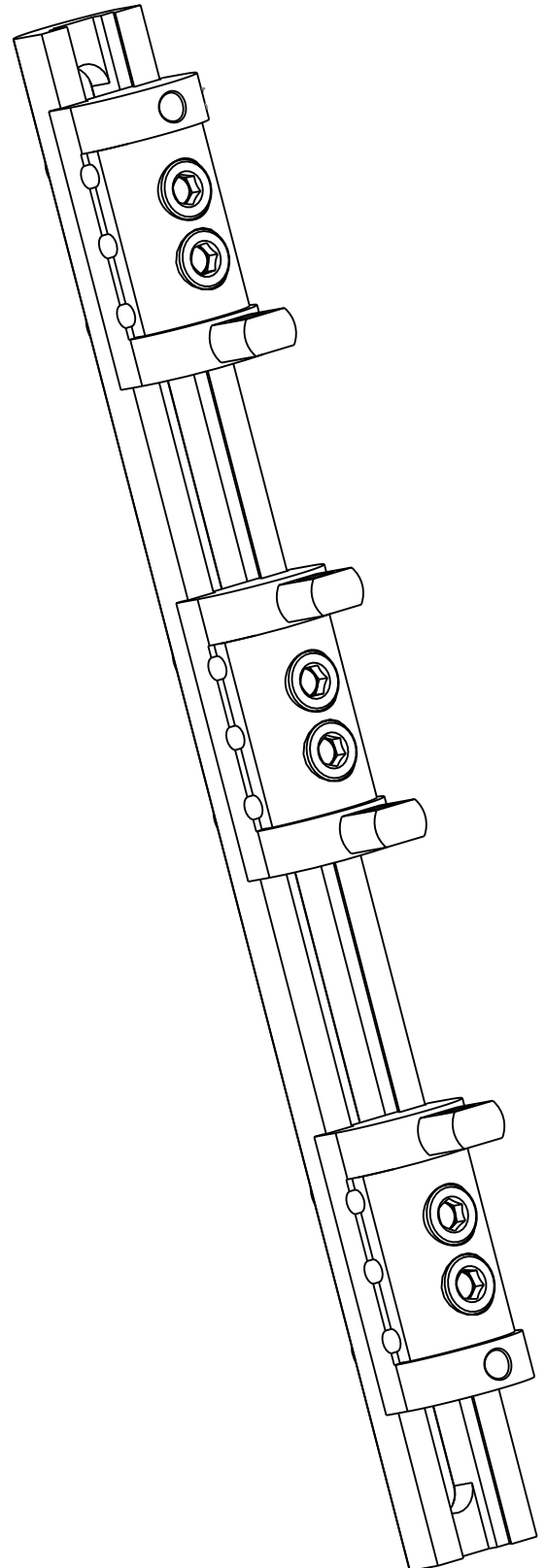


FEMUR TIBIA  
SEGMANTEL  
**FIXATOR**

Surgical Technique





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# FEMUR TIBIA SEGMANTEL FIXATOR

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# Introduction

## FEMUR TIBIA SEGMANTEL FIXATOR



## Specifications

Very short femur and tibia; monofocus or biofocus extensions; After proximal and distal osteotomy, the middle clamp is locked to the fixator rail. Extension is achieved by moving each of the other proximal and distal clamps in their direction. It can also be used for lengthening of the femur and tibia by intramedullary nail with middle shaft osteotomy. In cases of extensive loss of proximal or distal bone and / or length loss of the femur and tibia; The proximal metaphyseal osteotomy is performed and the junction is performed by moving the middle segment and the distal direction through the clamp in the middle. Femur and tibia; large, central,

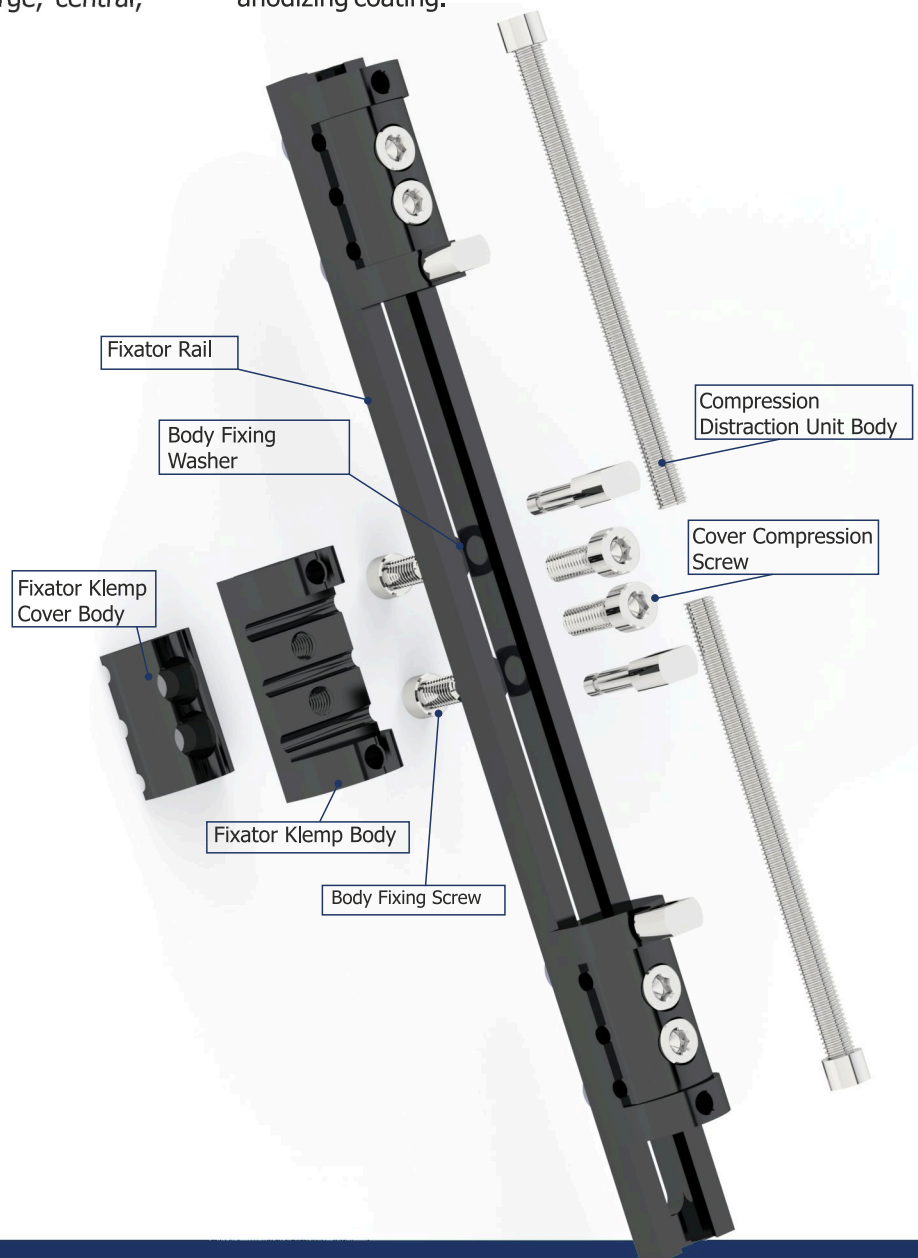
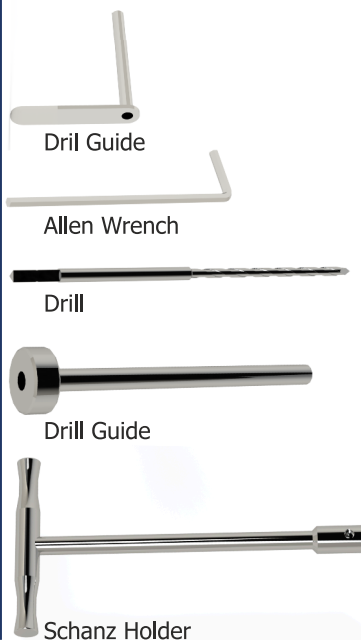
bone loss injuries; proximal and distal metaphyseal osteotomy is performed. Simultaneously, proximal and distal transport is performed until the segments are joined. In large, peripheral, bone loss injuries of femur and tibia; two different osteotomies are performed in the long bone segment. Simultaneously, proximal transport is performed until the gap is closed by proximal directional movement of both middle clamps. It is available in 3 different sizes as short, medium and long and it is made by using aluminum and stainless steel materials. Aluminum materials are suitable for anodizing coating.



## FEMUR TIBIA SEGMANTEL FIXATOR

REF. NO	SIZE
5074-0001	S
5074-0002	M
5074-0003	L

### Instruments





# Surgical Technique

## FEMUR TIBIA

# SEGMANTEL

# FIXATOR

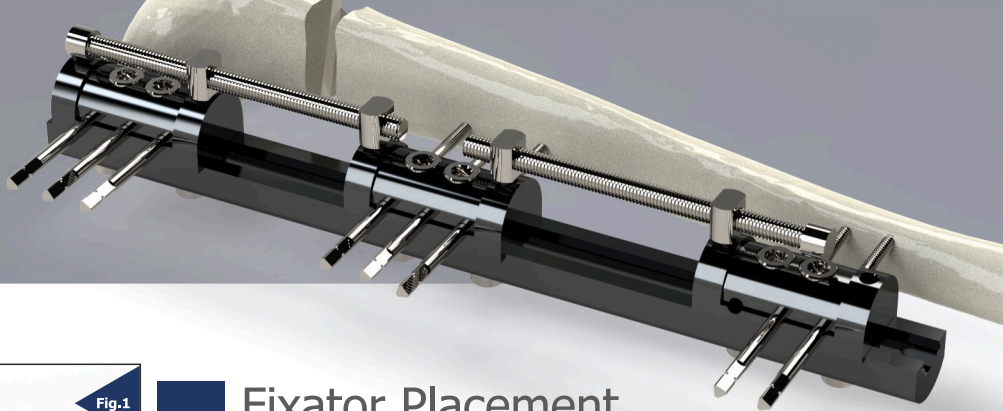


Fig.1

## 1 Fixator Placement

The fixator is placed in the fracture site. Adjustable to desired length. The points on which the Schanz screw is to be placed are determined. The drill guide is placed.(Fig 1.) Drill bits are drilled.(Fig 2.) With the Schanz Holder placed the schanz.(Fig 3.)

### Instruments

9544-0004



Drill Guide

9516-0001



Allen Wrench

Fig.2



### Instruments

9503-0001



Schanz Holder

Fig.3



### Instruments

9544-0006



Drill

9544-0004



Drill Guide



## 2 Limb lengthening

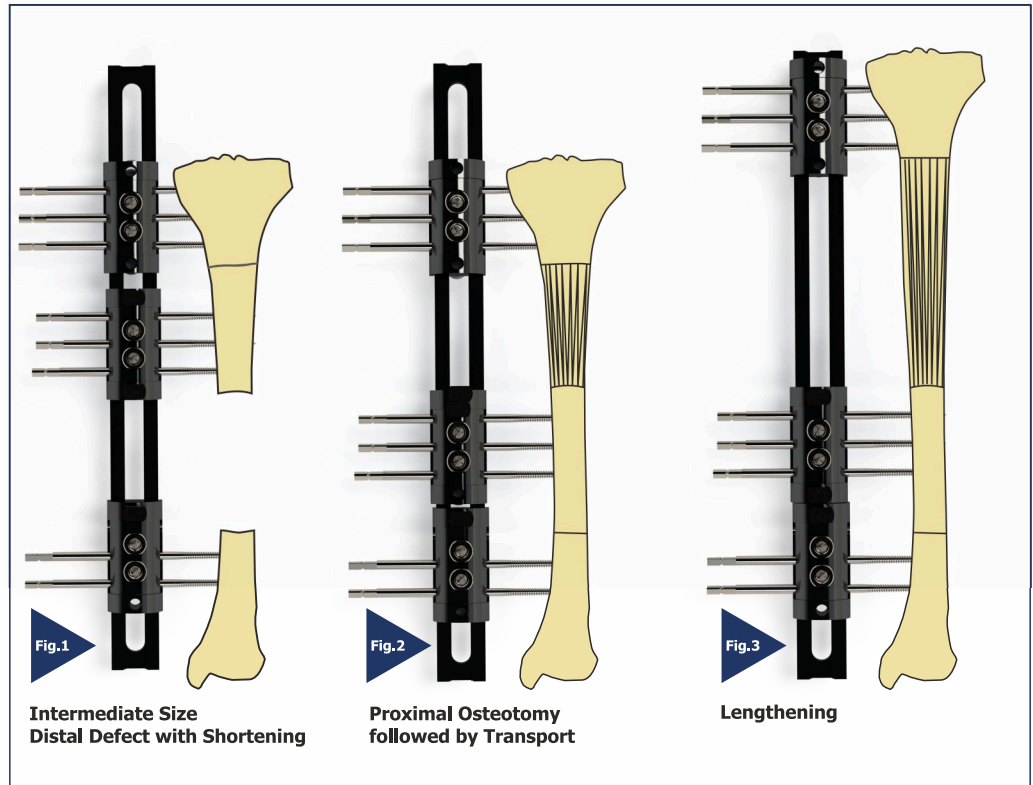
Limb lengthening techniques are used to replace bone loss and correct and lengthen bones with deformities. These procedures can be applied to children or adults (3-70 years) with congenital disease, bone loss or traumatic limbs. In this method, bone is cut surgically and gradually extended and new bone formation (osteogenesis) is observed in the extension region.





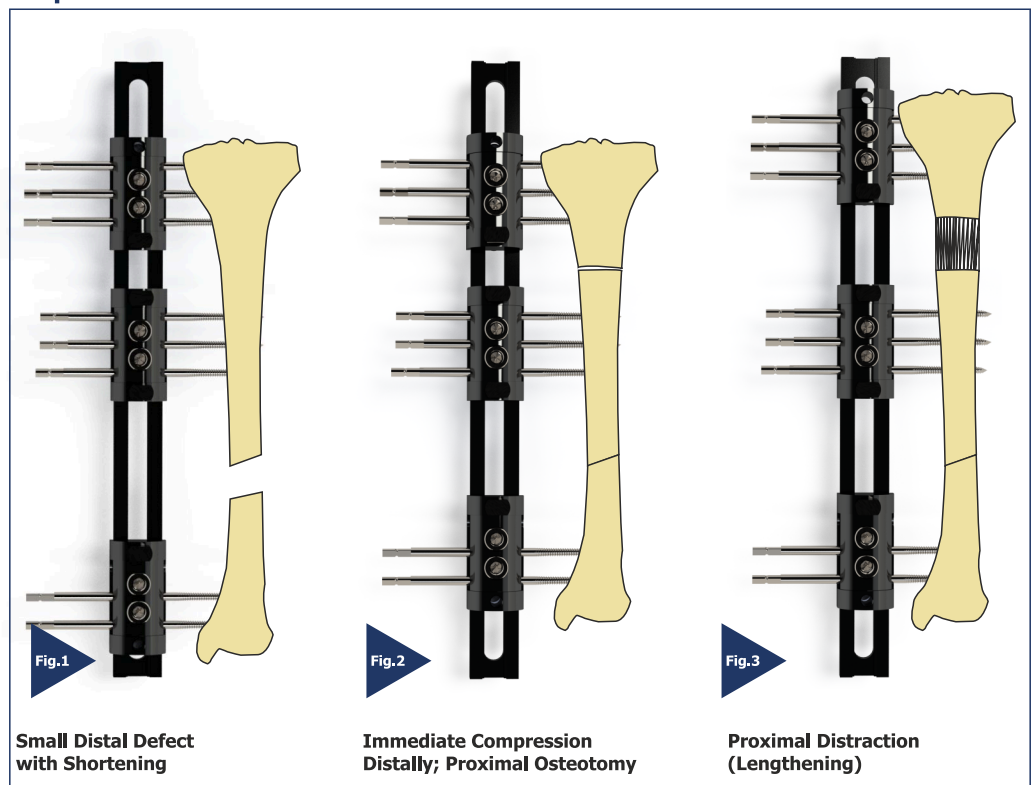
### 3 Bone Transport

- 1) Intermediate Size Distal Defect with Shortening. 3 clamps applied (Fig 1).
- 2) Proximal metaphyseal osteotomy between clamp 1 and 2, followed by transport with clamp 1 and 3 locked to the rail and clamp 2 moved distally (Fig 2).
- 3) Lengthening to restore the original limb length. Clamp 2 and 3 locked to rail and clamp 1 moved proximally (Fig 3).



### 4 Small Deffect Compression-Distraction

- 1) Small distal bone defect and Segmantel Fixator System in place (Fig 1).
- 2) Immediate compression between clamps 2 and 3 to close defect. Proximal osteotomy performed between clamps 1 and 2. (Fig 2)
- 3) With clamps 2 and 3 locked to rail to maintain compression, clamp 1 is moved proximally to restore original limb length (Fig 3).

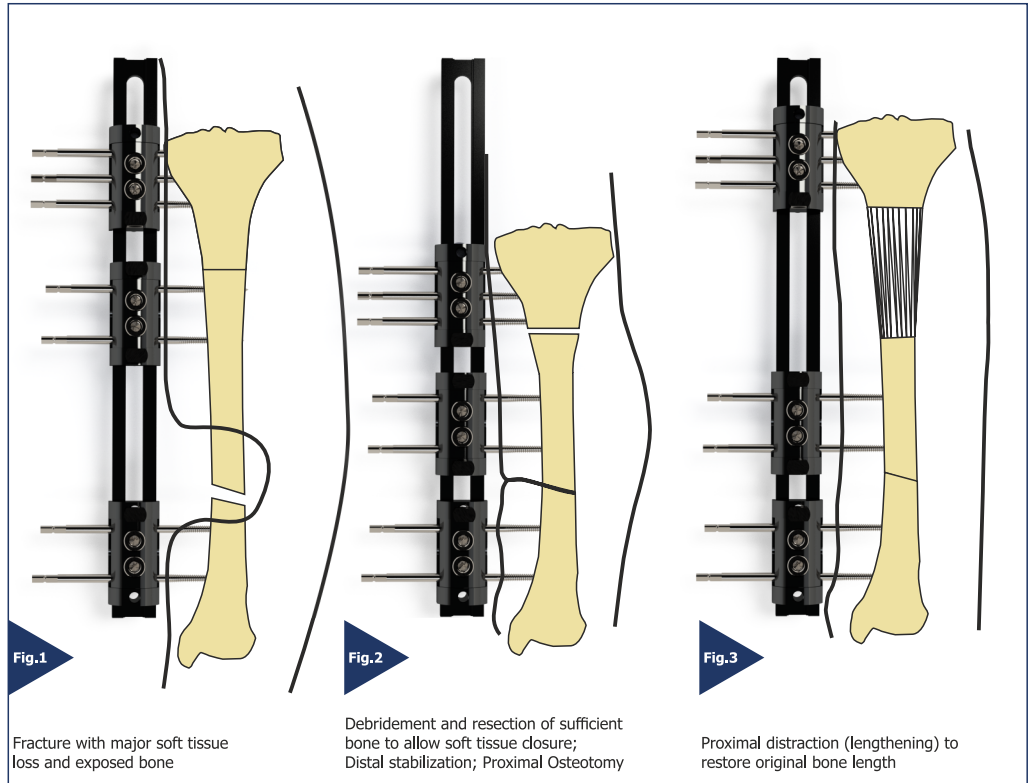




## 5 The Management Fractures Associated with Major Soft Tissue Defect

### Compression-Distraction

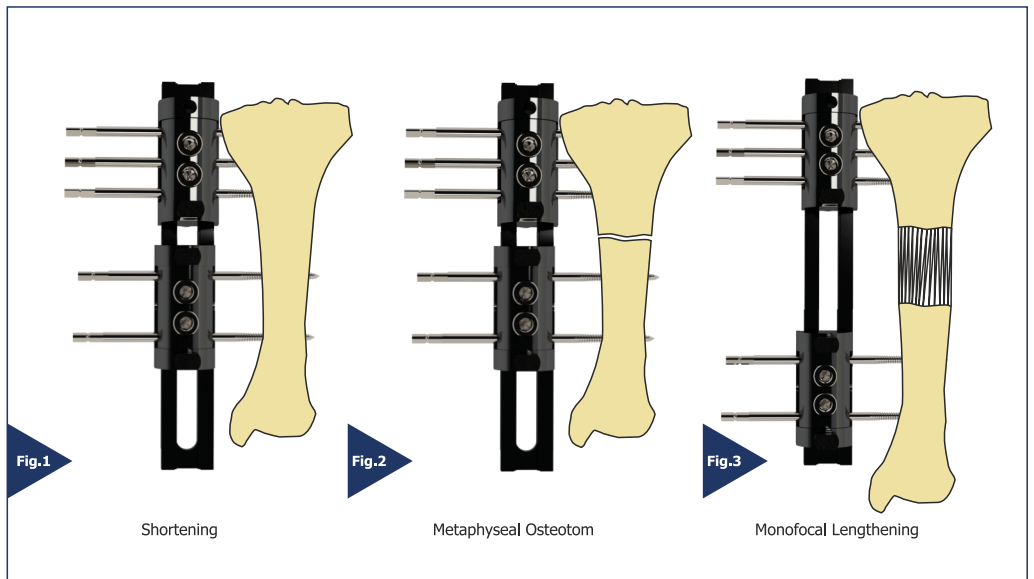
- 1) Fracture with major soft tissue defect and exposed bone (Fig.1).
- 2) Debridement and resection of sufficient bone to allow soft tissue closure; distal stabilization; proximal osteotomy (Fig.2).
- 3) Proximal distraction (lengthening) to restore original bone length. (Fig.3)



## 6 Lengthening

### Monofocal Lengthening

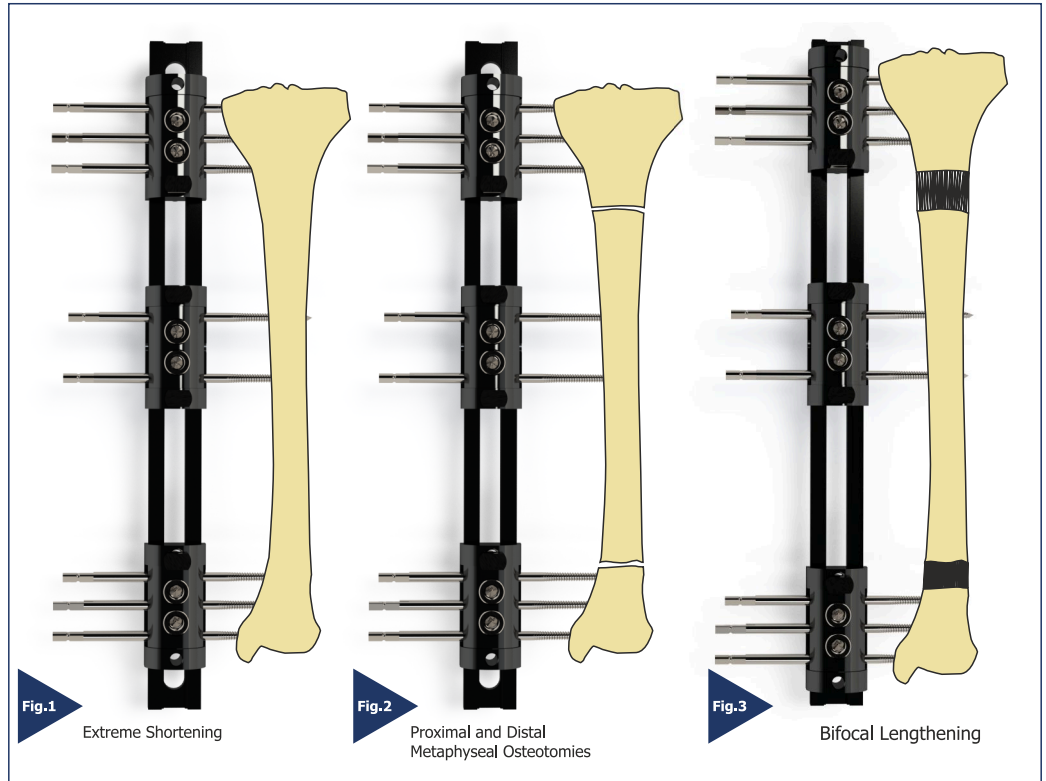
- 1) Shortening and Segmantel Fixator System in place (Fig.1).
- 2) Proximal metaphyseal osteotomy (Fig.2).
- 3) Distraction (lengthening) with clamp 1 locked to rail and clamp 2 free to move (Fig.3).





## 7 Bifocal Lengthening

- 1) Extreme shortening in the limb, with the Segmantel Fixator System in place (Fig.1).
- 2) Proximal metaphyseal osteotomy between clamps 1 and 2 and distal metaphyseal osteotomy between clamps 2 and 3.(Fig.1)
- 3) Simultaneous lengthening at each osteotomy site, with clamp 2 locked to the rail and clamps 1 and 3 free to move, restoring original limb length. (Fig.3)

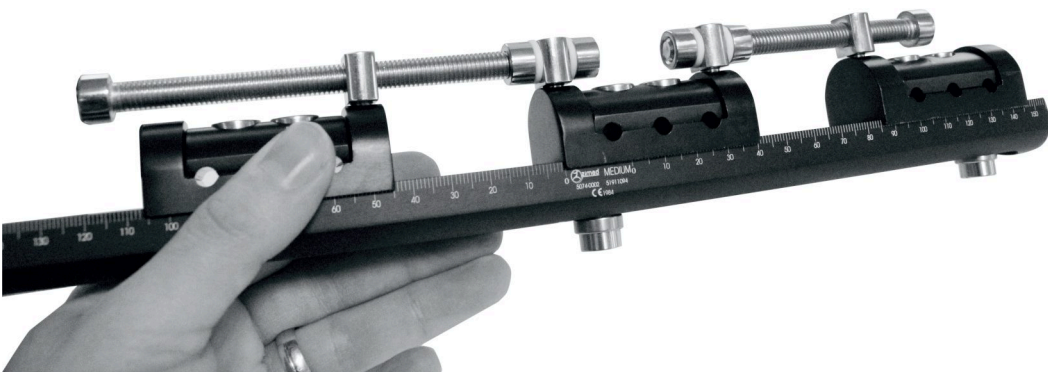


Surgical Technique  
FEMUR TIBIA  
SEGMENTAL  
FIXATOR



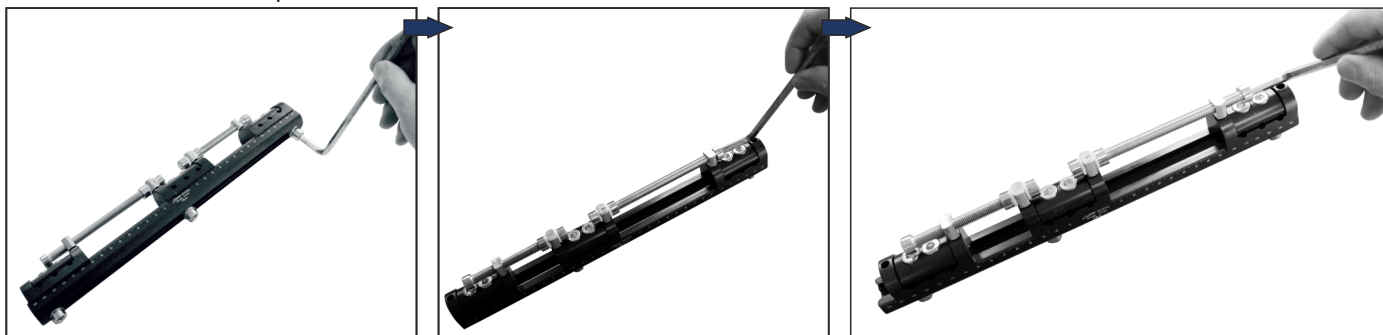
Medium Model

Clamps



Medium Model

Movement of the clamp





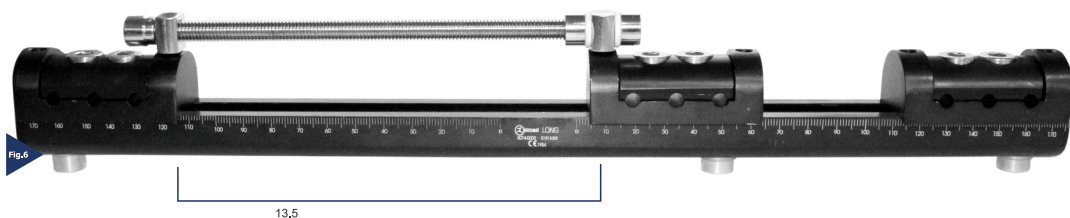
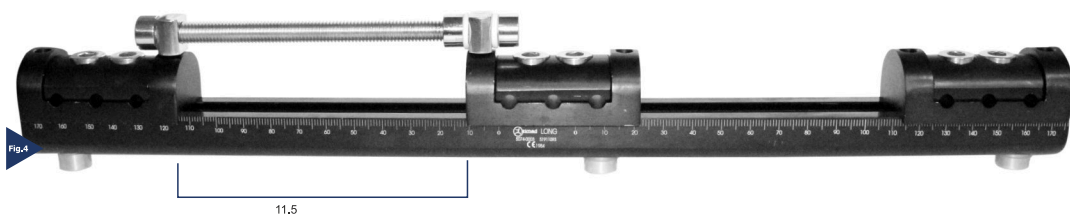
## Bone Transport - long model



The two outer clamps positioned at the extremities of the rail and the middle clamp in contact with one outer clamp.



With the compression-distraction positioned as shown, the maximum distraction possible is 7.5 cm.



The amount of distraction may be increased to 13.5 cm by changing the position of the compression-distraction unit from that shown in (Fig.3) to the above position and applying distraction.

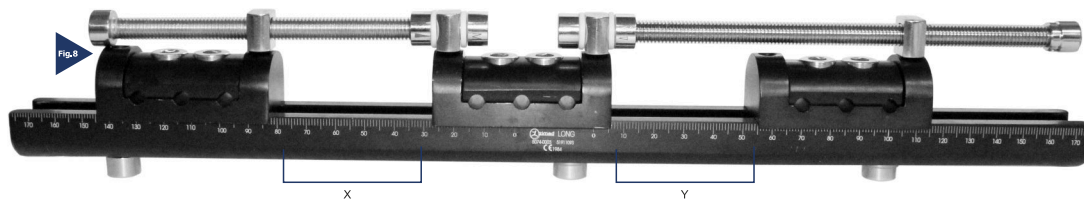
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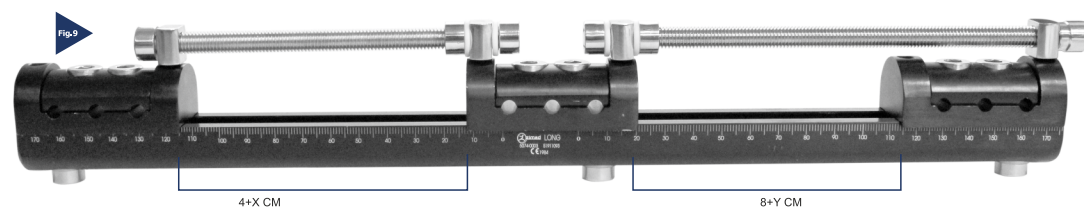
The maximum distraction may be obtained by changing the position of the compression-distraction unit from that shown in (Fig.6) to the above position and compressing further.



## Bifocal Lengthening long Model



With the compression-distraction positioned as shown, there are gaps x and y between the clamps.



A maximum of 4 cm of distraction can be achieved with compression-distraction unit, and 8 cm with compression-distraction unit

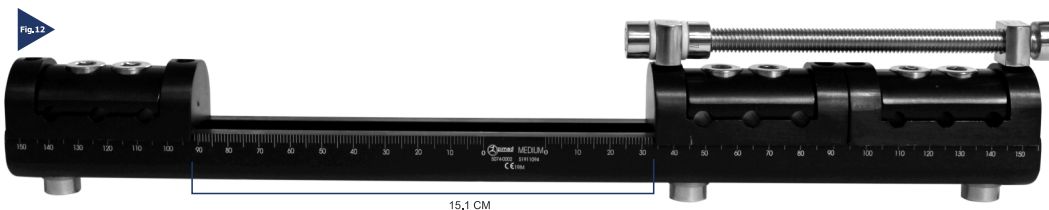
## Bone Transport Medium Model



The two outer clamps positioned at the extremities of the rail and the middle clamp in contact with one outer clamp.



With the compression-distraction positioned as shown, the maximum distraction possible is 7.5 cm.



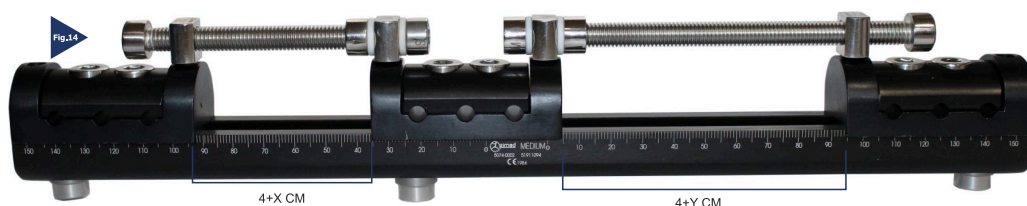
The distraction may be increased to 15.1 cm by changing the position of the compression-distraction unit from that shown in (fig.11) to the above position and applying compression.



## Bifocal Lengthening Medium



With the compression-distraction positioned as shown, there are gaps x and y between the clamps.

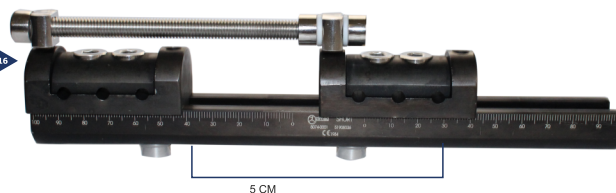


A maximum of 4 cm of distraction can be achieved with each compression-distraction unit.

## Short Model



One clamp at the extremity of the rail and the other clamp in contact with it.



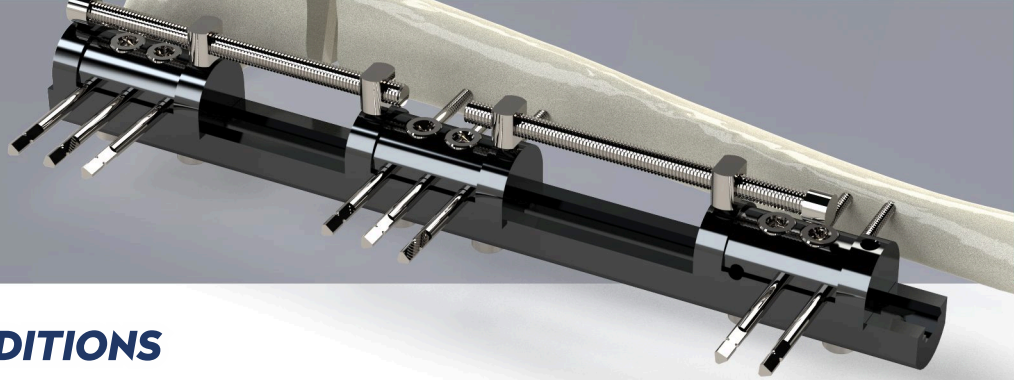
With the compression-distraction unit positioned as shown, the maximum distraction possible is 5.0 cm.



The amount of distraction may be increased to 11.5 cm by changing the position of the compression-distraction unit from that shown in (Fig.16) to the above position and applying further distraction.




# Disinfection FEMUR TIBIA SEGMANTEL FIXATOR



## DEVICE CLEANING CONDITIONS

Do not use metal brushes or rubbing pads during Decontamination of the tools should be performed immediately after the surgical procedure is completed. Contaminated tools must not be allowed to dry before reprocessing.

Excessive blood or debris must be removed in order to prevent the drying on the surface. All users must be qualified staff with documented evidence of training and competence. Training should include the current guidelines, standards and hospital policies. Even if they are made of high-grade stainless steel, the surgical tools must be thoroughly dried in order to prevent rust formation. Prior to sterilization, all the tools should be examined for the cleanliness of the lumens of the joints of the surfaces. manual cleaning process. Use cleaning agents with low-foam surfactant to be able to see the tools in the cleaning solution. Rinse the cleaning materials easily from the tool in order to prevent residue formation.

Mineral oil or silicon lubricants should not be used on  tools. Neutral pH enzymatic and cleaning materials are recommended for cleaning the reusable instruments. It is very important to neutralize and rinse the alkaline cleaning materials thoroughly from the tools. Anodized aluminum should not contact with certain cleaning or disinfectant solutions. Avoid strong alkaline cleaners and disinfectants and solutions containing iodine, chlorine or certain metal salts.

### Manual Cleaning/Disinfection:

Prepare the enzymatic and cleaning materials at the dilution rates and temperatures as recommended by the manufacturer. New solutions should be prepared when the existing solutions are heavily contaminated. Place the tools in the enzymatic solution so that they are completely immersed. Operate all the movable parts so that the detergent contacts with all the surfaces.

Keep in the fluid for minimum 20 min. Use a nylon, soft-bristled brush to gently rub the tools until all visible debris is cleaned. Pay particular attention to the accessible areas and use a suitable bottle brush. In order to remove the dirt in the open springs, coils or flexible parts, wash the recesses with plenty of cleaning solution. Rub the surface with a scrubbing brush to remove all the visible dirt from the surface and the recesses. To ensure that all the recesses are cleaned, turn the component while rubbing. Remove the tools and rinse them for minimum 3 min. under running water. Pay particular attention to the cannulas and use a syringe to pass the fluid through the hard-to-reach areas. Place all the tools that are completely immersed in water, in an ultrasonic unit containing the cleaning solution. Operate all the movable parts so that the detergent contacts with all the surfaces. Expose the tools to sonification process for minimum 10 min..

Remove the tools and rinse with deionized water for at least 3 minutes or unless all the blood or dirt traces are eliminated in the rinsing water. Examine the tools under normal light to verify that visible dirt is removed. If

visible dirt is present, repeat the above mentioned sonification procedure and the rinsing steps. Remove the excessive moisture on the tool with a clean, absorbent, lint-free cloth.

### Combination Manual / Automated Cleaning and Disinfection:

Prepare the enzymatic and cleaning materials at the dilution rates and temperatures as recommended by the manufacturer. New solutions should be prepared when the existing solutions are heavily contaminated. Place the tools in the enzymatic solution so that they are completely immersed. Operate all the movable parts so that the detergent contacts with all the surfaces. Keep in the fluid for minimum 10 min. Use a nylon, soft-bristled brush to gently rub the tools until all visible debris is cleaned. Pay particular attention to the accessible areas and use a suitable bottle brush. A sonicator will help to clean the instruments thoroughly. The use of a syringe or a water fountain will facilitate passing of the liquid from the low-spaced areas and difficult-to-access areas. Remove the tools from the enzyme solution and rinse them for minimum 1 min. under deionized water. Place the tools in a suitable washer / disinfectant basket and perform a standard washer / disinfectant cycle. Specific minimum parameters are essential for a complete cleaning and disinfection. These parameters are given in a below mentioned table.

### Combination Manual / Automated Cleaning and Disinfection:

Automated washing / drying systems are not recommended as the only cleaning method for surgical tools. An automated system can be used as a follow-up operation after manual cleaning. To ensure an effective cleaning, tools must be thoroughly examined before sterilization. For detailed information on Washing and Disinfection see

### Specific minimum parameters used for a complete cleaning and disinfection:

	Definition
1	Pre-washing for 2 minutes with cold tap water
2	enzyme spray for 20 seconds with hot tap water
3	Immersion in enzyme after 1 minute
4	rinsing for 15 seconds with cold tap water (Should be repeated twice)
5	Washing with detergent for 2 minutes with hot tap water
6	rinsing for 15 seconds with hot tap water
7	Rinsing with 10 seconds with optional lubricated purified water
8	Drying for 7 minutes with hot air

Note: Follow the instruction of the washer/disinfectant manufacturer



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