SIDEKICK®

FREEDOM™ Circular Fixator

SURGICAL TECHNIQUE

WRIGHT™

Contents

Proper surgical procedures and techniques are the responsibility of the medical professional. The following guidelines are furnished for information purposes only. Each surgeon must evaluate the appropriateness of the procedures based on his or her personal medical training and experience. Prior to use of the system, the surgeon should refer to the product package insert for complete warnings, precautions, indications, contraindications and adverse effects. Package inserts are also available by contacting Wright Medical Technology, Inc.

chapter 1

Surgical Technique

Triple Arthrodesis as described by
Stephen Offutt, DPM

Indications

The Circular Fixator system is indicated for open and closed fracture fixation, pseudoarthrosis or nonunions of long bones, limb lengthening by epiphyseal or metaphyseal distraction, correction of bony or soft tissue deformities, and correction of segmental or nonsegmental bony or soft tissue defects. The Circular Fixator is for use on all long bones including: tibia, fibula, femur, humerus, radius and ulna.

Joint Fixation

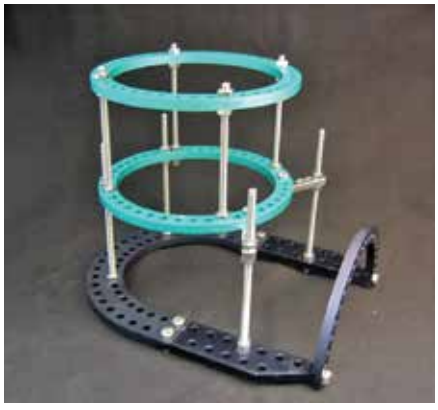
Incision and joint preparation per surgeons preference. Provisionally fixate each joint in desired alignment. Insert any adjuncts such as drains, pain pumps or internal bone stimulators and then close surgical sites completely. Lower tourniquet as applicable.

Ring Sizing

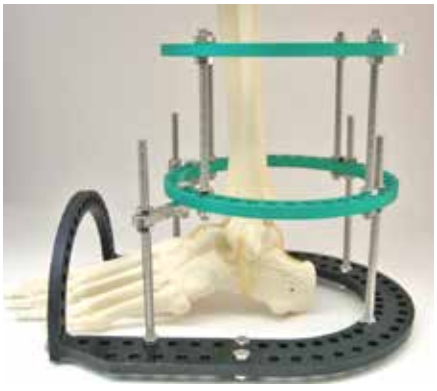
For most standard triple arthrodesis procedures, a prebuilt frame consisting of two tibial rings and a foot plate with extensions can be utilized. | **FIGURE 1** This frame can be prebuilt on the surgeon's back table during the case by an assistant. Ring size should be determined by selecting the smallest diameter possible while allowing at least 2 finger breadths clearance between the extremity and ring.

Positioning

Place the frame over the foot and leg. | **FIGURE 2** Take time to ensure proper positioning. The leg must be eccentrically located in the frame to accommodate the posterior musculature, and the plantar aspect of the foot must extend below the foot plate. Folded up towels can be placed under the calf to hold position. The frame should be orthogonal in all planes and should frequently be reassessed from both lateral and axial alignment. An assistant is particularly helpful for this.



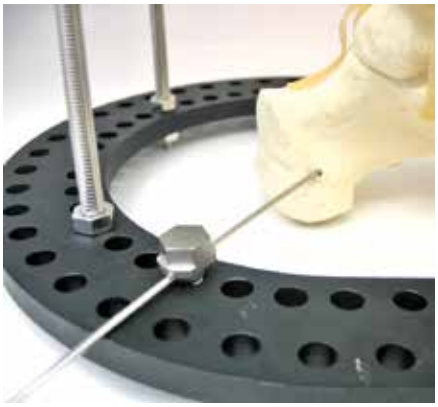
| **FIGURE 1**



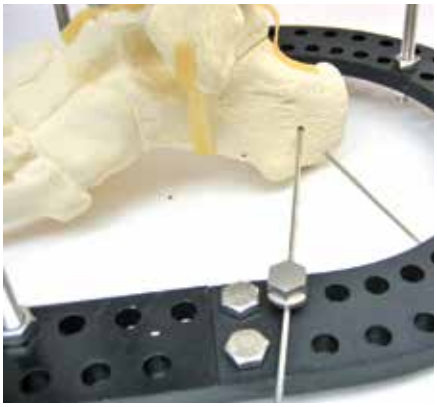
| **FIGURE 2**

Calcaneus Fixation

Begin by fixating the calcaneus to the frame. | **FIGURE 3A** Using a fixation bolt as a guide, insert 2 oblique crossing stopper wires into calcaneal tubercle at 60°. | **FIGURE 3B** One wire from medial and one from lateral. Use a start/stop technique when inserting the wires to minimize thermal damage. When placing any percutaneous fixation, be mindful of anatomic safe zones. Ideally wires should rest directly on the rings. If one does not, then build the ring up to the wire with washers or posts as needed.
DO NOT pull a wire down to the frame.



| **FIGURE 3A**



| **FIGURE 3B**

Wire Fixation

Wires can be attached, either with the hole or the slot, in the fixation bolts or with a separate slotted washer and bolt assembly, if desired. | **FIGURE 4**

| **FIGURE 4**

Wire Tensioning

(1) For stopper wires, completely tighten the wire down on the stopper side and then tension the wire on the side opposite the stopper. Maximally tighten the nut once desired tension is reached. (2) For smooth wires, tensioning can be performed from either side after the opposite side is maximally tightened.

Tension the 2 opposing calcaneal wires simultaneously to 50-60 kg. Curl and cut wires to avoid accidental injury. | **FIGURE 5**

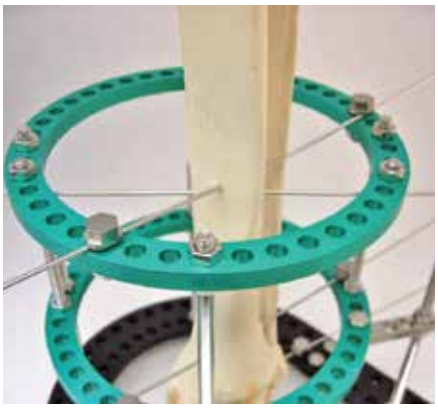
NOTE: Alternative calcaneal fixation could consist of two oblique half pins at 60°.

| FIGURE 5

Tibial Block Fixation

Insert an axial smooth wire and medial face smooth wires off of both tibial rings. | **FIGURE 6** Be careful that the most distal wires do not come within two centimeters of the ankle joint to avoid intracapsular insertion. Attach all four wires to their respective rings and tension opposing wire simultaneously to 100-110 kg. Curl and cut wires at this time.

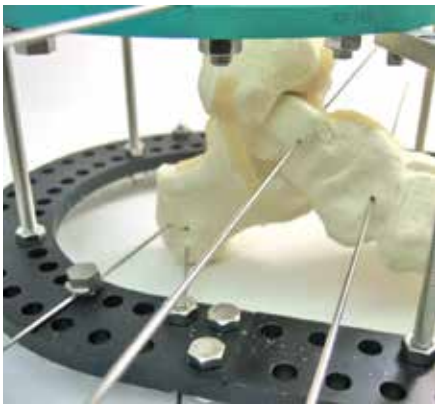
NOTE: A minimum of two points of fixation are required for each major bone segment. Additional points can also be placed as deemed necessary. Half pins work particularly well in the tibia for this purpose.



| FIGURE 6

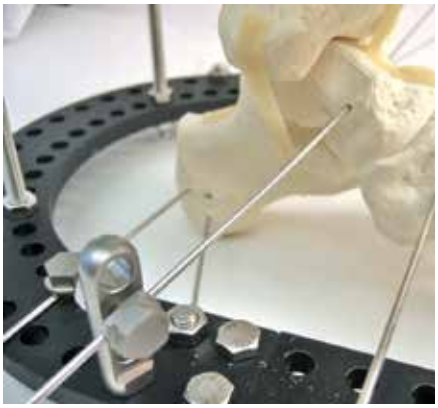
Midfoot Fixation

Insert a smooth midtarsal wire from medial to lateral through the navicular and cuboid. Fluoroscopy is helpful for insertion of this wire. Do not attach wire to the frame yet. | **FIGURE 7**



| **FIGURE 7**

Insert a smooth wire through the talar body/neck using fluoroscopy. Posts will be necessary to fixate the talar wire to the foot plate. "Walk" a three-holed post 1-2 holes proximal on the plate medially and laterally. Arch the wire back to the posts and "walk" the wire down 1-2 holes on each respective post. Fixate the wire on the posts using fixation bolts in their new "walked" position. | **FIGURE 8** Tension this wire to 50-60 kg. The arch wire will want to straighten once tensioned providing compression across the posterior facet of the subtalar joint. Curl and cut the wire.

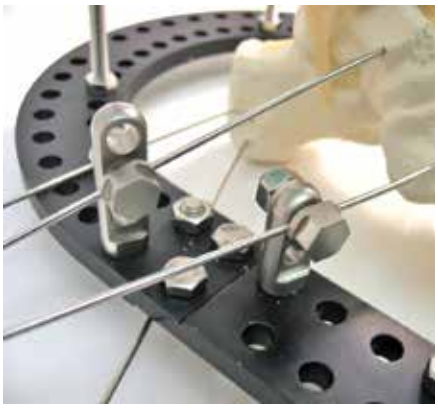


| **FIGURE 8**

"Walk" the midtarsal wire and washers back 2 holes on the foot plate both medially and laterally. This wire should rest on the foot plate. If it does not, use posts to build up to the wire. DO NOT arch this wire caudally, only posteriorly. Tension this wire to 50-60 kg. Curl and cut this wire. | **FIGURE 9 AND 10**

Double check that all nuts are tightened. Make sure skin is not tenting at any of the wire or pin sites. If it is, release it with an #11 blade. Apply post-op dressing per surgeon's preference.

Circular fixation for a triple arthrodesis is most effective when weight-bearing is allowed. In most instances, patients can begin partial weight bearing after a few days, with gradual increases over the first few weeks. Most patients can safely be full weight bearing by the fourth postoperative week.



| **FIGURE 9**

| **FIGURE 10**

Postoperative Care

The surgeon must educate the patients on pin care and to be diligent in watching for any signs of pin irritation. Pin site care is per standard technique according to surgeon preference. Aggressive pin site management, appropriate use of oral antibiotics, and a relatively low threshold to remove a problematic wire should be considered to minimize the risk of serious complication and ensure the desired outcome.

chapter 2

Introduction and Preoperative Planning

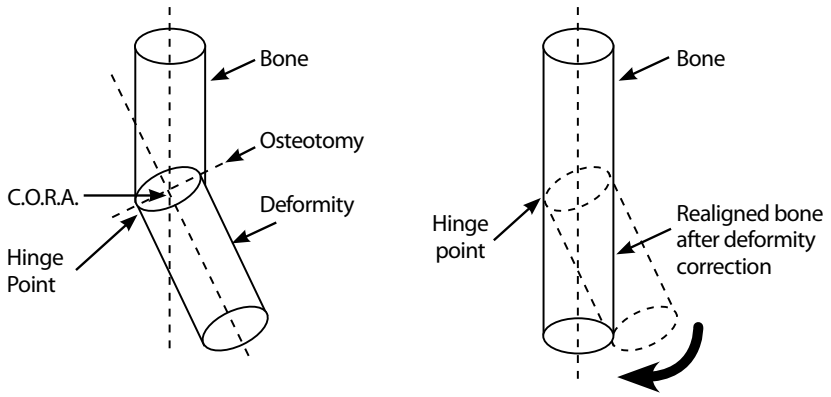
Dynamic Frames

Introduction

The struts and hinges for the SIDEKICK® Circular Fixator are used to construct a "dynamic" frame for the purposes of soft tissue or bone deformity correction. A "dynamic" frame is a frame that can change position or orientation from the beginning of treatment to the end of treatment. The alternative is a "static" frame, which will look the same on the day of removal as on the day of application. The hinges are used to create a point of rotation or angulation between levels of ring fixation on the frame. The struts are used as compressors or distractors, which "motor" the frame to provide gradual movement. The gradual movement is obtained through manual adjustment of the struts.

Preoperative Planning

When using struts and hinges in a frame construct, it is essential to preoperatively plan the location of the struts and hinges relative to the location of the deformity. The focal point of the deformity is often at the C.O.R.A. or Center of Rotational Angulation. The hinges of a fixator are often located at or near the C.O.R.A. to allow the frame to efficiently move the bone segments along a correction path until realignment is achieved. During preoperative planning, it is important to consider all parts of patient anatomy in addition to the bone, including nerves and arteries that may be stretched or impinged during correction. Plan the correction with these "at risk" structures in mind to prevent possible damage to the structures.

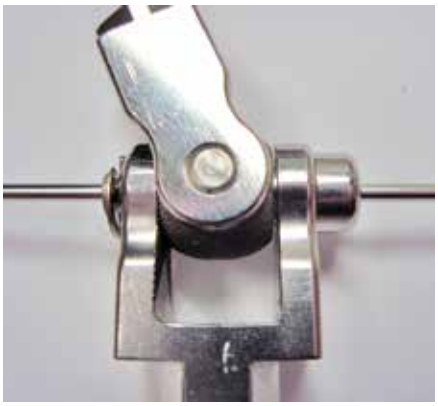


chapter 3

Surgical Technique

Dynamic Frames

For simple deformity or soft tissue contracture correction, a frame is pre-assembled with two coaxial hinges and one strut located 90° to the axis of the hinges on the concave side of the deformity. To assist with the alignment of the struts during pre-assembly, the central locking screws are cannulated to allow a guidewire to pass between the hinges. | **FIGURE 11** The guidewire holes can also be used to help locate the frame on the patient during frame application. During the initial fixation of the frame to the patient, the rings should be positioned orthogonal to the long axis of the bone segments, so that at the end of correction, the rings will be parallel to each other. To prevent threaded rod migration and maintain hinge position, it is necessary to use a 10mm nut to lock the hinge position. The 10mm nut should be positioned on the threaded rod before connecting the hinge to the threaded rod. | **FIGURE 12**



| **FIGURE 11**

| **FIGURE 12**

The hinges are initially configured as a universal joint that is free to rotate on two separate axes. If a simple hinge in only one plane is desired, then the threaded rod attached to the hinge should be fully inserted until it contacts the center of the hinge. | **FIGURE 13** The contact point will restrict the movement in one plane, thereby converting the universal hinge into a simple hinge. For latency or consolidation periods, before or after deformity correction, the hinge can be locked to restrict movement. Locking is achieved using a 3.5mm hex wrench to tighten the cannulated central axis screw. | **FIGURE 14**

| **FIGURE 13**

| **FIGURE 14**

The struts contain a lockable universal joint at either end that will attach to the rings. The Struts should be attached to the frame and the bone positioned prior to locking the Strut ball joints. When using struts to drive angulation of a hinge, make sure the strut universal joints remain unlocked to accommodate the change in angulation. The ring attachment bolts have an inner set screw, which can be tightened to lock the universal joint in one plane. | **FIGURE 15** Tightening the hinge screw locks the other plane. | **FIGURE 16**

| **FIGURE 15**

| **FIGURE 16**

Distraction or compression can either be performed acutely or gradually. For acute adjustments, the button on the side of the rotating knob is depressed to allow the inner threaded rod to telescope freely. If using multiple struts for acute correction, the strut universal joints should be locked after correction is completed. When gradual correction is desired, the screw on the opposite side of the button is locked to engage the threads. | **FIGURE 17** The knob is then turned to adjust the length. One full turn of the knob equals 1mm of compression or distraction. A directional arrow marked on the face of the knob indicates the direction to turn for distraction of the hinge. | **FIGURE 17** Rotation of the knobs should be divided equally between all struts in 1/4 turn increments. There are two scales marked on the side of the strut tube. | **FIGURE 18** One scale measures the absolute length of the strut, and the other scale measures the relative distance to the neutral midpoint position. An indicator is located on the threaded rod and can be viewed through the slot in the tube. To maintain strut position, the jam nut may be tightened to contact the knob. This will prevent unintentional compression/distraction.

| **FIGURE 17**

| **FIGURE 18**

Wire Placement Guide

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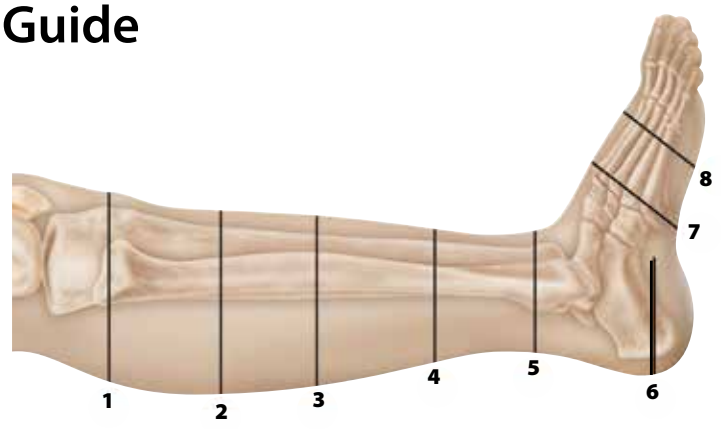
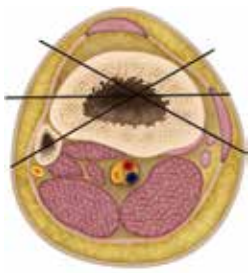
FREEDOM™ Circular Fixator

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Ordering Information

SIDEKICK® FREEDOM™ CIRCULAR FIXATOR

RR1001PK	NUT 10MM (PACK OF 20)
RR1010	SQUARE NUT
RR1200PK	BOLT, 12MM (PACK OF 10)
RR1600PK	BOLT, 16MM (PACK OF 10)
RR2000PK	BOLT, 20MM (PACK OF 10)
RR5300W	BOLT, WIRE FIXATION
RR5300P	BOLT, HALF PIN FIXATION
RR180400	WIRE W/STOPPER, 1.8MM X 400MM*
RR18400	WIRE, BAYONET, 1.8MM X 400MM*
RR4040	HALF PIN, 4MM X 180MM, 40MM THREAD*
RR5040	HALF PIN, 5MM X 180MM, 40MM THREAD*
RR120CE	FULL RING, 120MM*
RR140CE	FULL RING, 140MM*
RR160CE	FULL RING, 160MM*
RR180CE	FULL RING, 180MM*
RR200CE	FULL RING, 200MM*
RR1205CE	HALF RING, 120MM*
RR1405CE	HALF RING, 140MM*
RR1605CE	HALF RING, 160MM*
RR1805CE	HALF RING, 180MM*
RR2005CE	HALF RING, 200MM*
RR1258CE	5/8 RING, 120MM*
RR1458CE	5/8 RING, 140MM*
RR1658CE	5/8 RING, 160MM*
RR1858CE	5/8 RING, 180MM*
RR2058CE	5/8 RING, 200MM*
RR120DFP	FOOT PLATE, DOUBLE HOLE 120MM
RR140DFP	FOOT PLATE, DOUBLE HOLE 140MM
RR160DFP	FOOT PLATE, DOUBLE HOLE 160MM
RR180DFP	FOOT PLATE, DOUBLE HOLE 180MM
RR008DSL	PLATE EXTENSION, DOUBLE HOLE LEFT
RR008DSR	PLATE EXTENSION, DOUBLE HOLE RIGHT
RR120DFR	FOOT RING, DOUBLE HOLE 120MM
RR140DFR	FOOT RING, DOUBLE HOLE 140MM
RR160DFR	FOOT RING, DOUBLE HOLE 160MM
RR180DFR	FOOT RING, DOUBLE HOLE 180MM
RR0080TR	THREADED ROD, 80MM
RR0120TR	THREADED ROD, 120MM
RR0150TR	THREADED ROD, 150MM
RR0165TR	THREADED ROD, 165MM
RR0200TR	THREADED ROD, 200MM
RR0300TR	THREADED ROD, 300MM
RR0400TR	THREADED ROD, 400MM
RRCF0120	CIRCULAR FRAME ASSEMBLY, 120MM*
RRCF0140	CIRCULAR FRAME ASSEMBLY, 140MM*
RRCF0160	CIRCULAR FRAME ASSEMBLY, 160MM*
RRCF0180	CIRCULAR FRAME ASSEMBLY, 180MM*
RR10P	MALE POST, 1 HOLE
RR20P	MALE POST, 2 HOLE
RR30P	MALE POST, 3 HOLE
RR40P	MALE POST, 4 HOLE
RR10PF	FEMALE POST, 1 HOLE
RR20PF	FEMALE POST, 2 HOLE
RR30PF	FEMALE POST, 3 HOLE
RR40PF	FEMALE POST, 4 HOLE
RR100PL	PLATE, 1 HOLE
RR200PL	PLATE, 2 HOLE
RR300PL	PLATE, 3 HOLE
RR400PL	PLATE, 4 HOLE
RR2401PK	WASHER, 1.0MM (PACK OF 20)
RR2501PK	WASHER, 2.5MM (PACK OF 20)
RR2101	SLOTTED WASHER
RR2201	CONICAL WASHER
RR712525	SIDEKICK® STRUT, 125 + 25MM CIRC FIX
RR717060	SIDEKICK® STRUT, 170 + 60MM CIRC FIX
RR7500	SIDEKICK® UNIVERSAL HINGE
RR700035	SIDEKICK® HEX WRENCH 3.5MM
RR3010	WRENCH 10MM
RR3028	WIRE TENSIONER
RR3029	PIN DRIVER, SQUARE END
RR301090B	SIDEKICK® SLOTTED WRENCH, 10MM
RR5300C	WIRE CLAMP COVERS

ACCESSORIES

RR101001	PIN COVERS, SMALL, YELLOW
RR101002	PIN COVERS, MEDIUM, BLUE
RR101003	PIN COVERS, LARGE, RED

**Note | Primary components are packaged with detailed Instructions for Use*

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