

Headquarters Air Mobility Command



Regional Anesthesia ***Continuous Regional Pain Catheters...*** **A New AeroEvacuation Pain Control Capability**

Enabling the “Global” in “Global Vigilance, Reach and Power!”



PAIN...

The Fifth Vital Sign



For years the medical staff has been focused around four vital signs:

- Pulse
 - Blood Pressure
 - Core Temperature
 - Respiration
- The American Pain Society* has determined that "quality care means that pain is measured and treated**."
 - Pain should be treated as the fifth vital sign and taken seriously
 - Soldiers should NOT feel as though they are asking a favor in requesting adequate pain management

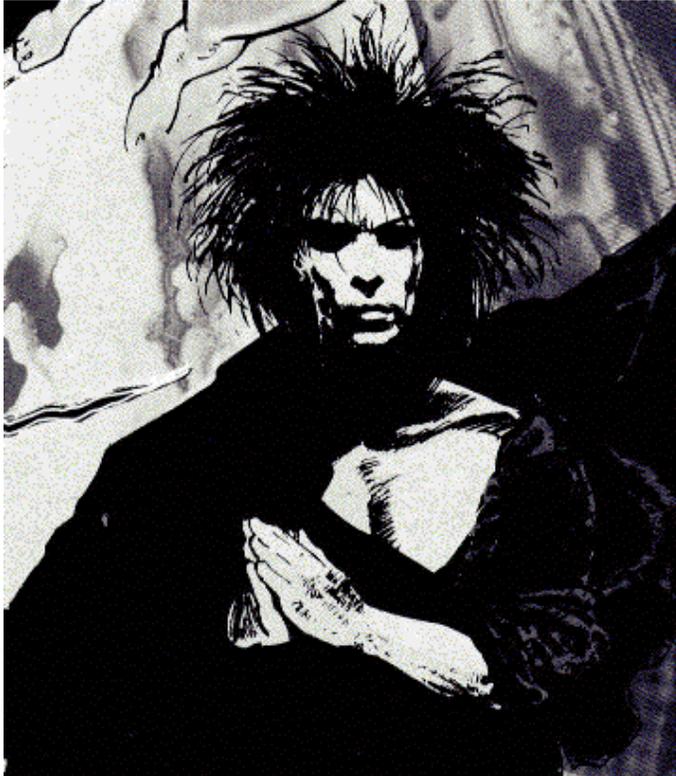
*Excerpts from American Pain Society

**James Campbell, MD, Presidential Address, American Pain Society

Enabling the "Global" in "Global Vigilance, Reach and Power!"



19th Century Battlefield Pain Control



In 1803, Serturmer, a German pharmacist, identified and isolated the main ingredient of opium, Morphine. He called this alkaloid "Morphia" after Morpheus, the Greek God of Dreams. The name "Morphine" is now used instead of Morphia because of the standard that all alkaloids end in "-ine".

Morphine is still the pain drug being given for acute and chronic pain control in the 21st Century...Is there something better?

Enabling the "Global" in "Global Vigilance, Reach and Power!"



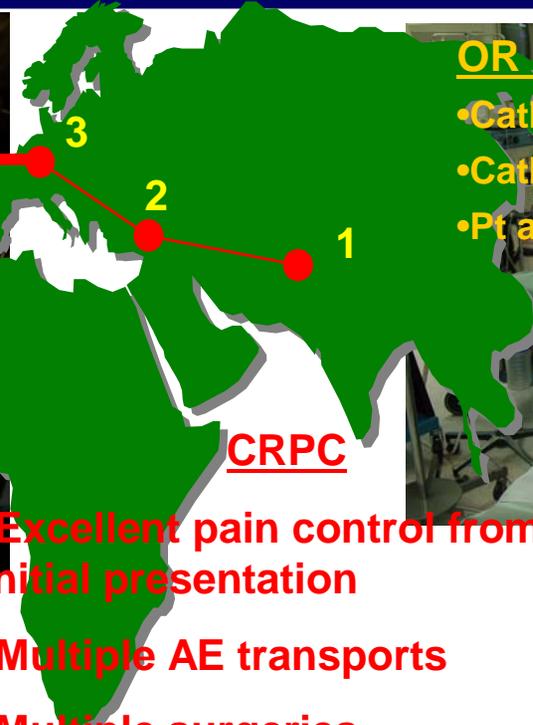
Continuous Peripheral Nerve Catheter (CPNC)



Initial Presentation in AOR



- Patient awake
- Regional Catheter Place
- Wound Washed out in OR



OR in LRMC, after AeroEvac



- Catheter in-place for transport
- Catheter used for OR procedure
- Pt awake throughout

Immediate post-op LRMC



Immediate post-op AOR



- Excellent pain control from initial presentation
- Multiple AE transports
- Multiple surgeries
- No need for large amounts of narcotics
- From AOR to USA, patient experienced excellent pain control

Enabling the "Global" in "Global Vigilance, Reach and Power!"



Regional Anesthesia Need



■ Non-Battle Injuries

- Orthopedics – 70%
- General Surgery – 30%

■ Wounded in Action

- Orthopedic – 42%
- General Surgery – 29%
- Other (Neuro, ENT, Burns, etc.) – 28%



Enabling the “Global” in “Global Vigilance, Reach and Power!”



Regional Anesthesia Defined



■ What is it?

- The ability to block a combination of motor and sensory innervations in a specific nerve distribution

■ How is it done?

- Single, one-time block
 - ◆ Single injection of analgesia
 - ◆ Time limited pain control
- Continuous Regional Pain Catheter Infusion
 - ◆ Insertion of catheter
 - ◆ Continuous local anesthetic infusion
 - ◆ Ability for long-term (days to weeks) pain control



Enabling the “Global” in “Global Vigilance, Reach and Power!”



Regional Anesthesia Various Blocks



■ Upper Extremity Blocks

- Interscalene
- Supraclavicular
- Infraclavicular
- Axillary
- Mid-humoral
- Wrist



■ Other Blocks

- Head
- Neck
- ParaVertebral
- Individual nerve



■ Lower Extremity Blocks

- Lumbar plexus
- Sacral plexus
- Ankle



Enabling the “Global” in “Global Vigilance, Reach and Power!”



Regional Anesthesia Advantages



- **Continuous, stable, and predictable pain control**
- **Pain control for sleep, rehab, dressing changes, operative procedures, transport**
- **Significantly reduced intravenous narcotics for BASELINE pain control**
- **Patient can remain fully awake and functional**
- **Excellent operative conditions**
- **Profound peri-operative analgesia**
- **Excellent transport analgesia**
- **Limb specific anesthesia**



Enabling the “Global” in “Global Vigilance, Reach and Power!”



Stryker PainPump®2 Policy



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 311TH HUMAN SYSTEMS WING (AFMC)
BROOKS CITY-BASE, TEXAS

29 Jan 04

MEMORANDUM FOR SEE DISTRIBUTION

FROM: 311 HSW/YA
7980 Lindbergh Landing
Brooks City-Base TX 78235-5119

SUBJECT: Safe-To-Fly Recommendation for the Stryker Pain Pump-2

1. The 311th Human Systems Program Office (SPO) recommends the Stryker Pain Pump-2 as Safe-to-Fly on all Air Force cargo aircraft. This recommendation is based on satisfactory results from a performance baseline assessment, electromagnetic interference evaluation, environmental tests, rapid decompression, and altitude testing. The Aeromedical Test Branch (ATB) at Brooks City-Base TX conducted some of these tests and the United States Army Aeromedical Research Lab (USAARL) conducted others. The results were examined by the SPO to make the above determination.

2. The device also underwent vibration testing and did not pass. The pump stopped operating halfway through the laboratory vertical axis operational test performed by USAARL, but passed the operational-flight test. However, since the pump is a disposable device and could simply be replaced, and this failure causes no harm to the aircraft, crew, or patient, this failure does not preclude the SPO from considering the device Safe-to-Fly. Aircrews should be aware of this possible interruption of service and carry extra back-up units onboard.

3. If you have any questions, please contact Mr. Mike Vajdos, ATB Chief, at DSN 240-3144, commercial (210) 536-3144, or Lt David Mandel at DSN 240-2939, commercial (210) 536-2939.

signed

ALBERT F. BURNETT, Colonel, USAF
Materiel Group Director
Human Systems Program Office

DISTRIBUTION LIST:

WR-ALC/LB
WR-ALC/LJ
OC-ALC/LK
OC-ALC/LC
188888

- Safe-to-Fly Letter (29Jan04)
- Failed vibration testing
 - Pump turns OFF automatically, turn pump back ON (Patient or AEC)
 - If pump remains OFF, initiate Back-Up Pain control plan
 - ◆ Either give IV, IM or PO pain medication
- ONLY for Regional Pain Control
- NOT indicated for IV administration
- NOT reprogrammable
 - After initial programming, only can turn pump ON/OFF
- Current recommendations
 - Refilled ONLY by Anesthesia Staff
- Single Soldier use (Disposable)
- In event of Emergency Egress, disconnect catheter from pump tubing

Enabling the “Global” in “Global Vigilance, Reach and Power!”

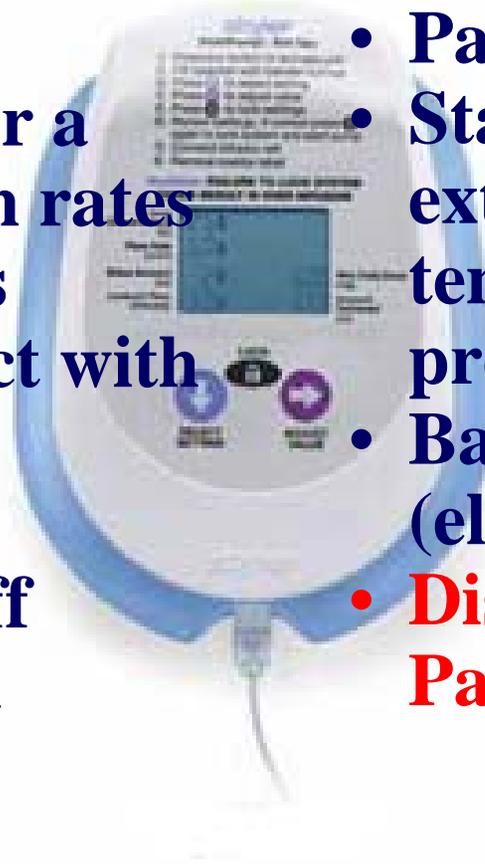


Stryker PainPump®2

Pain Control Features



- Patient controlled bolus capable
- Programmable for a variety of infusion rates and bolus profiles
- Light and compact with carrying strap
- Intuitive patient controlled shut-off
- Maximum 400 ml reservoir
- Inexpensive
- Patient tamper proof
- Stable infusion rates in extremes of temperature and pressure
- Battery operated (electronic pumps)
- **Disposable, Single Patient Use**



Enabling the “Global” in “Global Vigilance, Reach and Power!”



Stryker PainPump®2 Limitations



- **ONLY** provides pain relief for the peripheral nerves where it is placed
- Patient may have pain in other regions of body due to other injuries and should receive supplemental pain medication PRN
- Will not provide pain relief if
 - Pump is turned off
 - Pump is empty
 - Catheter is dislodged



Enabling the “Global” in “Global Vigilance, Reach and Power!”



Stryker PainPump®2 Additional Labels



■ Military and AeroEvacuation Specific Labels

- Will be placed on the pump at initial catheter insertion

TURN THE PUMP OFF

For signs of local anesthetic toxicity (**metallic taste in mouth, jittery feeling, eye or muscle twitching, tongue extension or seizure**) or the patient wants the pump off. The patient has been educated on these signs and symptoms.

**DO NOT ASSESS CATHETER
INSERTION SITE, REMOVE
THE CATHETER OR DISCONNECT
THE PUMP WHILE ENROUTE**

Catheters should NOT be removed during periods of defective anticoagulation.

Patient Name _____
SSN _____
Insertion site _____
Insertion date/time _____
Medication _____
Flow rate _____ cc/hr Bolus dose _____ cc
Lockout time _____
Initial medication volume _____ cc

Enabling the “Global” in “Global Vigilance, Reach and Power!”



Regional Anesthesia “Whatever-caine”



- **What is in the Pump?**
 - The infusion solution is a “numbing” agent used to block the local pain fibers / nerves transmissions
 - NO narcotic is infusing

- **Usual Local Anesthetics**
 - Ropivacaine 0.2%
 - Bupivacaine 0.125%



Enabling the “Global” in “Global Vigilance, Reach and Power!”



Stryker PainPump®2 Typical Infusion Settings



<u>Catheter</u>	<u>Infusion Rate</u>	<u>Patient Controlled Infusion</u>
Interscalene	5-8 ml/hr	5 ml/hr with 2 ml bolus/20min lockout
Super/Infraclavicular	5-10 ml/hr	5-8 ml/hr with 2 ml bolus/20 min lockout
Axillary	5-10 ml/hr	5-8 ml/hr with 2 ml bolus/20 min lockout
Paravertebral	5-10 ml/hr	5 ml/hr with 2 ml bolus/20 min lockout
Lumbar Plexus	8-15 ml/hr	8-10 ml/hr with 2 ml bolus /20min lockout
Sciatic	5-10 ml/hr	5-8 ml/hr with 2 ml bolus/20 min lockout

Enabling the “Global” in “Global Vigilance, Reach and Power!”



Stryker PainPump®2 AeroEvacuation Paperwork



- **Patient will NOT be placed on AE Aircraft until catheter has been in place and infusing \geq 1 hour, in order to minimize chance of side effects such as local anesthetic toxicity**
- **Patient Manifest**
 - **PMR and TRACE2ES will reflect**
 - ◆ Stryker pump present
 - ◆ Catheter location
 - ◆ Infusion rate, bolus, infusion medication and concentration
 - ◆ Back-Up pain orders for pump malfunction
 - **AF 3899 will document**
 - ◆ Same as PMR/TRAC2ES
 - ◆ Site location of catheter
 - ◆ In-flight incidents with catheter
 - ◆ Complications en-route
 - ◆ Patient's pain via Visual Analog Scale (VAS)
 - ◆ If Back-Up orders are instituted
 - Reason/circumstances documented

	Scale	
No pain	0	
	1	
Mild, annoying pain	2	
	3	
Nagging, uncomfortable, troublesome pain	4	
	5	
Distressing, miserable pain	6	
	7	
Intense, dreadful, horrible pain	8	
	9	
Worst possible, unbearable, excruciating pain	10	

Enabling the “Global” in “Global Vigilance, Reach and Power!”



Stryker PainPump®2

AE Pain & Catheter Care



■ Pain Management

- **Primarily with Stryker PainPump®2 at preset dosing**
- **Secondary with Back-Up orders from the sending facility or from the en-route Flight Surgeon / Physician**
- **Back-Up orders can be initiated for pump failure or in the event of persistent pain with a functioning pump**
- **Of note, the pumps CANNOT be reprogrammed to increase infusion rate**

■ Catheter Management

- **DO NOT manipulate catheter or catheter dressing**
 - **ONLY Anesthesia will manipulate catheters**
 - **ONLY Anesthesia will perform dressing changes on catheter site**
-

Enabling the “Global” in “Global Vigilance, Reach and Power!”



Stryker PainPump®2

Side Effects



-
- If you have any of the following side effects of local anesthetic toxicity, close the clamp on the tubing, turn the pump OFF (Hold “Off” button for 8 seconds), leave pump attached to catheter

 - Monitor for the following Signs and Symptoms
 - Metallic taste in your mouth
 - Light-headedness or dizziness
 - Ringing in the ears
 - Excitation, restlessness
 - Feeling of impending doom
 - Loss of consciousness
 - Seizure
 - Cardiovascular instability

 - FOR ANY QUESTION OF TOXICITY OR SIDE EFFECTS
 - TURN OFF THE PUMP
 - MONITOR THE PATIENT
 - INSTITUTE BACK-UP PAIN CONTROL MEASURES
-

Enabling the “Global” in “Global Vigilance, Reach and Power!”



??Questions??



www.stryker.com/instruments/painmanagement/painpump/patients2.htm

First Call Local Anesthesia Department

Todd E Carter, MD
LtCol, USAF, MC, SFS
Anesthesia/Critical Care
todd.carter@andrews.af.mil
DSN: 857-8554

Chester "Trip" Buckenmaier III, MD
LtC, USA, MC
Chief, Army Regional Anesthesia
Chester.Buckenmaier@na.amedd.army.mil
DSN: 662-2946

Enabling the "Global" in "Global Vigilance, Reach and Power!"



Appendix-A

- **Stryker PainPump2 Non-refillable Specifics**

Appendix –B

- **CPNB Clinical Guidelines**



Appendix-A

Stryker PainPump2 Specifics

Enabling the “Global” in “Global Vigilance, Reach and Power!”



Stryker PainPump®2



-
- What is the Stryker PainPump®2, and what is it used for?
 - **Infusion device for Controlled delivery of local anesthetics in close proximity to nerves for postoperative regional anesthesia and pain management**
 - **Delivers controlled amounts of medication directly to the intraoperative site for pain management**
 - ◆ Hourly flow rate
 - ◆ **Option for patient controlled bolus doses**
 - Button can be pushed, at most, 4 times an hour for extra pain relief
 - **Additional bolus dose will not be administered at that time.**

Enabling the “Global” in “Global Vigilance, Reach and Power!”



Stryker PainPump®2



-
- How does the Stryker PainPump®2 infusion device function?
 - **Pumps medication using a pulsing method**
 - ◆ A pulse of fluid will be pumped every so many seconds depending on the selected flow rate
 - **How, and by whom are the settings programmed?**
 - ◆ Completely programmed by the staff in the operating room/MTF/CASF/ASF
 - ◆ Once the settings have been selected and entered into the pump, the unit must be **LOCKED** in order for the pump to start infusing medication.
 - **Can the settings be changed after the pump has been locked?**
 - ◆ No. Once the pump has been locked, the settings cannot be changed. This mechanism ensures safety as the patient recovers at home or in the hospital.

Enabling the “Global” in “Global Vigilance, Reach and Power!”



Stryker PainPump®2



-
- Can the unit be turned ON and OFF?
 - **The pump may be turned ON and OFF during its use. The programmed settings will remain the same even after the unit has been turned OFF.**
 - How will I know when the pump is empty?
 - **A sensor within the pump will automatically turn off the device when it is empty. The display screen on the pump will read "EMPTY" to indicate that the pump may now be removed.**
 - Does the PainPump® 2 make any noise?
 - **You should know that you can hear your pump cycle as it gradually dispenses medication. If your doctor set the pump to dispense extra doses, it is normal to hear it cycle more rapidly for several minutes after pressing the EXTRA PAIN RELIEF button.**
 - What should I do with the pump when it is empty?
 - **The patient should follow the directions given by their surgeon/anesthesiologist/physician/nurse on how the catheter is to be removed, and how the pump should be discarded.**
-

Enabling the “Global” in “Global Vigilance, Reach and Power!”



PainPump® 2 Benefits



-
- Non-Narcotic
 - **Provides patients with a non-narcotic post-operative pain management**
 - Digital Status
 - **Digital screen provides status without any disruptive alarms or noises**
 - Unrestricted Movement
 - **Does not restrict mobility during post-operative activity and rehabilitation**
 - Patient Interaction
 - **Bolus feature allows for patients to play an active role in their pain management**
 - Programmable
 - **Programming capabilities allow for physicians to customize each pump to needs of the patient**
 - Disposable
 - **Disposable devices alleviate the patient's need to return any capital item**
 - No Extra Staff Required
 - **No additional staff to clean, stock, and reassemble PCA components**
-

Enabling the “Global” in “Global Vigilance, Reach and Power!”



PainPump® 2 Features



-
- **The Stryker PainPump®2 offers the features of a PCA pump with the advantages of a disposable, ambulatory product**
 - Continuous infusion rates of 0.5, 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 ml/hr
 - Bolus programming allows for doses of 1, 2, 3, 4, and 5 ml
 - Bolus lockout times: 10, 15, 20, 30, 45, 60, 90, and 120 minutes
 - Bolus is a non-narcotic means of dealing with breakthrough pain
 - **Programming lockout**
 - Eliminates possibility of patient manipulation of settings
 - **Kinkless catheter**
 - **Sensor will inform patient or clinician of an occlusion**
 - **Digital display provides clinician and patient constant infusion status**
 - **Reservoir volume of 400cc allow for large volumes to be administered**
 - Simple to fill and program
 - Completely enclosed and protected reservoir
 - **Shoulder strap or carrying case allows for easy ambulation**
-

Enabling the “Global” in “Global Vigilance, Reach and Power!”



Appendix-B

CPNB Practice Guidelines

Enabling the “Global” in “Global Vigilance, Reach and Power!”



AE Guidelines For Managing Continuous Peripheral Nerve Blocks



■ Continuous Peripheral Nerve Block (CPNB)

- CPNB involves insertion of a peripheral nerve catheter (PNC) and attachment to the Stryker pump. CPNB is a method for providing continuous and profound limb specific analgesia following surgery of the upper or lower extremity and thorax. CPNB involves infusion of local anesthetic (usually 0.2% ropivacaine) at low dosages to provide analgesia while often sparing motor function. Patient controlled operation of these catheters is available and should be encouraged. Opioid medications are not used in these infusions and concurrent oral, IV, or IV PCA opioid is recommended. Potential drawbacks associated with CPNB include catheter malfunction, infection, local anesthetic toxicity, and anticoagulation issues with catheter placement or removal.

Enabling the “Global” in “Global Vigilance, Reach and Power!”



AE Guidelines For Managing Continuous Peripheral Nerve Blocks



■ Stryker Pain Pump

- The Stryker Pain Pump infusion pump is an electromechanical pump designed to deliver a controlled amount of medication to the patient for pain management. Medication is delivered to the treatment site using an hourly flow rate or combination of hourly flow rate and bolus PCA (Patient Controlled Analgesia) dosing option
- The medication reservoir is filled with a maximum of 400 cc by means of a transfer syringe. A catheter set is placed in the treatment site then connected to a tubing set which carries fluid from the medication reservoir
- The physician selects and locks the drug delivery parameters before starting infusion. A lockout feature prevents the patient from manipulating the controls and becoming over infused. Once locked, the drug delivery parameters remain locked for the life of the unit. If the physician has selected a bolus option for PCA, the patient activates the bolus dose by pressing a pad
- Depending on the amount of medication, dispense rate, and mode of delivery, the unit is used up to seven days. The unit is intended for single patient use only. Upon completion of therapy, the unit is removed under the direction of a physician



AE Guidelines For Managing Continuous Peripheral Nerve Blocks



■ Breakthrough Pain

- If patients complain of persistent pain (> 5/10), first check for the integrity of the CPNB system: tubing is connected without kinks and pump is functioning. Note that the Stryker may turn itself off if there is excessive vibration and will need to be turned back on manually. Proceed to back-up pain medications if pump is malfunctioning or if patient continues to complain of pain with a functioning pump. The Stryker infusion rates cannot be adjusted once locked, so if no mechanical problems identified in a patient complaining of persistent pain, proceed to back-up pain medications.

■ Catheters and anticoagulation

- **Peripheral nerve catheters should not be placed or removed during periods of defective coagulation. A typical rule of thumb (particularly for fractionated heparin) is not to place catheters 12 hours since the last dose and do not remove catheters for 12 hours since the last dose.**