



## Surgical Technique

Primary Total Knee Replacement  
Fixed-bearing. Cemented or cementless  
Tibial Instrumentation 4T



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# Introduction

- ▶ This surgical technique describes the use of the conventional instrumentation for primary TKA implants.
- ▶ The steps below replace the sections on tibial alignment and tibial resection in the anatomic Surgical Technique documents TO.G.001 and TO.G.002, where the other steps can be found.
- ▶ The 4T tibial instrumentation allows the surgeon to use four different techniques:
  - Intramedullary system
  - Combined intramedullary system
  - Combined extramedullary system (with tibial bracket)
  - Extramedullary system (without tibial bracket)

Not all devices presented in this surgical technique are necessarily registered in your country. Please contact your Amplitude representative to find out if they are available.

# Overview of the implant

- ▶ The anatomic TKS is a PCL-sacrificing, posterior-stabilized, fixed bearing implant for primary knee arthroplasty.
- ▶ Its mediolateral coverage matches the morphology of the femur.
- ▶ Stability is provided:
  - in extension thanks to a congruent anterior lip,
  - in flexion thanks to a late contact between the cam and the post of the posterior stabilization mechanism.



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# Pre-operative planning

Pre-operative planning radiographs and templates are used to evaluate the following:

On the tibia:

- Choice between intra or extramedullary alignment method.
- Lateral and A/P position of the entry point for the intramedullary rod.
- Match between the tibial keel and fins and the metaphysis
- (e.g. following osteotomy).
- Presence of osteophytes.
- Magnitude of wear in each compartment.
- Potential need for a tibial extension stem.
- Estimated tibial baseplate size and insert height.

## REMINDER

This surgical technique describes how to use the instrumentation properly. The surgeon is fully responsible for choosing the surgical approach and technique.

## NOTE

The provided templates have a 1:1 scale. Make sure the template scale matches the X-ray scale.



# 1 Intramedullary (IM) and combined Intramedullary tibial system

## Locating the medullary canal:

- Place the knee in hyperflexing position and dislocate the tibia forward.
- Based on the pre-operative planning, make a hole in the middle of the medullary canal using the Intramedullary drill bit.



- Place the Intramedullary rod length 400 mm onto the T Wrench and insert it into the canal; the landmark must always be visible.

### NOTE

If the rod cannot be inserted, use the 250 mm intramedullary rod.

## 2 Intramedullary tibial system

### Intramedullary tibial system assembly:

- Assemble the 4T Wheel/Tibial Resection Guide Support with the 4T Aiming with tibial bracket ①.

**NOTE**  
The 'UP' engraving corresponds to the 4T Wheel/  
Tibial Resection Guide Support's superior side

**NOTE**  
The 'A' engraving on the 4T Aiming with tibial  
bracket must be on the anterior side.

- Insert the 4T tibial bracket on the 4T Aiming with tibial bracket ②. Screw on the 4T Proximal AP Wheel ③.

- Assemble the 4T Tibial resection guide right or left – 0° or 3° with the 4T Wheel/Tibial Resection Guide Support. The value of the tibial slope is described on the top of the 4T Tibial resection guide.

**NOTE**  
The instrumentation set contains two rods. Use the longest  
one with the 4T tibial bracket.

**NOTE**  
The 4T Tibial resection guide right or left is available with  
3° (recommended) posterior slope but also with 0° or 6°  
posterior slope.





## 2 Intramedullary tibial system

### Intramedullary tibial system:

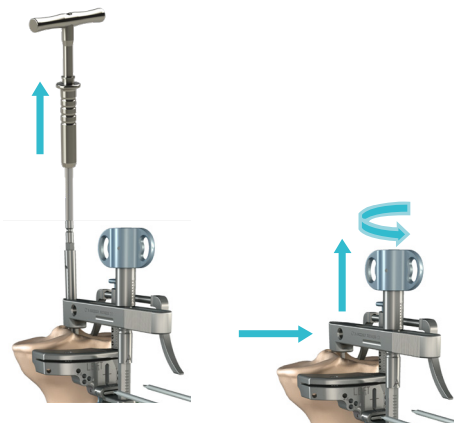
- ▶ Place this entire unit on the Intramedullary Rod; adjust its rotation relative to the tibial tuberosity and then impact the tabs.
- ▶ Clip the 4T tibial stylus on the 4T tibial resection guide (make sure the clip is fully engaged).
- ▶ Set the resection height by using the 4T tibial stylus to palpate either the:
  - healthy side (10 mm cut relative to palpated point)
  - worn side (2 mm cut relative to palpated point/exit of saw blade)



#### IMPORTANT

- For other resection heights, the adjustment can be made:**
- quickly by pressing on the green wheel on the 4T Wheel/ Tibial Resection Guide Support (release)
  - gradually by turning the green wheel (the 4T aiming has marking every 2 mm).

- ▶ Verify the height of the bone cut with the Resection gauge.
- ▶ Place the Headless pin length 80 mm in the 0 mm holes using the Pin Driver – Zimmer / Hall or the Pin Driver AO-Magnetic.



#### NOTE

**The 4T tibial stylus can be clipped on the lateral side of the 4T tibial resection guide to palpate the medial plateau (or the reverse) by passing the 4T tibial stylus over the 4T tibial bracket.**

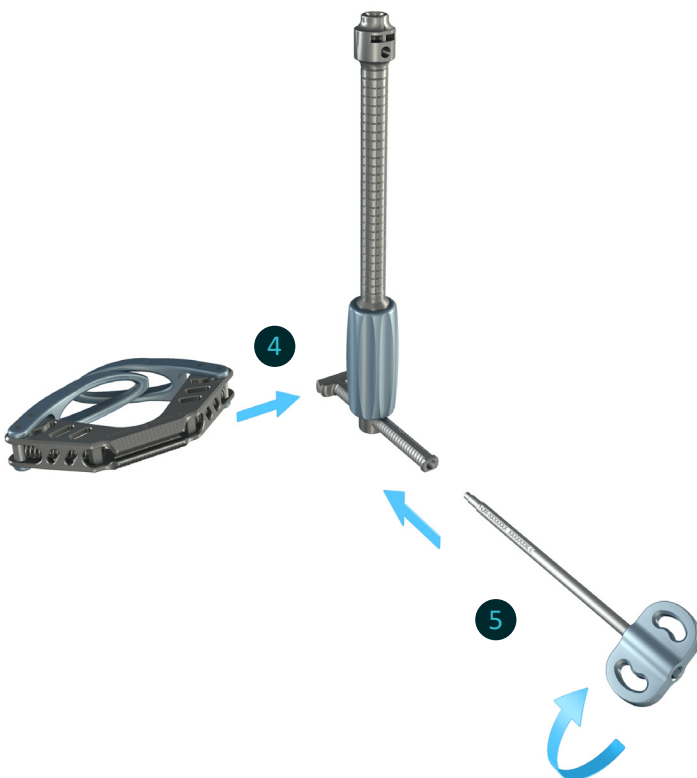
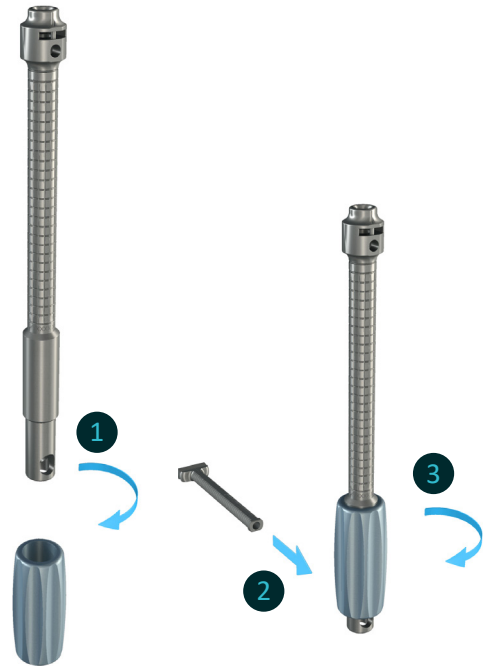
- ▶ Remove the 4T tibial stylus.
- ▶ Unscrew and remove the 4T Proximal AP Wheel.
- ▶ Place the T Wrench on Intramedullary rod length 400 mm and remove it.
- ▶ Place the 'T' end of the Slaphammer into the opening on the 4T tibial bracket and then remove the entire assembly.
- ▶ Remove the intramedullary assembly by pressing on the two blue buttons on the 4T Wheel/ Tibial Resection Guide Support.

### 3 Combined Intramedullary tibial system

#### Combined intramedullary tibial system assembly:

▶ Screw the 4T Distal AP wheel on the 4T EM Jig ①.

▶ Insert the 4T Rod for bimalleolar clamp for the Malleolar Clamp into the EM 4T EM Jig ②. Lock it in place with the 4T Distal AP wheel ③.



▶ Assemble the 4T malleolar clamp on the 4T Rod for bimalleolar clamp ④. Lock it in place with the 4T ML wheel for malleolar clamp ⑤.

### 3 Combined Intramedullary tibial system

#### Combined intramedullary tibial system:

- ▶ Assemble the intramedullary tibial system as described in the paragraph «Intramedullary tibial system assembly» and insert it into the assembly described above. Lock them using the 4T Wheel for EM Jig.
- ▶ Place the 4T malleolar clamp around the ankle (the clamp has a self-opening feature that makes it easier to set up), lock the clamp and position the 4T tibial bracket on the Intramedullary rod length 400 mm.
- ▶ Adjust the rotational alignment in relation to anterior tibial tuberosity and then sagittal alignment by setting the rod parallel to the anterior tibial axis. Impact the tabs.
- ▶ Clip the 4T tibial stylus – 2/10 (or 2/8 or 0/10) on the 4T tibial resection guide (make sure the clip is fully engaged).
- ▶ Set the resection height by using the 4T tibial stylus to palpate either the:
  - healthy side (10 mm cut relative to palpated point)
  - worn side (2 mm cut relative to palpated point/exit of saw blade).



#### IMPORTANT

- For other resection heights, the adjustment can be made:
- quickly by pressing on the green wheel on the 4T Wheel/ Tibial Resection Guide Support (release)
  - gradually by turning the green wheel (the 4T aiming has marking every 2 mm).

#### NOTE

All the wheels can be tightened with the H5 Screwdriver.

- ▶ Verify the height of the bone cut with the Resection gauge.
- ▶ Place the Headless pins length 80 mm in the 0 mm holes.

#### NOTE

The 4T tibial stylus can be clipped on the lateral side of the 4T tibial resection guide to palpate the medial plateau (or the reverse) by passing the 4T tibial stylus over the 4T tibial bracket.

## 4 Combined Extramedullary tibial system

### Combined extramedullary tibial system:

- For the combined extramedullary tibial system, all assembly steps are identical to the combined intramedullary tibial system, except that the 4T tibial bracket is directly impacted in the tibial spine.
- Adjust the rotational alignment in relation to anterior tibial tuberosity and then sagittal alignment by setting the rod parallel to the anterior tibial axis. Impact the tabs.
- Clip the 4T tibial stylus – 2/10 (or 2/8 or 0/10) on the 4T tibial resection guide (make sure the clip is fully engaged).
- Set the resection height by using the 4T tibial stylus to palpate either the:
  - healthy side (10 mm cut relative to palpated point)
  - worn side (2 mm cut relative to palpated point/exit of saw blade).



#### IMPORTANT

For other resection heights, the adjustment can be made:

- quickly by pressing on the green wheel on the 4T Wheel/Tibial Resection Guide Support (release)
- gradually by turning the green wheel (the 4T aiming has marking every 2 mm).

- Verify the height of the bone cut with the Resection gauge.
- Place the Headless pins length 80 mm in the 0 mm holes.

#### NOTE

All the wheels can be tightened with the H5 Screwdriver.

#### NOTE

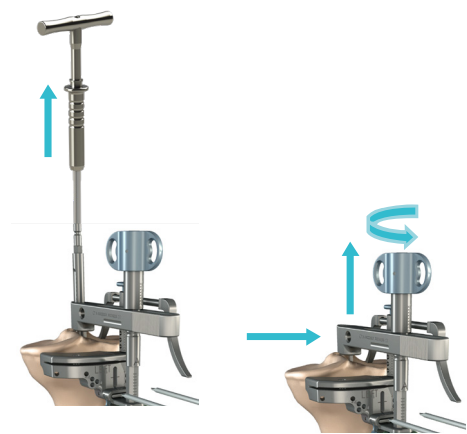
The 4T tibial stylus can be clipped on the lateral side of the 4T tibial resection guide to palpate the medial plateau (or the reverse) by passing the 4T tibial stylus over the 4T tibial bracket.



## 5 Combined Intramedullary and Extramedullary tibial system

### Removal of the tibial system:

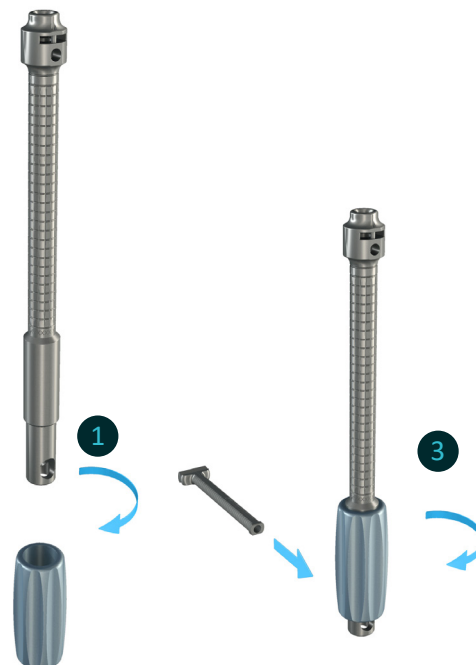
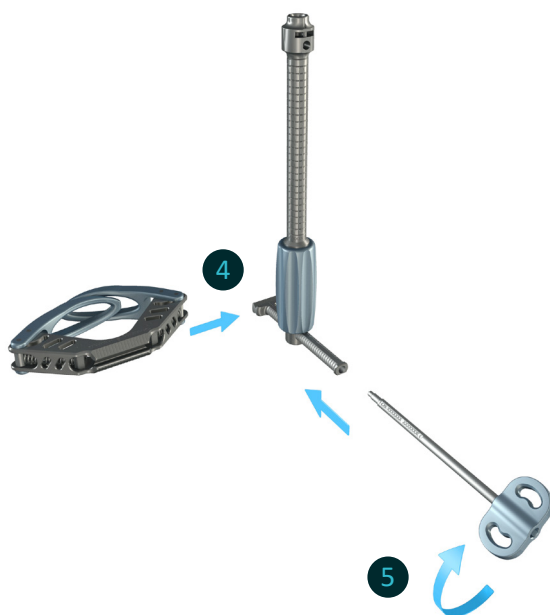
- Remove the 4T tibial stylus.
- Unscrew and remove the 4T Proximal AP Wheel.
- For the combined intramedullary tibial system, place the T Wrench on Intramedullary rod length 400 mm and remove it.
- Place the 'T' end of the Slaphammer into the opening on the 4T tibial bracket and then remove the entire assembly.
- Remove the intramedullary assembly by pressing on the two blue buttons on the 4T Wheel/Tibial Resection Guide Support.



## 6 Extramedullary tibial system

### Extramedullary tibial system assembly:

- ▶ Screw the 4T Distal AP wheel on the 4T EM Jig ①.
- ▶ Insert the 4T Rod for bimalleolar clamp for the Malleolar Clamp into the EM 4T EM Jig ②. Lock it in place with the 4T Distal AP wheel ③.



- ▶ Assemble the 4T malleolar clamp on the 4T Rod for bimalleolar clamp ④. Lock it in place with the 4T ML wheel for malleolar clamp ⑤.

- ▶ Assemble the 4T Tibial resection guide right or left – 0° or 3° with the 4T Wheel/Tibial Resection Guide Support ⑥.
- ▶ Assemble the 4T Wheel/Tibial Resection Guide Support with the 4T Aiming without tibial bracket by pressing on the support's green wheel ⑦.



#### NOTE

The 'UP' engraving corresponds to the 4T Wheel/Tibial Resection side Guide Support's superior side

#### NOTE

The 'A' engraving on the 4T Aiming without tibial bracket must be on the anterior side.

- ▶ Place the assembly on the 4T EM Jig. Lock them using the 4T Wheel for EM Jig.

#### NOTE

The instrumentation set contains two rods. Use the shortest one without the tibial bracket.



## 6 Extramedullary tibial system

### Extramedullary tibial system:

- ▶ Place the 4T malleolar clamp around the ankle (the clamp has a self-opening feature that makes it easier to set up), lock the clamp.
- ▶ Adjust the rotational alignment in relation to anterior tibial tuberosity and then sagittal alignment by setting the rod parallel to the anterior tibial axis.
- ▶ Clip the 4T tibial stylus – 2/10 (or 2/8 or 0/10) on the 4T tibial resection guide (make sure the clip is fully engaged).
- ▶ Set the resection height by using the 4T tibial stylus to palpate either the:
  - healthy side (10 mm cut relative to palpated point)
  - worn side (2 mm cut relative to palpated point/exit of saw blade).



#### IMPORTANT

- For other resection heights, the adjustment can be made:**
- quickly by pressing on the green wheel on the 4T Wheel/Tibial Resection Guide Support (release)
  - gradually by turning the green wheel (the 4T aiming has marking every 2 mm).

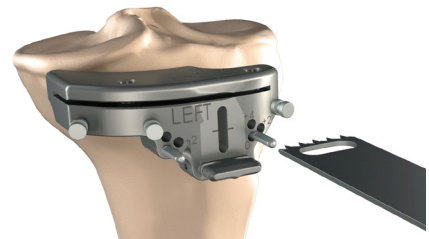
- ▶ Verify the height of the bone cut with the Resection gauge.
- ▶ Place the Headless pins length 80 mm in the 0 mm holes.
- ▶ Remove the 4T tibial stylus.
- ▶ Remove the intramedullary or extramedullary assembly by pressing on the two blue buttons on the 4T Wheel/Tibial Resection Guide Support.

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## 7 Tibial cut

### Performing the tibial cut:

- Place the 4T tibial resection guide flush with the anterior tibial cortex.
- Verify the height of the bone cut with the Resection gauge. If required, the 4T tibial resection guide can be moved by +2 or +4 mm to increase the tibial cutting height.
- Use at least one Headed pin length 70 mm to stabilise the 4T tibial resection guide.



#### NOTE

If the cortex is fragile or sclerotic, a 145 mm long,  $\varnothing 3.2$  mm drill bit can be used to make pilot holes for the pins.

- For all the tibial systems, perform the tibial cut using a medium or large Sawblade AMPLITUDE.
- Remove the Headed pin length 70 mm using the Pin extractor.
- Slide the 4T tibial resection guide off the Headless pin length 80 mm, but leave the pins in place in case recutting is required (the +2 and +4 holes will be used at that time).

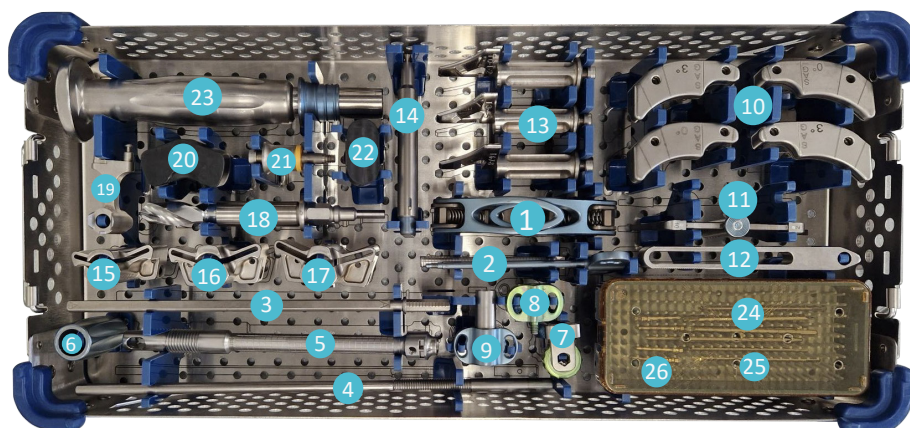




# Instrumentation

## ANATOMIC PS RESECTION TIBIAL SET – 4T

2-0299978

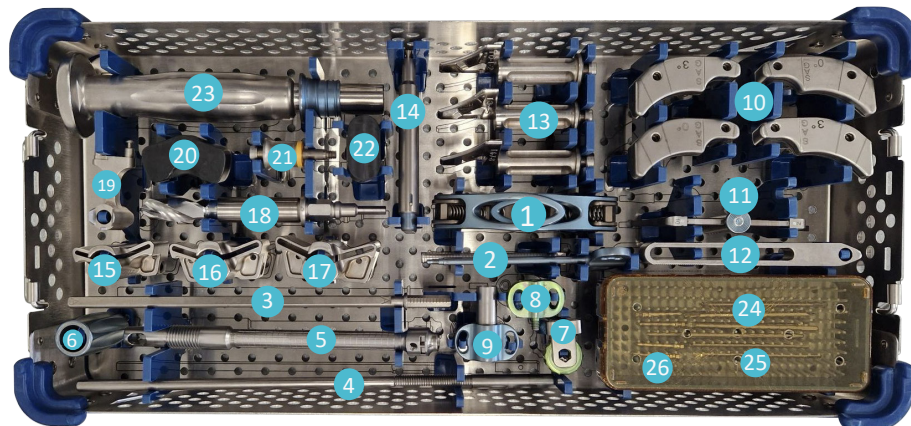


Item	Name	Produc N°	Qty
1	4T malleolar clamp	2-0237500	1
2	4T Rod for bimalleolar clamp	2-0237300	1
2	4T ML wheel for malleolar clamp	2-0237400	1
3	4T Aiming without tibial bracket	2-0239000	1
4	4T Aiming with tibial bracket	2-0236900	1
5	4T EM Jig	2-0237100	1
6	4T Distal AP wheel	2-0237200	1
7	4T Wheel/Tibial Resection Guide Support	2-0236700	1
8	4T Wheel for EM Jig	2-0237000	1
9	4T Proximal AP Wheel	2-0236800	1
10	4T tibial resection guide left - 0°	2-0236400	1
10	4T Tibial resection guide right – 0°	2-0236401	1
10	4T Tibial resection guide left – 3°	2-0237600	1
10	4T tibial resection guide right – 3°	2-0237700	1
11	4T tibial stylus – 2/10	2-0236502	1
12	4T tibial bracket	2-0236600	1
13	Tibial fin punch size 0-1-2	2-0230901	1
13	Tibial fin punch size 3-4-5	2-0230902	1
13	Tibial fin punch size 6-7-8	2-0230903	1

# Instrumentation

## ANATOMIC PS RESECTION TIBIAL SET – 4T

2-0299978



Item	Name	Produc N°	Qty
14	Removable hand holds	2-0226500	2
15	Guide for tibial fin punch Size 0-1-2	2-0230801	1
16	Guide for tibial fin punch Size 3-4-5	2-0230802	1
17	Guide for tibial fin punch Size 6-7-8	2-0230803	1
18	Reamer for tibial keel	2-0231600	1
19	Reference body support for tibial baseplate handle	2-0223600	1
20	Baseplate impactor	2-0233400	1
21	Tibial baseplate extractor	2-0231800	1
22	Tibial impactor	2-0231900	1
23	Universal handle	2-0232100	1
24	Headless pin length 80 mm	2-0201400	6
25	Headed pin length 70 mm	2-0201302	3
26	Headed pin length 30 mm	2-0201301	6

### Options :

	Pin Driver – Zimmer / Hall	2-0246300	1
	Pin Driver AO - Magnetic	2-0246200	1
	4T tibial stylus – 0/10	2-0236500	1
	4T tibial stylus – 2/8	2-0236501	1
	4T tibial resection guide left – 6°	2-0237800	1
	4T right tibial resection guide – 6°	2-0237900	1



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Reference: TO.G.003/EN/A