Featuring Model SP407
Sager Extreme Compact Emergency Traction Splint.
Including the Multi-versatile
SAM SPLINT in every package.
Attention: Read First – Prior to Application


⚠️ **Important**: Follow these additional steps to ensure correct assembly and usage of Sager Extreme Compact Bilateral Traction Splints. Note: the Security Sliding Lock should be applied after traction is applied to the patient and the yellow indicator is visible. On short, light-weight people, the yellow indicator might not be visible if the Traction Bar does not extend out of the Outer Tube. If the Lock is applied before inserting the Traction Bar into the Outer Tube, the range of travel will be limited.

Security Sliding Lock

1. Slide the Security Sliding Lock over hinge of the Inner Shaft and cover the yellow indicator with the red knob.

2. Lock down by tightening the red knob.
Important: Traction Assembly Packing and Folding Procedure! To refold the inner-traction splint shaft (traction tube) and place in Carrying Case, grasp the traction tube with thumb against Hinge Tab. Push Hinge Tab, as you would to turn on a flashlight, while gently pulling the solid bar. When solid bar stops then fold keeping the bar and tube in alignment.

Diagram 1
Traction Tube

Diagram 2
Traction Tube “pull away from the traction Tube...”

Warning: Failure to follow Manufacturer’s Assembly Instructions and Packing Procedures may result in damage to the splint and/or hinder the application of the splint. Minto Research & Development, Inc. is not responsible for incorrect assembly and/or usage of the splinting device. All Operators should receive full and proper initial/refresher instruction sessions from a qualified person on detailed use of this equipment and regarding the particular situations in which it should be used. Please defer to federal, state, and/or local protocol for definitive analysis and guidelines.

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The Complete Fracture Response System

The SP407 Sager Tactical Orthopedic Response Matrix is the only tactical splinting system in the world — with a full range of motion from 30° to 330° — that configures the splint to the patient. It enables EMS Responders to treat multiple fractures and/or multiple patients – from a single fracture response system – and eliminates the need to carry multiple kits. The compact, lightweight case with MOLLE attachments ensures easy field carry. The SP407 includes three main components; a fast, easy-fail-safe compact traction device, two Adaptors™ as well as a bacteriocidal and bacteriostatic Tensor Cravats System (in various sizes and widths). Together these three components set the stage for tactical fracture response in today’s extreme rescue environments.

Features and Benefits of the SP407 Emergency Traction Splint

- Indicated for treatment in proximal third and mid-shaft femoral fractures. As such, has a much broader range of application and use than other traction devices.
- From field to hospital: The SP407 when applied, is radio lucent to all areas of a femoral fracture. Radio lucent design enables X-rays, MRI and CATSCANS to be taken without removing the splint.
- The SP407 comes encased in a Cordura shell 7¼" in diameter and 18" long with MOLLE attachments for easy field carry. The unit unfolds into a mat 18" wide by 44" long. Hook and loop slings and patches hold each piece of equipment separately and securely and ensure instant identification and access.
- Universal: fits adult or child (5th to 99th percentile of patients). One splint has the capacity to treat four different patient types.
- Treats unilateral or bilateral fractures.
- Rapid assembly. The SP407 unfolds and is ready to apply in under 15 seconds.
- Rapid one-person application (can be applied in under 2 minutes). Frees other attendants for other patients or procedures.
- Reduces further trauma and pain.
- Promotes rapid recovery with fewer complications.
- Applied in any position (patient can be nursed in any position).
- Straight in-line traction. Alignment, traction and counter-traction is the same as that provided to patients in operating room theatres undergoing orthopedic surgical reductions and splinting. As with surgical procedures, Sager’s application of traction avoids point pressure on the sciatic nerve and related vascular structures – in the critical proximal third of femoral fractures. By design, Sager Splints do not have a half-ring posteriorly; this eliminates any pressure on the sciatic nerve and most importantly eliminates the angulation of the fracture site, which occurs with most ischial pad/half ring splints.
- Can be applied under or over M.A.S.T. Trousers.
- Stays within the body silhouette. Does not extend beyond the feet of an adult. Eliminates transport complications in helicopters, fixed wing, and van type ambulances. If the patient fits in a stokes basket – the Sager fits.
- Super durable composite plastic construction – years of use – practically indestructible.
Quantifiable, Dynamic Traction

Sager Emergency Traction Splints are the only traction splint available on the world market today that continuously shows the exact amount of traction being applied. The quantifiable feature (Sager’s traction handle/scale) enables EMS Responders to set and document the traction force applied. Traction is measurable in both pounds and kilograms. Sager Emergency Traction Splints are also dynamic. This permits the traction to decrease as the spasm releases. No fear of over-traction and the complications associated with excess traction. You always have the correct amount of safe traction.

Features and Benefits of the SP407 Tactical Orthopedic Response Matrix Components

- Universal; will treat any fracture. You always have the right equipment for any type of fracture, any size of patient.
- Adaptor™ allows splint to be applied in any position. No movement of fracture means less injury and pain.
- Rapid assembly, rapid application – assembles in under 15 seconds, application on fracture in less than 2 minutes. Fast rescue, less pain.
- Splints within the body silhouette – no protuberances outside of silhouette. Makes extrication from confined space of wreckage easier, less time consuming and with fewer complications.
- Engineered for comfort and safety – splint padding consists of closed cell foam – does not absorb fluids, easily cleaned and decontaminated.
- Wide range of Tensor Cravats – 2 widths, 10 lengths – ensures universal fit.
- Cost effective immobilization – Tenor Cravats can be disposed or cleaned and reused¹. Security Cravats do double duty – can be used as a figure 8 strap (pedal pinion) to prevent rotation when device is used in its traction splint mode.
- Includes (Optional) Security Cravats: for use on small subset of patients who may be agitated, struggling, or uncooperative due to drug use or brain injury.
- Floats! The STORM PAC™ is completely buoyant when closed.

SAM Splints

- Universal – ensures wide range of splinting on wide range of patients and injuries. Can be used separately or in conjunction with the SP407.
- SAM Splints are made from malleable aluminum with closed cell foam padding. These splints do not absorb fluids, or stick to wounds. Radio-lucent design enables X-rays.

Sager Tactical Orthopedic Response Matrix – ensuring the optimum in treatment standards.

See parts and accessories at the end of this brochure

¹ Maintains bacteriocidal and bacteriostatic properties when washed over thirty (30) times.
Step 1 ▶ Position

Position the Sager SP407 between the patient’s legs, resting the ischial perineal cushion (the saddle) against the ischial tuberosity, with the shortest end of the articulating base towards the ground. In the case of a unilateral fracture, the splint should be placed in the perineum on the side of the injury. In bilateral fractures, excluding pelvic trauma, the side with the greatest degree of injury should be the side of placement. Apply the abductor bridle (thigh strap) around the upper thigh of the fractured limb. Push the ischial perineal cushion gently down while at the same time pulling the thigh strap laterally under the patient’s thigh. This will seat the lower end of the cushion comfortably against the ischial tuberosity. Tighten the thigh strap lightly. Lift the spring clip to extent the inner shaft on the SP407 until the crossbar rests adjacent to the patient’s heels.
Step 2 > Set

Note the absence or presence of distal pulses, check for sensation. Position the malleolar harness (ankle harness) beneath the heel(s) and just above the ankle(s). Using the attached hook and loop straps wrap the ankle harness around the ankle to secure snugly. Pull control tabs to engage the ankle harness tightly against the crossbar. Apply Quantifiable Dynamic Traction.

Grasp the padded shaft of the SP407 with one hand and the red traction handle with the other; gently extend the inner shaft until the desired amount of traction is recorded on the traction scale. It is suggested to use 10% of the patient's body weight per fractured femur up to 7kg (15 pounds) for each leg. If bilateral fractures are present – the maximum amount would be 14kg (30 pounds). At the hollow of the knees, gently slide a large Tensor Cravat through and scissor it upwards to the thigh, repeating with the smaller Tensor Cravats to minimize lower and mid-limb movement.

Step 3 > Secure

Adjust the abductor bridle (thigh strap) at the upper thigh making sure it is not too tight, but snug and secure, then firmly secure the tensor cravats. Apply a 24 inch long Security Cravat as a figure 8 strap around the feet to prevent rotation¹. Note the absence or presence of distal pulses, check for sensation. Patient is now ready for transport.

Warning: All Operators should receive full and proper initial/refresher instruction sessions from a qualified person on the detailed use of this equipment and regarding the particular situations in which it should be used.²

Multiple Fractures

If a patient has multiple fractures, femur as well as tibia-fibula fractures, use of the Sager is recommended. In the case of ankle fractures along with a femur fracture, an air splint should be placed over the ankle with the Sager malleolar harness (ankle harness) applied over the air splint. This method was developed by innovative Paramedics to provide traction with alignment and immobilization of all fractures².

¹ If a greater length is needed to perform a longer figure of eight – two or more Security Cravats may be attached to one another by placing hook to loop.
² Please defer to federal, state, and/or local protocol for definitive analysis and guidelines.
The **SP407** has been designed for rapid assembly and application when used as a traction splint. The splint can be assembled and applied in under 2 minutes. To assemble the splint, simply unfold and secure into place. The **SP407**’s unique semi-attached design ensures that no major parts will be lost or incorrectly assembled.

**Position:**

**a.** Position the Sager **SP407** between the patient’s legs, resting the ischial perineal cushion (the saddle) against the ischial tuberosity, with the shortest end of the articulating base towards the ground.

**Set:**

**b.** Using the attached hook and loop straps, wrap the ankle harness around the ankle to secure snugly.

**Secure:**

**d.** Adjust the abductor bridle (thigh strap) at the upper thigh making sure it is not too tight, but snug and secure, then firmly secure the tensor cravats.
C. Pull control tabs to engage the ankle harness tightly against the crossbar. Apply Quantifiable, Dynamic Traction. Grasp the padded shaft of the **SP407** with one hand and the red traction handle with the other; gently extend the inner shaft until the desired amount of traction is recorded on the traction scale.

E. Apply a 24 inch long Security Cravat as a figure 8 strap around the feet to prevent rotation. An additional length of a Security Cravat can be affixed to the 24 inch Security Cravat (hook to loop) if extra length is needed or required.
How much traction should I apply?

Apply the amount of traction recommended by your medical consultant, or that required by protocol. For adults, the American Academy of Orthopedic Surgeons recommends gentle traction to a maximum of 7kg (15 pounds) per fractured femur (14kg (30 pounds for a bilateral fracture)). A general rule of thumb is 10% of the patient’s body weight per fractured femur. For example; if a patient weighing 45kg (100 pounds) has a single fracture, the appropriate amount of traction would be 4½kg (10 pounds). If that same person has a bilateral fracture, 9kg (20 pounds) would be estimated. The SP407 Sager Splint is designed to register a maximum of 14kg (30 pounds) of traction. There are rare circumstances, such as patients who have highly developed muscles, where the initial traction of more than the maximum of 14kg (30 pounds) is required. This is easily accomplished by extending the splint shaft beyond the 14kg (30 pound) stop, increasing the traction beyond the maximum registered. This should only be done with consent from your Medical Director.

Indications and contraindications for the use of traction splints on femoral fractures.

Sager splints are indicated for use on proximal third and mid-shaft femoral fractures.

All traction splints of any kind are contraindicated in the case of fractured pelvises unless the Medical Consultant indicates otherwise or a MAST Trouser has been applied – in which case a Sager Splint can be applied over the MAST Trousers. Supracondylar fractures of the knee and ankle fractures are also contraindicated. The contraindications listed above are only intended as a basic reference tool. Please defer to federal, state, and/or local protocol for definitive analysis and guidelines.

Important: Traction Assembly Packing and Folding Procedure! To refold the inner–traction splint shaft (traction tube) and place in Carrying Case, grasp the traction tube with thumb against Hinge Tab. Push Hinge Tab, as you would to turn on a flashlight, while gently pulling the solid bar. When solid bar stops then fold keeping the bar and tube in alignment.
Articulating Base and Cushion

The Articulating Base and Cushion (the saddle) bends laterally for seating and exacting conformance to the ischial tuberosity. With a SP407, most perineal examinations and procedures can be performed with the splint in place — without compromising the comfort and safety of the patient. The SP407’s well-padded shaft cushion provides additional comfort and stability.

M.A.S.T. Trousers

If M.A.S.T. trousers are used in cases of multiple trauma, Sager Splints may be used either over or under the shock garment to rapidly provide traction and alignment. The optimum in treatment is to apply the Sager Splint prior to the application of the trousers. In the case where trousers have already been applied, the splint may also be placed over the trousers with good results. If the splint is applied first, the patients’ fractured femur is stabilized and it becomes simple to clothe the patient in shock trousers. The shaft of the splint is closely applied to the medial side of the thigh and the ischial perineal cushion is located so that it lies in the perineal opening of the garment. In addition, since the splint is applied closely to the leg, there is excellent contouring of the pressure bladder of the trouser around the shaft of the splint and over the leg. The possibility of tenting between the shock trouser and the splint shaft is so small that it becomes negligible.

Comfort

How comfortable are Sager Splints against male and female genitalia? The ischial perineal cushion of the splint rests against the ischial tuberosity and with natural genital mobility the male genitalia can be checked and moved to ensure it is not under any pressure. During actual accident situations the clothing should be opened, cut and/or removed during the general assessment procedures. In practice trials, loose clothing should be worn to enable genital mobility. (Note: the structures used and pressed on are the same as sitting on a bicycle seat).
The SP407 Adaptor™ has been designed for rapid assembly and rapid application. The unit can be assembled and applied in under 60 seconds. To assemble the unit, simply follow the easy steps illustrated on the following pages. The SP407 has been designed to treat any fracture in the position found without patient movement or pain.

Packing sequence:

Unroll the STORM PAC case. Secure Tensor Cravats to the corresponding identification marks. Lift the hook and loop strap to resituate the Adaptor(s)™, Ischial Perineal Cushion, Inner Tube, Padded Splint Shafts (Outer Tube(s)), Extender Shafts and SAM Splints as indicated on the mat.
Adaptor™, Immobilizes all extremity fractures “as found”.

The STORM PAC’s Adaptor™ is manipulated free of the patient and mimics the shape and angle of the fracture. STORM PAC’s unique design ensures virtually pain-free application. The STORM PAC’s Adaptor™ is lightly placed or centered over the fracture site and the arms aligned with each side of the fracture. Make sure that the arms of the Adaptor™ are parallel to the bone (not the muscle silhouette). The Adaptor™ is locked to retain the angle configuration, then attached to the padded splint shafts.

STORM PAC is an excellent device for extrication. When the splint is in place it remains within the silhouette of the injured limb; no extraneous parts to hang-up or impede when extricating patient.

For fractured femurs, follow the existing SP407 application procedure of position, set and secure (see previous pages).

Initial steps and index of parts:

- Variable range STORM PAC Adaptor™ rotatable from 30 to 330 degrees
- With extenders in place and Adaptor™. The lengths noted will splint the 95th percentile of patients
- Soft closed cell foam pad on outer shaft, will not absorb fluids
- Colour coded extender with foam pad

“Study principles rather than methods. A mind that grasps principles will devise its own methods.”

A. Bruce Gill, MD.

Sourcebook of Orthopedics, Editor: Edward M. Bick, Williams & Wilkins Co., Baltimore, MD, 1948, Chapter 10, Fractures/General Principles, pg: 279
Treatment of all other fractures without traction. Fractures can be splinted in the position found.

1. Turn each of the red Adaptor™ Knobs counter-clockwise to unlock each of the rotatable arms.

2. Unlock this knob. 
   Range of **vertical** motion; 30° to 330°.

3. Unlock this knob. 
   Range of **lateral** motion; 30° to 330°.
   *note: One (1) full 360° rotation/turn of the knob is sufficient to make any adjustment you need.*

4. Place the loosened Adaptor™ on or above the fracture as shown. Make sure the arms of the device lay parallel, centered and in-line with the arms of the proximal and distal parts of the fractured limb. Lock the Adaptor™ arms by turning the knobs clockwise. Make sure teeth are aligned, then tighten.

5. Separate the two halves of the padded outer shaft as shown.

6. Insert the long arm of the Adaptor™ into the large hole in the Outer Shaft as shown.
7 Always insert the yellow marked short arm of the Adaptor™ into the colour coded yellow marked Outer Shaft as shown.

8 Hook the bungy cords over the knobs to move them out of the way.

9 Splint is now ready to apply to the fracture.

10 If needed, add Extender Shafts to extend the length of the splint: red to red, black to black, then place prepared splint on fractured limb.

11 Apply tensor cravats as shown. Patient is now ready for extrication and transport.
Extraction Procedure

1. After clearing obstruction with Jaws of Life; position the splint in preparation for extraction and splinting of limb in position found.

2. If ankle is unstable, Sam Splints® can be used to immobilize with a figure-of-eight strap procedure.

Straight Leg Knee Injury

1. Manipulate Adaptor™ to a slight 6–10 degree valgus and lock into place on the distal half of the Splint.

2. This Tensor Cravat should be added.
   - Distal to the head of the Fibula
   - Normal 6-degrees valgus of the tibia/fibula at the knee joint
**Bent Knee Injury**

1. Anterior position of Splint for bent knee injuries.

2. Place Tensor Cravats as shown. Knee is immobilized.

WARNING: A Traction splint is contraindicated in any knee injury. Proper leg splinting: Injuries at the knee should be splinted in position found. **ATTEMPT TO STRAIGHTEN A BENT KNEE IS ONLY INDICATED IF PULSES ARE ABSENT AND LEG STRAIGHTENING IS DONE WITHOUT PAIN OR RESISTANCE TO MOVEMENT.**

**SAM SPLINTS:**

A (The C-Curve); Curve the **Sam Splint®** length-wise to create a longitudinal bend which gives the splint strength.

B (The Reverse C-Curve); Curve the outside edges in the opposite direction to make it even stronger.

C (The T-Curve); Double the **Sam Splint®** or create a T-Bend for extra strength.

Easy to apply
Fracture dislocation of the knee


2. Place Tensor Cravats as shown. Knee is immobilized.

Alternate splint placement
Ankle Injury

1. Splint position for ankle injury.

2. Place Tensor Cravats as shown. Ankle is immobilized.

A Traction splint is contraindicated in any knee injury. Proper leg splinting: Injuries at the knee should be splinted in position found. ATTEMPT TO STRAIGHTEN A BENT KNEE IS ONLY INDICATED IF PULSES ARE ABSENT AND LEG STRAIGHTENING IS DONE WITHOUT PAIN OR RESISTANCE TO MOVEMENT.
Dislocated Shoulder
1 Dislocation of shoulder splinted in position found.
2 Arm is immobilized.

Forearm Injury
1 Anterior view forearm injury.
2 Splinted forearm.
Easy to apply

Fractured Elbow
- Distal pad can be rotated to fit in palm of the hand.
1 Splint position for fractured elbow.
2 Immobilized fractured elbow.

Elbow Injury
1 Elbow injury in position found and splinted.

Fractured Wrist or Forearm
1 Immobilized wrist or forearm.
The SP407 STORM PAC Sager Tactical Orthopedic Matrix comes complete with all accessories required for use:

1. One Traction Assembly
2. One Ischial Perineal Cushion/Base Assembly
3. One Thigh Strap
4. Two Cushioned Outer Tude Assemblies (Padded Splint shafts)
5. Four Extender Shafts (Two Red, Two Black)
6. Two Adaptor™ Assemblies
7. Two Ankle Harnesses (One Left, One Right)
8. Two C-Curve SAM SPLINTS (36 inches)
9. Two 4”x18” Tensor Cravats
10. Two 4”x24” Tensor Cravats
11. Two 6”x18” Tensor Cravats
12. Two 6”x24” Tensor Cravats
13. Two 6”x32” Tensor Cravats
14. Two 2”x24” Security Cravats
15. Two 4”x40” Security Cravats
16. One STORM PAC Wrap/Carry Case

SAM SPLINT Instructions
STORM PAC Instructions

Caution: This product contains Natural Rubber Latex, which may cause allergic reactions.
Cleaning Instructions

Software Goods (excluding tensor cravats), Stainless Steel and Adaptor™; “Manu-Klenz”¹ (i.e.: Sodium Dodecylbenzine Sulfonate and Coconut Diethylthanolamide). Effective manual washing of heavily soiled washable surfaces, medical instruments, counters, glass and plastic surfaces.

Directions: 1 ounce Manu-Klenz to 1 gallon water.

Stainless Steel: 70% Alcohol solution or above instructions.

Foam Rubber, Shaft and Extender Pad: “Precise”² Hospital Foam Cleanser/Disinfectant. (¹, ² or other comparable product).

Tensor Cravats: The Tensor Cravats treated with SilverTec™ nano-crystals of silver creating a surface that is antibacterial, bacteriocidal and bacteriostatic, can be washed a total of 30 times without losing its antibacterial properties. Tensor cravats can be washed in warm water with soap and still retain its antibacterial properties. Rinse clear, hang dry.

Adaptor™: DO NOT DISASSEMBLE ADAPTOR TO CLEAN! Immerse in cleaning solution. Blow dry with high pressure.

Guarantee:

Each SP407 Sager Tactical Orthopedic Response Matrix (STORM PAC) has been tested and is guaranteed by Minto Research & Development, Inc. to be free of defects for a period of five years under normal usage.
Security Cravats: NOTICE TO ALL STORM PAC USERS. There is a small subset of patients who may be agitated or struggling and uncooperative due to drug use or brain injury. These cravats can be used in special circumstances for tactical medical rescue situations.

In the normal course of splinting a patient, first apply the regular stretchable cravats to secure the limb. If there is a need to totally prevent any incidental movement due to extrication from a wreckage or struggling by the patient, apply the (non-stretchable) Security Cravats over the regular cravats to completely immobilize the patient. NOTE: It is vitally important to monitor patient circulation and sensation when Security Cravats are in place. There is a danger that these cravats can create a tourniquet effect and should be removed as early as possible or be loosened and tightened consistent with good blood circulation if there is a continuing need.