PARASTOMAL HERNIAS

PRINCIPLES & CONCEPTS BEHIND EFFECTIVE RESULTS

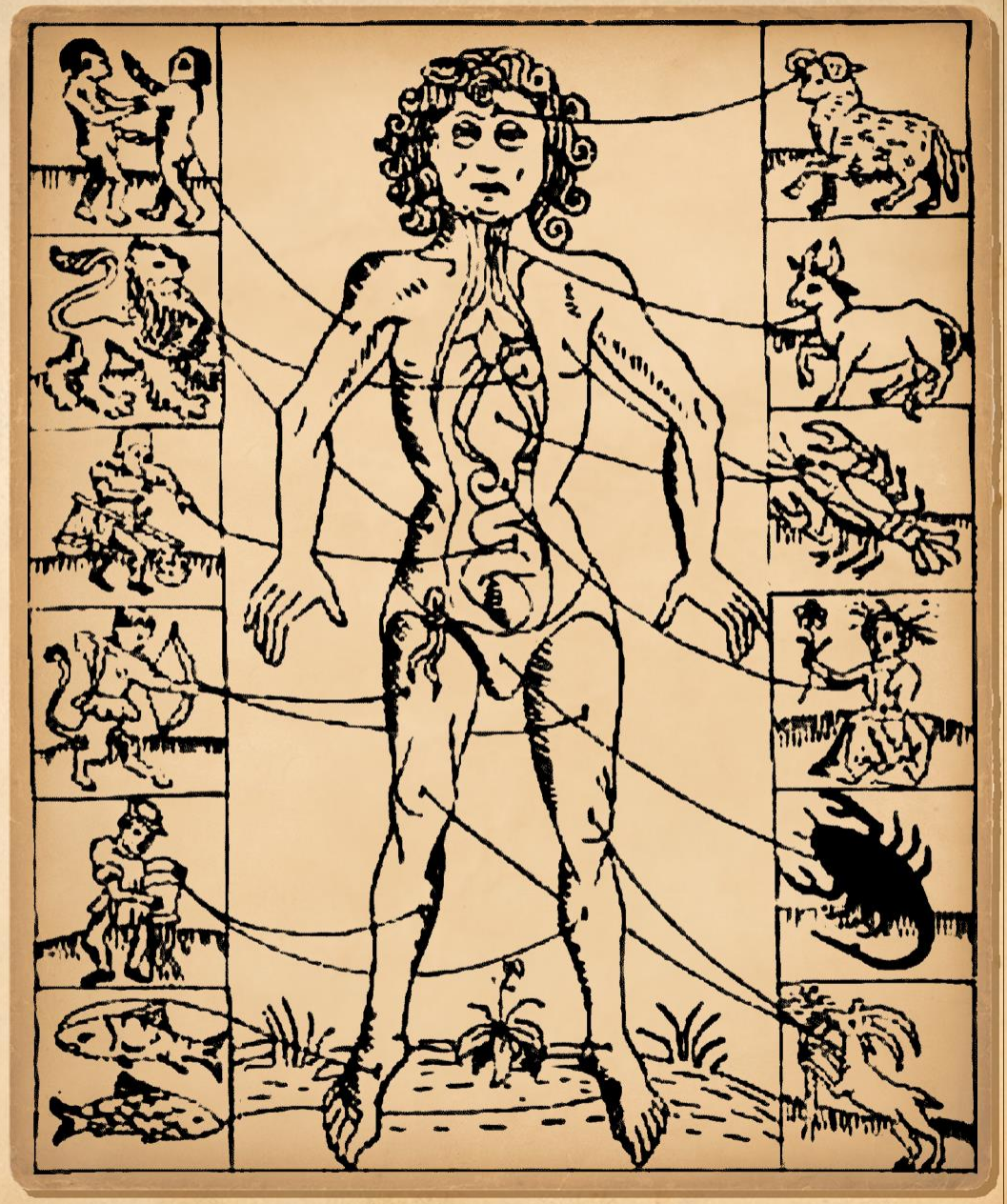
PREEMPTING & FIXING A NOTORIOUSLY MORBID & DISABLING DIFFICULT PROBLEM OF THE SURGICAL ARTS & SCIENCES

ANATOMICAL, STRUCTURAL, & TECHNICAL

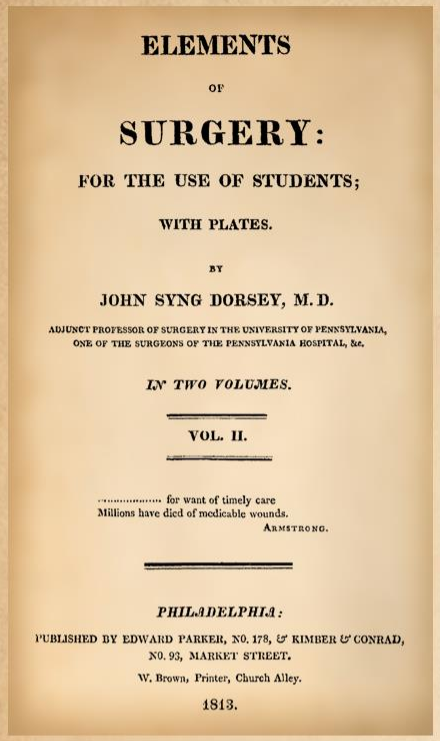
Considerations to keep intra-abdominal viscera
from prolapsing through or around
a cutaneous enterostomy.

Marc E. Gottlieb, MD, FACS
Phoenix, Arizona

arimedica.com
2017



Zodiac Man , 1702 reproduction of earlier work (German, late 15th or early 16th century).



ELEMENTS

OF

SURGERY:

FOR THE USE OF STUDENTS;

WITH PLATES.

BY

JOHN SYNG DORSEY, M. D.

ADJUNCT PROFESSOR OF SURGERY IN THE UNIVERSITY OF PENNSYLVANIA, ONE OF THE SURGEONS OF THE PENNSYLVANIA HOSPITAL, &c.

IN TWO VOLUMES.

VOL. II.

..... for want of timely care
Millions have died of medicable wounds.
ARMSTRONG.

PHILADELPHIA:

PUBLISHED BY EDWARD PARKER, NO. 178, & KIMBER & CONRAD, NO. 93, MARKET STREET.

W. Brown, Printer, Church Alley.

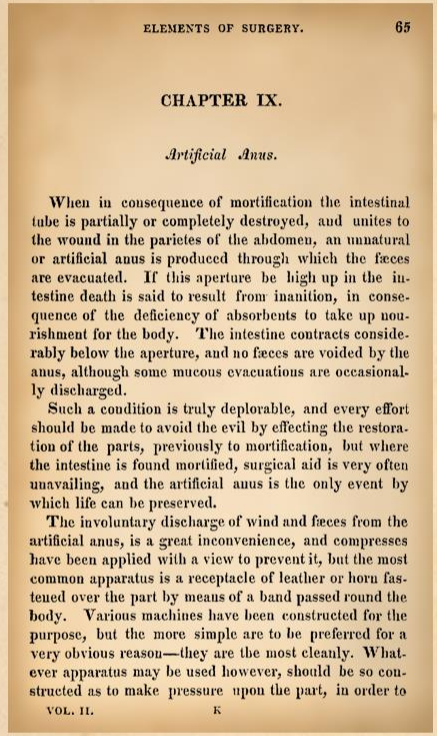
1813.

"Artificial anus", an entero-cutaneous fistula following trauma or inflammatory bowel disorders, has long been recognized as a survivable condition, even if quality of life is impaired.

Deliberate colocutaneous fistula formation for therapeutic reasons was first tried in 18th century Europe. Typically done for desperate conditions, failures and deaths were accepted, and successes established validity of the concept.

Therapeutic enterostomy was sporadic until mid 19th century, when anesthesia & asepsis set foundations for modern surgical techniques.

By 20th century, colostomy was legitimate but infrequent. Use increased after WWI which spurred advances in surgery and long term patient support. After WWII, colostomy became normative surgical practice.



ELEMENTS OF SURGERY. 65

CHAPTER IX.

Artificial Anus.

When in consequence of mortification the intestinal tube is partially or completely destroyed, and unites to the wound in the parietes of the abdomen, an unnatural or artificial anus is produced through which the fæces are evacuated. If this aperture be high up in the intestine death is said to result from inanition, in consequence of the deficiency of absorbents to take up nourishment for the body. The intestine contracts considerably below the aperture, and no fæces are voided by the anus, although some mucous evacuations are occasionally discharged.

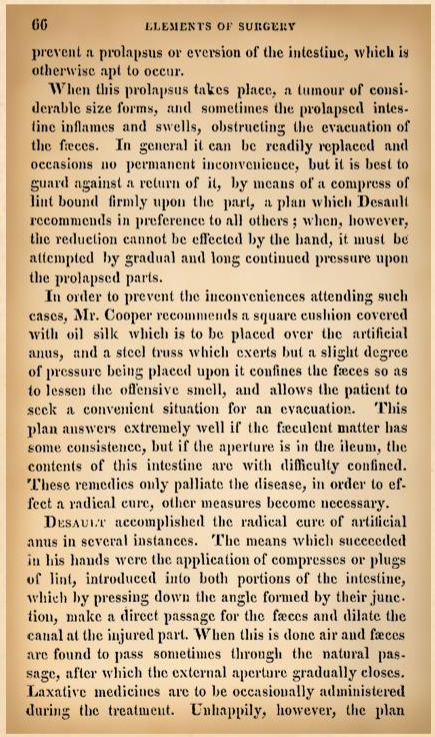
Such a condition is truly deplorable, and every effort should be made to avoid the evil by effecting the restoration of the parts, previously to mortification, but where the intestine is found mortified, surgical aid is very often unavailing, and the artificial anus is the only event by which life can be preserved.

The involuntary discharge of wind and fæces from the artificial anus, is a great inconvenience, and compresses have been applied with a view to prevent it, but the most common apparatus is a receptacle of leather or horn fastened over the part by means of a band passed round the body. Various machines have been constructed for the purpose, but the more simple are to be preferred for a very obvious reason—they are the most cleanly. Whatever apparatus may be used however, should be so constructed as to make pressure upon the part, in order to

VOL. II. K

Ileostomy lagged behind colostomy in usage, infrequent until mid 20th cent.

Everted mucosal "spigot", innovation by Bryan Brooke 1952, solved most ileostomy issues, making it accepted.



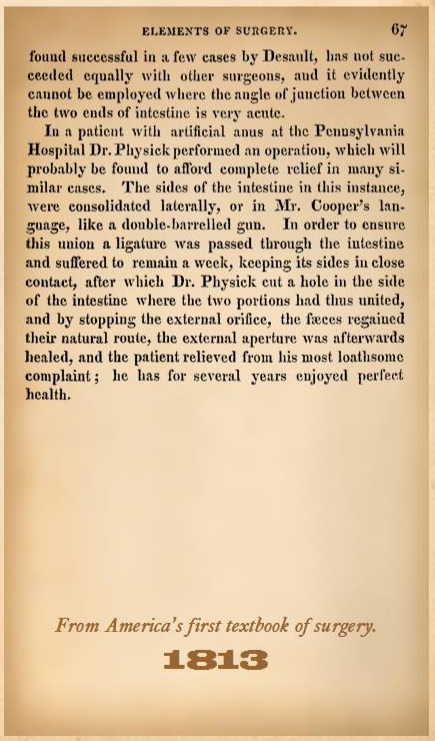
66 ELEMENTS OF SURGERY

prevent a prolapsus or eversion of the intestine, which is otherwise apt to occur.

When this prolapsus takes place, a tumour of considerable size forms, and sometimes the prolapsed intestine inflames and swells, obstructing the evacuation of the fæces. In general it can be readily replaced and occasions no permanent inconvenience, but it is best to guard against a return of it, by means of a compress of lint bound firmly upon the part, a plan which Desault recommends in preference to all others; when, however, the reduction cannot be effected by the hand, it must be attempted by gradual and long continued pressure upon the prolapsed parts.

In order to prevent the inconveniences attending such cases, Mr. Cooper recommends a square cushion covered with oil silk which is to be placed over the artificial anus, and a steel truss which exerts but a slight degree of pressure being placed upon it confines the fæces so as to lessen the offensive smell, and allows the patient to seek a convenient situation for an evacuation. This plan answers extremely well if the fæculent matter has some consistence, but if the aperture is in the ileum, the contents of this intestine are with difficulty confined. These remedies only palliate the disease, in order to effect a radical cure, other measures become necessary.

DESAULT accomplished the radical cure of artificial anus in several instances. The means which succeeded in his hands were the application of compresses or plugs of lint, introduced into both portions of the intestine, which by pressing down the angle formed by their junction, make a direct passage for the fæces and dilate the canal at the injured part. When this is done air and fæces are found to pass sometimes through the natural passage, after which the external aperture gradually closes. Laxative medicines are to be occasionally administered during the treatment. Unhappily, however, the plan



ELEMENTS OF SURGERY. 67

found successful in a few cases by Desault, has not succeeded equally with other surgeons, and it evidently cannot be employed where the angle of junction between the two ends of intestine is very acute.

In a patient with artificial anus at the Pennsylvania Hospital Dr. Physick performed an operation, which will probably be found to afford complete relief in many similar cases. The sides of the intestine in this instance, were consolidated laterally, or in Mr. Cooper's language, like a double-barrelled gun. In order to ensure this union a ligature was passed through the intestine and suffered to remain a week, keeping its sides in close contact, after which Dr. Physick cut a hole in the side of the intestine where the two portions had thus united, and by stopping the external orifice, the fæces regained their natural route, the external aperture was afterwards healed, and the patient relieved from his most loathsome complaint; he has for several years enjoyed perfect health.

From America's first textbook of surgery.

1813

ParaStomal Hernias first got attention in medical literature circa 1950- 1960's.

Primary PSH rates vary widely due to many factors. Peak reported rates are 80%, average estimates of 1/3 to 1/2.

Early approaches to fixing PSH were simple fascial repair, relocation of the stoma, and experimentation with rectus vs. obliques or else extra-peritoneal.

These have high failure or recurrence. Rates for 1st time fix vary, but are up to 75%. Recurrence rates for 2nd time fixes are up to 100%. Most PSH, primary or recurrent, appear within 2 years. Certain high risk factors are identified.

Alloplastic meshes were used for PSH in the 1970's. A benchmark of improved results was the Sugarbaker technique, 1985. Laparoscopy in the 1990's, and biomatrices in the 2000's have created more opportunities for innovative surgery.

Sugarbaker technique uses mesh to cover the hernia aperture and create a valve effect in the bowel. It has dropped recurrence rates from 20-80% range to the 0-20% range. Usually done with plastic mesh, there is room for refinement.

PARASTOMAL HERNIAS
CAUSATIVE FACTORS & PATHOGENESIS

Technical Factors
Ordinary Surgical Biology
Mesenchymal Biology & Mechanics

Some primary parastomal hernias begin with preventable details of surgical technique.

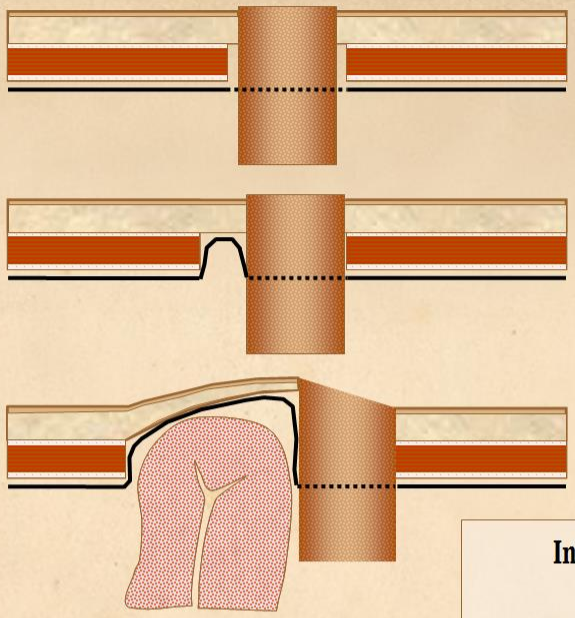
e.g., Making the trans-muscular via too wide, or not suturing or closing mesentery or parietes.

Some primary parastomal hernias begin as consequences of post-operative factors.

e.g., Inflammation or necrosis which weakens scar, or abdominal distension which distends the aperture.

Secondary or recurrent parastomal hernias represent progressive consequences of scar mechanics.

Techniques relevant to primary uncomplicated surgery, can be irrelevant or counterproductive to redo surgery.



Pathogenesis of Hernia

There must be an initial defect, traverse, slot, sinus, via into which bowel or other structures can insinuate themselves.

That initial via is essential - prevent it, and there is no hernia.

Initial slots occur due to:

Technique,

Mechanical forces on the tissues,

Inflammatory states that lyse or weaken the tissues.

Once the hernia and sac start to develop, there is

Progressive dilation of the sac,
and
Attrition & enlargement of the ring.

The process is governed by Wolf's Law and the principles of mesenchymal biomechanics.

Once the process starts, the hernia sac becomes a pulsion diverticulum or aneurysmal dilation that expands at an exponential rate.

PARASTOMAL HERNIAS :: GENERAL PRINCIPLES OF PREVENTION AND CORRECTION

INITIAL & PREVENTIVE :

Seal the aperture:
at parietes
at external fascia
parietal petals

Buttress the aperture:
attached mesentery
moot mesentery
epiploic appendages
omentum

REPAIR & RECONSTRUCT :

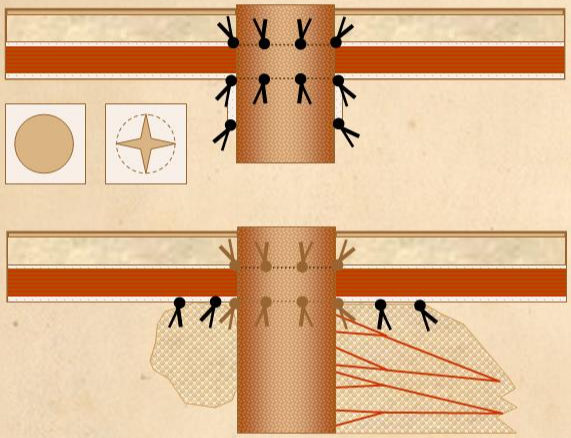
Autogenous repair:
as above
muscle flaps, cylindrical
muscle & fascia, tangential

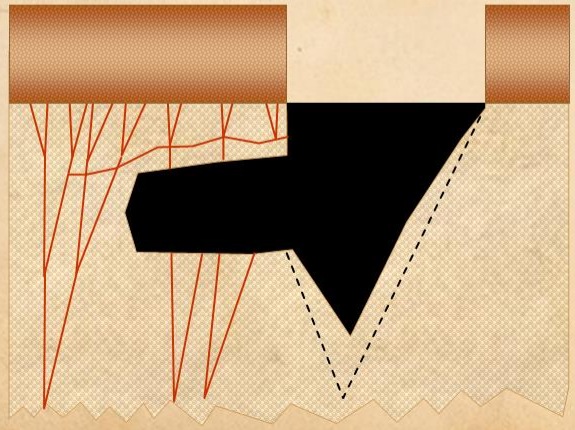
Mesh repair:
alloplastic vs biomatrix
barrier vs gusset

Valves & seals:
Sugarbaker technique
Sandwich technique
Collar-and-skirt bushing

PREVENTING PARASTOMAL HERNIA

Technicalities to be applied during the initial enterostomy creation, and at redo's if possible.





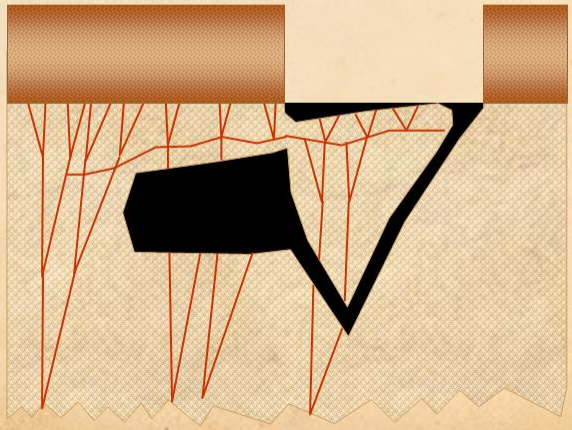
Treating Parastomal Hernias Begins with Prevention

A variety of small activities done at the time of the stoma creation can minimize the likelihood of aperture dilation, bowel insinuation, and similar factors that lead to hernia.

Seal the aperture: *at parietes, at external fascia. Preserve and attach parietal petals.*

Buttress the aperture: *attached mesentery, epiploic appendages, omentum, discard mesentery.*

Moot mesentery: *mesenteric wedge that would be discarded as part of segmental bowel resection can be preserved on a pedicle and used to seal anastomoses or buttress stomas.*



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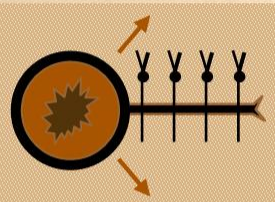
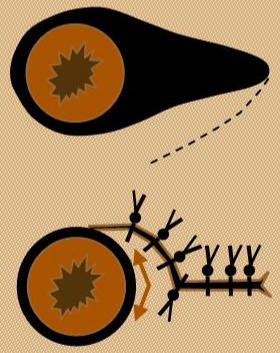
Parastomal hernia through abdominal fascias. (View is the same whether seen from below or external.)

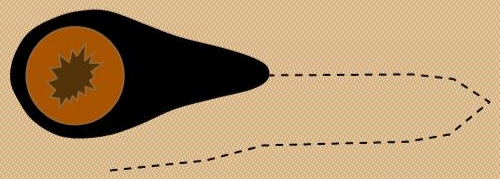


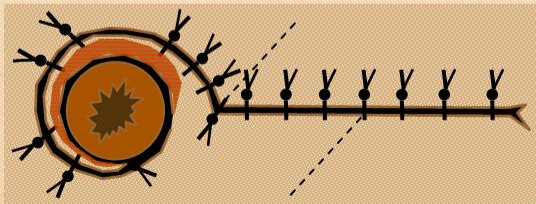
Direct repair, by tightening the aperture to just the required diameter.



Complex repair by flaps and tissue transposition.

For parastomal hernias, rectus muscle and anterior fascia is usually available and usable.





Large, long flaps create broad contact area sleeves and grommets around the bowel. Other basic soft tissue plasties can further augment the repair.

"Simple Fix" by Suture – vs – Autogenous Repair

Literature and experience validate that simple suture repair does not work for parastomal hernias.

However, these conclusions are biased by procedures that do simple edge-to-edge repairs rather than proper musculofascial soft tissue restorations.

Principles of Plastic Surgery 101 – "This Does Not Work"

Stress concentration & failure propagation.
Repair in tension rather than shear.
Small "knife edge" contact area.
Centrifugal vectors distract the fascia-viscera interface.
Risk for acute failure. Risk for chronic attrition & hernia sac.

Tissue Transposition for Structural Integrity

No stress concentration, or at non-essential points.
Stress dissipation on a long contact line, & more fixation points.
Centripetal vectors close & buttress the para-visceral space.
Repair in shear rather than tension.
Lines of force are staggered.
Broad contact area.

Principles of Musculoskeletal and Soft Tissue Surgery

as practiced by Plastic and Orthopedic Surgeons, are the constitutive principles of repairing the abdominal wall. When principles of surgery on muscles, fascias, ligaments, and tendons are applied to hernias and the abdominal wall, autogenous repairs work.

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ALLOPLASTIC vs BIOMATRIX
barrier vs gusset

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ALLOPLASTICS

Structural superiority

Pros:

Effective short term barrier.
Solid & long term structural material.
Good substitute for missing abdominal wall.

Cons:

Mechanical complications from improper placement.
Long term inflammatory and visceral complications.
Long term toxic and immune complications.
Poor engineering and bio-incompatiblity.
Serious and life-threatening problems under-reported.

***Structural virtues** negated by faulty technique.*

BIOMATRICES

Biological superiority

Pros:

Biocompatible and biodegradable.
Biocompatibility and safety are superior.
Histo-integration and autogenous metaplasia.

Cons:

Subject to vicissitudes of scar biology.
Atrophy, attrition, dilation, structural incoherence
(if tension, contact area, & bio-interface are ignored).
Lost mechanical competence with early complications.
Relative expense, procurement issues, consistency.

***Biological virtues** negated by faulty technique.*

These principles apply for all hernias, parastomal and otherwise.

For PSH, short term success rates are equal, independent of the material.

Short term, structural superiority of alloplastics are offset by biocompatibility of biologics in the face of complications.

Long term: bio-incompatibility & morbidity of alloplastics -vs- attrition & structural inadequacy of biologics.

Faulty technique will preempt or undo any of the hypothetical virtues of either.

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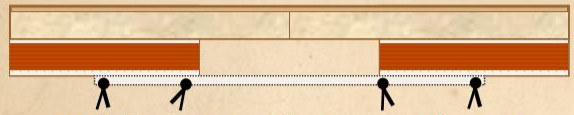
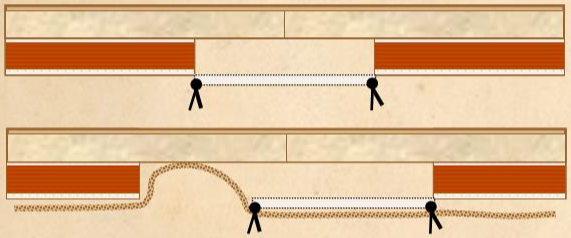
BARRIER

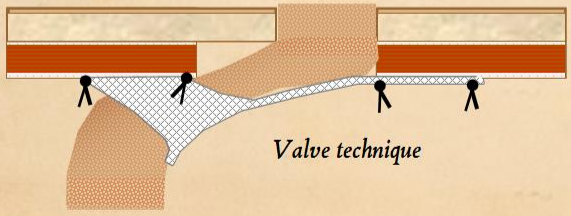


Mesh placed as span or barrier, proper placement.



Mesh placed as span or barrier, improper placement.

Keyhole technique



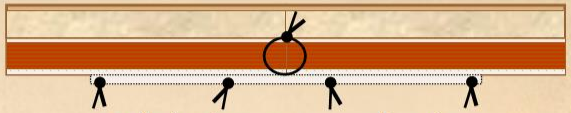
Valve technique

Long term, can work well for alloplastics.

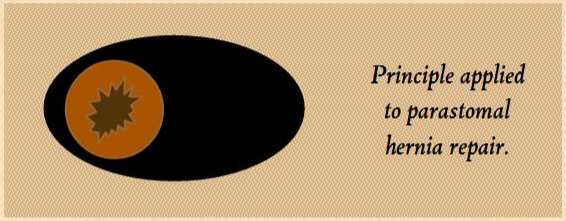
Long term, cannot work well for biologics.

Short term, works well for both (absent complications).

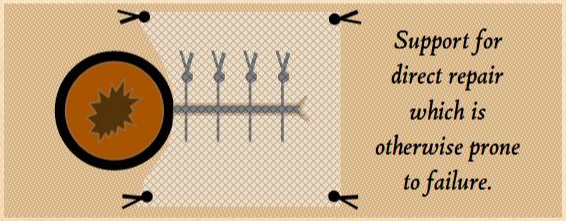
GUSSET



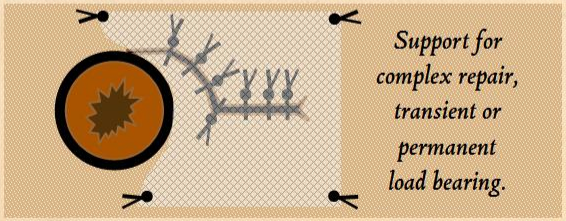
Mesh placed as gusset or mending plate.



Principle applied to parastomal hernia repair.



Support for direct repair which is otherwise prone to failure.



Support for complex repair, transient or permanent load bearing.

Short term, works well for both.

Long term, continued support from alloplastics.

Long term, biologics become an autogenous fascia.

Used as transient support, moot after wound is healed.

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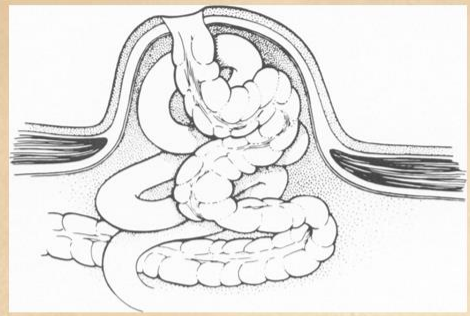
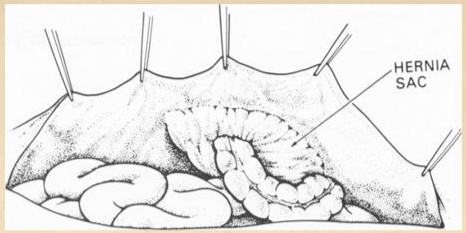
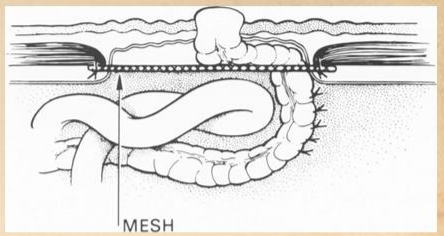
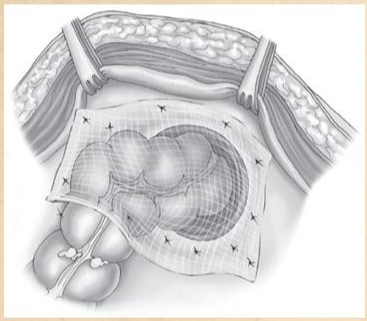
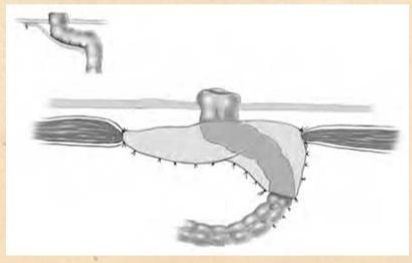


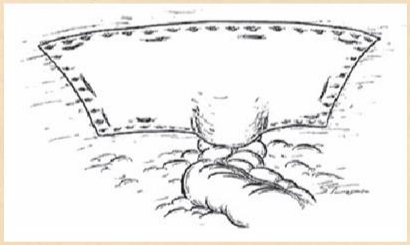


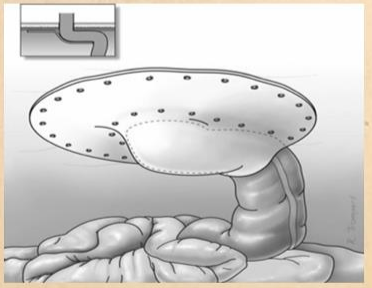


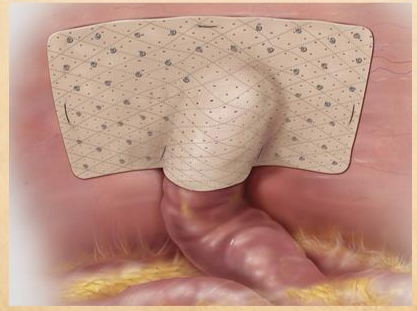
SUGARBAKER, PH. PERITONEAL APPROACH TO PROSTHETIC MESH REPAIR OF PARAOSTOMY HERNIAS. ANN SURG. 1985, 201-3: 344–346.







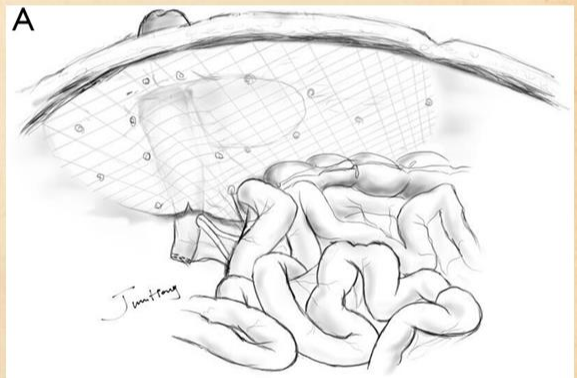


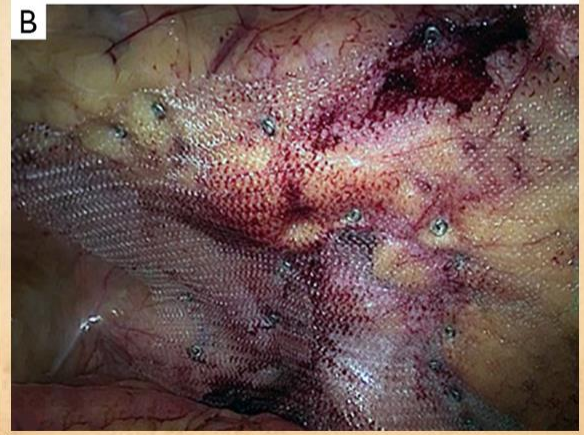


Sugarbaker RESULTS

Recurrence rates
6 - 12% or less.

(2-3x less than keyhole.)





PARASTOMAL HERNIAS :: GENERAL PRINCIPLES OF PREVENTION AND CORRECTION

INITIAL & PREVENTIVE :

Seal the aperture:

at parietes

at external fascia

parietal petals

Buttress the aperture:

attached mesentery

moot mesentery

epiploic appendages

omentum

REPAIR & RECONSTRUCT :

Autogenous repair:

as above

muscle flaps, cylindrical

muscle & fascia, tangential

Mesh repair:

alloplastic vs biomatrix

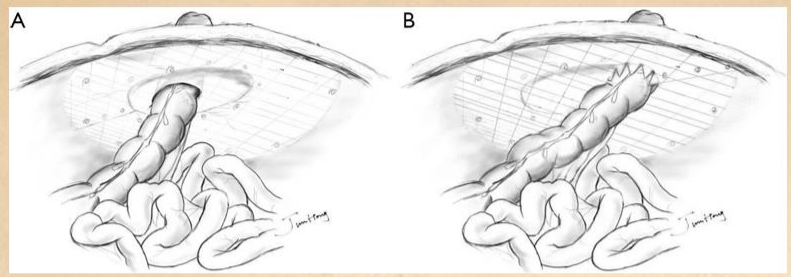
barrier vs gusset

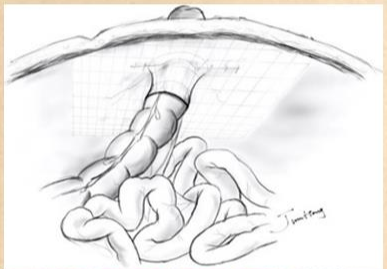
Valves & seals:

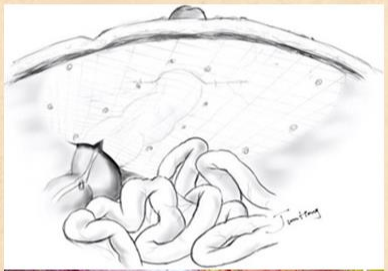
Sugarbaker technique

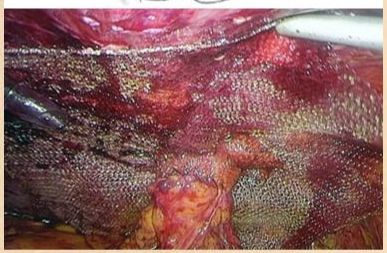
SANDWICH TECHNIQUE

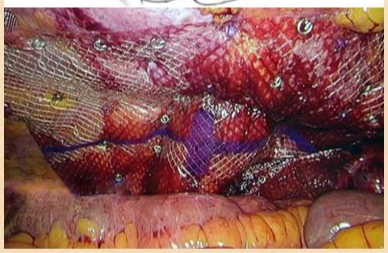
Collar-and-skirt bushing

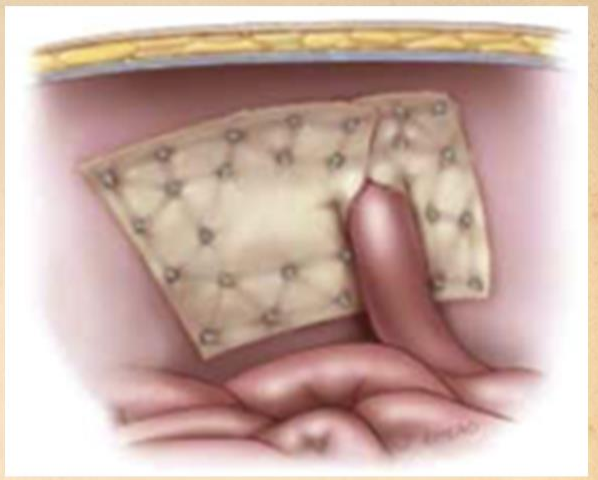








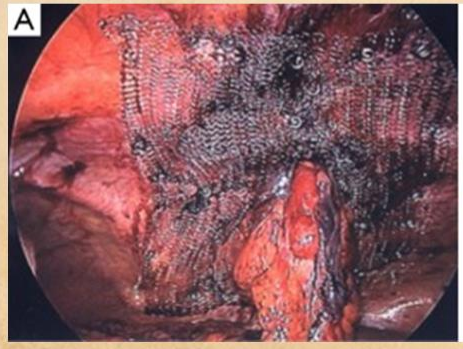


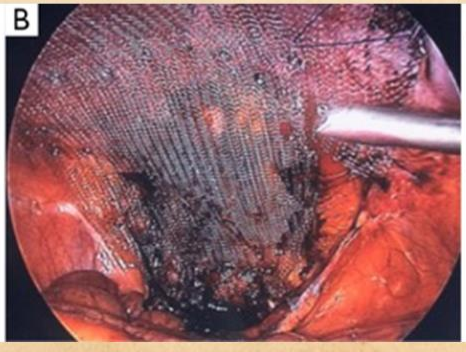


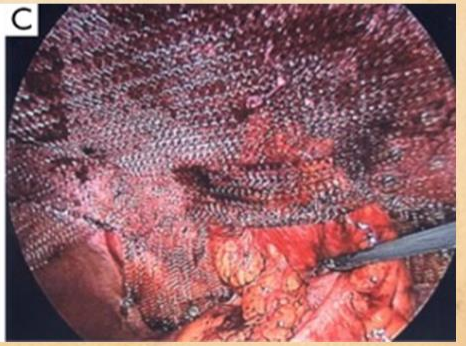
Keyhole technique:
Recurrence rates 20 - 75%

Sugarbaker technique:
Recurrence rates 6 - 12%

Two-mesh "sandwich" technique:
(Keyhole 1st layer, Sugarbaker 2nd layer, bowel sandwiched between.)
Recurrence rates 02%







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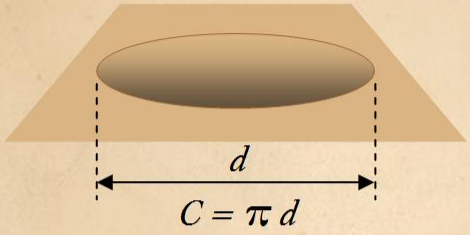
Valves & seals:

Sugarbaker technique

Sandwich technique

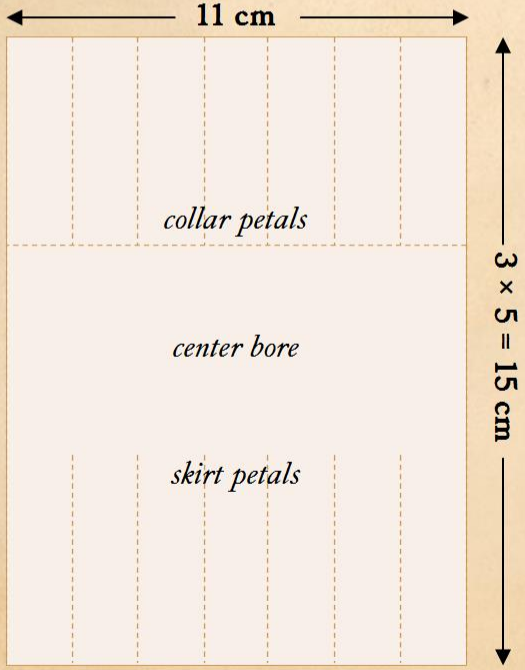
COLLAR-AND-SKIRT BUSHING

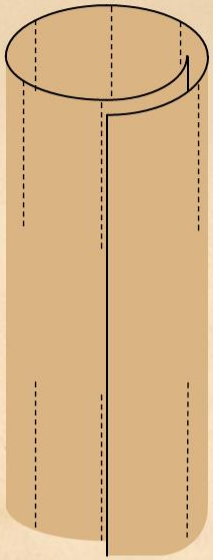


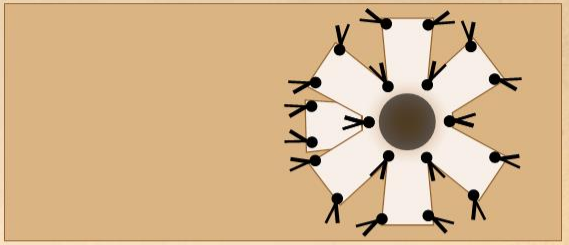
$C = \pi d$

e.g. d / C = 3.0 / 9.4 cm

C / 6 = 1.6, … x 7 = 11.0 cm



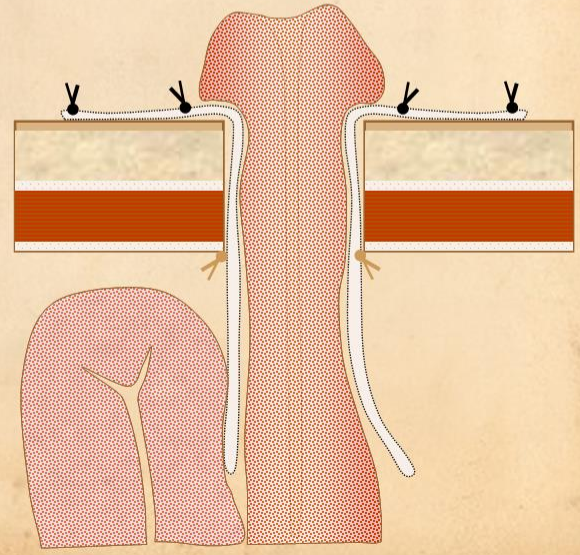




Bushing wraps around bowel.
Center bore traverses abdominal wall.

Collar petals fold out and
suture to outer abdominal wall.

Skirt petals "float" in abdomen,
block insinuation of bowel into center.



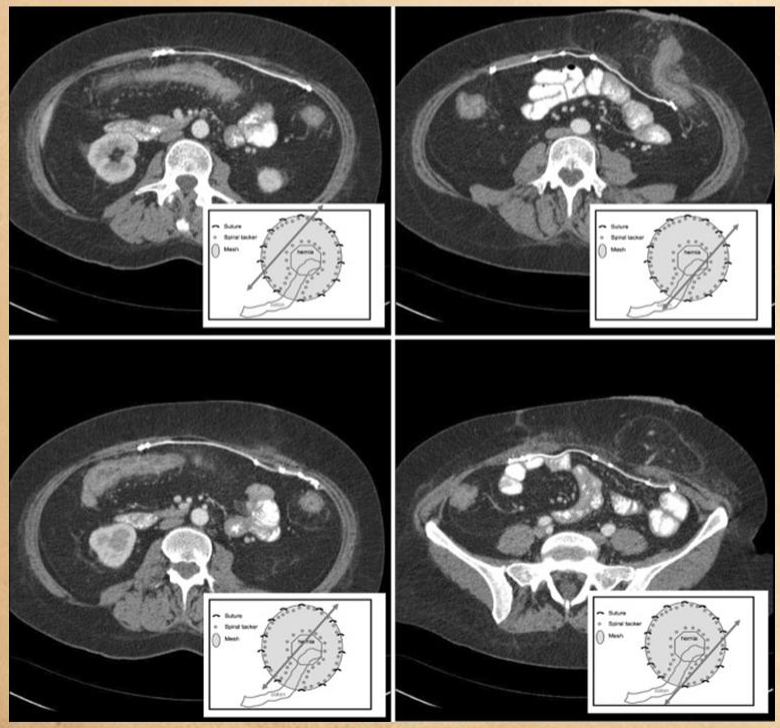
Hansson, Annals of Surgery, 2012

Suture repair of parastomal hernia should be abandoned because of increased recurrence rates. The use of mesh in parastomal hernia repair significantly reduces recurrence rates and is safe with a low overall rate of mesh infection. In laparoscopic repair, the Sugarbaker technique is superior over the keyhole technique showing fewer recurrences.

Slater, Journal of Gastrointestinal Surgery, 2011

*The use of reinforcing or bridging biologic grafts during parastomal hernia repair results in acceptable rates of recurrence and complications. However, given the similar rates of recurrence and complications achieved using synthetic mesh in this scenario, the evidence does not support use of biologic grafts. [** Last statement is disputable based on long term complication rates of alloplastic meshes.]*

Sugarbaker technique



PARASTOMAL HERNIAS
RECOMMENDATIONS

Parastomal hernias are common.

Primary occurrence = 35 – 80 %

Recurrence = 20 - 100 %

Mesh is superior to suture repair & relocation.

Recurrence after relocation = 35 - 75 %

Recurrence after suture = 50 - 80 %

Recurrence after mesh = 5 - 75 %

** *Sutures cannot be impeached because techniques are often simple "stitches" rather than proper reconstructive restoration.*

* *Mesh repair is now considered the standard.*

Open and laparoscopic repairs are comparable.

Recurrence and complication rates are a function of the method of repair, not the method of exposure.

** *Re lap., "perioperative complication rate may be underreported."*

* *Each affords certain versatility, select accordingly.*

Valve & seal techniques best barrier techniques.

Recurrence after keyhole technique = 20 - 75 %

Recurrence after Sugarbaker = 6 - 12 %

** *Sandwich techniques and through-bore bushings are other options.*

* *Sugarbaker is currently the best verified method.*

Biologics vs alloplastics – same and different.

Alloplastics can be more durable.

Biologics reduce long term risks.

** *Reported results seem similar, but experience is greater for alloplastics.*

** *Reported results are not long enough to identify long term risks.*

* *Both require fastidious technique to get durable uncomplicated results.*

* *Biologics are superior for long term safety. Weigh the risks.*

CASE STUDIES

To be presented in later session.

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Marc E. Gottlieb, MD, FACS

Phoenix, AZ