Over 1 million times per year, Biomet helps one surgeon provide personalized care to one patient.

The science and art of medical care is to provide the right solution for each individual patient. This requires clinical mastery, a human connection between the surgeon and the patient, and the right tools for each situation.

At Biomet, we strive to view our work through the eyes of one surgeon and one patient. We treat every solution we provide as if it’s meant for a family member.

Our approach to innovation creates real solutions that assist each surgeon in the delivery of durable personalized care to each patient, whether that solution requires a minimally invasive surgical technique, advanced biomaterials or a patient-matched implant.

When one surgeon connects with one patient to provide personalized care, the promise of medicine is fulfilled.
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From simple fractures to complex reconstruction, this modular system can be configured for many different applications, including:

- Tibial, femoral and humeral fractures
- Unstable diaphyseal comminution
- Open wound/fracture management
- Arthrodesis
- Osteotomy
- Limb lengthening /distraction osteogenesis
- Deformity correction
- Charcot foot management
- Temporary fixation

The ACE-Fischer System is comprised of lightweight carbon fiber, aluminum and titanium materials. The simple design of this system keeps in mind the needs and requirements of the patient, surgeon, OR team and hospital staff.

<table>
<thead>
<tr>
<th>Features</th>
<th>Advantages</th>
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<tbody>
<tr>
<td>Connecting Rods</td>
<td></td>
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<tr>
<td>Gross compression/distraction</td>
<td>Frame acts as a reduction tool</td>
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<tr>
<td>Fine compression/distraction</td>
<td>Postoperative adjustments</td>
</tr>
<tr>
<td>Universal joints</td>
<td>Maximum versatility</td>
</tr>
<tr>
<td>Carbon Fiber Composite Rings</td>
<td></td>
</tr>
<tr>
<td>Radiolucent</td>
<td>Unobstructed radiographic views</td>
</tr>
<tr>
<td>Lightweight</td>
<td>Weight reduction for patient comfort</td>
</tr>
<tr>
<td>Three diameters</td>
<td>Flexibility for patient size</td>
</tr>
<tr>
<td>Half pin/thin wire options</td>
<td>Intraoperative options</td>
</tr>
<tr>
<td>Wire Tensioner</td>
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<tr>
<td>One-squeeze tensioning</td>
<td>Saves OR time</td>
</tr>
<tr>
<td>Tensioner head options (cannulated/offset)</td>
<td>Accommodates wire placement</td>
</tr>
<tr>
<td>Half Pins</td>
<td></td>
</tr>
<tr>
<td>Double lead fine thread</td>
<td>Allows for quick insertion</td>
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<tr>
<td>Self-tapping</td>
<td>Alleviates need to pre-tap</td>
</tr>
<tr>
<td>Various thread lengths</td>
<td>Ability to bury threads below soft tissue</td>
</tr>
<tr>
<td>Stainless steel and titanium</td>
<td>Options to suit surgeon preferences</td>
</tr>
<tr>
<td>Foot Frame</td>
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<tr>
<td>Carbon fiber composite material</td>
<td>Strong and light for patient comfort</td>
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<tr>
<td>One-piece molded closed construct</td>
<td>Solves instability issues of U-Ring design</td>
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<tr>
<td>Radiolucent</td>
<td>Provides unobstructed x-ray view</td>
</tr>
<tr>
<td>Double row of holes</td>
<td>Greater wire/rod placement options</td>
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<tr>
<td>Crossbar attachment</td>
<td>Control of mid-foot compression</td>
</tr>
<tr>
<td>Elevator attachment</td>
<td>Protects bottom of foot</td>
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</tbody>
</table>
Wire Fixation Bolts

Varying bolt heights provide the flexibility to drive wires at different levels in order to address comminuted fractures and to keep thin wires from intersecting. Wire height may be varied utilizing the following components:

Guidelines for Proper Stability

A minimum of one ring per bone segment with three fixation points per ring is recommended. Utilize any half pin and thin wire combination.

Three connecting rods are recommended per construct. They should be placed in a circumferential manner around the leg.
Ace-Fischer External Fixation System


The versatility of the ACE-Fischer System will provide the flexibility to create multiple constructs based on surgical application. The following technique suggestions will facilitate application and assembly.

**Thin Wire Insertion Technique**

1. Make a nick incision and bluntly insert the wire through the skin and soft tissues until the wire contacts the bone. Do not start drilling until the wire has made contact with the near cortex. Lightly press the wire against the near cortex and begin drilling through the bone, stopping the drill every couple of seconds. NOTE: The start-stop method will reduce the risk of heat build-up and/or thermal necrosis.

2. Once the wire has been drilled through the far cortex, stop the drill and tap the wire through the soft tissues using a mallet and pliers. This technique will help minimize the risk of soft tissue complications.

3. When the wire reaches the skin, make a nick incision over the tip of the wire to allow it to pass through the skin.

4. Be sure to relieve the skin of any tension that wire insertion may have caused.

**Wire Tensioning Technique**

1. Prior to tensioning, ensure that the opposite wire fixation bolt is tightened and anchored to the ring. When tightening wire bolts to the ring, apply counter-pressure to counteract tightening torque and wire bending.

2. Confirm that the tensioner handles are completely open and the ratchet is not engaged. If the handles are not completely open, the internal jaws will be engaged, preventing the tensioner from sliding over the wire.

3. Slide the wire tensioner with its appropriate tensioning head over the wire until the head engages the fixation bolt. (Figure 1)

4. Referencing the calibrations on the tensioner head, compress the tensioner handles until the desired tension level is achieved. 100-125 kg of tension is recommended. Do not exceed 130 kg (Figure 2)

5. With the tensioner still engaged over the bolt, securely tighten the nut-and-bolt assembly to retain tension.

6. Prior to removing the tensioner from the wire, release the lock and confirm that the tensioner handles are completely open and the ratchet is not engaged.
Half Pin Insertion Technique

1. Make a stab incision in the skin.
2. Bluntly insert the sheath and trocar through soft tissue until it hits the near cortex.
3. Lightly tap the trocar to seat on the bone.
4. Remove the trocar.
5. Insert the drill bit through the sheath.

Note: Take a measurement from the depth gauge, referencing the top of the sheath. Select the appropriate length of half pin.

Once the appropriate half pin has been selected, insert the pin by hand through the sheath using a pin inserter.
Maximum Versatility Through Connecting Rods

The features of the connecting rods are efficiently consolidated into a single component allowing the use of fewer parts than typically found in competitive systems. To ensure maximum adjustability, align all of the universal joints in the same plane and place the compression/distraction wheels proximally. When this orientation is achieved, the ACE-Fischer System is at its maximum versatility. Other adjustments on the connecting rods are achieved as follows:

**Length**: Restore length and gross alignment using the gross compression/distraction adjustment mechanism.

**Reduction**: Accomplish initial reduction by loosening the gross adjustment mechanism and universal joints to allow rings to act as reduction tools. Ensure all of the connecting rod bolts are loose.

**Rotation**: Correct rotational deformities by loosening the gross adjustment mechanism and all universal joints. Rotation is corrected manually, utilizing rings as reduction tools. NOTE: Major rotational correction will alter length if gross distraction is not loose.

**Translation**: Correct translation by loosening the four universal bolts in the affected plane only. Using the rings as reduction tools, correct the translational deformity.

**Angulation**: Correct the angulation by loosening the gross adjustment mechanism and all universal joints. Once gross alignment is achieved, lock the universal joints and fine-tune the reduction using the fine compression/distraction wheels.

**Displacement**: Correct the displacement by loosening the four universal bolts in the affected plane. Displacement is corrected manually.

**Axial Compression and Distraction**: Axial compression and distraction is obtained by turning the compression/distraction wheels. Connecting rods must be aligned straight up and down, paralleling the affected bone.

Tighten all bolts once all the appropriate adjustments have been made.
The Unilateral Construct

The unilateral construct is a simple treatment for a midshaft tibia fracture.

1. Place two half pins medially in the proximal tibia, and 2 half pins medially in the distal tibia.

2. Attach two connecting rods and two 3-pin holders to the 1/3 rings.

3. Slide assembled frame over half pins and secure.

4. Utilize the compression / distraction wheels to dial in final compression / distraction.

Components

<table>
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<th>Description</th>
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</tr>
<tr>
<td>2</td>
<td>FA-10000-2</td>
<td>Medium connecting rods</td>
</tr>
</tbody>
</table>
Ace-Fischer External Fixation System

The Tibial Plateau Construct

When stabilization of highly comminuted fractures in the proximal tibia where soft tissue preservation is crucial, utilize the tibial plateau frame.

1. Using a 2/3 ring at the proximal portion of the tibia, secure three fixation points with any half pin or thin wire combination. Ensure that these are parallel and at least 10 mm distal to the joint surface.

2. A second 2/3 ring will be placed at the distal portion of the tibia. Secure three fixation points using any half pin and thin wire combination. The third fixation point should be at a 60-90 degree spread from the aforementioned fixation points.

3. Select appropriate length connecting rods and attach them to the rings posterior-medially, posterior-laterally and anteriorly.

Take care to position the connecting rods out of the AP and lateral fluoroscopic views.

Components

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</tr>
<tr>
<td>3</td>
<td>FA-10000-2</td>
<td>Medium connecting rods</td>
</tr>
</tbody>
</table>


The Spanning Pilon Construct

Utilize this frame to temporarily span tibial pilon fractures in a staging protocol.

1. Place one thin wire into the talar neck and one in the calcaneal tuberosity. Attach the wires to a 2/3 ring, with the opening positioned anteriorly.

2. Place two half pins into the tibial shaft and attach to the second 2/3 ring, with the opening positioned anterolaterally.

3. Select the appropriate length connecting rods and attach them in a circumferential manner around the leg.

Take care to position the connecting rods out of the AP and lateral fluoroscopic views.

The Components

<table>
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<tr>
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</tr>
<tr>
<td>3</td>
<td>FA-10000-2</td>
<td>Medium connecting rod</td>
</tr>
</tbody>
</table>
The Distal Femur Construct
This configuration is used for distal femoral fractures.

1. On the distal portion of the femur, secure the frame using four fixation points in any combination of half pins and thin wires and attach the 2/3 ring.

2. With any half pin or thin wire combination, secure the femur’s proximal portion with four fixation points and attach the 2/3 ring. The spread among the last fixation point should be 60-90 degrees from the aforementioned fixation points.

3. Attach four connecting rods in a circumferential manner around the leg.

Components
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<td>4</td>
<td>FA-10000-2</td>
<td>Medium connecting rods</td>
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</tbody>
</table>
The elevator is provided for use with the foot frame and is **NOT** intended for weight-bearing application. The elevator is meant to shield the bottom of the foot to minimize the potential for accidental contact with the floor surface. Whether at rest or ambulation on crutches, the elevator is **NOT intended to support the weight of the foot or leg.**

**The Foot and Ankle Construct**

When the ankle and subtalar joints are no longer thought to be salvageable, employ the Tibio-Talar Calcaneal Fusion Frame.

For midfoot, hindfoot and ankle applications, utilize the foot and ankle frame construct.

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### Components

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**The Tibio-Talar Calcaneal Fusion Frame/ Charcot Frame Configuration**

1. Place one thin wire through the calcaneal tubercle. Place one additional thin wire through the metatarsals. Attach the wires to the ring. This technique will define the position of the foot ring. Add two additional wires through the calcaneal tubercle and one additional wire through the metatarsals.

2. Three fixation points are recommended on the proximal ring and can be composed of any half pin and thin wire combination. **NOTE:** A 60 - 90 degree spread between the fixation points is recommended.

3. Attach three connecting rods, medially, laterally and posteriorly.

4. Gain initial alignment with the gross compression/distraction feature on the connecting rods, utilizing the fine compression/distraction wheels to fine-tune ankle alignment and final compression.
Ace-Fischer External Fixation System

The Limb Lengthening Construct
The Limb Lengthening construct can be used to lengthen a portion of bone that has a severe limb length discrepancy from that of the other limb.

1. Utilizing two 2/3 rings, apply the frame and stabilize the proximal metaphyseal/diaphyseal along regions of the bone with any half pin or thin wire combination.

2. Attach three connecting rods, ensuring they are parallel to the bone.

3. Make a corticotomy/osteotomy at the metaphyseal/diaphyseal junction through the cortical bone, preserving the periosteum and bone marrow.

4. Depending on the patient's age, allow 5-10 days as a rest period post-corticotomy before beginning distraction.

5. One mm of distraction every 24 hours can be achieved by turning the compression/distraction wheels one quarter turn four times a day.

Components

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<tr>
<td>3</td>
<td>FA-10000-2</td>
<td>Medium connecting rods</td>
</tr>
</tbody>
</table>
The Bone Transport Construct

Use the Bone Transport Frame to move a healthy bone segment to fill a segmental defect.

1. This frame is intended to be prebuilt.

2. Utilizing three 2/3 rings, stabilize the metaphyseal and diaphyseal regions of the bone. Secure three points of fixation per ring. Use any half pin and thin wire combination.

3. Make a corticotomy/osteotomy at the metaphyseal/diaphyseal junction.

4. The frame must compress at the defect and distract at the corticotomy site.

5. Allow 5-10 days as a rest period post-corticotomy before beginning distraction.

6. One mm of distraction every 24 hours can be achieved by turning the compression/distraction wheels one quarter turn four times a day.

Components

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</table>
The Angular Deformity Correction Construct

This frame is used to correct a long bone angular deformity.

1. Identify the Center of Rotation of Angulation (CORA).

2. Ensure the proximal ring is parallel to the proximal joint surface and the distal ring is parallel to the distal joint surface.

3. Secure three fixation points per ring using any half pin and thin wire combination.

4. Perform a corticotomy/osteotomy at the CORA.

5. At the identified CORA, place the universal joint in the plane of the deformity that is to be corrected. The universal joint must be loose in this plane to allow the correction to occur.

6. Compress one quarter turn four times a day on the long connecting rod using the compression/distraction wheels. Distract the short connecting rod using the compression/distraction wheels and turning one quarter turn four times a day until the rings are parallel.

Components

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</table>
The Knee Fusion Construct

When the risk of knee replacement is high or contraindicated, the Knee Fusion Construct can easily be applied.

1. Place three half pins in the femur. Place anterolaterally and anteromedially.

2. With the same technique, place three half pins into the tibia and attach them to the 2/3 ring.

3. Attach four connecting rods in a circumferential manner around the leg.

4. Utilize the compression/distraction wheels to dial in final compression.

Components

<table>
<thead>
<tr>
<th>Qty.</th>
<th>Catalog number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>See page 17 for sizing</td>
<td>5 mm half pin</td>
</tr>
<tr>
<td>2</td>
<td>FA-10365</td>
<td>3 pin holder</td>
</tr>
<tr>
<td>2</td>
<td>FA-10355</td>
<td>1 pin holder</td>
</tr>
<tr>
<td>2</td>
<td>FC-10029</td>
<td>Medium 2/3 ring</td>
</tr>
<tr>
<td>4</td>
<td>FA-10000-2</td>
<td>Medium connecting rods</td>
</tr>
</tbody>
</table>
Immediate Postoperative Pin Care

Step 1: Wash hands thoroughly, including between fingers and the back of each hand.

Step 2: Gently massage the skin around the pin sites with fingertips to bring drainage to the surface that is then cleaned away.

Step 3: Saturate a sterile cotton swab with a solution made up of one-half saline and one-half peroxide. Apply the solution to one pin site at a time, removing any drainage and/or crust. After cleaning each pin site, dry the pin site with a new cotton swab.

Step 4: Clean the entire pin with the same solution using a new cotton swab for each pin.

Step 5: Cover the pin site with the preferred dressing.

Once the wounds have healed, the patient can shower daily with a liquid antibacterial soap. The pin sites will no longer need to be covered with a dressing; however, they will still need daily cleansing with saline solution until the frame is removed.

Postoperative Pin Care

Pin loosening is a potential risk associated with infection. Therefore, it is essential that pin sites be cared for correctly to limit the possibility of infection and allow more comfortable healing. The following is one option:
Ace-Fischer External Fixation System

Components

Miscellaneous Items
1001-00-000 SS Locking Hex Nut 10 mm 1/4-28
8100-50-010 SS Low Profile Nut 10 mm
100162 Bolt Clevis .445
100163 Bolt Clevis Medium .545
100165 Bolt Clevis Long .669
1011-00-166 SS Bolt Medium 10 mm
1011-00-167 SS 10 mm Bolt Long
10095 Spherical Nut and Washer Assembly (pk/2)
1012-73-010 SS Threaded Rod 10 cn
1012-73-015 SS Threaded Rod 15 cn
1012-73-020 SS Threaded Rod 20 cn
1012-73-025 SS Threaded Rod 25 cn
1012-73-030 SS Threaded Rod 30 cn
1012-73-035 SS Threaded Rod 35 cn
1012-73-040 SS Threaded Rod 40 cn
10740 Universal Joint
8118-04-008 Aluminum Medium Foot U-Ring
8118-04-009 Hinge Wire Bolt
6029 ACE Align Pin Holder
FF-10551 5 mm Tip Cap (pk/3)

Instrumentation
FF-10503 Drill Bit for 5 mm Half Pin
FF-10516 Depth Gauge
FF-10504 Half Pin Insertor
FF-10525 Sheath and Tocarc
FF-10502 Open End Wrench 10 mm
8280-03-010 Ratchet Wrench 10 mm
FF-10507 Socket Wrench 10 mm
59 Spanner Wrench 7 mm
8282-20-000 Tommy Bar
FF-10511 Universal Joint Positioner
AC-11514 Wrench Combo 10 mm

Transfixing Pins
Stainless Steel
FF-11250.40 5 mm Transfixing Pin 250 mm x 40 mm
FF-11250.50 5 mm Transfixing Pin 250 mm x 50 mm
FF-11300.60 5 mm Transfixing Pin 300 mm x 60 mm
FF-11300.70 5 mm Transfixing Pin 300 mm x 70 mm

Titanium
FF-11250.40 5 mm Transfixing Pin 250 mm x 40 mm
FF-11250.50 5 mm Transfixing Pin 250 mm x 50 mm
FF-11300.60 5 mm Transfixing Pin 300 mm x 60 mm
FF-11300.70 5 mm Transfixing Pin 300 mm x 70 mm

5 mm Half Pins
Stainless Steel
FS-10150.10 5 mm Half Pin 150 mm x 10 mm
FS-10155.15 5 mm Half Pin 155 mm x 15 mm
FS-10160.20 5 mm Half Pin 160 mm x 20 mm
FS-10165.25 5 mm Half Pin 165 mm x 25 mm
FS-10170.30 5 mm Half Pin 170 mm x 30 mm
FS-10175.35 5 mm Half Pin 175 mm x 35 mm
FS-10180.40 5 mm Half Pin 180 mm x 40 mm
FS-10185.45 5 mm Half Pin 185 mm x 45 mm
FS-10190.50 5 mm Half Pin 190 mm x 50 mm
FS-10200.60 5 mm Half Pin 200 mm x 60 mm
FS-10210.70 5 mm Half Pin 210 mm x 70 mm
FS-10220.80 5 mm Half Pin 220 mm x 80 mm

5 mm Half Pins
Titanium
FF-10150.10 5 mm Half Pin 150 mm x 10 mm
FF-10155.15 5 mm Half Pin 155 mm x 15 mm
FF-10160.20 5 mm Half Pin 160 mm x 20 mm
FF-10165.25 5 mm Half Pin 165 mm x 25 mm
FF-10170.30 5 mm Half Pin 170 mm x 30 mm
FF-10175.35 5 mm Half Pin 175 mm x 35 mm
FF-10180.40 5 mm Half Pin 180 mm x 40 mm
FF-10185.45 5 mm Half Pin 185 mm x 45 mm
FF-10190.50 5 mm Half Pin 190 mm x 50 mm
FF-10200.60 5 mm Half Pin 200 mm x 60 mm
FF-10210.70 5 mm Half Pin 210 mm x 70 mm
FF-10220.80 5 mm Half Pin 220 mm x 80 mm

6 mm Self Drilling Half Pins
Stainless Steel
1320-15-010 6 mm Half Pin 150 mm x 10 mm
1320-15-015 6 mm Half Pin 155 mm x 15 mm
1320-16-020 6 mm Half Pin 160 mm x 20 mm
1320-16-025 6 mm Half Pin 165 mm x 25 mm
1320-17-030 6 mm Half Pin 170 mm x 30 mm
1320-17-035 6 mm Half Pin 175 mm x 35 mm
1320-18-040 6 mm Half Pin 180 mm x 40 mm
1320-18-045 6 mm Half Pin 185 mm x 45 mm
1320-19-050 6 mm Half Pin 190 mm x 50 mm
1320-20-060 6 mm Half Pin 200 mm x 60 mm
1320-21-070 6 mm Half Pin 210 mm x 70 mm
1320-22-080 6 mm Half Pin 220 mm x 80 mm

Foot Frame Components
8180-04-011 Medium Foot Frame
8180-04-012 Large Foot Frame
8180-04-013 Crossbar Assembly
8180-04-014 Posterior Angulation Attachment (PAA)
8180-04-015 Elevator

Sterilization Modules and Cases
2008-01-000 ACE Fischer Lid
2008-01-001 Pin/Wire Tension Case
2008-01-002 Threaded Rod/Misc Tray
2008-01-003 Half Pin/Wire Tray
2008-01-004 Connecting Rod/Inst Case
2008-01-005 Univ Conn Rod Tray
2008-01-006 Tensioner/Instrument Tray
2008-01-007 Ring/Frame Case
2008-01-008 1/3, 2/3 Ring Tray
2008-01-009 1/2 Ring Tray

Wire Tension Components
10485 Anchor Assembly
10480 Distraction Assembly
8180-30-008 Nut for Wire Fixation Bolt
8180-30-005 Cannulated Wire Fixation Bolt
8180-30-006 Slotted Wire Fixation Bolt
10735 Olive Wire Distractor w/ Allen Wrench
10495 5.0 mm Spacer w/ Bolt
10470 Gap Gauge
8180-50-000 Wire Tensioner
8180-50-004 Tensioner Head Anchor/Distraction
8180-50-001 Tensioner Head Cannulated Hole
8180-50-002 Tensioner Head Offset Hole
10420 Olive wire 1.8X400 mm NS (pk/3)
10469 Dist Wire 1.8 mm Bayonet (pk/3)
1042-01-001 1.8 mm x 19 in. Olive Wire (3 pk)
1046-91-001 1.8 mm x 17 in. Straight Wire (3 pk)
1010-10-370 2 Hole Post
1010-10-375 4 Hole Post

Universal Connecting Rods
FA-10000-0 Extra Short Connecting Rod
FA-10000-1 Short Connecting Rod
FA-10000-2 Medium Connecting Rod
FA-10000-3 Long Connecting Rod

Pin Holders
FA-10355 1 Pin Holder
FA-10360 2 Pin Holder
FA-10365 3 Pin Holder

Carbon Fiber Rings/Connectors
FC-10027 Small 2/3 Ring
FC-10028 Small 1/3 Ring
8180-04-050 Small 1/2 Ring
FC-10029 Medium 2/3 Ring
FC-10030 Medium 1/3 Ring
8180-04-060 Medium 1/2 Ring
FC-10031 Large 2/3 Ring
FC-10032 Large 1/3 Ring
8180-04-070 Large 1/2 Ring
1002-31-000 Ring Connector
1002-33-000 Ring Connector w/ Outilger

Foot Support System
FF-10610 Articulation
**Indications:**
The Biomet ACE-Fischer External Fixation System is indicated for open and closed long bone fracture fixation to include tensioned wire fixation of periarticular fractures, arthrodesis, limb lengthening, osteotomy, reconstruction, non-unions, pseudoarthrosis, correction of bony or soft tissue defects and deformities.

**Contraindications:**
- Conditions that restrict the patient’s ability or willingness to follow post operative instructions during the healing process;
- Foreign body sensitivity – where material sensitivity is suspected, appropriate tests should be made and sensitivity ruled out prior to implantation.

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