Hoffmann Xpress
External Fixation System

Operative Technique

- MR Conditional up to 3 Tesla
- Modular single use system for
  - Long Bones
  - Pelvis
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In 1938, Raoul Hoffmann, a surgeon from Geneva, Switzerland, designed a revolutionary External Fixation system. The basic features of this system were its modular design and the ability to reduce fractures or to make post operative corrections to the alignment of fragments in three planes with the frame in situ.

The Hoffmann II has built upon these principles, and today is a gold standard in modular external fixation. Certainly, the Hoffmann II family of products is unique in its ease-of-use, versatility and patient comfort.

Stryker continues 60 years of innovation in external fixation by introducing a completely new system specifically designed for the use of Damage Control Orthopedics.

Hoffmann Xpress has as good biomechanical performance as the existing Hoffmann products.

Hoffmann Xpress is a single-use medical device. 100% traceability is guaranteed thanks to its unique one-use indicator.

Hoffmann Xpress gives you an optimized view of fracture site due to radiolucent components.

Hoffmann Xpress is MR Conditional up to 3 Tesla. Since the components are non-magnetic and non-conductive, the magnetic fields in the MRI environment will not cause a frame displacement and no conductive heating that can pose a risk to the patient or scanner.

All components are sterile packed. Whatever the circumstances are, Hoffmann Xpress offers a fast and safe solution.

The Hoffmann Xpress device has a reduced number of components.

The Universal Couplings can be used as both a Pin to Tube or a Tube to Tube Coupling.

The Pin Clamps with springs are selfholding and make the mounting faster and easier.

Of course, the outstanding performance of the original Hoffmann II has been retained in the Hoffmann Xpress:

- Patented* snap fit connections allow rapid frame construction. Also, additional Clamps can be added at any time.
- Single point of tightening for rapid and easy frame construction.
- Independent, multiplanar Pin placement allows flexibility.
- Lightweight Clamps for lower profile frames, better visualization and access to the fracture site, as well as increased patient comfort.

*Patented in EU and USA, additional patents pending.
Introduction

You will find in the following pages common frame building techniques for the Hoffmann Xpress System.

1. Universal Coupling, Ø15 - 4/5mm
2. Universal Coupling, Ø15 - 5/6mm
3. Multi Pin Clamp 1 Post
4. Multi Pin Clamp 2 Posts
5. Aluminium Connecting Tubes
6. Semi Circular Aluminium Connecting Tube
7. Apex Pin
Relative Indications

Due to its versatility, the Hoffmann Xpress System is indicated for complete and temporary fracture fixation for lower Extremities and Pelvis fractures. It is particularly suited for the following indications:

- Bone fracture fixation
- Osteotomy
- Arthrodesis
- Correction of deformity
- Revision procedures where other treatments or devices have been unsuccessful
- Bone reconstruction procedures

Relative Contraindications

Since external devices are often used in emergency situations to treat patients with acute injuries, there are no absolute contraindications for use. The surgeon’s education, training and professional judgment must be relied upon to choose the most appropriate device and treatment for each individual patient. Whenever possible, the device chosen should be of a type indicated for the fracture being treated and/or for the procedure being utilized.

Caution:

Pins referred to in this Operative Technique are not indicated for Pin attachment or fixation to the posterior elements (pedicles) of the cervical, thoracic or lumbar spine.

This publication sets forth detailed recommended procedures for using Stryker Trauma devices and instruments.

It offers guidance that you should heed, but, as with any such technical guide, each surgeon must consider the particular needs of each patient and make appropriate adjustments when and as required. A workshop training is required prior to first surgery.
Rationale, Features and Benefits

**General:**

All components are single packed sterile in double plastic peel pouches. Instrument equipment is similar to Hoffmann II but with a size of 8mm screw heads.

A Torque Wrench is needed to tighten the screws. Pin placement is identical to Hoffmann II. The System is MR Conditional up to 3.0 Tesla in all possible frame configuration’s if used with Stryker Apex Pins.

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**Pin Clamp with integrated Post with new snap fit function:**

- Reinforced Nylon
- X-Ray transparency 60%
- MR conditional up to 3 Tesla

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**8mm screw head:**

- Austenitic steel
- Non-magnetic
- MR conditional up to 3 Tesla

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**Pin:**

- Stainless Steel
- Titanium available in 5mm
- Not X-Ray transparent but not located at fracture site
- MR conditional up to 3 Tesla

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**Coupling with snap fit function:**

- Reinforced Nylon
- X-Ray transparency 60%
- MR conditional up to 3 Tesla

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**Tube Ø15mm:**

- High performance Aluminium
- X-Ray transparency 85%
- Coloured anodization
- Non-magnetic
- MR conditional up to 3 Tesla
The system includes two types of Pin Clamps and one Universal Coupling. The Pin Clamps are available with one or two Posts. The Universal Couplings can be used as both a Pin to Tube or a Tube to Tube Coupling. See detailed functionality of the components on page 12. All components are MR conditional up to 3 Tesla.

**5 Hole Pin Clamp 1 Post**
**REF 4980-2-010S**
- Integrated Sterilization Indicator (to avoid re-use after re-sterilization)
- Pin Clamp Springs with snap-fit function for easy handling

**5 Hole Pin Clamp 2 Post**
**REF 4980-2-020S**
- Integrated Sterilization Indicator (to avoid re-use after re-sterilization)
- Pin Clamp Springs with snap-fit function for easy handling

**Universal Coupling**
**REF 4980-1-010S**
**REF 4980-1-020S**
- Integrated Sterilization Indicator (to avoid re-use after re-sterilization)
- Removable/reversible Pin Insert 4/5mm

**Note:**
The Universal Coupling (REF 4980-1-010S) is premounted with a Pin Insert (white) for 4 and 5mm Apex Pins. The Universal Coupling (REF 4980-1-020S) is premounted with a Pin Insert (blue) for 5 and 6mm Apex Pins.
Components

Aluminium Tubes
REF 4980-3-XXXS – Please see page 39 for detailed ordering information.

- Sizes: 150, 210, 260, 330, 440
- Ø15mm
- 85% radiolucent
- MR conditional up to 3 Tesla

Semi-Circular Curved Tube
REF 4980-3-020S

- 85% radiolucent
Instruments

The Hoffmann Xpress System has a similar instrumentation as the Hoffmann II and Apex System. Some instruments from these systems can be used for Hoffmann Xpress as well.

3 additional instruments are necessary to tighten the 8mm screws (see next page).

Existing Instruments:

Drill Brace Assembly
REF 5057-0-300

The Drill Brace Assembly is designed for manual Pin Insertion for better control and reduced insertion temperature.

It provides integrated attachments for 3 & 4 mm and 5 & 6mm Pins. Simply by changing the Drill Handle from one end to the other you gain access to the different attachments.

Drill Guide Block
REF 5057-1-115

Drill Guide Handle
REF 5057-1-110

The Drill Guide Block is designed for simplified parallel Pin Insertion. The Drill Guide Block provides the correct distance for the Pin clamps.

The Drill Guide Block offers the possibility for perpendicular and horizontal attachment to the Drill Guide Handle, which allows adaptation to the anatomical requirements.

Pre-Drilling Assembly
REF 5057-X-XXX – Please see page 43 for detailed ordering information.
Dedicated Hoffmann Xpress Instruments:

- **Thumbwheel 8mm**
  - REF 4980-9-020

- **Spanner Wrench 8mm**
  - REF 4980-9-036

- **Torque Wrench 8mm/11Nm**
  - REF 4980-9-010

- **Thumbwheel 8mm**
  - REF 4980-9-020
Technical Details

Instructions for Use

Drill Brace Assembly
REF 5057-0-300

The Drill Brace Assembly provides attachments for 3 & 4mm Pins on one end and 5 & 6mm on the other end. For Pin insertion, place the Pin into the end correlating to the chosen Pin diameter.

To access the different attachments for the Pins remove the handle and assemble it on the other end.

Drill Guide Block
REF 5057-0-115

Drill Guide Handle
REF 5057-0-110

To assemble the Drill Guide Block, set the Drill Guide Block horizontal or perpendicular and push it onto the Drill Guide Handle. To release the block, push the button on the handle and pull it off.

Caution:
Never use Hoffmann Xpress components as a drill guide!
Technical Details

Torque Wrench 8mm/11Nm
REF 4980-9-010

The Torque Wrench is a maintenance free instrument which indicates the applied torque.

There is NO click release torque indication. The instrument works with a torsion indication.

11Nm is reached when line A and B are aligned (see picture below).

Spanner Wrench can be used to facilitate the Torque Wrench

It is recommended to use Thumbwheel 8mm (4980-9-020) or Spanner Wrench (4980-9-036) for pre tightening.

When tightening the Clamps and Couplings, it is important to apply sufficient torque to fully tighten the frame.

The Hoffmann Xpress System has a 8mm Torque Wrench (4980-9-010) with an indicator that shows when you have reached the sufficient tightening of 11Nm.

Note:
Always check carefully if 11Nm are reached on each connection

11Nm is reached when lines A and B meet
Features and Benefits

**Single Use Symbol**

**Caution:**
All components of Hoffmann Xpress are dedicated for single use. Do not wash or re-sterilize components. The components lose functionality if re-sterilized.

**Pin Clamp “Snap-Fit”**

The Pin Clamp can easily be put on the frame by pressing the Pin Clamp springs to open the mechanism and sliding over the Apex Pins.

**Coupling “Snap-Fit”**

The Universal Couplings are designed with the “Snap-Fit” mechanism which allows complete versatility of the frame.

**360° movement**

It is possible to rotate either side of the Universal Coupling 360° independently.

**Removable Pin Insert**

The Universal Coupling comes with a premounted removable Pin Insert Ø4/5mm (white) or Ø5/6mm (blue) (Pin to Tube Coupling). The Pin Insert can easily be removed and the Coupling can then be used as a Tube to Tube Coupling. The Pin Insert can be switched from one side to another.

**Pin “Snap-Fit”**

Insert the Apex Pin into the white Pin Insert as shown in the picture. Do not push the thread of the Apex Pin through the Pin Insert.
Frame Building Guidelines

The guidelines given here will help you to build frames which have been proven to provide stability for sustained fracture reduction and elasticity for dynamic osteosynthesis. By using these simple biomechanical principles, you can build a frame suited to the indication at hand.

Pin Clamps are designed to build a variety of frames. When using 2 Half-Pins within a Clamp, use the hole positions furthest apart (1 and 5) if the anatomy and soft tissues allow. This Pin position is the most stable Pin to Clamp construct.

Pin Clamps and Couplings should be placed approximately 2 to 3 centimeters (2 fingers) away from the soft tissue to allow for Post-operative swelling and proper pin-site care.
Step by Step

Pin Insertion Guidelines

Four types of Half-Pins are compatible with the system: Blunt/Self-Tapping Half-Pins (Ø4 and Ø5mm), Blunt/Cancellous Half-Pins (Ø6mm), Self Drilling/Self Tapping Half-Pins (Ø4 and Ø5mm) and Self Drilling Transfixing Pins (Ø5mm).

Pre-drilling is necessary when using Blunt Pins. It is optional to pre-drill when using Apex Self-Drilling Pins.

- Use a Ø3.2mm Drill to pre-drill a Ø4mm Pin
- Use a Ø4.0mm Drill to pre-drill a Ø5mm Pin
- Use a Ø4.5mm Drill to pre-drill a Ø6mm Pin or a Cancellous Half-Pin

For the Hoffmann Xpress System Self Drilling Apex Pins are recommended.

It is important to have a stable Pin to bone interface. To ensure this, make sure to obtain bi-cortical purchase with the Pin.

Caution:
Never use Hoffmann Xpress components as a drill guide!
When using a Self Drilling/Self Tapping Pin, turn the Drill Brace two times counter-clockwise to create a small notch for the Pin. This helps to prevent the Pin from slipping on the cortex.

Afterwards, turn the Drill Brace clockwise for Pin insertion.

To have a stable Pin to bone interface, ensure always to obtain a bi-cortical purchase with the Pin.

The maximum Pin diameter should not exceed 30% of the diameter of the bone. For example: bone diameter 18mm = maximum Pin diameter 6mm.

The Pin diameter influences the axial frame rigidity. A 1mm increase in Pin diameter will approximately double its stiffness and thereby increase the frame rigidity.

The number of Pins used in a frame construct depend on the patients condition and the indication. By increasing the number of Pins the frame rigidity increases.

The maximum Pin diameter should not exceed 30% of the diameter of the bone. For example: bone diameter 18mm = maximum Pin diameter 6mm.

The Pin diameter influences the axial frame rigidity. A 1mm increase in Pin diameter will approximately double its stiffness and thereby increase the frame rigidity.

The number of Pins used in a frame construct depend on the patients condition and the indication. By increasing the number of Pins the frame rigidity increases.

When using a Self Drilling/Self Tapping Pin, turn the Drill Brace two times counter-clockwise to create a small notch for the Pin. This helps to prevent the Pin from slipping on the cortex.

Afterwards, turn the Drill Brace clockwise for Pin insertion.

To have a stable Pin to bone interface, ensure always to obtain a bi-cortical purchase with the Pin.
Step by Step

When inserting the Pin by power, make sure to use a low speed to avoid significant temperature increase which can cause bone necrosis.

Insert the Pins 90° to the long axis of the bone to reduce pull in and push out forces on the Pins.

Caution: Surgeons must always rely on their own clinical judgement when deciding which treatment and product to use with their patients.
Operative Technique

Due to the high versatility of the Hoffmann Xpress System, an unlimited number of frame configurations can be constructed, thus providing surgeons the ease of use to treat a variety of indications.

This Technical Guide provides step by step surgical techniques for six standard frame assemblies. These assemblies can then be adapted to other indications.

Frame Overview

Tibial Shaft Frame with 2 Tubes (See page 19)

Tibial Shaft Frame with 1 Tube (See page 19)

Proximal Tibia Frame 2 or 3 Tubes with Curved Tube (See page 22)

Ankle Frame (See page 27)

Pelvic Frame (See page 31)

Knee Bridging Frame (See page 35)
Operative Technique

Tibial Shaft Frames

Tibia Shaft Frame with 2 Tubes

Components needed:
- 4x Universal Couplings (4980–1–010S)
- 2x Pin Clamps – 2 Posts (4980–2–020S)
- 2x Aluminium Tubes
  (4980–3–XXXS, see page 39)
- 4x Apex Pins
  (50XX–X–XXX, see page 41-42)

Tibia Shaft Frame with 1 Tube

Components needed:
- 2x Universal Couplings (4980–1–010S)
- 2x Pin Clamps – 1 Post (4980–2–010S)
- 1x Aluminium Tube
  (4980–3–XXX, see page 39)
- 4x Apex Pins
  (50XX–X–XXX, see page 41-42)

Note:
To build a Tibia Frame with 1 Tube repeat steps 1 and 2 explained on page 20. In step 3, use the 5-Hole Pin Clamps with 1 Post. In step 4 connect 2 Universal Couplings to the Posts and a Ø15mm Connecting Tube on the medial side of the tibia and continue like described on page 21.
Operative Technique

**Tibia Shaft Frame**

**Half-Pin Insertion Guidelines**

The safe zone of the tibia shaft is the medial side. For maximum bi-cortical bone purchase and patient comfort, it is suggested to insert Pins 15° to 20° anterior to the coronal plane.

---

**Step 1**

The surgical technique utilizes a limited open approach for Half-Pin insertion. Make an incision at least 2cm proximal to the fracture site. Using the Drill Brace Assembly together with Pre-Drilling Assemblies attached to the Drill Guide Handle, manually insert the first Half-Pin, making sure to obtain bi-cortical purchase.

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**Step 2**

Insert a second Half-Pin parallel to the first Half-Pin so that it will correspond to one of the holes in the Clamp, using the Drill Brace Assembly together with Pre-Drilling Assemblies attached to the Drill Guide Block.
Operative Technique

**Tibia Shaft Frame**

**Step 3**
Position the 5-Hole Pin Clamps with 2 Posts approximately 2 to 3 cm (2 fingers) away from the skin. Pre-tighten the screws in the Pin Clamps with the Spanner Wrench or the Thumbwheel.

**Step 4**
Repeat Steps 1, 2 and 3 for the distal Half-Pin groups making an incision at least 2 cm distal to the fracture site.

**Caution:**
Pin Clamps have to be tightened with 11 Nm before Couplings are mounted.

**Note:**
The Universal Coupling is premounted with a Pin Insert (see page 13, “Features and Benefits”). Remove the Pin Insert to make the Coupling a “Tube to Tube” Coupling.

**Step 5**
Release the Pin Inserts from the Universal Couplings. Connect four Universal Couplings to the Posts and attach Ø15 mm Connecting Tubes aligning the long axis of the tibia. This will connect the two Pin Clamps together.

Unrestricted multi-planar motion of the components allows for the manipulation of the fracture fragments with the fixator in place.

Perform your fracture reduction and pre-tighten the Couplings with the Spanner Wrench or Thumbwheel.

Finally, tighten the screws on the Couplings with the 11 Nm Torque Wrench as shown on the instructions (page 12).
Operative Technique

**Proximal Tibia Frame with Curved Tube and 2 Tubes**

Components needed:
- 7x Universal Couplings (4980–1–010S)
- 1x Pin Clamp – 2 Posts (4980–2–020S)
- 1x Curved Tube (4980–3–020S)
- 2x Aluminium Tubes
  (4980–3–XXX, see page 38)
- 5x Apex Pins
  (50XX–X–XXX, see page 40-41)

**Proximal Tibia Frame with Curved Tube and 3 Tubes**

Components needed:
- 9x Universal Couplings (4980–1–010S)
- 1x Pin Clamp – 2 Posts (4980–2–020S)
- 1x Curved Tube (4980–3–020S)
- 3x Aluminium Tubes
  (4980–3–XXX, see page 38)
- 5x Apex Pins
  (50XX–X–XXX, see page 40 - 41)
Operative Technique

Proximal Tibia Frame 2/3 Rods

Half-Pin Insertion Guidelines

For this frame, 3 Half-Pins are inserted into the metaphyseal region of the proximal tibia at least 1.5 centimeters distal to the plateau under x-ray control. Also, 2 Half-Pins are inserted anterio-medially in the shaft of the tibia, approximately 90° to the long axis of the bone. The safe zones are illustrated here.

Step 1
Using soft-tissue protection, manually insert the medial and lateral Half-Pins in the metaphyseal region of the tibia. Ensure that the Half-Pins do not compromise the joint capsule.

Step 2
Connect a Universal Coupling to each Half-Pins, and connect the Universal Couplings to the Curved Tube and pre tighten them with Thumbwheel or Spanner Wrench.
Operative Technique

**Proximal Tibia Frame with Curved Tube and 2/3 Tubes**

**Step 3**
Attach a Universal Coupling to the anterio-medial aspect of the Curved Tube. Use this Coupling as a guide for placing the anterio-medial Half-Pin.

Click the soft tissue protector into the Universal Coupling to insert Half-Pin and pre-tighten screw with Thumbwheel or Spanner Wrench in order to secure the Curved Tube to the Half-Pins.

**Step 4**
Place the third Pin by using the soft tissue protector and pre-tighten with Thumbwheel or Spanner Wrench.

**Step 5**
Tighten the screws with the Torque Wrench until you reach 11Nm which is indicated on the Wrench (see instructions on page 12).
Operative Technique

Proximal Tibia Frame with Curved Tube and 2/3 Tubes

Step 6
Place a 5 Pin Clamp 2 Posts at least 2cm distal to the fracture side as shown and pre-tighten with Thumbwheel or Spanner Wrench.

Step 7
Tighten the screws on the Pin Clamps with the Torque Wrench until you reach 11Nm which is indicated on the Wrench (see instructions on page 12).

Step 8
Connect the two constructs using 2 or 3 Connecting Tubes and 4 or 6 Universal Couplings in the adequate configuration (“Tube to Tube” or “Pin to Tube”). The third Tube in the middle of the frame can be connected to the curved Tube construct or as “Tube to Tube” or “Pin to Tube”.

Unrestricted multiplanar motion of the components allows for the manipulation of the fracture fragments with the fixator in place.

Perform your fracture reduction and pre-tighten with Thumbwheel or Spanner Wrench.
Operative Technique

Proximal Tibia Frame with Curved Tube and 2 Tubes

Step 9a
After final reduction and satisfactory alignment has been restored ensure that all screws are securely tightened. Tighten the screws with the Torque Wrench until you reach 11Nm which is indicated on the Wrench (see instructions on page 12).

For proper alignment, check the final reduction with X-Ray.

Proximal Tibia Frame with Curved Tube and 3 Tubes

Step 9b
After final reduction and satisfactory alignment has been restored ensure that all screws are securely tightened. Tighten the screws with the Torque Wrench until you reach 11Nm which is indicated on the Wrench (see instructions on page 12).

For proper alignment, check the final reduction with X-Ray.

Note:
For the central Tube it is also possible to use 2 Universal Couplings in a “Pin to Tube” configuration to fix the Tube on the Pins.
Ankle Frame

Components needed:
2x Pin Clamp 1 Post (4980-2-010S)
1x Pin Clamp 2 Posts (4980-2-020S)
4x Universal Couplings (4980-1-010S)
2x Aluminium Tubes
(4980-3-XXX, see page 39)
2x Transfixing Pins
(5030-X-XXX, see page 42)
2x Apex Pins
(50XX-X-XXX, see page 41)
Operative Technique

Ankle Frame

The ankle frame has Pins that traverse the calcaneus, protruding medially and laterally. These Pins then connect to the Pins in the tibia to make a triangle.

Pin Insertion guidelines

The safe zone for the tibia and calcaneus is on the medial side. Take care not to damage soft tissue, particularly the posterior tibial artery or tibial nerve.

Step 1

Use soft-tissue protection, and then insert two parallel Transfixing Pins into the calcaneal tuberosity.

Note:

Insert the Transfixing Pins in the Clamp-hole position 1 and 5 if the anatomy permits, since it will give the largest Pin spread in the 5 Pin Clamp with 1 Post providing maximum stability. Holes 3 or 4 are also suitable if the anatomy does not allow a hole-5 Pin placement.

Step 2

Insert two Half-Pins into the diaphysis of the tibia. Insert the Pins medio-anteriorly, approximately 15 to 20 degrees anterior to the coronal plane.
**Operative Technique**

**Ankle Delta Frame**

**Step 3**
Position two 5-Hole Pin Clamps with 1 Post on each side of the calcaneus and one 5-Hole Pin Clamp with 2 Posts in the tibia. The Clamps should be positioned approximately 2 to 3 centimetres away from the skin. Do final tightening on all Pin Clamps with the 11Nm Torque Wrench.

**Step 4**
Attach four Universal Couplings without the pre-mounted inserts to each of the four Posts. Then finally mount two Connecting Tubes to the Universal Couplings. Do final tightening on all Couplings with the 11Nm Torque Wrench.
Alternative Ankle Frame

The construct shown here is an alternative ankle bridging frame. Two 5mm Half-Pins are placed in the tibia, one 5mm Half-Pin is placed in the calcaneus, and one 4mm Half-Pin is placed in the 1st metatarsal.
Pelvic Frame

Components needed:
9x Universal Couplings (4980–1–010S)
5x Aluminium Tubes
(4980–3–XXXS, see page 39)
4x Apex Pins
(50XX–X–XXX , see page 41-42)

This frame is recommended to be built with Universal Couplings only as an emergency frame which can be mounted quickly.
Operative Technique

Pelvic Frame

Half-Pin Insertion Guidelines

Two Pin placement options are illustrated in picture A and B. Our technique will describe option B in detail.

Picture A illustrates two Half-Pins placed in each iliac crest. The first half Pin should be positioned 2.5cm posterior to the anterior superior iliac spine. The second Half-Pin should be inserted following the natural midline of the iliac crest with a distance of 3-4cm from the first Pin. Take care to insert the Pin between the cortices of the iliac crest. Pin placement should be checked radiographically.

Picture B illustrates one Half-Pin placed in each iliac crest and one Half-Pin placed in each anterior superior iliac spine. The first Half-Pin in the iliac crest should be positioned 2.5cm posterior to the anterior superior iliac spine. The second Half-Pin should be inserted in the area of the anterior superior iliac spine.

Step 1

Make a 1-2cm incision for each Pin over the iliac crest toward the umbilicus. Blunt dissect to the bone after cutting through the skin.

Using soft-tissue protection, manually insert a Half-Pin between the inner and outer tables of the iliac crest toward the acetabulum.

After initial penetration of the cortex, continue inserting the Half-Pin while taking care not to penetrate the inner or outer tables.

When using Blunt Pins, the outer cortex of the iliac crest must be predrilled.
Pelvic Frame

Step 2
Place the second Pin Half-Pin in the area of the anterior superior iliac spine in the same manner and check to ensure that it has adequate purchase. Repeat step 1 and 2 for the opposite side of the pelvis.

Step 3
Place a Universal Coupling over each of the Half-Pins on each side of the pelvis two to three finger-breadths away from the skin. Connect a Tube in a “Tube to Pin” configuration on each side of the pelvis as illustrated in the picture.

Pre-tighten the screws in the Universal Couplings with the Spanner Wrench or the Thumbwheel.

Finally tighten the screws of the Universal Couplings with the Torque Wrench to 11Nm.

Note:
The Universal Coupling is premounted with a Pin Insert (see page 13). Remove the Pin-Insert to make the Coupling a “Tube to Tube” Coupling.

Step 4
Add a Universal Coupling to each of the two horizontal Tubes attached in Step 3, then connect two Tubes vertically to the horizontal Tubes on each side of the pelvis. Add a Tube in a horizontal mode between the two vertical Tubes. Finally connect the two vertical Tubes together in an ‘A’ construct as illustrated in the picture.

Step 5
Pre-tighten all the Universal Couplings with the Spanner Wrench or the Thumbwheel and fix them definitively with 11Nm by using the Torque Wrench.
Operative Technique

Pelvic Frame

Step 6
Perform your fracture adjustment and pretighten the four remaining Universal Couplings with the Spanner Wrench or the Thumbwheel.

Step 7
While holding the reduced pelvis, properly adjust and stabilize the frame and fully tighten all screws on the Universal Couplings using the 11Nm Torque Wrench.
To verify alignment, obtain an AP X-Ray of the pelvis.
The Frame is complete.

Note:
Tighten the screws of the Universal Couplings with the Torque Wrench until you reach 11Nm which is indicated on the Wrench (see instructions on page 12).
Knee Bridging Frame

Components needed:
6x Universal Couplings (4980–1–010S)
2x Pin Clamps - 2 Posts (4980-2-020S)
4x Aluminium Tubes
(4980–3–XXXS, see page 39)
4x Apex Pins
(50XX–X–XXX, see page 41-42)

Note:
If the frame is not stable enough it is also possible to add an additional Tube across the knee with two additional “Tube to Tube“ Couplings.
Operative Technique

Knee Bridging Frame

Half-Pin Insertion Guidelines

The safe zone of the tibia shaft is on the medial side. The safe zone of the femur shaft is on the lateral side. For maximum bi-cortical bone purchase and patient comfort, it is suggested to insert Pins 15 to 20 degrees anterior to the coronal plane.

Step 1
The surgical technique utilizes a limited open approach for Half-Pins insertion. Make an incision at least 2cm proximal to the fracture site. Using the Drill Brace Assembly together with Pre-Drilling Assemblies attached to the Drill Guide Block, manually insert the first Half-Pin, making sure to obtain bi-cortical purchase.

Step 2
Insert a second Half-Pin parallel to the first Half-Pin so that it will correspond to one of the holes in the Clamp, using the Drill Brace Assembly together with Pre-Drilling Assemblies attached to the Drill Guide Block.
Operative Technique

Knee Bridging Frame

Step 3
Repeat step 1 and 2 for the femur in order to bridge the knee.

Step 4
Position the 5-Hole Pin Clamps with 2 Posts approximately 2 to 3.0cm away from the skin.
Pre-tighten the screws in the Pin Clamps with the Spanner Wrench or the Thumbwheel.

Step 5
Do final tightening on both Pin Clamps with the 11Nm Torque Wrench.
Operative Technique

Knee Bridging Frame

Step 6
Connect four Universal Couplings to the Posts on the Pin Clamps using the “Tube to Tube” configuration by removing the Pin Inserts from the Universal Couplings. Connect four Tubes to the Universal Couplings and span them over the knee as illustrated in the picture. Perform your fracture reduction with a knee angle of about 10° and pre-tighten the Universal Couplings with the Spanner Wrench or the Thumbwheel.

Step 7
Do final tightening on all Universal Couplings using the 11Nm Torque Wrench.
# Ordering Information – Components

<table>
<thead>
<tr>
<th>Ref</th>
<th>Description</th>
<th>Length mm</th>
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<tbody>
<tr>
<td>4980-1-010S</td>
<td>Universal Coupling Ø15/15mm 4-5/15mm</td>
<td>For Tubes and Curved Rod 15mm Ø, Pins Ø4mm, 5mm and 6mm cancellous (shaft Ø5mm)</td>
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<td>Universal Coupling Ø15/15mm 5-6/15mm</td>
<td>For Tubes and Curved Rod 15mm Ø, Pins Ø5mm, 6mm and 6mm cancellous (shaft Ø5mm)</td>
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Ordering Information – Components

Apex Pin Range
All listed Pins are also available sterile packed.

**Self Drilling/Self Tapping Pin:**
The Stainless Steel and Titanium Self Drilling/Self Tapping Pins allow a One Step Procedure due to the advanced self drilling and cutting technology.

**Blunt Pin:**
The Stainless Steel Blunt Pins help to reduce soft tissue irritation around the tip of the Pin. Pre-drilling is required for this Pin.

**Cancellous Pin:**
The Stainless Steel Cancellous Pins are designed for a strong grip in cancellous bone. The specially designed thread provides an increased contact area between the cancellous bone and the Pin. This Pin is blunt and requires pre-drilling.

**Transfixing Pin:**
The self drilling Transfixing Pins are available threaded and smooth and are indicated for bi-lateral frame constructs.

The Apex Pin Range is MR conditional for procedures up to 3.0 Tesla.
For more information we refer to the Hoffmann II MRI Brochure (Ref.-No. 5075-1-600).
**Ordering Information – Implants**

All listed Pins are also available sterile. To order sterile Pins add “S” after the Ref. No.

### Self Drilling/Self Tapping

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## Ordering Information – Implants

All listed Pins are also available sterile. Just add a “S” after the Ref. No.

### Cancellous

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<td>4980-9-010</td>
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<td>Thumbwheel 8mm</td>
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<td>4980-9-036</td>
<td>Spanner Wrench 8mm</td>
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<td>4980-9-915</td>
<td>Tube Measure Gauge</td>
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### Ordering Information – Set Configuration

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<td>8mm Spanner Wrench</td>
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**Note:** Pre-Drilling Assemblies short and long also fit in Hoffmann Xpress Instrumentation Tray, but there is only space for two options.

**Caution:** Never use Hoffmann Xpress components as Drill Guide! The use of Pre-Drilling Assemblies and Drill Guide Block is mandatory!

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<td>4980-9-911</td>
<td>Storage Case Base (with Silicon Mat)</td>
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<td>Silicon Mat (spare part)</td>
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**Disposal information**

There are no waste disposal requirements that specifically apply to Hoffmann Xpress components. For local waste disposal requirements please refer to the specific regulations of your country.