



The ABRA Abdominal Wall Closure System

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CANADIAN SURGERY FORUM CANADIEN DE CHIRURGIE

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DYNAMIC TISSUE SYSTEMS™

Help!!!

The abdomen is not closing with Negative Pressure Wound Therapy!

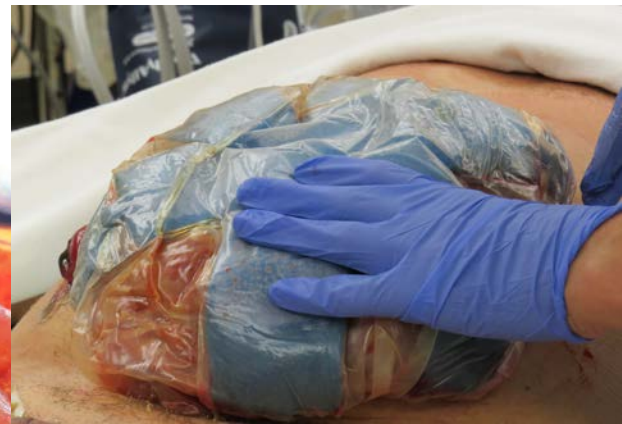


The ABRA Abdominal Wall Closure System

A dynamic wound closure system

Objectives

- To understand
 - What the ABRA system is
 - Why the ABRA system works
 - When to use the ABRA system
 - How to install the ABRA system

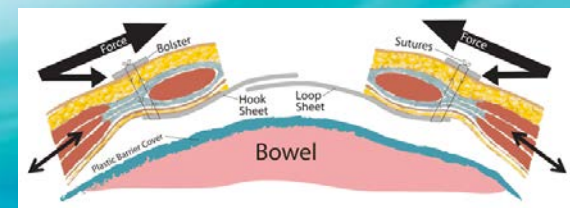
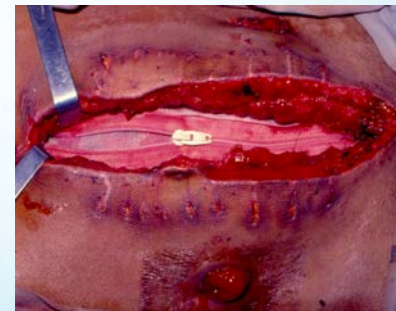


What would your next step be?

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Potential Wound Closure Options

- Negative pressure wound therapy (eg. ABThera)
- Skin graft
- Myocutaneous flap
- Component separation
- Static medial traction devices
 - Wittman Patch, Velcro, zipper



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Another Option...



The ABRA Abdominal Wall Closure System

Dynamic Wound Closure System

Premise:

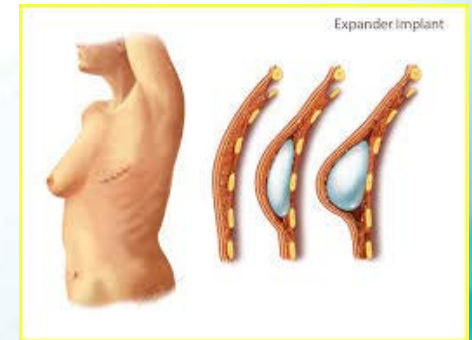
- If tissue has not been removed then that tissue should be restored to correct position, integrity and function
- The problem - wound edges try to separate due to the elastic forces inherent in skin and muscle tissue
- If elastic forces are causing the problem then it makes sense to use elastic forces to treat it
- If dynamic forces holds a wound open then dynamic traction should be able to close them

Physical Basis of Dynamic Wound Healing

- Skin/Muscle is viscoelastic allowing it to stretch via 2 mechanisms

1. Mechanical Creep

- Elongation of tissue with a constant load over time
- Causes micro-fragmentation of elastic fibers
- Viscous properties result in retained memory of new stretched position



2. Biological Creep

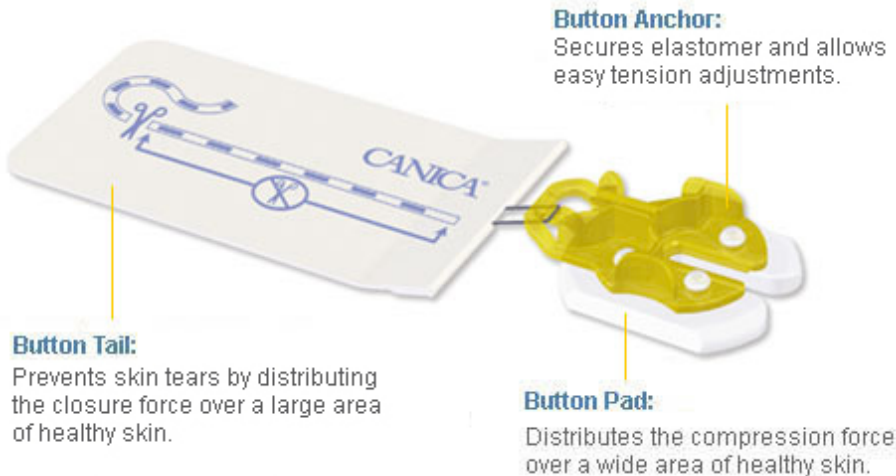
- New tissue created as a result of persistent stretching force
- Causes unique histological changes not seen with intraoperative tissue expansion



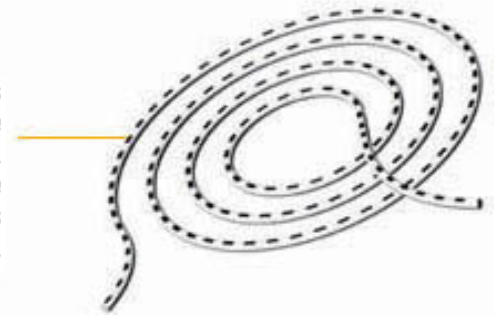
What are the challenges in making an effective, clinically acceptable dynamic system?

- ✓ Calculating a reliable, measurable and controllable therapeutic traction force
- ✓ Developing a means of maintaining the therapeutic traction force as tissue moves
- ✓ Implementing a quick way to release traction in the event of clinically adverse tissue hypertension
- ✓ Developing skin anchoring devices that are as atraumatic as possible, yet evenly distribute traction forces at the anchor sites and minimize forces that contribute to point load and skin breakdown

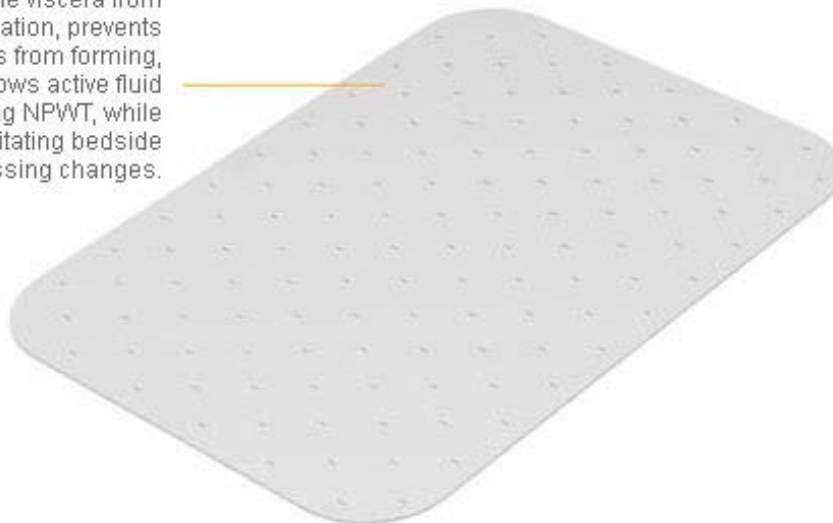
The ABRA System



Silicone Elastomer:
Provides the continuous dynamic force that closes the wound under low tension. Stretches to accommodate inflammation, yet releases easily at bedside as required.



Perforated Silicone Sheet (30cm x 43cm x 1mm):
Protects the viscera from strangulation, prevents adhesions from forming, and allows active fluid transfer using NPWT, while facilitating bedside dressing changes.



Note: ABRA should always be used in combination with a Negative Pressure Wound Therapy System

ABRA Abdominal Wall Closure

Benefits	Features
<ul style="list-style-type: none">• Achieves a low tension primary closure• Maintains/restores domain• Can eliminate the need for mesh or skin graft• Preserves fascial margins	<ul style="list-style-type: none">• Used with NPWT eg. VAC• Reduces OR procedures by 50%• Allows bedside dressing changes• Reduces length of stay• MRI compatible

WHEN DO WE NEED ABRA WITH NPWT FOR WOUND CLOSURE?

- 30% to 40% of patients are not closed following NPWT, they have FIXED RETRACTED ABDOMINAL MUSCULATURE
- These patients cannot be closed until the muscles are advanced to the midline
- These patients need a device to provide traction to overcome this retracted fixed resistance
- ABRA pulls muscle planes together - acute wound closure rates exceed 92% and fascial edges have not been compromised due to the use of elastomers

Indication for ABRA

- A full-thickness retracted midline abdominal wound after laparotomy
 - ✓ Sepsis has been controlled
 - ✓ Intra-abdominal procedures have been completed
 - ✓ Hemodynamically stable

Do not place ABRA if there is ongoing contamination and further intra-abdominal procedures are planned

Management of the open abdomen with the Abdominal Reapproximation Anchor dynamic fascial closure system

Candace Haddock, M.D., David E. Konkin, M.D.*, N. Peter Blair, M.D., M.B.C.

Department of Surgery, Royal Columbian Hospital, University of British Columbia, 208-250 Keary Street, New Westminster V3L 5E7, Vancouver, BC, Canada

RESULTS: Between January 2006 and July 2011, 36 patient charts were identified. The average Acute Physiology and Chronic Health Evaluation II score was 21.9 ± 6.9 . There was a mean of 3.1 ± 1.8 laparotomies before ABRA placement for each patient, and the duration of ABRA placement until removal was 10.4 ± 6.1 days. Complete fascial apposition was achieved in 83% of the patients across the entire study and in 91% of the patients in the final 2 years. Component separation was used in 17% of cases. The incisional hernia rate was 13% at 6 months and 11% at 12 months.

number of operations, the time to primary closure, the success rate of primary closure, and complications related to the use of the ABRA were analyzed.

RESULTS: Between January 2006 and July 2011, 36 patient charts were identified. The average Acute Physiology and Chronic Health Evaluation II score was 21.9 ± 6.9 . There was a mean of 3.1 ± 1.8 laparotomies before ABRA placement for each patient, and the duration of ABRA placement until removal was 10.4 ± 6.1 days. Complete fascial apposition was achieved in 83% of the patients across the entire study and in 91% of the patients in the final 2 years. Component separation was used in 17% of cases. The incisional hernia rate was 13% at 6 months and 11% at 12 months.

CONCLUSIONS: Our use of the ABRA system resulted in an 83% fascial apposition rate, which further improved when experience was taken into account. The incisional hernia rate was acceptable in this complicated patient group. This technique is an excellent addition to a surgeon's armamentarium for complicated abdominal cases that require an open abdomen. Further prospective studies are planned to identify ideal candidates for this technique.

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Management of the open abdomen using combination therapy with ABRA and ABThera systems

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Background: The open abdomen is an increasingly used technique that is applied in a wide variety of clinical situations. The ABThera Open Abdomen Negative Pressure Therapy System is one of the most common and successful temporary closure systems, but it has limited ability to close the fascia in approximately 30% of patients. The abdominal reapproximation anchor system (ABRA) is a dynamic closure system that seems ideal to manage patients who may not achieve primary fascial closure with ABThera alone. We report on the use of the ABRA in conjunction with the ABThera in patients with an open abdomen.

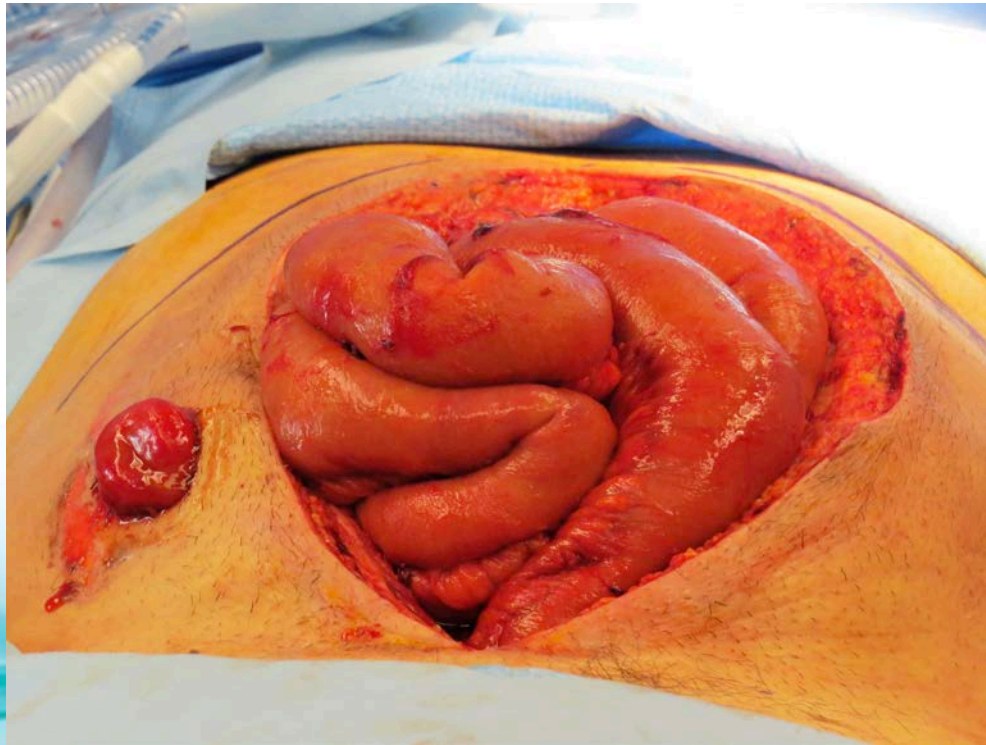
Methods: We retrospectively analyzed patients with an open abdomen managed with the ABThera and ABRA between January 2007 and December 2012 at the Halifax Infirmary, QEII Health Science Centre, Halifax, Nova Scotia.

Results: Sixteen patients had combination therapy using the ABRA and ABThera systems for treatment of the open abdomen. After removing patients who died prior to closure, primary fascial closure was achieved in 12 of 13 patients (92%).

Conclusion: We observed a high rate of primary fascial closure in patients with an open abdomen managed with the ABThera system in conjunction with the ABRA. Applying mechanical traction in addition to the ABThera should be considered in patients predicted to be at high risk for failure to achieve primary fascial closure.

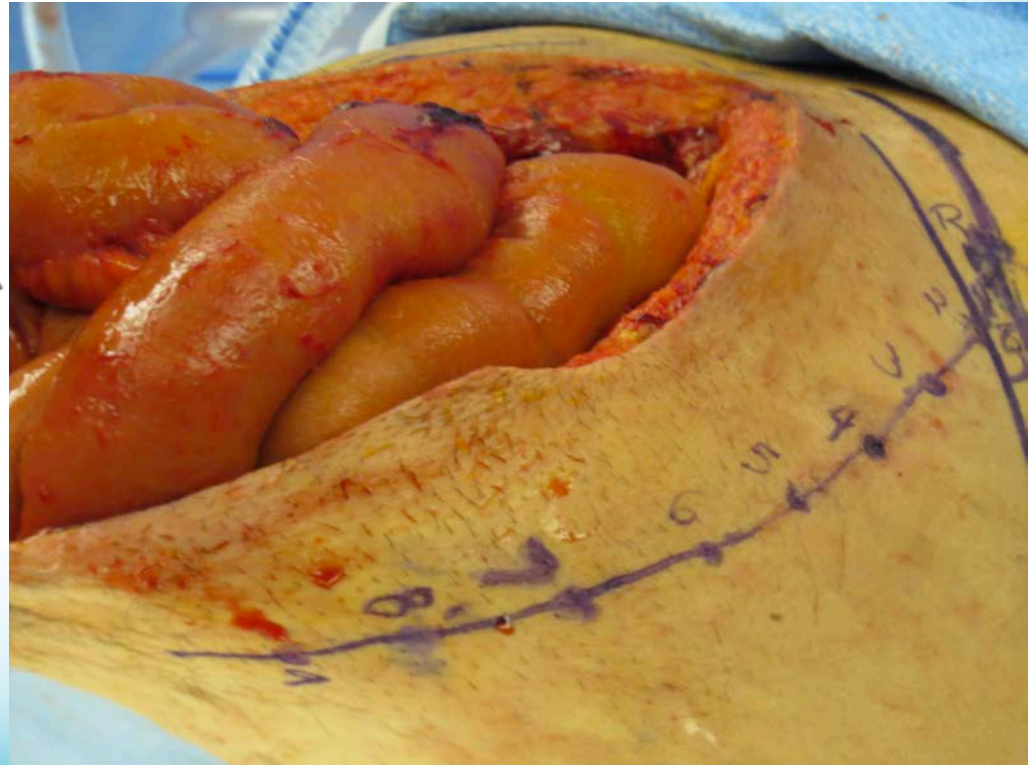
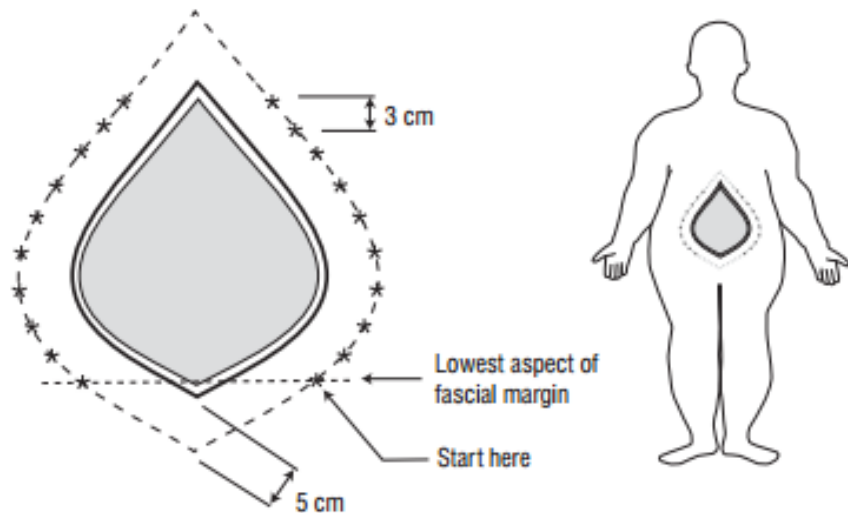
12 of 13 patients with primary fascial closure

ABRA Installation

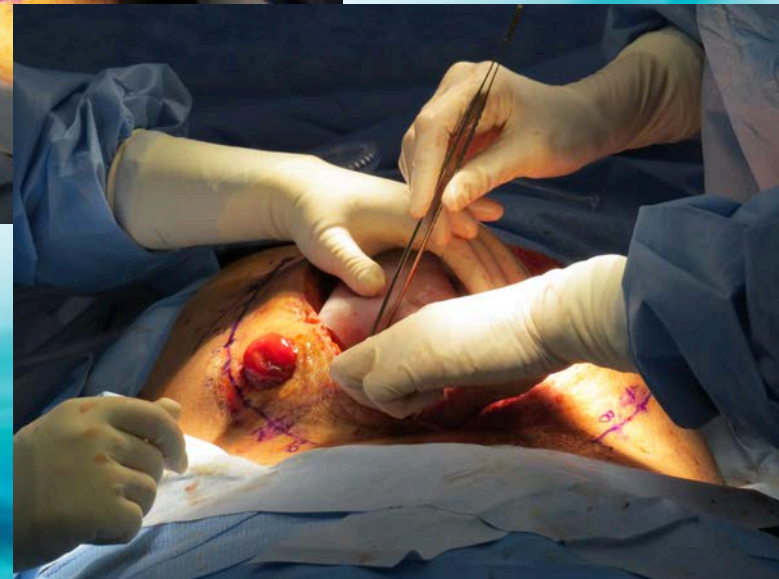
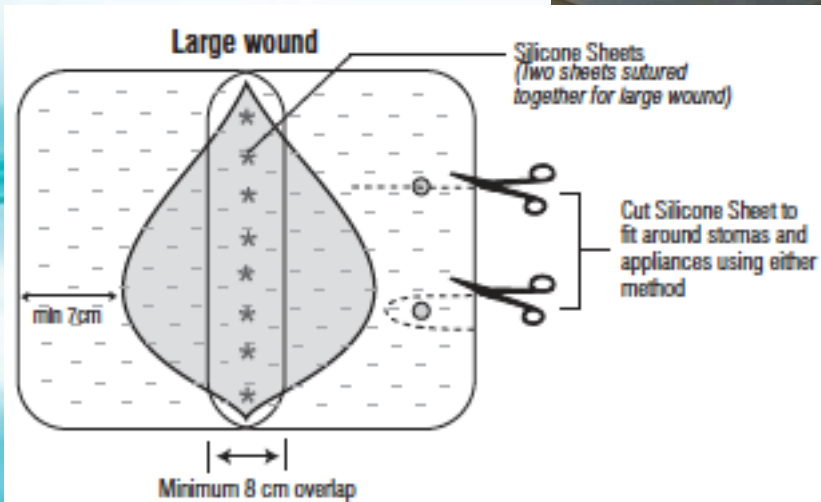
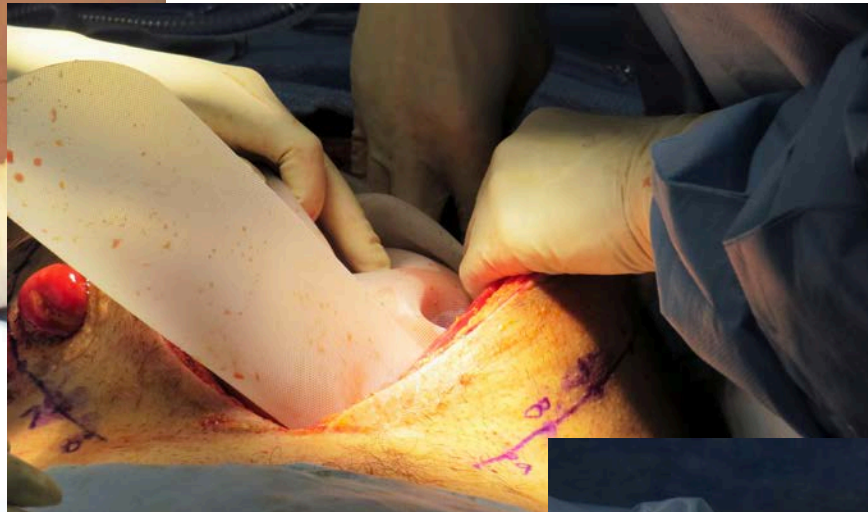


- Remove NPWT
- Ensure no ongoing bleeding nor sepsis
- Marking pen and ruler
- ABRA components

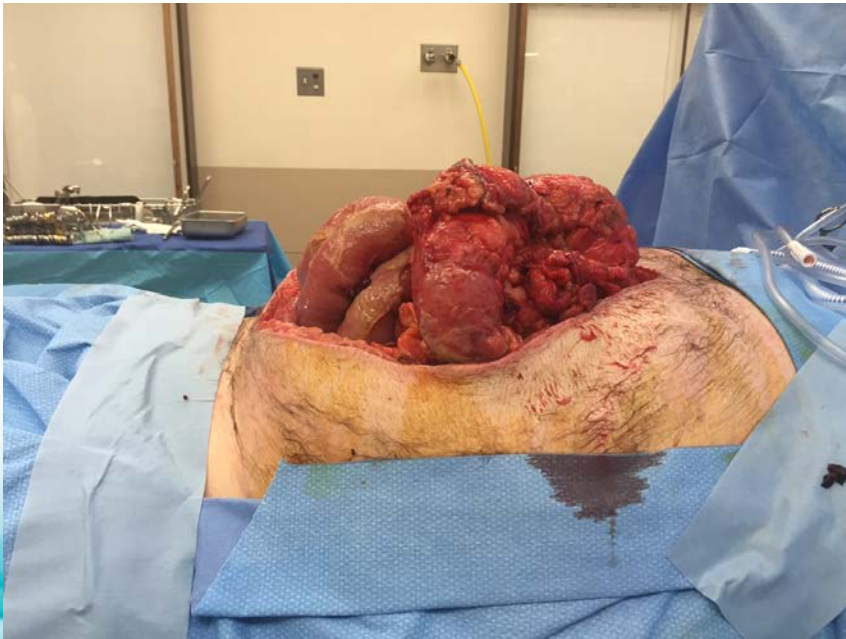
Mark out sites for elastomers



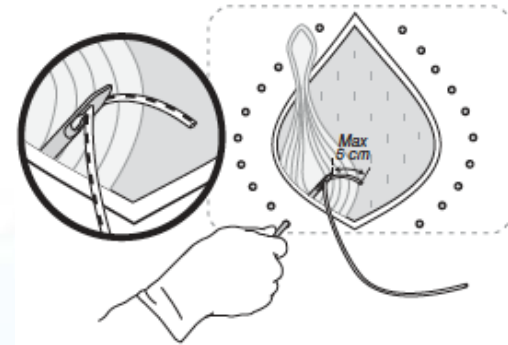
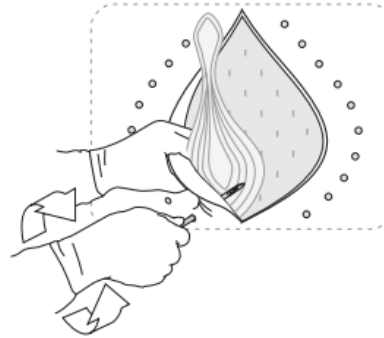
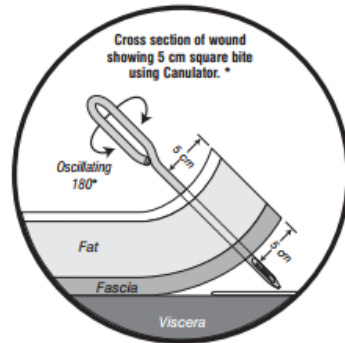
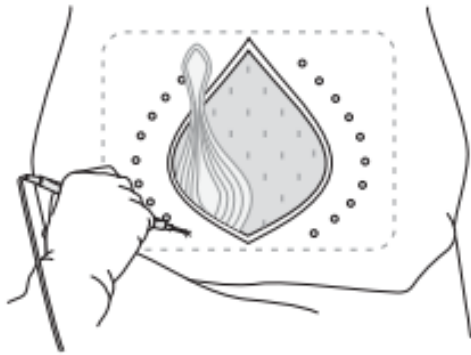
Prepare and Insert Silicone Sheet*



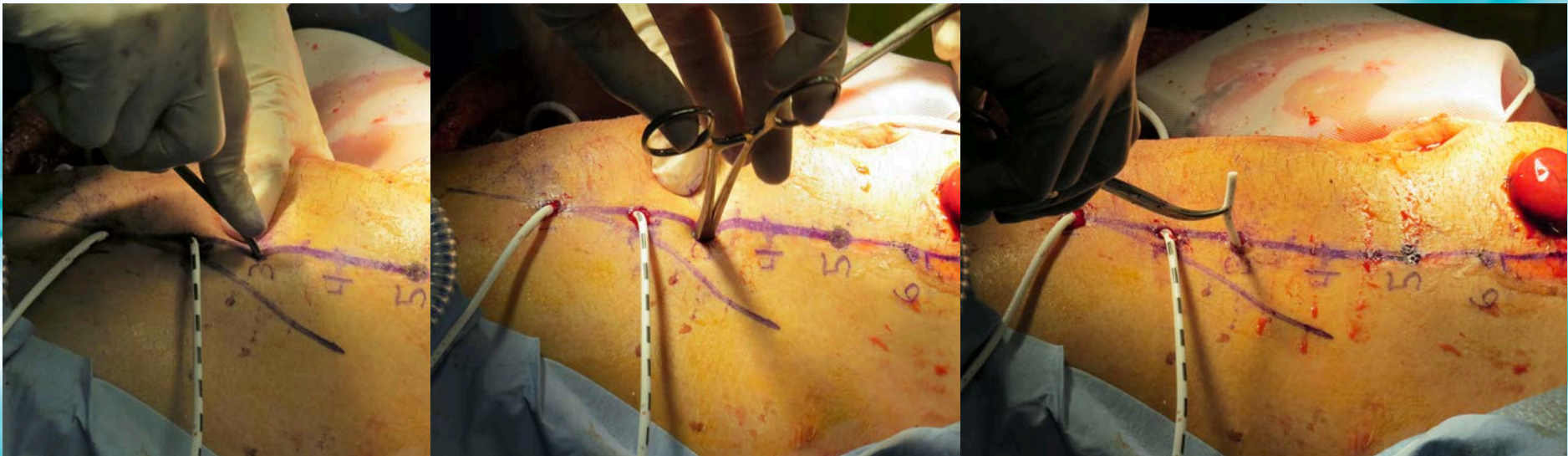
Two silicone sheets sewn together



Insert the Elastomers

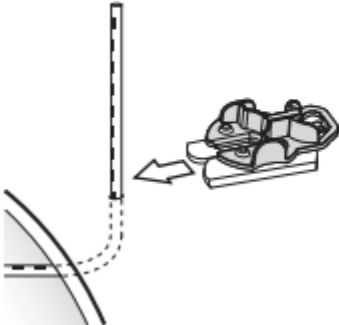


How I do it

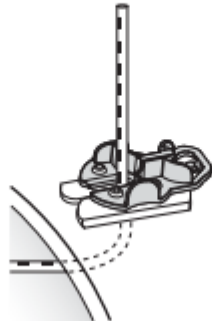


Attach Button Anchors

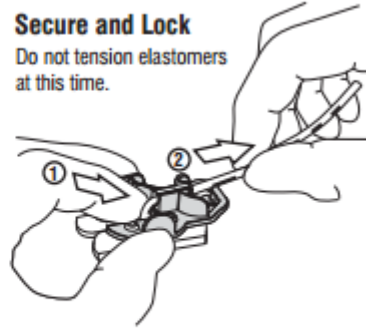
A Face Button Anchor slot towards the wound.



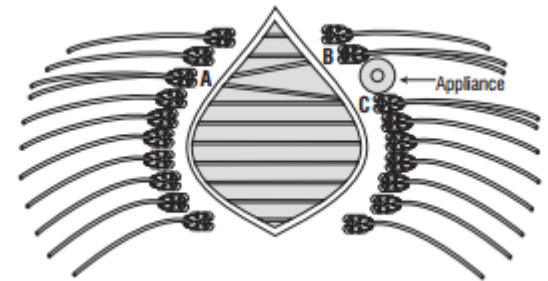
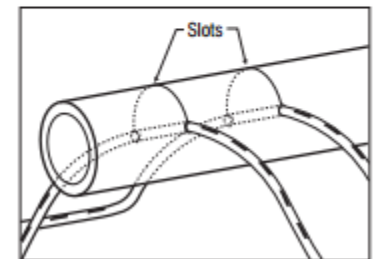
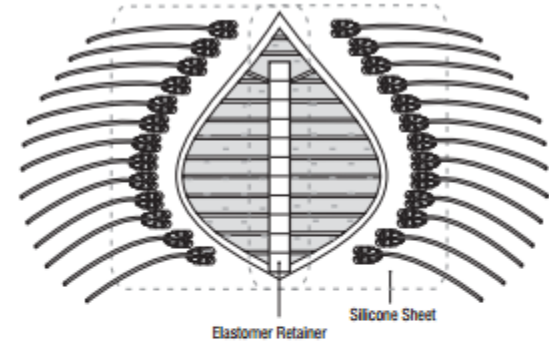
B Slide the Button Anchor until elastomer is in the slot.



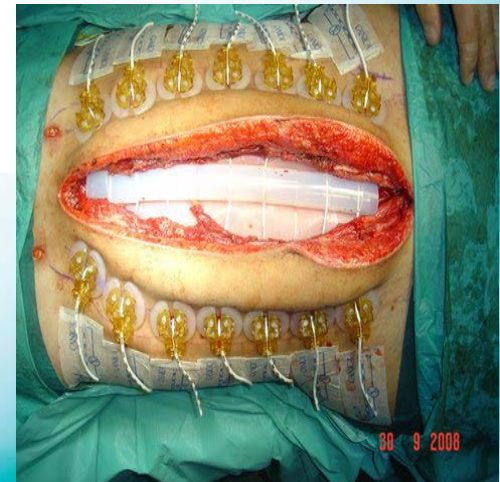
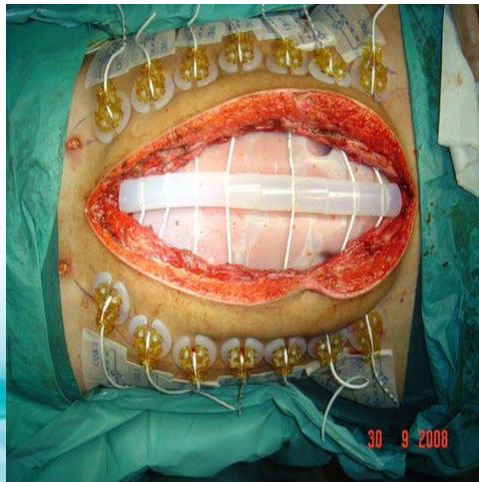
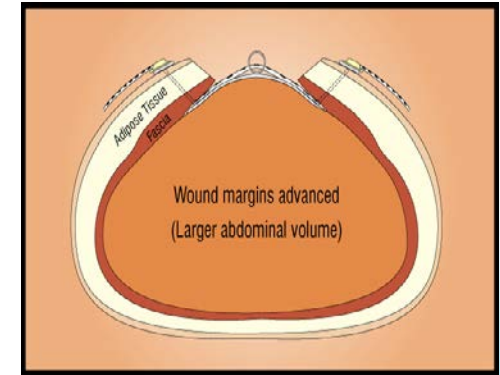
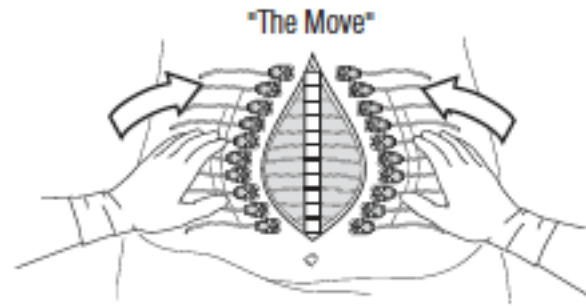
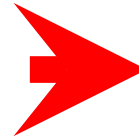
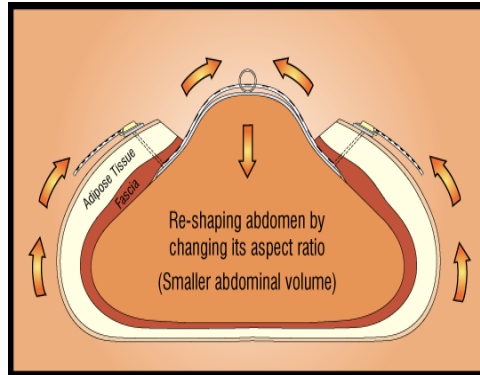
C Secure and Lock
Do not tension elastomers at this time.



Secure the elastomer with your finger (#1), then draw back on the loose end with the opposite hand until the elastomer drops into the cleat (#2).

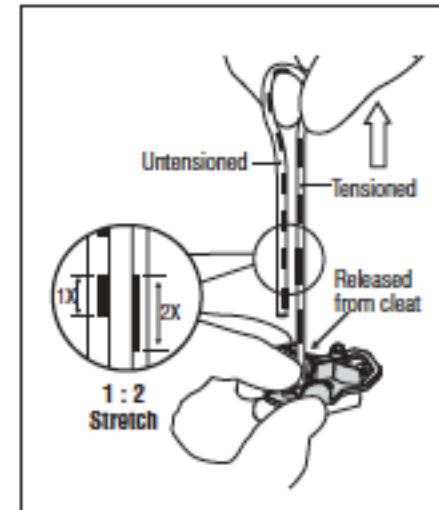
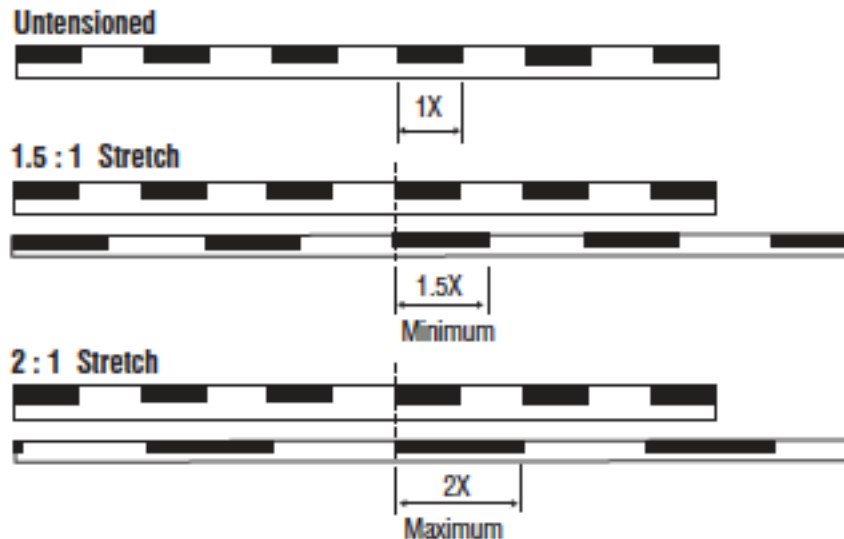


“The Move” – Essential to success

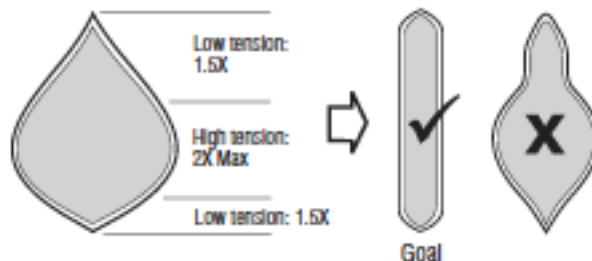


The “Move” increases abdominal cavity volume and regains lost domain in the OR immediately after ABRA installation

Set the Tension



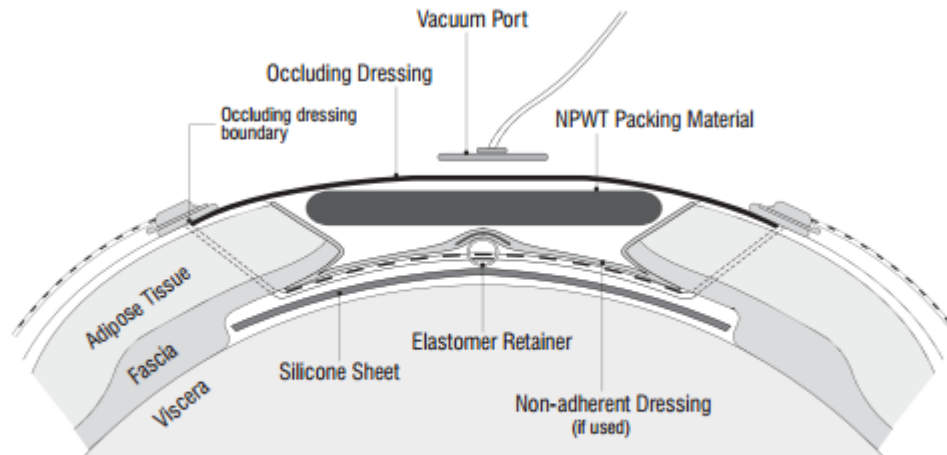
Example of Tension Settings (Based on Wound Width)



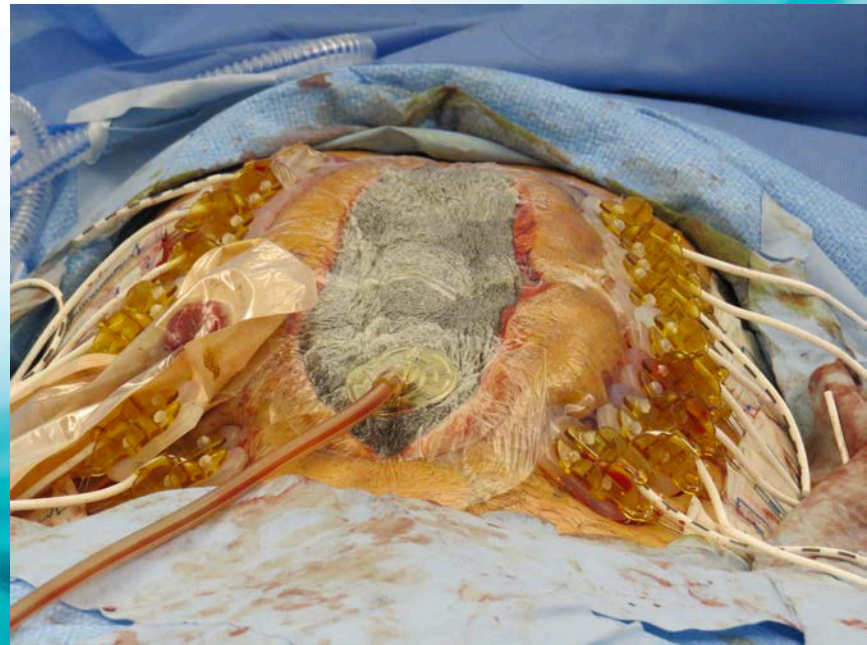
Widest points = High tension = 2X
Narrower points = Low tension = 1.5X

Note: Patients with a large pannus require high tension on the lower aspect of the wound.

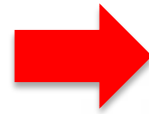
Apply NPWT



NOTE: It is important that the occluding top dressing does not cover the Button Anchors. Trim the dressing and seal to the skin within the 5 cm margin in front of the elastomers.



Ongoing Care – ICU NPWT change and Tension Adjustment



ABRA Tips & Tricks

Warnings

- If peak ventilator pressure or bladder pressure is adversely increasing during an inflammatory response, elastomer tensions should be reduced to 1.5X stretch to normalize pressure.
- Monitor the patient's fluid balance. If appropriate, consider steps to reduce interstitial volumes. High fluid balance increases abdominal volumes and makes fascial re-approximation more difficult.
- Constipation may increase bowel volume, which may slow wound closure progress.
- The Button Anchor pad is occlusive so it is important to clean and dry under the Buttons at least once every 12 hours, or every nursing shift, to prevent skin maceration. Hydrocolloid or other dressings may be placed under the Buttons to assist in moisture collection and load distribution.
- Button Anchors and Button Tails must remain dry. Do not cover with occlusive dressings.
- The Button Tails must be maintained at all times. Improperly installed or maintained Button Tails will result in unnecessary skin tears. Replace Button Tails immediately if skin tears are observed.
- Do not trim elastomer ends. The added length may be required during an inflammatory response period.
- Do not restrain or knot the ends of the elastomer beyond the cleat of the Button Anchor.

Tips:

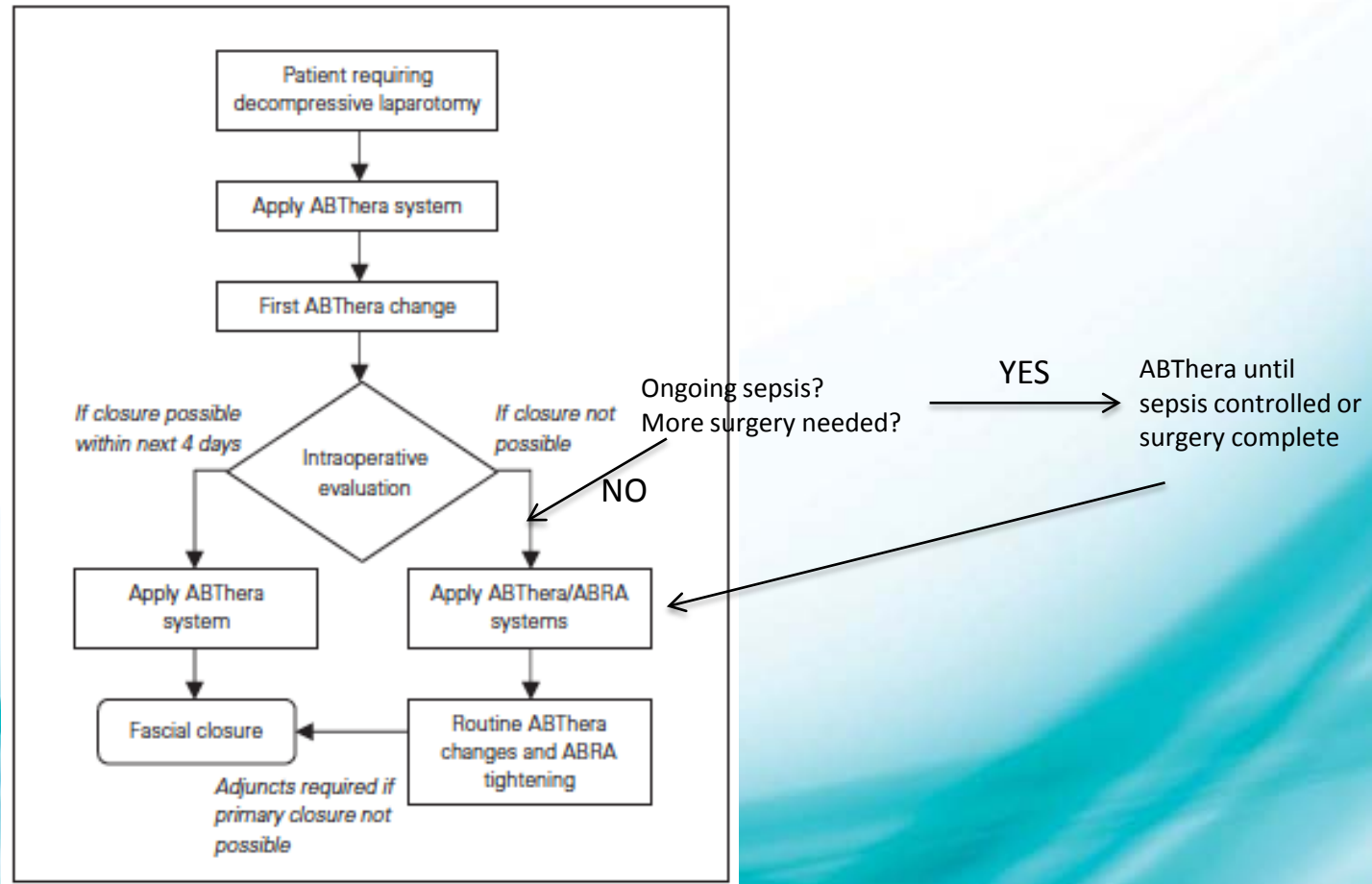
- During the post-operative period, the system may be loosened and the viscera protector re-positioned to allow for inspection and cleaning of the wound.
- During patient transfers, abdominal binders may be used to temporarily support the mass of adipose tissues. **(Do not leave binder in place for more than 10 minutes!)**

ABRA Tips & Tricks

- Work with the Intensivist re: fluid balance
- Daily “Move” and elastomer assessment
- Keep holes small to prevent air leak
- Overtightening will result in elastomer breakage
- We allow some mobilization of the patient with an ABRA

The ABRA will fail if not properly installed

Treatment Algorithm



Thank You!

QUESTIONS?

HELP US IMPROVE!

Complete the session evaluation:

on the CSF App

OR

at www.canadiansurgeryforum.com

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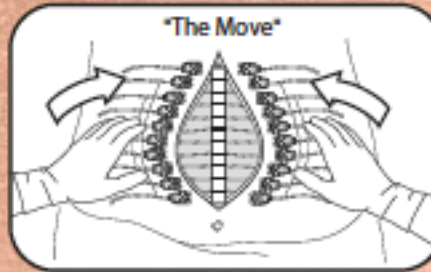
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Bedside Care Physician Instructions



Before the Move

- Set elastomer tensions to a maximum of 2X stretch by securing elastomer with your finger, then drawing back on loose end with opposite hand until elastomer drops into cleat, then release.
- To release elastomer, hold the button anchor by the finger grips and pull the elastomer towards the wound.



Do the Move

- A repeated sequence to reshape the abdomen by changing its aspect ratio.
- Starting from the patient's sides, apply a palmar, massaging, tension-reduction force toward the midpoint.
- Observe margin advancement and the reduction in elastomer tension.



After the Move

- Re-set all elastomer tensions to a maximum of 2X stretch.
- Repeat Move once more.
- Re-set elastomers to max. 2X stretch. Release tension to 1.5X stretch in areas such as upper & lower aspects to adjust wound shape.
- Elastomers can be released and re-set repeatedly.

After the Move, wound margins should be as close to parallel as possible with highest tension at 2X stretch

