



Zimmer® NexGen®
Complete Knee
Solution
Extramedullary/
Intramedullary
Tibial Resector
Surgical Technique



Provides a choice of techniques for tibial resection.



Zimmer NexGen Complete Knee Solution EM/IM Tibial Resector Surgical Technique

Table of Contents

Introduction	2
Extramedullary Technique Using the Spike Arm	2
Step One: Assemble Alignment Guide	2
Step Two: Position Alignment Guide	3
Step Three: Set Resection Level	4
Step Four: Resect the Proximal Tibia	5
Optional Technique	6
Cut Guide Extramedullary Technique	7
Step One: Assemble Alignment Guide	7
Step Two: Position Alignment Guide	8
Step Three: Set Resection Level	9
Step Four: Resect the Proximal Tibia	11
Optional Technique	11
Intramedullary Technique	12
Step One: Position IM Alignment Guide	12
Step Two: Set Resection Level	15
Step Three: Resect the Proximal Tibia	16
Optional Technique	17
Spike Arm Intramedullary Technique	18
Step One: Insert IM Rod	18
Step Two: Position Cut Guide	19
Step Three: Set Resection Level	20
Step Four: Resect the Proximal Tibia	21
Optional Technique	22

Introduction

The Extramedullary/Intramedullary Tibial Resector provides a choice of techniques for tibial resection. Each of the techniques offers a number of options to accommodate various anatomical conditions and surgeon preferences. To facilitate the handling of bone defects in the proximal tibia, both the extramedullary and intramedullary techniques allow the depth of the tibial resection to be adjusted after the alignment guide has been positioned. In addition, an extramedullary alignment check can be performed after the alignment guide has been removed.

The same cutting guide is used for both intramedullary and extramedullary approaches. It is provided in both left and right configurations to facilitate alignment while accommodating the patellar tendon. The cutting guides have multiple holes to provide four different depth-of-cut adjustments (-2, 0, +2, and +4) after the guide has been positioned and fixed to the bone with headless holding pins. These four positioning options are important in maintaining a high level of surgical latitude throughout the tibial resection procedure. The resection can be made using either the slot or the top surface of the cutting guide. The top surface is 4mm above the slot, and appropriate adjustments must be made.

The Extramedullary/Intramedullary Tibial Resector can be used with any of the *NexGen*[®] Instrumentation Systems.

Extramedullary Technique Using the Spike Arm

Step One Assemble Alignment Guide

Slide the Ankle Clamp onto the dovetail at the bottom of the Distal Telescoping Rod. Turn the knob opposite the dovetail to temporarily hold the clamp in place (Fig. 1). The mediolateral position of the rod can be adjusted by loosening this knob. When the final position is determined, the knob can be fully tightened to secure it in place.



Fig. 1

Slide the Spike Arm onto the dovetail at the top of the Spike Arm Telescoping Rod and temporarily secure it by turning the knob at the top of the rod (Fig. 2).

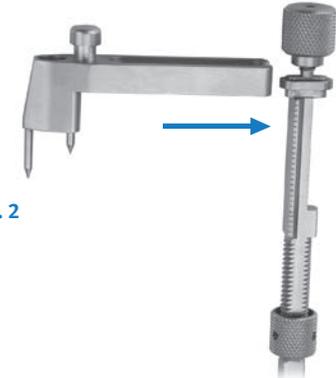


Fig. 2

The system includes four different Cut Guides: a 7-degree guide and a 0-degree guide both in left and right configurations. The 0-degree guide is for use with the A/P Wedge Tibial Plates.

Lower the adjustment knob in the middle of the Spike Arm Telescoping Rod to the bottom of the threaded portion. Insert the Cut Guide over the threaded portion of the rod above the adjustment knob and slide it all the way up on the dovetail (Fig. 3). To hold the Cut Guide in place, advance the adjustment knob to the upper end of its range of travel. This will allow for space adjustment after the alignment guide assembly has been secured in position.



Fig. 3

Arrows are etched onto both the Spike Arm Telescoping Rod and the Distal Telescoping Rod to indicate the correct orientation during assembly (Fig. 4). Insert the Spike Arm Telescoping Rod into the Distal Telescoping Rod.



Fig. 4

Step Two Position Alignment Guide

To improve exposure of the tibial surface, use the Tibial Retractor to lever the tibia anteriorly. This instrument should be carefully positioned against the posterior cortex of the tibia subperiosteally to prevent neurovascular injury. Use the Patella Retractor to retract the patella laterally.

Adjust the telescoping rod to the approximate length of the tibia and turn the knob on the shaft to temporarily maintain the length.

Place the spring arms of the Ankle Clamp around

the ankle proximal to the malleoli (Fig. 5) and loosen the knob that provides mediolateral adjustment at the ankle.



Fig. 5

Position the Cut Guide at the proximal tibia. Loosen the knob in the middle of the telescoping rod and adjust the length of the rod until the long spike on the Spike Arm just contacts the tibial plateau. The Cut Guide should be proximal to the tibial tubercle. Center the long spike mediolaterally on the bone surface anterior to the tibial spine. This should align the rod with the medial third of the tibial tubercle. Stabilize the Alignment Guide by tapping the Spike Arm until only the long spike engages the tibial plateau. Do not drive the long spike in too far (Fig. 6).



Fig. 6

Adjust the slide at the foot of the rod mediolaterally so the guide is aligned with the mechanical axis of the tibia. The longitudinal axis of the rod will usually lie just medial to the mid-point of the tibial tubercle and be centered over the intercondylar eminence. The foot of the rod should be positioned about 5mm-10mm medial to the midpoint between the palpable medial and lateral malleoli. The tip should point to the second toe. When the proper mediolateral position is achieved, tighten the knob to secure the Ankle Clamp to the rod.

In the sagittal plane, align the rod so it is parallel to the anterior tibial shaft by using the slide adjustments at both the proximal and distal ends of the rod (Fig. 7). Then tighten the knobs for both adjustments. If there is a bulky bandage around the ankle, adjust the rod to accommodate the bandage. This will help ensure that the tibia will be cut with the proper slope.

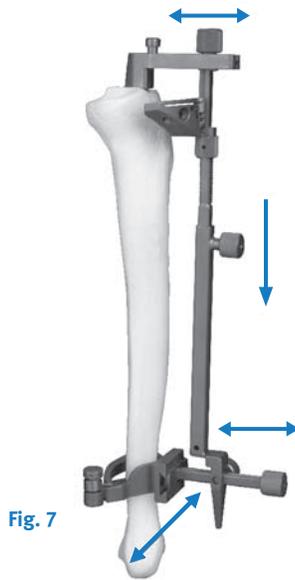


Fig. 7

Set the final position of the extramedullary alignment guide assembly by tapping the Spike Arm until both the long and short spikes are fully impacted in the proximal tibia (Fig. 8). Then tighten the knob in the middle of the telescoping rod assembly.



Fig. 8

Step Three Set Resection Level

Each tip of the Tibial Depth Resection Stylus indicates a different depth. The 2mm tip is used to check the depth from the defective tibial condyle for a minimal cut. The 10mm tip is used to check the depth from the least involved tibial condyle for an anatomic cut.

Insert the Tibial Depth Resection Stylus into the top of the Cut Guide, using the hole that corresponds to the defective tibial condyle (Fig. 9).



Fig. 9

The stylus will snap into the hole (Figs. 9a & 9b). Confirm that it is fully seated and properly oriented. The 2mm tip should rest on the tibial condyle (Fig. 10). This positions the slot of the Cut Guide to remove 2mm of bone below the tip of the stylus.

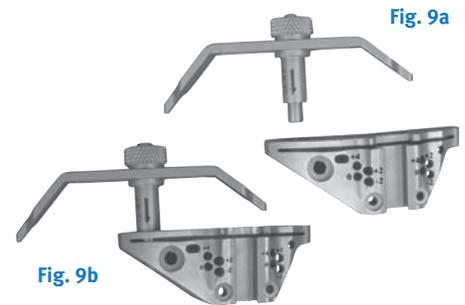


Fig. 9b

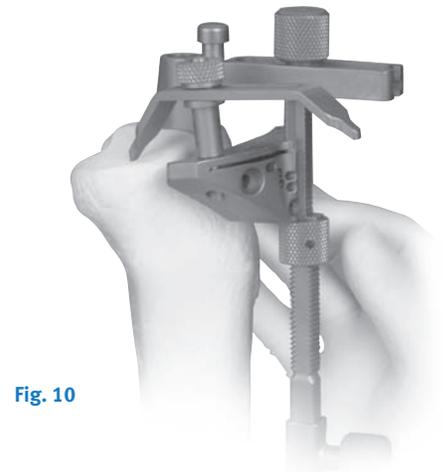


Fig. 10

Alternatively, rest the 10mm tip of the stylus on the cartilage of the least involved condyle (Fig. 11).



Fig. 11

This will allow the removal of the same amount of bone that the thinnest tibial component would replace.

These two points of resection will usually not coincide. **The surgeon must determine the appropriate level of resection based on patient age, bone quality, and the type of prosthetic fixation planned.**

Adjust the Cut Guide to the desired depth by adjusting the length of the alignment guide assembly. Then retighten the telescoping rod, and insert a 48mm Headless Screw Pin or 75mm Headless Holding Pin into the hole marked "o" on the lateral side of the guide (Fig. 12).

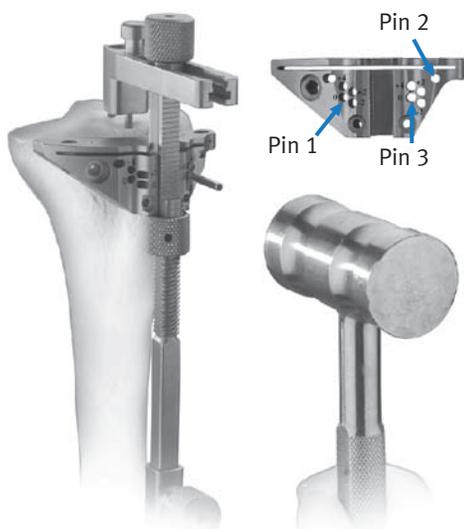


Fig. 12

To confirm alignment, insert the Extramedullary Alignment Arch into the Cut Guide and insert the Alignment Rod with Coupler through the arch, passing it distally toward the ankle (Fig. 27). The distal end of the rod should point to the second toe (Fig. 13).



Fig. 13

Insert a second 75mm Headless Holding Pin into the medial hole marked "o." Once the tibial resection has been determined, use the Hex-head Holding Pins, or 48mm Headed Screw Pins, or Silver Spring Pins to further stabilize the guide.

The extramedullary alignment arch can be left attached to the tibial cut guide for added stability. A 0.050" reciprocating saw blade can be used to make the medial and lateral tibial plateau cuts. Then remove alignment tower to finish tibial cuts.

Step Four Resect the Proximal Tibia

Loosen the adjustment knob below the Cut Guide until the knob is at the bottom of the threaded portion of the rod. Then loosen the knob on the telescoping rod. Use a slaphammer to disengage the spikes on the Spike Arm. Raise the telescoping rod until the dovetail disengages the Cut Guide. Then open the arms of the Ankle Clamp and remove the entire assembly, leaving the Cut Guide in place on the bone.

If desired, the Alignment Arch and Alignment Rod with Coupler can be used on the Cut Guide again to check alignment.

2mm adjustments may be made by using the sets of holes marked -2, +2, and +4. The markings on the Cut Guide indicate, in millimeters, the amount of bone resection each will yield relative to the standard tibial resection set by the Cut Guide and Tibial Depth Resection Stylus.

Use a .050-inch oscillating saw blade through the slot on the Cut Guide to cut the proximal surface of the tibia flat (Fig. 14). Then remove the Cut Guide.



Fig. 14

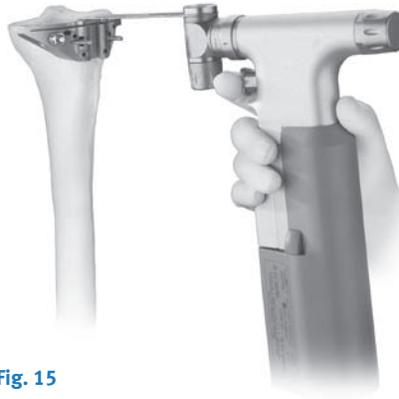


Fig. 15

Alternatively, the adjustment can be made after the alignment guide assembly is removed by lifting the Cut Guide off the headless pins, which were inserted through the holes marked "0," and reinserting the guide through the holes marked "+4" (Fig. 17).

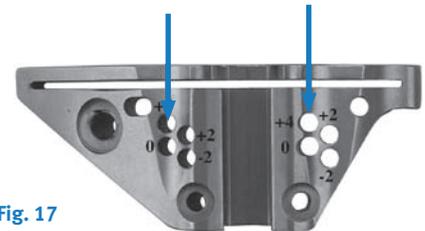


Fig. 17

Optional Technique

If desired, the cut can be made from the top surface of the Cut Guide. The top surface of the guide is 4mm above the slot (Fig. 15), so the position of the guide must be adjusted to account for this difference. The adjustment can be made when the Cut Guide is first positioned by using the etch lines, which are in 2mm increments, at the top of the Spike Arm Telescoping Rod (Fig. 16).

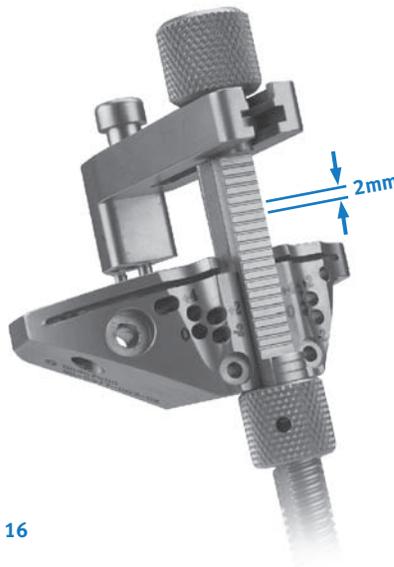


Fig. 16

Cut Guide Extramedullary Technique

Step One Assemble Alignment Guide

Slide the Ankle Clamp onto the dovetail at the bottom of the Distal Telescoping Rod. Turn the knob opposite the dovetail to temporarily hold the clamp in place (Fig. 18). The mediolateral position of the rod can be adjusted by loosening this knob. When the final position is determined, the knob can be fully tightened to secure it in place.

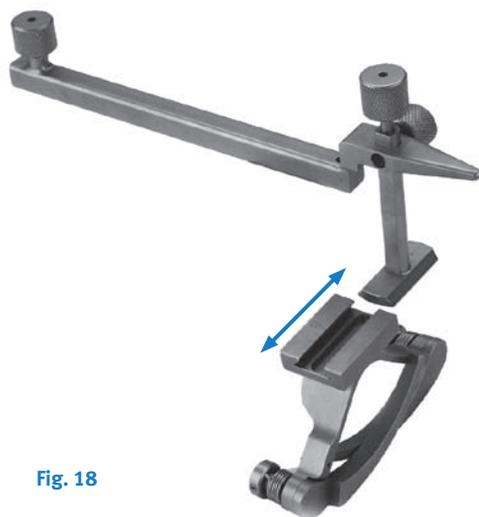


Fig. 18

The system includes six different Cut Guides: a 7-degree guide, 3-degree guide, and a 0-degree guide, all in left and right configurations. The 0-degree guide is for use with the A/P Wedge Tibial Plates.

Place the desired Cut Guide onto the dovetail of the proximal portion of the Cut Guide Telescoping Rod. Tighten the knob to secure the position (Fig. 19).

Arrows are etched onto both the Cut Guide Telescoping Rod and the Distal Telescoping Rod to indicate the correct orientation during assembly (Fig. 20). Insert the Cut Guide Telescoping Rod into the Distal Telescoping Rod.



Fig. 19



Fig. 20

Step Two

Position Alignment Guide

To improve the exposure of the tibial surface, use the Tibial Retractor to lever the tibia anteriorly. This instrument should be carefully positioned against the posterior cortex of the tibia subperiosteally to prevent neurovascular injury. Use the Patellar Retractor to retract the patella laterally.

Adjust the telescoping rod to the approximate length of the tibia and turn the knob on the shaft of the rod to temporarily maintain the length.

Place the spring arms of the Ankle Clamp around the ankle proximal to the malleoli (Fig. 21) and loosen the knob that provides mediolateral adjustment at the ankle.



Fig. 21

Position the Cut Guide at the proximal tibia. Loosen the knob in the middle of the telescoping rod and adjust the length of the rod until the Cut Guide is proximal to the tibial tubercle. Align the rod with the medial third of the tibial tubercle (Fig. 22) or just medial to the tubercle.

Adjust the slide at the foot of the rod mediolaterally so the guide is aligned with the mechanical axis of the tibia (Fig. 23). The longitudinal axis of the rod will usually lie just medial to the mid-point of the tibial tubercle and be centered in line with the intercondylar eminence. The foot of the rod should be positioned about 5mm-10mm medial to the midpoint between the palpable medial and lateral malleoli. The tip should point to the second toe. When the proper mediolateral position is achieved, tighten the knob to secure the Ankle Clamp to the rod. The posterior cortex of the tibia can also be used as a rotational check.

In the sagittal plane, align the rod so it is parallel to the anterior tibial shaft by using the slide adjustment at the distal end of the rod. Tighten the knob for the adjustment. If there is a bulky bandage around the ankle, adjust the rod to accommodate the bandage. This will help ensure that the tibia will be cut with the proper slope.



Fig. 22



Fig. 23

Step Three

Set Resection Level

Each tip of the Tibial Depth Resection Stylus indicates a different depth. The 2mm tip is used to check the depth from the defective tibial condyle for a minimal cut. The 10mm tip is used to check the depth from the least involved tibial condyle for an anatomic cut.

Insert the Tibial Depth Resection Stylus into the top of the Cut Guide, using the hole that corresponds to the defective tibial condyle (Fig. 24).



Fig. 24

The stylus will snap into the hole (Figs. 24a & 24b). Confirm that it is fully seated and properly oriented. The 2mm tip should rest on the tibial condyle (Fig. 25). This positions the slot of the Cut Guide to remove 2mm of bone below the tip of the stylus.



Fig. 24a



Fig. 24b



Fig. 25

Alternatively, rest the 10mm tip of the stylus on the cartilage of the least involved condyle (Fig. 26).

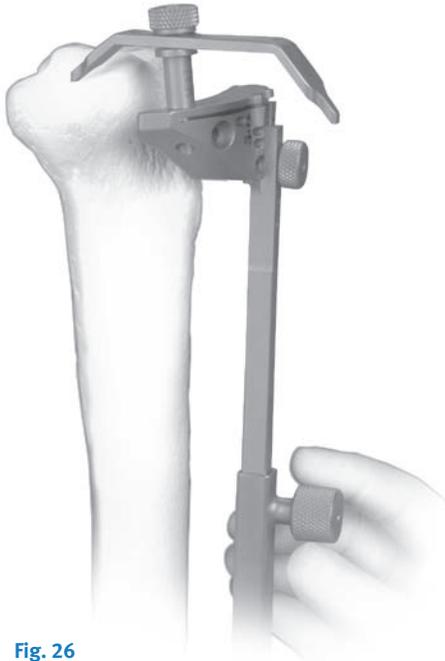


Fig. 26

This will allow the removal of the same amount of bone that the thinnest tibial component would replace.

These two points of resection will usually not coincide. The surgeon must determine the appropriate level of resection based on patient age, bone quality, and the type of prosthetic fixation planned.

Adjust the Cut Guide to the desired depth by adjusting the length of the alignment guide assembly. Then retighten the telescoping rod, and insert a 48mm Headless Screw Pin or 75mm Headless Holding Pin into the hole marked "o" on the lateral side first of the Cut Guide.

To confirm alignment, insert the Extramedullary Alignment Arch into the Cut Guide and insert the Alignment Rod with Coupler through the arch, passing it distally toward the ankle (Fig. 27). The distal end of the rod should point to the second toe.



Fig. 27

Insert a second 75mm Headless Holding Pin into the other hole marked "o" (Fig. 28).



Fig. 28

Step Four

Resect the Proximal Tibia

Loosen the knob that has secured the Cut Guide onto the Cut Guide Telescoping Rod and remove the entire assembly, leaving the Cut Guide in place on the bone. The entire assembly can be left in place for additional fixation during resection.

Additional 2mm adjustments may be made by using the sets of holes marked -2, +2, and +4. The markings on the Cut Guide indicate, in millimeters, the amount of bone resection each will yield relative to the standard tibial resection set by the Cut Guide and Tibial Depth Resection Stylus. Once the tibial resection has been determined, use the hex-head Holding Pins, 48mm Headed Screw Pins, or Silver Spring Pins to further stabilize the guide.

Use a .050-inch oscillating saw blade through the slot on the Cut Guide to cut the proximal surface of the tibia flat (Fig. 29). Then remove the Cut Guide.



Fig. 30

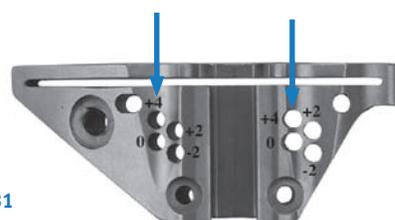


Fig. 31



Fig. 29

Optional Technique

If desired, the cut can be made from the top surface of the Cut Guide. The top surface of the guide is 4mm above the slot (Fig. 30), so the position of the guide must be adjusted to account for this difference. The adjustment can be made after the alignment guide assembly is removed by lifting the Cut Guide off the headless pins, which were inserted through the holes marked "0," and reinserting the guide through the holes marked "+4" (Fig. 31).

Intramedullary Technique

To improve exposure of the tibial surface, use the Tibial Retractor to lever the tibia anteriorly. This instrument should be carefully positioned against the posterior cortex of the tibia subperiosteally to prevent neurovascular injury. Use the Patella Retractor to retract the patella laterally.

A preoperative radiograph of the tibia is necessary to make sure that the tibial shaft is straight and will accept the Tibial IM Rod. Some tibias are bowed or have too small a canal and will not accept the rod. The acetate template used for femoral planning can be inverted and used on the tibia.

Step One Position the Alignment Guide

Use the Universal Handle to start a hole in the proximal tibia just anterior to the anterior cruciate ligament insertion and centered mediolaterally (Fig. 32). This may seem too far anterior; however, it is the straight proximal extension of the tibial medullary canal. If a hole is started further posteriorly, excessive posterior slope may be cut into the proximal tibia.

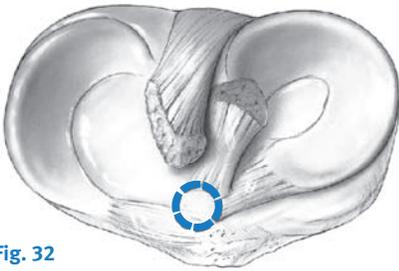


Fig. 32

Drill a hole using the 8mm IM Drill. Suction the canal to remove medullary contents.

Slowly insert the Tibial IM Rod (5977-44) into the canal. The flutes on the rod will aid decompression of the canal during insertion.

Attach either the 7-degree Revision Tibial Boom (5787-10), 3-degree Boom, or the 0-degree Augment Tibial Boom (5125-60) to the rod (Fig. 33). The selection of the boom will determine the posterior slope of the tibial resection.



Fig. 33

Lower the adjustment knob on the IM Alignment Guide to the bottom of the threaded portion. Insert the 0-degree Cut Guide over the threaded portion of the alignment guide above the adjustment knob and slide it up until it just engages the dovetail (Fig. 34). This will allow for final adjustment after the alignment guide has been secured in position. To hold the Cut Guide in place, advance the adjustment knob until it contacts the underside of the guide.

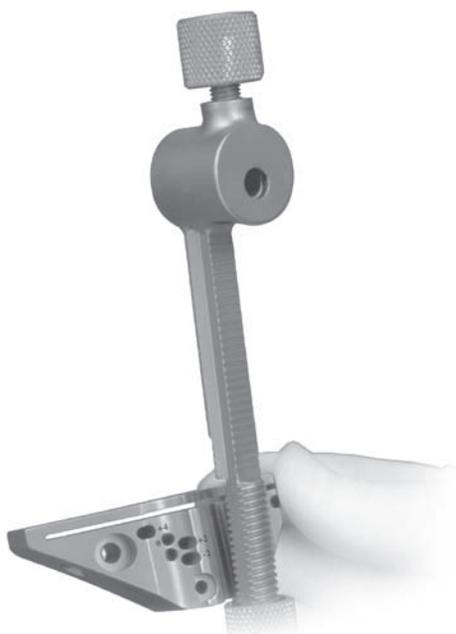


Fig. 34

Only the 0-degree Cut Guide will fit onto the IM Alignment Guide. The 7-degree Cut Guide will not fit onto the IM Alignment Guide. Using the 0-degree Cut Guide with the 7-degree Revision Tibial Boom will give you a 7-degree cut. Using the 0-degree Cut Guide with the 3-degree Boom will give you a 3-degree cut.

Slide the barrel of the IM Alignment Guide onto the boom, making sure that the locking knob has been adjusted to allow free access (Fig. 35). Rotate the boom on the rod until the Cut Guide is properly positioned mediolaterally on the anterior tibia. Use the medial third of the tibial tubercle as a landmark. Then slightly secure the knob on the boom.



Fig. 35

To determine varus/valgus alignment, insert the Extramedullary Alignment Arch onto the Cut Guide and insert the Alignment Rod with Coupler through the arch, passing it distally toward the ankle (Fig. 36). The distal end of the rod should point to the second toe.

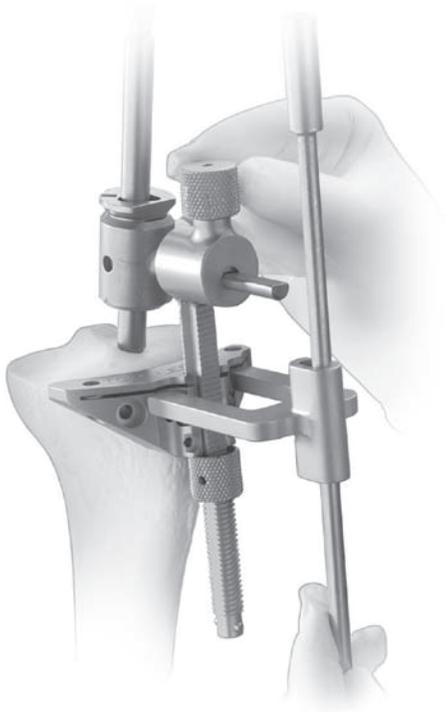


Fig. 36

If the surgeon would like to set the Cut Guide at a 90-degree angle to the Tibial IM Rod, tighten the knob at the top of the IM Alignment Guide clockwise in the “90” direction as etched on top of the knob (Fig. 37). Do not overtighten the knob.

If the alignment check suggests a varus/valgus adjustment, rotate the barrel of the IM Alignment Guide on the boom to align the Alignment Rod to the second toe. When the appropriate varus/valgus alignment is achieved, tighten the knob at the top of the IM Alignment Guide counterclockwise in the “Var-Valg” direction as etched on top of the knob (Fig. 38). This will hold the varus/valgus position of the Cut Guide. Do not overtighten the knob.



Fig. 37



Fig. 38

Step Two Set Resection Level

Each tip of the Tibial Depth Resection Stylus indicates a different depth. The 2mm tip is used to check the depth from the defective tibial condyle for a minimal cut. The 10mm tip is used to check the depth from the least involved tibial condyle for an anatomic cut.

Insert the Tibial Depth Resection Stylus into the top of the Cut Guide, using the hole that corresponds to the defective tibial condyle (Fig. 39). The stylus will snap into the hole (Figs. 39a & 39b). Confirm that it is fully seated and properly oriented.



Fig. 39



Fig. 39a



Fig. 39b

The 2mm tip should rest on the tibial condyle (Fig. 40). This positions the slot of the Cut Guide to remove 2mm of bone below the tip of the stylus.

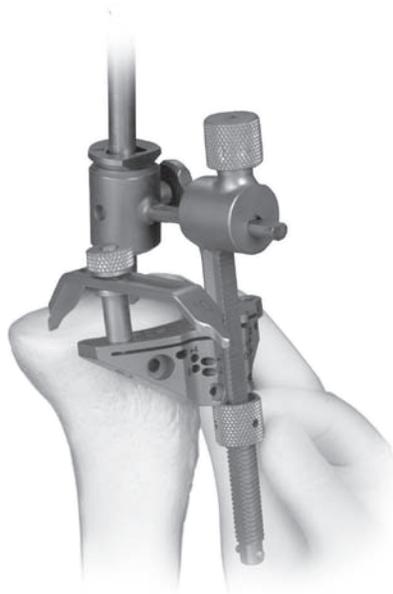


Fig. 40

Alternatively, rest the 10mm tip of the stylus on the cartilage of the least involved condyle (Fig. 41). This will allow the removal of the same amount of bone that the thinnest tibial component would replace.

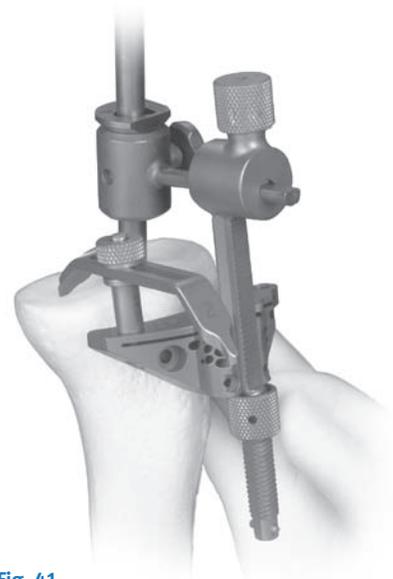


Fig. 41

These two points of resection will usually not coincide. **The surgeon must determine the appropriate resection based on patient age, bone quality, and the type of prosthetic fixation planned.**

Adjust the Cut Guide to the desired depth by turning the adjustment knob. Then insert 48mm Headless Pin, or 75mm Headless Holding Pins into the holes marked “o” lateral side first (Fig. 42).

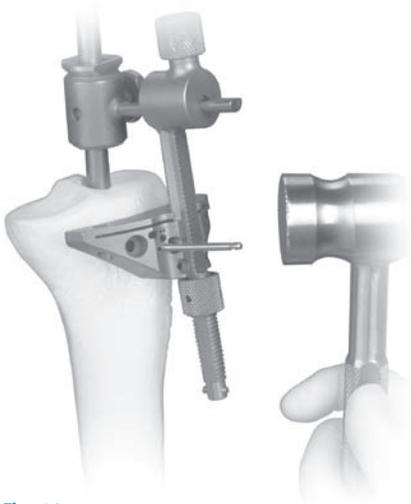


Fig. 42

Step Three Resect the Proximal Tibia

Loosen the adjustment knob below the Cut Guide until the knob is at the bottom of the threaded portion of the rod. Loosen the varus/valgus adjustment knob on the IM Alignment Guide. Use a slaphammer to raise the IM Rod until the dovetail portion of the IM Alignment Guide disengages from the Cut Guide. Remove the alignment assembly, leaving the Cut Guide in place on the bone.

If desired, the Alignment Arch and Alignment Rod with Coupler can be used on the Cut Guide again to check alignment.

Additional 2mm adjustments may be made by using the sets of holes marked -2, +2, and +4. The markings on the Cut Guide indicate, in millimeters, the amount of bone resection each will yield relative to the standard tibial resection set by the Cut Guide and Tibial Depth Resection Stylus. Once the tibial resection has been determined, use the Hex-head Holding Pins, 48mm Headed Screw Pins, or Silver Spring Pins to further stabilize the guide.

Use a .050-inch oscillating saw blade through the slot on the Cut Guide to cut the proximal surface of the tibia flat (Fig. 43). Then remove the Cut Guide.



Fig. 43

Optional Technique

If desired, the cut can be made from the top surface of the Cut Guide. The top surface of the guide is 4mm above the slot (Fig. 44), so the position of the guide must be adjusted to account for this difference. The adjustment can be made when the Cut Guide is first positioned by using the etch lines, which are in 2mm increments, on the IM Alignment Guide (Fig. 45).



Fig. 44

Alternatively, the adjustment can be made after the IM Alignment Guide is removed by lifting the Cut Guide off the headless pins, which were inserted through the holes marked "0," and reinserting the guide through the holes marked "+4" (Fig. 46).

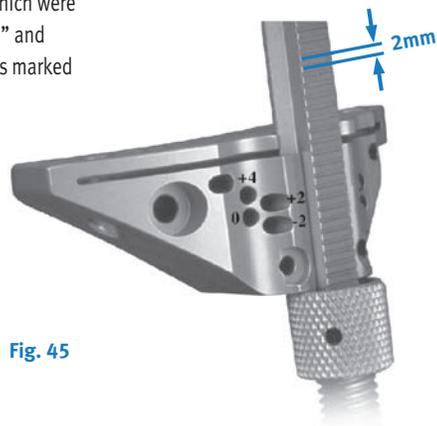


Fig. 45

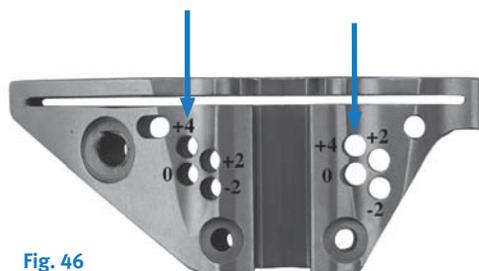


Fig. 46

Spike Arm Intramedullary Technique

To improve exposure of the tibial surface, use the Tibial Retractor to lever the tibia anteriorly. This instrument should be carefully positioned against the posterior cortex of the tibia subperiosteally to prevent neurovascular injury. Use the Patella Retractor to retract the patella laterally.

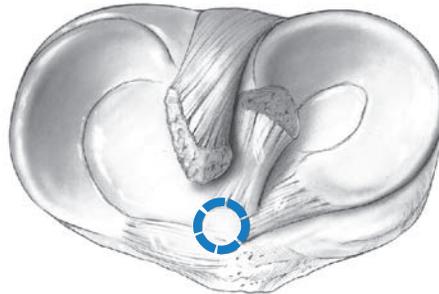
A preoperative radiograph of the tibia is necessary to make sure that the tibial shaft is straight and will accept the Tibial IM Rod. Some tibias are bowed or have too small a canal and will not accept the rod. The acetate template used for femoral planning can be inverted and used on the tibia.

Step One Insert IM Rod

Use the Universal Handle to start a hole in the proximal tibia just anterior to the anterior cruciate ligament insertion and centered mediolaterally (Fig. 47). This may seem too far anterior; however, it is the straight proximal extension of the tibial medullary canal. If a hole is started further posteriorly, excessive posterior slope may be cut into the proximal tibia.

Drill a hole using the 8mm IM Drill. Suction the canal to remove medullary contents.

Slowly insert the Tibial IM Rod (5977-44) into the canal. The flutes on the rod will aid decompression of the canal during insertion.



Step Two Position Cut Guide

The system includes six different Cut Guides: a 7-degree guide, a 3-degree guide, and a 0-degree guide, all in left and right configurations. The 0-degree guide is for use with the A/P Wedge Tibial Plates.

Slide the Spike Arm onto the top of the Spike Arm Telescoping Rod and secure it temporarily by turning the knob at the top of the rod (Fig. 48).

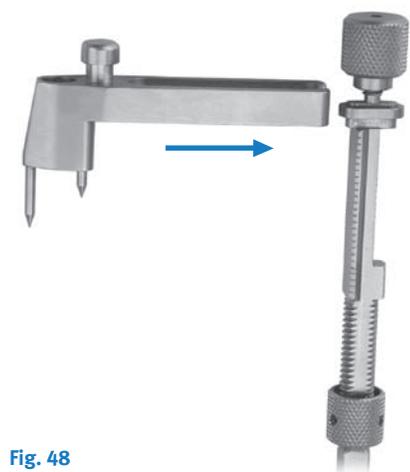


Fig. 48

Lower the adjustment knob in the middle of the Spike Arm Telescoping Rod to the bottom of the threaded portion. Insert the Cut Guide over the threaded portion of the rod above the adjustment knob and slide it all the way up on the dovetail (Fig. 49). To hold the Cut Guide in place, advance the adjustment knob to the end of its range of travel. This will allow for final adjustment after the alignment assembly has been secured in position.



Fig. 49

Slide the Spike Arm assembly over the IM Rod (Figs. 50, 50a & 50b). Lower the assembly until the long spike engages the tibial surface. Adjust the assembly to the correct rotation. Impact the Spike Arm until both the long and short spikes are fully engaged in bone. Loosen the knob at the top of the Spike Arm Telescoping Rod, and slide the rod and Cut Guide toward the anterior tibial surface. Then tighten the knob.



Fig. 50



Fig. 50a



Fig. 50b

To confirm alignment, insert the Extramedullary Alignment Arch onto the Cut Guide and insert the Alignment Rod with Coupler through the arch, passing it distally toward the ankle. The distal end of the rod should point to the second toe.

Step Three Set Resection Level

Each tip of the Tibial Depth Resection Stylus indicates a different depth. The 2mm tip is used to check the depth from the defective tibial condyle for a minimal cut. The 10mm tip is used to check the depth from the least involved tibial condyle for an anatomic cut.

Insert the Tibial Depth Resection Stylus into the top of the Cut Guide, using the hole that corresponds to the defective tibial condyle (Fig. 51). The stylus will snap into the hole (Figs. 51a & 51b). Confirm that it is fully seated and properly oriented. The 2mm tip should rest on the tibial condyle (Fig. 52). This positions the slot of the Cut Guide to remove 2mm of bone below the tip of the stylus.



Fig. 51



Fig. 51a



Fig. 51b

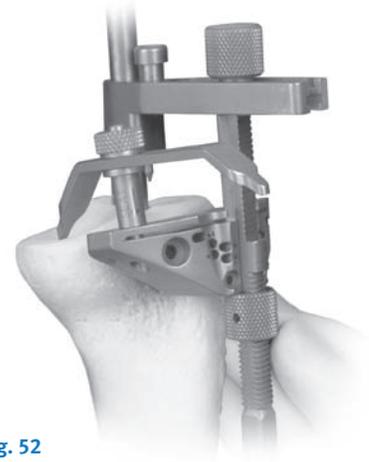


Fig. 52

Alternatively, rest the 10mm tip of the stylus on the cartilage of the least involved condyle (Fig. 53). This will allow the removal of the same amount of bone that the thinnest tibial component would replace.



Fig. 53

These two points of resection will usually not coincide. **The surgeon must determine the appropriate resection based on patient age, bone quality, and the type of prosthetic fixation planned.**

Adjust the Cut Guide to the desired depth by turning the adjustment knob. Then insert 48mm Headless Screw Pins or 75mm Headless Holding Pins into the holes marked “o” lateral side first.

Step Four

Resect the Proximal Tibia

Loosen the adjustment knob below the Cut Guide until the knob is at the bottom of the threaded portion of the rod. Use a slaphammer to raise the IM Rod and Spike Arm assembly until the dovetail portion of the IM Alignment Guide disengages from the Cut Guide. Remove the alignment assembly, leaving the Cut Guide in place on the bone.

If desired, the Alignment Arch and Alignment Rod with Coupler can be used on the Cut Guide again to check alignment.

Additional 2mm adjustments may be made by using the sets of holes marked -2, +2, and +4. The markings on the Cut Guide indicate, in millimeters, the amount of bone resection each will yield relative to the standard tibial resection set by the Cut Guide and Tibial Depth Resection Stylus. Once the tibial resection has been determined, use the Hex-head Holding Pins, Silver Spring Pins, or 48mm Headed Screw Pins to further stabilize the guide.

Use a .050-inch oscillating saw blade through the slot on the Cut Guide to cut the proximal surface of the tibia flat (Fig. 54). Then remove the Cut Guide.



Fig. 54

Optional Technique

If desired, the cut can be made from the top surface of the Cut Guide. The top surface of the guide is 4mm above the slot (Fig. 55), so the position guide must be adjusted to account for this difference. The adjustment can be made when the Cut Guide is first positioned by using the etch lines, which are in 2mm increments, on the Spike Arm Telescoping Rod (Fig. 56).

Alternatively, the adjustment can be made after the alignment assembly is removed by lifting the Cut Guide off the headless pins, which were inserted through the holes marked "0," and reinserting the guide through holes marked "+4" (Fig. 57).



Fig. 55

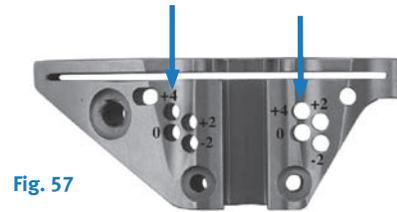


Fig. 57

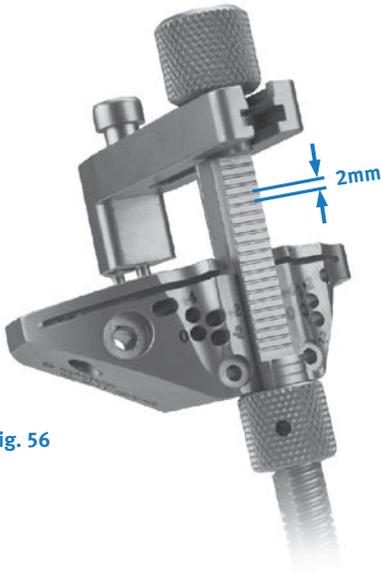


Fig. 56





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