Biomet® Carbon Rail Deformity System

Surgical Technique
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Introduction

The Biomet Carbon Rail System is a modular unilateral design intended for use in reconstructive procedures involving limb length inequality, angular deformity, and bone transport. The system was designed to provide maximum flexibility and component modularity to allow for the treatment of the above-mentioned orthopaedic conditions.

The frame allows for individualized configuration based upon the specific requirements of the application and indication. The radiolucent carbon fiber rails allow for enhanced vision of the patient’s anatomy as well as a higher level of comfort from a reduced construct weight. This system is also available in adult and small sizes to accommodate different patient requirements. The System can be utilized in various constructs to achieve fixation in complex deformities. The unique design permits adjustment of the bone screw clamps along the length of the rail to facilitate optimal bone screw spacing.

Uniplanar, shim, and metaphyseal attachments allow for gradual or acute correction of linear, angular, rotational, and translational deformities. Gradual angular, translational, shim, and uniplanar swivel clamps were designed to provide the ultimate in flexibility for gradual and acute deformity correction. The System’s increased interchangeability with other Carbon Rail Systems also provides for more flexibility in periarticular applications.
### System Components

**Product #** | **Description** | **Tray Qty**
--- | --- | ---
03188 | Adult Rail Surgical Tray | 1
06140 | Adult Rotation T-Clamp | 1
06145 | Rotational Serrated T-Clamp | 1
06250 | Adult Rail 5cm Titanium C/D Clicker | 1
06255 | Adult Rail 10cm Titanium C/D Clicker | 1
06260 | Adult Rail 15cm Titanium C/D Clicker | 1
06262 | Adult Rail 20cm Titanium C/D Clicker | 1
06301 | Adult Rail 150mm Rail | 1
06306 | Adult Rail 250mm Rail | 1
06311 | Adult Rail 350mm Rail | 1
06316 | Adult Rail 420mm Rail | 1
06330 | Adult Rail End Adapter Clamp | 1
06420 | Adult Rail Ring Adapter Assembly | 1
06345 | Adult Rail C/D Support | 2
06350 | Adult Rail Gradual Swivel Clamp | 2
06360 | Adult Rail Translational Clamp | 2
06370 | Adult Rail Straight Clamp | 3
06375 | Adult Rail Bifocal Clamp | 1
06380 | Adult Rail 5° Shim Clamp | 1
06385 | Adult Rail 10° Shim Clamp | 1
06390 | Adult Rail 15° Shim Clamp | 1
06395 | Adult Rail 20° Shim Clamp | 1
06400 | Adult Rail Uniplaner Adjustment Clamp | 2
06410 | Adult Rail Dynamization Unit | 1
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<td>06606</td>
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<td>06616</td>
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<td>06655</td>
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<td>06650</td>
<td>Small Rail Gradual Angulation Clamp</td>
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<td>06565</td>
<td>Small Rail Rotational Adapter</td>
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<td>06568</td>
<td>Small Rail Locking Bolt</td>
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<td>06569</td>
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<td>06570</td>
<td>Small Rail Straight Clamp</td>
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<tr>
<td>06580</td>
<td>Small Rail Uniplanar Adjustment Clamp</td>
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<tr>
<td>06585</td>
<td>Small Rail Bifocal Lengthening Clamp</td>
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<td>06440</td>
<td>Rotation T-Clamp</td>
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<td>Small Rail Sterilization Case</td>
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Indications, Contraindications, and Deformity Planning

Indications
The Biomet Rail System is a unilateral external fixation device intended for use in the treatment of bone conditions including limb lengthening, corrective osteotomies, arthrodesis, fracture fixation, acute or gradual multiplanar correction, and other bone conditions amenable to treatment by use of the external fixation modality.

Contraindications
Patients with mental or neurologic conditions who are unwilling or incapable of following postoperative care instructions.

Deformity Planning
Planning complex deformity correction requires precise understanding of four basic principles:

1. Parallelism between the knee, ankle and the ground. This requires that the patient’s knee and ankle should be parallel to the ground during the stance phase of gait analysis.

2. Determination of Mechanical Axis Alignment
   Mechanical axis alignment can be verified on AP or frontal projection by passing a straight line (bovie cord, guide wire) through the center of the hip, knee and ankle. In the lateral position, the center of the hip, the anterior 1/3 of the distal femur, the anterior 1/5 of the proximal tibia and the center of the ankle should fall on the same line.

3. Determination of Anatomic Axis Alignment
   The anatomic axis of each bone is defined by the relationship of the diaphyseal shaft to the adjacent joints. In the tibia, the AP anatomic axis is located in the center of the diaphysis. The medial tibial plateau angle is 87° and the ankle is 90° to the anatomic axis. The lateral anatomic axis is located in the center of the diaphysis and accommodates the 7-10° posterior slope of the tibial plateau and ankle plafond. The AP anatomic axis of the femur is the center of the diaphysis and 81° to the bicondylar line of the distal femur. The mechanical axis is from the center of the femoral head to the intercondylar notch and normally 88° to the bicondylar line. If the center point of the deformity is identified and the point of rotation for the correction is located at this center, the resultant correction will restore mechanical axis realignment without requiring subsequent translation.
Deformity Planning—Identifying The Plane Of Deformity

A deformity can exist in multiple planes (coronal, sagittal, transverse and oblique). Each plane should be evaluated and characterized pre-operatively. For example, a pure coronal (AP) plane deformity will have no angulation in the sagittal (lateral) plane. Likewise, an oblique plane deformity is defined as having angulation in the true coronal and sagittal planes. This is not representative of a deformity with two angles; rather it is single angular deformity that exists in a plane oblique to the coronal and sagittal planes. Evaluating the angle of this deformity in either the coronal (AP) or sagittal (lateral) plane x-rays will provide false angular measurements. To determine the extent of the deformity, it must be measured in the oblique plane. The preoperative planning process is paramount to the success of the procedure. There are three ways to identify the exact plane of an oblique deformity:

1. Intra-operative rotation of the limb to the maximum point of deformity in a single plane with the aid of an image intensifier,

2. The graphic method (after Herzenberg) and,

3. The trigonometric method (after Green).

The first two will be described. To use the rotational method, the limb is rotated intra-operatively until there is no deformity in one plane with a maximum deformity in the other. This is easily accomplished with an image intensifier. The graphic method requires that the appropriate angles are measured from the lateral and the AP x-rays and plotted on an X and Y-axes graph. Once the angular deformities and AP and Lateral coordinates are plotted on the X and Y-axes, a line is drawn (hypotenuse) connecting the origin of the graph to the point of intersection between the X and Y-axes. The resultant angle of the hypotenuse from the X and Y-axes gives the number of degrees of the oblique deformity from the frontal and sagittal planes. The length of the hypotenuse graph line indicates the true angular measurement.
Deformity Planning—Identifying The Plane Of Deformity (Continued)

The deformity may also have a rotational component. The rotational deformity may be difficult to recognize, as most long bones are round in cross section. CT scans can be useful in assessing rotational deformities.

Alternatively, the bone can be rotated in an image beam until one end (proximal/distal) appears as it should on an AP x-ray. Guide pins are then inserted into the bone to mark the plane in which the deformity is most apparent. The other end of the bone is then rotated in an image beam until it appears as it should on an AP x-ray, once this plane is identified it should then be marked by inserting a guide pin into the plane identified under image intensification.

The difference between the two wires will provide a visual estimation of the rotational deformity. While less accurate than CT imaging, this method is often useful in the operating room. With a unilateral system, it is important to address and correct the rotational deformity prior to application of the rail. In general, for limb lengthenings that do not require any angular correction, bone screws should be placed perpendicular to the normal mechanical axis of the bone and parallel to the floor (assuming normal AP projection prior to pin placement). This will facilitate identification and correction of angular and rotational deformities as well as ensure co-linear bone screw placement and rail application.

Oblique plane deformities can be corrected acutely using the Carbon Rail System. Similar to the correction of rotational deformities, bone screws should be inserted parallel to the oblique plane deformity.

Once the osteotomy is made, the proximal and distal bone screw clamps should be co-linear to allow for attachment of the rail. Inserting bone screws parallel to the oblique plane deformity and perpendicular to the shaft of the bone will facilitate accurate correction of the oblique plane deformities. Moderate adjustments will be tolerated by the use of specialty clamps (shim, angulation and translational clamps are available). Regardless of the method utilized to determine the plane of deformity, it is extremely important to carefully evaluate the anatomic and mechanical axis. Long standing films, scanograms, AP and Lateral x-rays are all useful diagnostic tools in the planning and intraoperative evaluation process.
Planning The Osteotomy Or Corticotomy

It should be noted that the location of the corrective osteotomy must take into consideration

1. Anatomical structures (i.e. open growth plates and soft tissue attachments).

2. Plane and location of the center of the deformity.

In general, the osteotomy should be located at the level of the deformity to prevent any unwanted translational deviation from the mechanical or anatomical axes. Failure to correct the deformity at the anatomic axis will result in a translational defect. Certain deformities and anatomical considerations (deformity in the joint, open physis) preclude placement of the osteotomy at the center of the deformity. In these cases, it is critical that the surgeon understands how the placement of the osteotomy will affect overall alignment. Once the level of the Osteotomy has been determined, the surgeon should evaluate the placement of the fixator in relation to the position of the deformity. This is critical, especially when using gradual correction clamps, as the center of the deformity may not correspond to the pivot or radius of the gradual correction clamps. For this reason, it is recommended that the translation clamp should be used in conjunction with the gradual angular clamps. If translation is part of the deformity correction, the surgeon should preoperatively anticipate the direction of translation. The clamp should then be preset to allow a maximum amount of correction in the desired direction. In this scenario, careful consideration of the amount of length needed on the rail should be included in the planning process.

When using the gradual swivel clamp, it is conceivable that if one splits the angle of deformity in half with the insertion of the bone screws, the frame will allow for automatic translation as the clamp travels the distance around its arc (center of rotation).

This will require careful planning as the position of the clamp on the rail will both shorten and lengthen as the clamp rotates around the arc. Bone screw selection should be evaluated pre-operatively and chosen based on individual patient needs. All bone screws are tapered to provide greater pin to bone interface with each successive turn. However, due to tapered design, the screws must not be backed out or they will lose purchase. Bone screw diameter should never exceed 1/3 the diameter of the bone. A full complement of various diameter and length bone screws are available in stainless steel with and without hydroxyapatite coating. Please refer to the Carbon Rail product catalog for a complete listing.

NOTE: It is important to remember that whenever an adjustment is made to the gradual swivel clamp, that the angle of the clamp must then be locked in place by turning the set screw on the back of the clamp clockwise with a 5mm wrench (P/N 03110). This will ensure that the clamp does not angulate unintentionally while the patient is wearing the frame.
The following tips should be considered when the osteotomy is not made at the level of the deformity:

**Varus To Valgus Corrections Of The Femur**
*(Lateral Bone Screw Placement)*

1. Length should be addressed prior to, or in conjunction with, angulation. Purely angulating the frame first may cause binding of bone and limit subsequent translation.
2. Shortening on the rail will occur during the angulation process.
3. Require translation to provide mechanical realignment.

**Varus To Valgus Corrections Of The Tibia**
*(Medial Bone Screw Placement)*

1. Length should be addressed prior to, or in conjunction with, angulation. Purely angulating the frame first may cause binding of bone and limit subsequent translation.
2. Require additional length on the rail during angulation process.
3. Require translation to provide mechanical realignment.

**Valgus To Varus Corrections Of The Femur Will**

1. Length should be addressed prior to, or in conjunction with, angulation. Purely angulating the frame first may cause binding of bone and limit subsequent translation.
2. Require additional length on the rail during angulation process.
3. Require translation to provide mechanical realignment.

**Valgus To Varus Corrections Of The Tibia Will**

1. Length should be addressed prior to, or in conjunction with, angulation. Purely angulating the frame first may cause binding of bone and limit subsequent translation.
2. Cause shortening on the rail.
3. Require translation to provide mechanical realignment.
Surgical Technique

The following technique will describe the standard application of the Carbon Rail System for a straight lengthening procedure of the femur. Single level lengthening can be achieved using the Carbon Rail System with two bone screw clamps. Precise parallel relationship of the rail to the mechanical axis of the bone should be established prior to insertion of bone screws. This can be accomplished by inserting k-wires into the bone through the designated hole on the bone screw clamps. The mechanical and anatomical axes can be checked intra-operatively using a bovie cord and image intensification. Rail positioning is confirmed and the bone screw positions are marked. The k-wires may then be removed to facilitate freehand placement of the first bone screw.

For lengthening procedures, initial bone screw insertion should alternate between proximal and distal clusters to allow for accurate sagittal alignment of the rail with the axis of lengthening. It is recommended that the first bone screw placed be the one in closest proximity to the joint (when operating on a femur, the distal most bone screw should be placed parallel to the joint, when operating on a tibia the first bone screw placed should be the most proximal bone screw). The second bone screw is recommended to be the furthest away from the first bone screw insertion. This approach will help to ensure that all of the remaining bone screws will be aligned with sufficient bone stock for the remaining screws. Depending on surgeon preference, the proximal or distal bone screw cluster can be inserted first. This decision should be based on:

1. Anatomical considerations.
2. Level of desired osteotomy.

In cases where a deformity exists, it is recommended that the first screw(s) is inserted perpendicular to the segment where the deformity exists and parallel to the adjacent joint A 1cm incision is made and blunt dissection is continued to bone. The trocar and appropriate length soft tissue guide are then utilized to identify the center of the bone and to establish the orientation of the screw tract to be predrilled. Bone screw insertion should be perpendicular to the mechanical axis. Once the screw site is selected, use gentle pressure to maintain contact between the soft tissue guide and the cortex of the bone while extracting the trocar. Insert the appropriate drill guide into the soft tissue guide.

**NOTE:**

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<th>Drill Bit</th>
<th>Bone Screw</th>
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<td>4.8mm</td>
<td>4.8mm</td>
<td>6/5mm Cortical</td>
</tr>
<tr>
<td>3.2mm</td>
<td>3.2mm</td>
<td>6/5mm Cancellous</td>
</tr>
<tr>
<td>3.2mm</td>
<td>3.2mm</td>
<td>4.5/3.5mm Cortical</td>
</tr>
<tr>
<td>2.9mm</td>
<td>2.9mm</td>
<td>3.5/3.2mm Cortical</td>
</tr>
</tbody>
</table>

Bone Screw diameter should not exceed 1/3 the diameter of the bone.
Insert matching drill bit into the drill guide. After bi-cortical penetration of the bone, the drill bit and drill guide are withdrawn. Maintain contact and position of the soft tissue guide to prevent losing the predrilled hole. If the position of the screw hole is lost, a 2.0 k-wire can be inserted in the soft tissues until the hole is located. The soft tissue guide can then be placed over the k-wire and the position re-established.

The appropriate size and length bone screw is inserted through the soft tissue guide. The bone screw T-wrench is used to advance the screw. To obtain optimal purchase, all bone screws must be bi-cortical with no less than 2mm of thread protruding beyond the far cortex and 5mm remaining outside the near cortex. Image intensification is utilized to confirm depth of penetration.

The bone screw wrench is extracted and the frame can now be applied to the patient using the first bone screw in place as a reference point. The appropriate rail size and clamps should be applied to the rail taking into account the desired spacing between the bone screw clamps and the osteotomy.

Care must be taken to avoid over penetration. Due to the tapered design, the bone screws must not be backed out or they will lose purchase.
The clamp covers on the selected rail clamps should be loosened as to allow the soft tissue guide to fit into the bone screw slots. Once the soft tissue guides are in place, the clamp covers should be tightened to prevent the soft tissue guides from falling out of the clamp during the remainder of the procedure. The fixator is now ready to serve as a template assuring the bone screws will be positioned according to the appropriate spacing and angle in relation to one another.

The Carbon Rail System is then connected to the bone screw and soft tissue guide. Soft tissue guides must remain in all bone screw slots where bone screws will be used. Removal of a soft tissue guide before all bone screws are inserted into the bone will alter the predetermined spacing between the bone screws. This will result in the bone screws not fitting properly in the bone screw clamps. Always use soft tissue guides and never remove any prior to completion of inserting all bone screws.

It is important to remember that increased stability of the frame can be achieved through increasing the distance between the bone screws within the same bone screw clamp (i.e. using the #1 and #5 position on the 5-hole bone screw clamp). Using the fixator as a template, the bone screw clamp may be slide along the rail to obtain optimal positioning for bone screw insertion. To maximize stability, the bone screw clamps should be in close proximity to the level of the osteotomy, but never closer than 2-3cm of any bone screw. Stability can also be improved by using three bone screws in each cluster and moving the frame as close to the skin as possible (while still maintaining a safe acceptable distance for bone screw hygiene).
Surgical Technique (Continued)

The soft tissue guide and drill guide can be locked into the most distal seat of the second bone screw clamp. This will ensure proper positioning of the rail in the medial/lateral plane as it relates to the axis of lengthening. Failure to do so will predetermine the position of the rail and may affect the relationship of the rail to the desired lengthening access.

Drilling and bone screw insertion can proceed in the same manner as performed for the first bone screw, making sure bi-cortical penetration is achieved. Once appropriate alignment is secured, subsequent bone screws are inserted into both proximal and distal bone screws clamps. After all bone screws have been inserted, the soft tissue guides should be removed from the bone screw clamps and definitively tightened to the bone screws.

After all bone screws are inserted, soft tissue guides are removed and clamp cover bolts are definitively tightened allowing 2-3cm between the skin and the fixator for subsequent bone screw hygiene.

Regardless of rail size, or the number of clamps in a given construct, it is paramount that bone screws are inserted in alternating sequence, one bone screw at a time and alternating between proximal and distal bone screw clamps.
Once the bone screws have been inserted and the frame has been assembled, the corticotomy incision is made. Dissection is continued to the level of the periosteum. The periosteum is then incised and reflected circumferentially, subperiosteally, away from the bone. Using a 3.2mm or smaller drill bit, multiple bicortical drill holes are placed transversely, parallel to the joint space at the desired level of bone separation. A small chisel or straight osteotome and mallet are used to connect the drill holes and complete the corticotomy. Care is taken to avoid damaging neurovascular structures as well as breaking off any small fragments of bone.

The compression/distraction unit is then attached to the bone screw clamps using the 5mm wrench. With one clamp definitively locked to the rail and the lengthening clamp loose, the frame is distracted to ensure completeness of the corticotomy. Completeness should also be verified fluoroscopically. Plane radiographs in the OR can be taken in order to ensure that the mechanical axis of the bone and fixator are parallel.
Application Of The Rail Dynamization Component

1. Rail Dynamization Component

The rail dynamization component comes in two pieces, a rail locking bolt (identical to the rail locking bolt used for the rail pin clamps), and the dynamization component. The dynamization component is straight on one side and semicircular on the remaining three sides. The straight side has a raised 2mm lip which allows for the 2mm of dynamization the device will provide to the rail fixator. The straight side of the dynamization component is intended to sit flush against the bone screw clamp. The underside of the dynamization component is raised to serve as a key for the beam slot of the rail.

2. Design

The rail dynamization component has been designed to allow up to 2mm of micro-motion in the axial plane. For the dynamization component to allow for a full 2mm of dynamization 60lbs (35lbs for the small) of weight bearing pressure is required. Due to its design the component can be placed on the rail at any given point. Before the dynamization component can be applied to the rail, the locking bolt must be removed from the dynamization component by turning it counterclockwise.

These components are NOT interchangeable. The adult rail dynamization component can NOT be used for the small rail, and the small rail dynamization component can NOT be used to dynamize the adult rail.
3. Placement

The dynamization component is placed on the rail above the loaded pin clamp assembly. In the illustrated case, the distal bone screw clamp will be loaded. The lip on the straight side of the dynamization component must be flush against the proximal end of the distal pin clamp.

RULE #1

The determining factor in the placement of any dynamization component is prevention of undesired shortening or collapse of regenerate bone. As a result, we recommend that the dynamization component must be placed on the side where shortening could potentially take place. When attempting to dynamize a bifocal configuration, segmental, or any other complex rail configuration you must apply the principles of rule #1 stated in the first line of this paragraph.

RULE #2

Any space between the dynamization component and the pin clamp must be removed to prevent instability of the fracture site. The rail dynamization component is positioned on the frame with its key recessed into the center beam of the rail (Figure A). This will allow the dynamization component to sit flush against the rail.

Correct placement of dynamization unit to prevent potential shortening or collapse
Surgical Technique (Continued)

4. Securing The Dynamization Component

Upon reaching satisfactory placement, take the locking bolt which was removed in step two and install it into the dynamization component from the opposite side of the rail. This is synonymous with the method used to secure any other clamp body to the rail. Before tightening the locking bolt, check to make sure that the 2mm lip is flush against the appropriate side of the bone screw clamp.

5. Final Step In Application

After the dynamization component is locked in place, loosen the rail locking bolt on the distal pin clamp (see note). This will result in the pin clamp directly resting on the dynamization component. Upon loosening the locking bolt the pin clamp should not move at all until axial load is applied.

**Suggestion:** 1) Tape can be applied to the bone screw clamp to prevent the locking screw from dislodging. 2) The locking screw can be removed all together and stored in a safe location in case it is needed for future use.
6. Location

Location of the dynamization component (in the referenced example) is the same regardless of whether it is the small or adult rail system.

Please note that this application guide for the Biomet rail dynamization component is based on the following criteria:

- Standard Lengthening Construct (One Rail, Two Bone Screw Clamps)
- The rail compression/distraction module has been removed
**Post-Operative Care**

The fixator and coricotomy should be compressed for a latency period of 7-10 days. Once the inflammatory process of bone healing has subsided, the lengthening process can be addressed on a daily basis. In order to employ the gradual lengthening feature of the device, the frame should be distracted at a rate of four 1/4 turns per day (totaling 1mm per day). This is achieved by loosening the fixator clamp locking bolt on the lengthening clamp, while maintaining a definitive and locked position on the opposite clamp. The compression/distraction clicker features a measured stop at each 1/4 turn to ensure precise distraction adjustments. Depending on patient age and quality of regenerate bone, distraction can be adjusted (increased or decreased) to accommodate patient needs.

Typically the lengthening process proceeds at 1mm of length per day. In conservative estimates, it usually takes three times as long for the bone to consolidate as it does to distract. For example, if 5cm of distraction is the surgical goal, the approximate length of fixator duration should take:

1. 7-10 days for latency period.
2. 50 days for distraction.
3. Roughly 150 days for consolidation: totaling approximately 210 days. Patients should be monitored routinely to evaluate the lengthening process, regenerate bone formation, and pin site hygiene.

Once length has been established, it is recommend that a dynamization unit is inserted in the rail construct. This component is placed proximal to the lengthening clamp to allow for elasticity and controlled micromotion of the clamp. Dynamization should lead to increased rates of consolidation.

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**Suggested Bone Screw Care**

Dry sterile gauze is wrapped around the shanks of the bone screws to prevent pistoning of the soft tissues on the bone screws. A solution of 2% hydrogen peroxide and sterile water should be used on the pin sites until the wounds have healed and sutures are removed. The patients are then instructed to shower on a daily basis using an antibacterial soap and water as a means for routine bone screw hygiene. Screw sites should be monitored during subsequent clinic visits. All fixator fittings should be evaluated for tightness during subsequent clinic visits. Antero-posterior and lateral x-rays with the knee extended and the patella forward should be obtained weekly during the correction to assure patient compliance and proper usage of the distraction device.
Sterilization Recommendations

STERILIZATION
The Biomet Rail Systems is provided non-sterile and must be sterilized prior to use. All packaging materials must be removed prior to sterilization. All fixator components should be sterilized in a loosened state such that components may move freely.

The following steam sterilization parameters are recommended:

- Cycle: Vacuum Steam
- Temperature: 270°F (132°C)
- Time: 8 minutes
- Note: Allow for cooling

Repeated sterilization of carbon fiber reinforced epoxy is not recommended.

Individuals or hospitals not using the recommended method, temperature, and time are advised to validate any alternative method or cycle using an approved method or standard.

WARNINGS
This device is not approved for screw attachment or fixation to the posterior elements (pedicles) of the cervical, thoracic, or lumbar spine.

Patient smoking may result in delayed healing, non-healing and/or compromised stability in or around the placement site.

CAUTION: Federal Law (USA) restricts this device to sale by or on the order of a physician.

WARNING: This device is not approved for screw attachment or fixation to the posterior elements (pedicles) of the cervical, thoracic, or lumbar spine.

Biomet, as the manufacturer of this device, and their surgical consultants do not recommend this or any other surgical technique for use on a specific patient. The surgeon who performs any implant procedure is responsible for determining and utilizing the appropriate techniques for implanting the device in each individual patient. Biomet and their surgical consultants are not responsible for selection of the appropriate surgical technique to be utilized for an individual patient.
System Modularity

Providing Maximum Flexibility And Component Modularity In The Treatment Of Limb Lengthening, Angular Deformity And Bone Transport

(1) Adult MAC and Adult Carbon Rail combine enhanced lengthening capabilities with gradual or acute angulation translation and rotation in two planes simultaneously.

(2) Carbon Arc Clamp and Adult Carbon Rail construct offers flexible bone screw placement in the proximal femur.

(3) Hybrid Ring and Adult Carbon Rail applied to the distal tibia.

(4) Anterior Angular Hinge Clamp with Adult Carbon Rail System combines gradual angular correction with limb lengthening.

(5) Adult Carbon Rail — Bi-focal lengthening.
Further Information

Biomet Trauma, as the manufacturer of this device, does not practice medicine and does not recommend this product or any specific surgical technique for use on any individual patient. The surgeon who performs any implant procedure is responsible for determining the appropriate product(s) and utilizing the appropriate technique(s) for said implantation in each individual patient.

For further information, please contact the Customer Service Department at:

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