

# 3 Failures in Hernia Surgery Done by Experts

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## Introduction

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As an invitee to Dr. Volker Schumpelick's fourth triennial meeting in St. Moritz (2006), my assignment was to present answers to why expert hernia surgeons don't always have perfect results. Stated another way, why do some repairs done by experts fail? Clearly, this was one of the most difficult topics I have been asked to write about. Research in the printed surgical literature has been less than fruitful. Textbooks and journals mention generally accepted factors related to hernia repair failure, usually as a prologue to the subject of recurrence. These articles and texts do not distinguish causes of failure by experts from non-expert hernia surgeons. Finding limited value from the printed literature for answers to the assigned question, I sought information directly from colleagues who have demonstrated unusual interest, additional experience, or have recognized expertise in herniology.

## Methods

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My first attempt to gather information regarding the causes of failures by experts was by sending an e-mail request to a specific group of surgeons asking for their opinions (■ Fig. 3.1). This group (group 1) was comprised of

- senior authors of articles published in the past 3 years in *Hernia*, *The World Journal of Hernia* and *Abdominal Wall Surgery*, and
- some other recognized hernia experts whose work has contributed to the science.

Specifically, I asked for their opinions of the causes of failure by experts who repair:

- groin hernias,
- primary abdominal wall hernias,
- incisional hernias, and
- hiatus hernias.

The answers rendered by surgeons in group 1 were divided into four hernia-type categories (■ Tables 3.1 to 3.4). Within each category five different temporal segments were designated (segments 1–5 in Tables 3.1–3.4). Mostly, the answers and terminology used by the responder was recorded verbatim.

My second attempt to gain answers to this question was to send e-mail requests to the invitees to this St. Moritz meeting. To reach them, I used their current e-mail addresses as listed and furnished by the organizing committee. In this request I asked for their personal results with the technique(s) they had used most often. I included our own results as an example of the information I sought.

### Request for “Expert” Professional Assistance

As you are a published expert in the field of herniology I am asking for your input to assist me in preparing a presentation that deals with your views of reasons for recurrence of abdominal hernias. I am sending this same survey to many others who have expertise in this field.

My topic is “Recurrence as a problem of the expert”. Note that the emphasis is on EXPERT. The essence of the presentation leaves room for reference to open and laparoscopic approaches to groin hernias, other primary abdominal wall hernias, incisional hernias, and hiatus hernias. It requires answers based on your individual experiences and observations.

Please EMAIL REPLY to me what you believe are the two or three main causes for failed repairs of each group by experts in each field. (Some causes may apply to all four groups):

**Groin Hernias:** .....

**Primary Abdominal Wall Hernias:** .....

**Incisional Hernias:** .....

**Hiatus Hernias:** .....

Excuse the BCC format of this correspondence. It is the simplest, quickest, and least expensive way to get responses from a large group while keeping your emails private.

Thank you for taking the time to answer this survey.  
This will be the only questionnaire I will send.

Arthur I. Gilbert, M.D.

■ Fig. 3.1. Request for “Expert” Professional Assistance

## Results

The initial mailing was to 112 surgeons. I used the e-mail addresses that were noted in each article. Twelve e-mails were returned as undeliverable due to unrecognized addresses. From the 100 e-mails that were not returned as undeliverable I received 46 responses (46%). The causes of hernia repair failures they reported are itemized in ■ Tables 3.1–3.4. I received no response from the other presumed recipients.

The 46 responders (group 1) noted 180 answers listing 46 different causes of groin hernia repair failure, 150 answers listing 27 different causes of primary ventral hernia repair failure, 149 answers listing 31 causes of incisional hernia repair failure, and 132 answers listing 35 causes of hiatus hernia repair failure. Several responders noted many of the same causes. For each type of hernia repair I separated the causes of failure into the same five temporally related categories.

From my second attempt to gain answers from the 62 invitees to the 2006 St. Moritz meeting, I received only

14 responses (22.5%) to my e-mail inquiry (group 2). The majority of surgeons in this group noted many of the same causes noted by surgeons in group 1. The causes of failures noted by group 2 experts are itemized in ■ Table. 3.1. Thirteen of the 14 furnished an overview of their preferred techniques and their personal results. Since anonymity was promised to the responders the details of techniques and personal numeric results furnished by each responder is not included.

## Discussion

A true expert expects success, but always looks for his/her own failures. I received information about recurrences from 13 of 14 surgeons in group 2. Despite my specific request for the details of their own failures, only 4 of the 13 furnished information of those causes. Responses from surgeons in group 2 included faults in Lichtenstein, plug, and laparoscopic repairs. These causes were basically the same as furnished by group 1. While group 1 surgeons noted metabolic defects, col-

**Table 3.1.** Reasons for failure by experts (group 1) – groin hernias

Reason for failure	No.
<i>1. Surgeon's personal preparation</i>	
Poor understanding of anatomy/pathophysiology	7
Poor training in lap hernia repair	7
Surgeon's limited knowledge, experience, skill	6
Poor training in open hernia repair	5
Failure to recognize multiple defects	4
Ignorance of MPO	3
Poor teaching of residents	2
Surgeon's age-related factors	1
Non expert pressured to do LIH vs. lose case	1
<i>2. Patient profile and habits</i>	
Collagen disorders	4
Smoking	3
Obesity	2
Genetic factors	2
Ascites	1
<i>3. Various intra-operative factors</i>	
Inadequate dissection	13
Repair without mesh	10
Inadequate size of mesh	10
Technical mistakes	9
Inadequate overlap of mesh	9
Errant fixation of mesh	7

**Table 3.1.** Continued

Reason for failure	No.
<i>3. Various intra-operative factors</i>	
Plug migration	6
Tension in repair	5
Plug not in pp space for direct hernias	5
Choice of wrong procedure	4
Missed hernia sac	4
Mesh wrongly placed	3
Lichtenstein poor shutter reconstruction	3
No coverage of femoral canal from groin	3
Incision too small	2
Unrecognized lateral hernias	2
Lichtenstein poor overlap at pubis	2
LIH poor closure of keyhole	2
Wrong anesthetic modality	2
Not fully creating pp space for mesh	1
<i>4. Wound problems</i>	
Infection	8
Mesh shrinkage	3
Hematoma	2
Use of absorbable suture material	2
Intestinal obstruction	1
Seroma	1
<i>5. Postoperative events</i>	
Strenuous activity too soon	3

lagen disorders, and patient's biological features as some causes of failed repairs, the group 2 surgeons did not attribute even one failure to poor patient selection

or to patients' biological features. All attributed their failed repairs to faulty personal observation or technique.

**Table 3.2.** Reasons for failure by experts – primary abdominal wall hernias

Reason for failure	No.
<i>1. Surgeon's personal preparation</i>	
Poor understanding of anatomy and physiology	7
Surgeon's limited knowledge, experience, and skill	5
Surgeon underestimating extent of hernia	4
<i>2. Patient profile and habits</i>	
Genetic factors	7
Obesity	4
Collagen disorders	4
Previous contaminated or infected wound	3
Smoking	1
Concurrent diastasis recti	1
<i>3. Various intra-operative factors</i>	
Failure to use mesh	14
Mesh too small	13
Tension on repair	12
Inadequate fixation of mesh	12

**Table 3.2.** Continued

Reason for failure	No.
<i>3. Various intra-operative factors</i>	
Inadequate overlap of mesh	10
Using onlay method of mesh repair	7
Overlooked multiple defects	5
Failure to use component separation tissue repairs	3
Poor exposure	2
Inadequate dissection	2
Wrong anesthetic modality	2
Rapidly absorbing suture material	2
Lap hernia poor alignment of mesh	1
Fascia not strong enough for repair	1
<i>4. Wound problems</i>	
Infection	11
Seroma	3
Hematoma	2
<i>5. Postoperative events</i>	
Resuming forceful activity too soon	2

Regarding ventral hernia repairs, Awad [1] identified certain technical causes of failure. Inlay mesh repairs were associated with higher failure rates compared to onlay, sublay, and sandwich techniques. The lowest rate of failure was in the sandwich technique. Infection, lateral detachment of the mesh, and inadequate fixation of the mesh were shown to be the most common factors related to failed repairs.

At the 2003 St. Moritz meeting of hernia experts, the question was posed to the group, "Do you believe you can always prevent a hernia recurrence by doing the procedure properly?"; 24% of attendees responded they thought they could; 76% did not feel they could. The audience proffered that failures were related to poor technical skill in 83% of failures, to poor teaching in

57% of failures, and to the patient's defective biological features in 28% of cases.

My personal observations of causes of failed groin preperitoneal hernia repairs by experts include the surgeon's failure to sufficiently develop the preperitoneal space (Bogros space) in doing TEP, TAPP, Ugahary, Kugel, or PHS repairs. Other causes in open repairs were related to inadequate mesh size and poor mesh fixation. I personally was responsible for two failed PHS repairs due to my own poor knot tying.

Causes for failed Lichtenstein repairs were detailed by Amid [2], and Read [2, 3]. With the help of ultrasonography I have identified persistent hernia sacs under the onlay mesh of patients who had Lichtenstein tension-free hernioplasties and presented complaining of inter-

**Table 3.3.** Reasons for failure by experts – incisional hernias

Reason for failure	No.
<i>1. Surgeon's personal preparation</i>	
Surgeon underestimating extent of hernia	11
Poor understanding of anatomy and physiology	3
Surgeon's limited knowledge, experience, and skill	2
<i>2. Patient profile and habits</i>	
Obesity	7
Genetic factors	6
Smoking	3
Collagen disorders	1
Previous contaminated or infected wound	1
Not fully prepared preoperative.	1
<i>3. Various intra-operative factors</i>	
Mesh too small	15
Inadequate fixation of mesh	13
Inadequate overlap of mesh	11
Tension on repair	10
Inadequate exposure	9
Inadequate dissection	8

**Table 3.3.** Continued

Reason for failure	No.
<i>3. Various intra-operative factors</i>	
Overlooked multiple defects	8
Using onlay method of mesh repair	8
Fascia not strong enough for tissue repair	3
Failure to use mesh	3
Fixation failure at iliac crest and/or pubis	2
Lap hernia inadequate lysis of adhesions	2
Inadequate lysis of adhesions open procedure	2
Rapidly absorbing suture material	1
Lap hernia sutures breaking or tearing tissue	1
Bowel injury	1
Failure to use component separation tissue repairs	1
<i>4. Wound problems</i>	
Infection	9
Hematoma	3
Mesh shrinkage	1
<i>5. Postoperative events</i>	
Resuming forceful activity too soon	2
Drains removed too soon	1

mittent postoperative pain. My personal observations from treating failed plug operations include plug migration into the scrotum in two patients, bowel perforation in two patients, and failure to protect the area surrounding the plug resulting in recurrent interstitial hernias through the lateral triangle and femoral hernias.

For incisional and ventral hernias, my observation in failed repairs has been the surgeon's failure to use mesh large enough to get far wide of the original defect(s). Ventral and incisional hernia failures also are closely related to wound complications that lead to infection. Impatience by the surgeon and/or patient

dealing with a postoperative seroma has led to infection because of single or multiple wound aspirations that might have been unnecessary if treated expectantly. My own failures following those repairs were related most often to infection. Once infected, the wound has a high chance of herniation. Additional factors leading to failure include consenting to operate too soon on patients with inadequate pulmonary preparation or insufficient weight loss. Such failures represent compromised judgment by the surgeon who lowers basic principles in response to the patient's pleadings, despite increased chance of failure.

**Table 3.4.** Reasons for failure by experts – hiatus hernia

Reason for failure	No.
<i>1. Surgeon's personal preparation</i>	
Surgeon's limited knowledge, experience, and skill	9
Poor understanding of anatomy and physiology	2
Surgeon underestimating extent of hernia	4
No. of surgeons that don't do this operation	11
<i>2. Patient profile and habits</i>	
Obesity	4
Collagen disorders	3
Poor preoperative evaluation	2
<i>3. Various intra-operative factors</i>	
Inadequate fixation of mesh	13
Failure to use mesh	9
Inadequate dissection	8
Tension on repair	8
Using onlay method of mesh repair	8
Short esophagus	4
Failure to remove hernia sac	3
Inadequate exposure	3
Fascia not strong enough for tissue repair	3
Lap division of the short gastric vessels	3

**Table 3.4. Continued**

Reason for failure	No.
<i>3. Various intra-operative factors</i>	
Not approximating crura	2
Suture tear through	2
Fixation failure at iliac crest and/or pubis	2
Lap hernia inadequate lysis of adhesions	2
Inadequate lysis of adhesions open procedure	2
Mesh too small	1
Rapidly absorbing suture material	1
Lap hernia sutures breaking or tearing tissue	1
Bowel injury	1
<i>4. Wound problems</i>	
Infection	9
Crura too tight	5
Incomplete closure of hiatus	5
Hematoma	3
Not anchoring fundoplasty	2
Mesh shrinkage	1
Slipped Nissen	1
<i>5. Postoperative events</i>	
Vomiting or gagging	4
Resuming forceful activity too soon	2

At the 2005 meeting of the European Hernia Society, Kingsnorth reported that in a plan to improve surgical education he proposed a scheme of teaching hernia repair he refers to as "Surgery by Numbers." In this plan he had identified 42 separate technical steps that have to be learned to properly perform uncomplicated groin hernia repair. Based on pure mathematical probabilities of successful completion of any endeavor, a standard

probability chart (Table 3.5) shows that the more steps or factors involved or needed to complete the job, the greater becomes the chance of failure. To better appreciate how the demand for perfection in every surgical procedure must be, if one presumes that only seven steps are involved in the surgical procedure, and further assumes a 95% probability that each step was completed successfully, the probability of the total success of the operation

**Table 3.5.** Probability table of successful results. First row: probability of successful completion of each step in the process. Percentages in the table represent the probability of successfully completing the entire process. In a 7-step process, if probability of success in each is step 95%, the probability of a successful outcome is less than 70%

Step	99%	98%	97%	96%	95%	94%	93%	92%	91%	90%
1	0.9900	0.9800	0.9700	0.9600	0.9500	0.9400	0.9300	0.9200	0.9100	0.9000
2	0.9801	0.9604	0.9409	0.9216	0.9025	0.8836	0.8649	0.8464	0.8281	0.8100
3	0.9703	0.9412	0.9127	0.8847	0.8574	0.8306	0.8044	0.7787	0.7536	0.7290
4	0.9606	0.9224	0.8853	0.8493	0.8145	0.7807	0.7481	0.7164	0.6857	0.6561
5	0.9510	0.9039	0.8587	0.8154	0.7738	0.7339	0.6957	0.6591	0.6240	0.5905
6	0.9415	0.8858	0.8330	0.7828	0.7351	0.6899	0.6470	0.6064	0.5679	0.5314
7	0.9321	0.8681	0.8080	0.7514	0.6983	0.6485	0.6017	0.5578	0.5168	0.4783
8	0.9227	0.8508	0.7837	0.7214	0.6634	0.6096	0.5596	0.5132	0.4703	0.4305
9	0.9135	0.8337	0.7602	0.6925	0.6302	0.5730	0.5204	0.4722	0.4279	0.3874
10	0.9044	0.8171	0.7374	0.6648	0.5987	0.5386	0.4840	0.4344	0.3894	0.3487

would be only 69.83%. And this probability considers only one of the five categories (intra-operative factors) mentioned above as reasons for failure. Nevertheless, certainly as related to mesh repairs, technical skills are the most critical factor in the equation of success.

Finally, this verbatim quote from Schroder is worth considering: “Expert surgeons become expert based on repetitive experience, enthusiasm and dedication to a particular field of expertise, hand-eye coordination skills, and intellectual stimulation. Eventual failure of technique is inherent with age, as enthusiasm tends to wane over time, hand-eye coordination skills can diminish, and the fatigue factor plays more of a role with age. As the expert surgeon becomes more known for his/her skills, more work is thrust upon them, which may cause him to rush through their cases, take short cuts that may be inadvisable, and have mental lapses simply due to fatigue which takes more of a toll as we age. Being the expert lends itself to a failure in the expertise, not due to wanton carelessness or overconfidence, but due to the volume of cases and the imperfection of the human being. If you walk a high wire enough times, you will fall. I believe this general statement is applicable for each of the operations requested.”

Tough as it may be for expert surgeons to accept this fact gracefully I believe Schroder’s comments should

be seriously considered. Just as Babe Ruth, Pele, Mohammed Ali, and other notable experts enjoyed being at the top in their field as the result of their excellent ability, dexterity, and performances, there came a time when their physical skills and performances began to slip down the ladder of excellence. Usually, it is the physical component that declines before the cognitive. While value is given to judgment, dexterity, and tenacity, it becomes clear why perfection at best is asymptotic, and that there certainly comes a time in each expert surgeon’s career when reputation and desire are not the most reliable predictors of successful out-comes.

## References

1. Awad ZT, Puri V, LeBlanc K, Stoppa R, Fitzgibbons RJ, Iqbal A, Filipi CJ (2005) Mechanisms of ventral hernia recurrence after mesh repair and a new proposed classification. *JACS* 201: 132–140
2. Amid P (2002) How to avoid recurrences in Lichtenstein tension-free hernioplasty. *Am J Surg* 184: 259–260
3. Read R, Gilbert AI (2004) Interstitial recurrence, with chronic inguinalgia, after Lichtenstein herniorrhaphy. *Hernia* 8: 264–267
4. Kingsnorth A (2005) Quality of care in hernia surgery: Educational aspects. *Hernia (Special Issue)* 9: 74