range of motion, the tendency of luxation and the ligament tension (Fig. 16). **3.30.100–3.30.109 Trial Heads 54.02.1215–54.02.1219 Trial Heads 51.34.0280–51.34.0294 Trial Heads** 

Fig. 16



To easily extract the Trial Stem there is an extraction hole in the neck. The instrumentation foresees an Extraction Handle with a Modular Hook. Depending on the surgical approach and the patient positioning the left or right Hook can be chosen (Fig. 17).

51.34.0062 Stem Extractor 51.34.0187 stellaris Slide Weigth 51.34.0188 Modular Extraction Hook left 51.34.0235 Modular Extraction Hook right

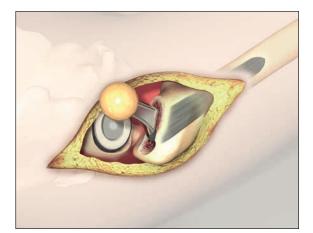


Fig. 18

#### Insertion of the final stem

Insert the prosthesis of the appropriate size with the stellaris Impactor or stellaris Impactor NG which is fixed in the corresponding slot. The prosthesis can be aligned into the desired anteversion and impacted into its definitive position with a few moderate mallet blows.

Once the implant is fully seated in the femoral canal, place the appropriate Trial Head onto the taper of the stem. Perform a final trial reduction to assess joint stability, ROM and leg length.

Then the Trial Head is removed, the cone of the prosthesis is carefully cleaned and dried. The final Head is placed onto the taper and securely fixed with a rotational movement (Fig. 18).

### 56.02.3816 stellaris Impactor 51.34.0864 stellaris Impactor NG

#### Remarks

Match the final head size with the inner diameter of the cup.

To avoid complications at the stem / head interface clean and dry the cone of the stem before assembling the final head.

As an option to reproduce the right anteversion chosen with the Trial Stem, the stellaris Adapter for Anteversion can be fixed on the handle of the impactor.

#### 56.02.3128 stellaris Adapter for Anteversion



Always make sure that there is no impingement on the cortex of the femoral neck with the neck of the stem. Otherwise remove some bone with a chisel.

Use only the recommended impactor for the different implants.

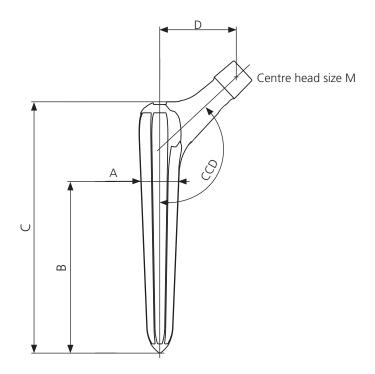
It is mandatory to use the stellaris Impactor 54.02.3816 only for the following implants 56.20.3190–56.20.4290.

It is mandatory to use the stellaris Impactor NG 51.34.0864 only for the follwoing implants 54.20.3150NG – 56.20.4290NG.

#### 4. Implants



**Technical Data** 



	Item no.	ltem no.	Item no.	ltem no.	Α	В	C	D	D	CCD	CCD
	Standard	Standard	Lateral	Lateral	Ø			Std.	Lat.	Std.	Lat.
	—	56.20.3150NG	—	56.20.4150NG	15	80	117.5	31.2	36.6	133°	126°
	—	56.20.3160NG	—	56.20.4160NG	16	80	117.5	32.4	38.0	133°	126°
	—	56.20.3170NG	—	56.20.4170NG	17	80	117.5	33.4	39.2	133°	126°
	—	56.20.3180NG	—	56.20.4180NG	18	80	117.5	34.5	40.4	133°	126°
	56.20.3190	56.20.3190NG	56.20.4190	56.20.4190NG	19	80	117.5	35.7	41.8	133°	126°
	56.20.3200	56.20.3200NG	56.20.4200	56.20.4200NG	20	80	117.5	36.8	43.1	133°	126°
	56.20.3210	56.20.3210NG	56.20.4210	56.20.4210NG	21	80	117.5	37.6	44.0	133°	126°
	56.20.3220	56.20.3220NG	56.20.4220	56.20.4220NG	22	80	117.5	38.4	44.9	133°	126°
asic	56.20.3230	56.20.3230NG	56.20.4230	56.20.4230NG	23	80	117.5	39.2	45.7	133°	126°
B	56.20.3240	56.20.3240NG	56.20.4240	56.20.4240NG	24	80	117.5	39.9	46.5	133°	126°
	56.20.3245	56.20.3245NG	56.20.4245	56.20.4245NG	24.5	105	142.5	40.3	46.9	133°	126°
	56.20.3260	56.20.3260NG	56.20.4260	56.20.4260NG	26	105	142.5	41.4	48.1	133°	126°
bug	56.20.3275	56.20.3275NG	56.20.4275	56.20.4275NG	27.5	105	142.5	42.5	49.3	133°	126°
Ľ	56.20.3290	56.20.3290NG	56.20.4290	56.20.4290NG	29	105	142.5	43.6	50.5	133°	126°

All measurements in mm



**NG** = Implant will not have a thread and can therefore not be used with the Stem Positioner with Screw holder (56.02.6204). It is mandatory to use the stellaris Impactor 54.02.3816 only for the following implants 56.20.3190–56.20.4290. It is mandatory to use the stellaris Impactor NG (51.34.0864) only for the following implants 54.20.3150NG–56.20.4290NG.

#### Portfolio

#### stellaris Stem standard

	V

ltem no.	Description
56.20.3150NG	stellaris Stem standard 15
56.20.3160NG	stellaris Stem standard 16
56.20.3170NG	stellaris Stem standard 17
56.20.3180NG	stellaris Stem standard 18
56.20.3190NG	stellaris Stem standard 19
56.20.3200NG	stellaris Stem standard 20
56.20.3210NG	stellaris Stem standard 21
56.20.3220NG	stellaris Stem standard 22
56.20.3230NG	stellaris Stem standard 23
56.20.3240NG	stellaris Stem standard 24
56.20.3245NG	stellaris Long Stem standard 24.5
56.20.3260NG	stellaris Long Stem standard 26
56.20.3275NG	stellaris Long Stem standard 27.5
56.20.3290NG	stellaris Long Stem standard 29
Matarial TiGALAV	

Material: Ti6Al4V Cone: 12/14mm CCD-angle: 133°

#### stellaris Stem lateral



ltem no.	Description
56.20.4150NG	stellaris Stem lateral 15
56.20.4160NG	stellaris Stem lateral 16
56.20.4170NG	stellaris Stem lateral 17
56.20.4180NG	stellaris Stem lateral 18
56.20.4190NG	stellaris Stem lateral 19
56.20.4200NG	stellaris Stem lateral 20
56.20.4210NG	stellaris Stem lateral 21
56.20.4220NG	stellaris Stem lateral 22
56.20.4230NG	stellaris Stem lateral 23
56.20.4240NG	stellaris Stem lateral 24
56.20.4245NG	stellaris Long Stem lateral 24.5
56.20.4260NG	stellaris Long Stem lateral 26
56.20.4275NG	stellaris Long Stem lateral 27.5
56.20.4290NG	stellaris Long Stem lateral 29

Material: Ti6Al4V Cone: 12/14mm CCD-angle: 126°

### Portfolio



#### stellaris Stem standard

ltem no.	Description
56.20.3190	stellaris Stem standard 19
56.20.3200	stellaris Stem standard 20
56.20.3210	stellaris Stem standard 21
56.20.3220	stellaris Stem standard 22
56.20.3230	stellaris Stem standard 23
56.20.3240	stellaris Stem standard 24
56.20.3245	stellaris Long Stem standard 24.5
56.20.3260	stellaris Long Stem standard 26
56.20.3275	stellaris Long Stem standard 27.5
56.20.3290	stellaris Long Stem standard 29
Matorial: Ti6A14V	

Material: Ti6Al4V Cone: 12/14mm CCD-angle: 133°

#### stellaris Stem lateral



ltem no.	Description
56.20.4190	stellaris Stem lateral 19
56.20.4200	stellaris Stem lateral 20
56.20.4210	stellaris Stem lateral 21
56.20.4220	stellaris Stem lateral 22
56.20.4230	stellaris Stem lateral 23
56.20.4240	stellaris Stem lateral 24
56.20.4245	stellaris Long Stem lateral 24.5
56.20.4260	stellaris Long Stem lateral 26
56.20.4275	stellaris Long Stem lateral 27.5
56.20.4290	stellaris Long Stem lateral 29

Material: Ti6Al4V Cone: 12/14mm CCD-angle: 126°

### 5. Instruments



stellaris Basic Instrumentation Set incl. Reamers 51.34.0179A

Item no. 51.34.0365 stellaris Tray for Basic Instruments



Item no. 51.34.0363 **stellaris Insert for Reamers** No Picture / Item no. 51.34.0362 **stellaris Lid** 



Item no.

3.30.130

**Item no.** 3.30.349

**Item no.** 3.30.535

**Item no.** 3.30.550

#### 51.34.0179 stellaris Basic Instruments incl. Reamers

ltem no.	Description
3.30.100	Trial Head 28 S blue
3.30.101	Trial Head 28 M blue
3.30.102	Trial Head 28 L blue
3.30.103	Trial Head 32 S green
3.30.104	Trial Head 32 M green
3.30.105	Trial Head 32 L green
54.02.1215	Trial Head 36 S
54.02.1216	Trial Head 36 M
54.02.1217	Trial Head 36 L

Ruler length 20

Reamer broad

Head Impactor



- 0 - 7 0 0 10 17 17 18 14 18 19 17 18 19 20 -





Extractor curved for Hip



Item no.	Description
51.34.0204	stellaris Reamer 13
51.34.0205	stellaris Reamer 14
51.34.0206	stellaris Reamer 15
51.34.0207	stellaris Reamer 16
51.34.0208	stellaris Reamer 17
51.34.0209	stellaris Reamer 18
51.34.0210	stellaris Reamer 19
51.34.0211	stellaris Reamer 20
51.34.0212	stellaris Reamer 21
51.34.0213	stellaris Reamer 22
51.34.0214	stellaris Reamer 23
51.34.0215	stellaris Reamer 24







ltem no.	
56.02.3128	stellaris Adapter for Anteversion
ltem no.	
56.02.3816	stellaris Impactor
ltem no.	
51.34.0864	stellaris Impactor NG
ltem no.	
58.02.4008	Handle with quick Coupling

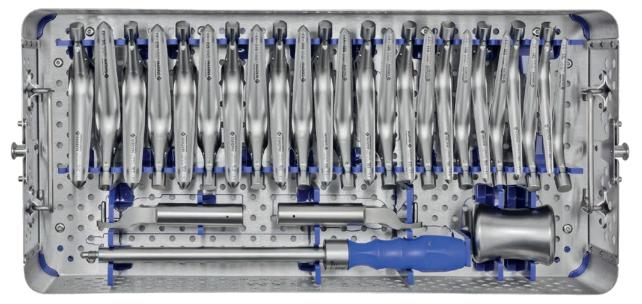
### Optional

Description
Trial Head 28 XL blue
Trial Head 32 XL green
Trial Head 36 XL
Trial Head 28 XXL blue
Trial Head 32 XXL green
Trial Head 36 XXL

		ntern nor
		51.34.028
	Sam 321 SOT	51.34.028
32 M SC 7		51.34.028
		51.34.028
		51.34.028
32 XI 55	E 32 XXL SP	51.34.028
	0.001	51.34.028
		51.34.028
		51.34.028

Item no.	Description
51.34.0280	Trial Head SC XRO 28 S
51.34.0281	Trial Head SC XRO 28 M
51.34.0282	Trial Head SC XRO 28 L
51.34.0283	Trial Head SC XRO 28 XL
51.34.0284	Trial Head SC XRO 28 XXL
51.34.0285	Trial Head SC XRO 32 S
51.34.0286	Trial Head SC XRO 32 M
51.34.0287	Trial Head SC XRO 32 L
51.34.0288	Trial Head SC XRO 32 XL
51.34.0289	Trial Head SC XRO 32 XXL
51.34.0290	Trial Head SC XRO 36 S
51.34.0291	Trial Head SC XRO 36 M
51.34.0292	Trial Head SC XRO 36 L
51.34.0293	Trial Head SC XRO 36 XL
51.34.0294	Trial Head SC XRO 36 XXL

#### stellaris Instrumentation Set for Trial Prostheses 51.34.0180A



Item no. 51.34.0366 **stellaris Tray for Trial Protheses** No Picture / Item no. 51.34.0362 **stellaris Lid** 







#### 51.34.0180 stellaris Set for Trial Prostheses

Item no.	
51.34.0062	Stem Extractor
Item no.	
51.34.0187	stellaris Slide Weight
Item no.	Description
51.34.0188	Modular Extraction Hook left
51.34.0235	Modular Extraction Hook right

ſ	12 F

Item no.	Description
56.02.3212	stellaris Trial Prosthesis standard 15
56.02.3213	stellaris Trial Prosthesis standard 16
56.02.3214	stellaris Trial Prosthesis standard 17
56.02.3215	stellaris Trial Prosthesis standard 18
56.02.3216	stellaris Trial Prosthesis standard 19
56.02.3217	stellaris Trial Prosthesis standard 20
56.02.3218	stellaris Trial Prosthesis standard 21
56.02.3219	stellaris Trial Prosthesis standard 22
56.02.3220	stellaris Trial Prosthesis standard 23
56.02.3225	stellaris Trial Prosthesis standard 24



ltem no.	Description
56.02.3242	stellaris Trial Prosthesis lateral 15
56.02.3243	stellaris Trial Prosthesis lateral 16
56.02.3244	stellaris Trial Prosthesis lateral 17
56.02.3245	stellaris Trial Prosthesis lateral 18
56.02.3246	stellaris Trial Prosthesis lateral 19
56.02.3247	stellaris Trial Prosthesis lateral 20
56.02.3248	stellaris Trial Prosthesis lateral 21
56.02.3249	stellaris Trial Prosthesis lateral 22
56.02.3250	stellaris Trial Prosthesis lateral 23
56.02.3255	stellaris Trial Prosthesis lateral 24

### stellaris Long Instrumentation Set 51.34.0182A



Item no. 51.34.0364 **stellaris Long Tray** No Picture / Item no. 51.34.0362 **stellaris Lid** 



#### 51.34.0182 stellaris Long Instrumentation

ltem no.	Description
51.34.0216	stellaris Long Reamer 24.5
51.34.0217	stellaris Long Reamer 26
51.34.0218	stellaris Long Reamer 27.5
51.34.0219	stellaris Long Reamer 29



ltem no.	Description
56.02.3221	stellaris Long Trial Prothesis Std. 24.5
56.02.3222	stellaris Long Trial Prothesis Std. 26
56.02.3223	stellaris Long Trial Prothesis Std. 27.5
56.02.3224	stellaris Long Trial Prothesis Std. 29

ltem no.	Description
56.02.3251	stellaris Long Trial Prothesis Lat. 24.5
56.02.3252	stellaris Long Trial Prothesis Lat. 26
56.02.3253	stellaris Long Trial Prothesis Lat. 27.5
56.02.3254	stellaris Long Trial Prothesis Lat. 29

# 6. Symbols



Caution



Australia	Mathys Orthopaedics Pty Ltd Lane Cove West, NSW 2066 Tel: +61 2 9417 9200 info.au@mathysmedical.com	Italy	Mathys Ortopedia S.r.l. 20141 Milan Tel: +39 02 5354 2305 info.it@mathysmedical.com
Austria	Mathys Orthopädie GmbH 2351 Wiener Neudorf Tel: +43 2236 860 999 info.at@mathysmedical.com	Japan	Mathys KK Tokyo 108-0075 Tel: +81 3 3474 6900 info.jp@mathysmedical.com
Belgium	Mathys Orthopaedics Belux N.VS.A. 3001 Leuven Tel: +32 16 38 81 20 info.be@mathysmedical.com	New Zealand	Mathys Ltd. Auckland Tel: +64 9 478 39 00 info.nz@mathysmedical.com
France	Mathys Orthopédie S.A.S 63360 Gerzat Tel: +33 4 73 23 95 95 info.fr@mathysmedical.com	Netherlands	Mathys Orthopaedics B.V. 3001 Leuven Tel: +31 88 1300 500 info.nl@mathysmedical.com
Germany	Mathys Orthopädie GmbH «Centre of Excellence Sales» Bochum 44809 Bochum Tel: +49 234 588 59 0 sales.de@mathysmedical.com	P. R. China	Mathys (Shanghai) Medical Device Trading Co., Ltd Shanghai, 200041 Tel: +86 21 6170 2655 info.cn@mathysmedical.com
	«Centre of Excellence Ceramics» Mörsdorf 07646 Mörsdorf/Thür. Tel: +49 364 284 94 0	Switzerland	Mathys (Schweiz) GmbH 2544 Bettlach Tel: +41 32 644 1 458 info@mathysmedical.com
	info.de@mathysmedical.com «Centre of Excellence Production» Hermsdorf 07629 Hermsdorf Tel: +49 364 284 94 110 info.de@mathysmedical.com	United Kingdom	Mathys Orthopaedics Ltd Alton, Hampshire GU34 2QL Tel: +44 8450 580 938 info.uk@mathysmedical.com

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