Functional conditions – issues without an organic cause – are estimated to be found in as many as 40% of the diagnoses in the practice of gastroenterology. Naturopathic functional diagnosis and treatment are uniquely suited to good outcomes in working with patients with these disorders. In Functional Gastroenterology, Steven Sandberg-Lewis, ND, draws upon skills he has acquired through three decades of naturopathic practice and teaching to articulate clinical pearls, as well as a thorough review of the most recent literature on gastrointestinal physiology. This text focuses on the underlying causes of functional GI disorders as well as their diagnosis, treatment and management.

Steven Sandberg-Lewis, ND, DHANP, is a professor at the National College of Natural Medicine. He has taught GI physiology, psychophysiology, GI pathology and gastroenterology since 1996. In continuous practice since graduating from NNCNM in 1978, he supervises student clinicians at the NNCNM Clinic with a focus on digestive and musculoskeletal health. The practice emphasis is on diet; myofascial, visceral and spinal manipulation; functional analysis and mindbody clearing techniques. He periodically co-teaches a series of continuing education weekend seminars on Functional Gastroenterology (visit www.ncnm.edu and click on “Continuing Education”). He also writes and performs music with his band, the Wicky Pickers (visit www.myspace.com/wickypickers).

Leah Sherman, ND, is a 2007 graduate of the National College of Natural Medicine. She is completing her second year of residency at the clinics affiliated with the college and has just opened her own private practice, Holistica Healthcare, in Portland, Oregon. Prior to attending NNCNM, she worked as a graphic designer and art director in New York City, Santa Fe, NM, and Richmond, VA, earning her bachelor’s degree in Medical Illustration from Virginia Commonwealth University in 2002.
Functional Gastroenterology
Assessing and Addressing the Causes of Functional Gastrointestinal Disorders

Steven Sandberg-Lewis
ND, DHANP

Please visit http://www.functionalgastroenterology.com/additional to access additional course materials. Type in the following username and password to access the appendixes:

username: fgidstudent
password: fgidstudent

NCNM Press
2009
I want to thank Nora Sande who encouraged me to write and reminded me of that commitment every time we saw each other. No doubt I would not have written the book in just short of a year without her persistence.

Thanks to David Schleich – president of the National College of Natural Medicine (NCNM) – for his vision. He created the first series of sabbaticals for NCNM professors and brought his decades of publishing experience to the creation of the NCNM Press.

Thanks to my wife Kayle for her tireless editing and along with my sons Asher and Ezra for being such a supportive family.

Kudos to readers Gil Winkleman and Alexis Shields who read some of the early drafts and gave me the medical student’s perspective on the text. Thanks also to copy editor Jenny Bowlden for graciously making repeated corrections and modifications.
# Table of Contents

**Forward** ix  
**Introduction** 1  
**Chapter 1** Functional Gastroenterology and Functional Gastrointestinal Disorders 8  
**Chapter 2** The Enteric Nervous System, GI Hormones and Immunity 24  
**Chapter 3** Flora and the GI Tract 37  
**Chapter 4** The Brain-Gut Axis, Stress and Digestion 53  
**Chapter 5** Blood Sugar, Insulin and the GI Tract 67  
**Chapter 6** Functional GI Physical Exam Reflex Points and Muscle Testing 86  
**Chapter 7** Lab Testing for Functional Gastrointestinal Disorders (FGID) 99  
**Chapter 8** Hiatal Hernia Syndrome 141  
**Chapter 9** Gastric Secretion and Suppression 150  
**Chapter 10** Functional Pancreatic Insufficiency 174  
**Chapter 11** Ileocecal Valve Syndrome 182  
**Index** 189
Forward

Functional Gastroenterology - Assessing and Addressing the Causes of Functional Gastrointestinal Disorders written by Professor Steven Sandberg-Lewis ND, DHANP is a book that is long overdue. While many Gastroenterology texts focus on pathology, diagnosis and current drug therapy, this work views the GI tract and its function in much greater depth. In the chapters that follow, Dr. Sandberg-Lewis discusses not only the scientific aspects of gastroenterology but also the art of medicine as it pertains to the assessment of diseases and dysfunctions of the gastrointestinal tract. Functional Gastroenterology explores the gastrointestinal tract in terms of a living and dynamic ecosystem, its endocrinology, and its interaction with the central nervous system and the environment. In this work Dr. Sandberg-Lewis constructs a symphony of function, biochemistry, diet and ecosystem interactions, effects of the environment and stressors, and the gastrointestinal nervous system, which aid the practitioner in understanding how the art and science of medicine must both be used in order to achieve optimal and lasting health.

He discusses the philosophical differences between the reductionist and holistic views of medicine noting that within the last 30 years a more biopsychosocial model of gastroenterology is emerging, but as with all changes in medicine, they are slow to be embraced by the dominant school of thought. Whereas allopathy treats the perceived gastrointestinal dysfunction with drugs and surgery to allay symptomology, the functional gastrointestinal model allows the practitioner to view the dysfunction in terms of an imbalance of the different systems that interact within the GI tract in order to maintain homeostasis. Once perceived, the practitioner will be able to provide a more specific intervention to allow the homeostatic balance to be restored rather than prescribe medications that mask symptoms of GI distress while maintaining the imbalance. Viewing the gastrointestinal dynamic in a functional and integrated manner embodies the naturopathic precepts of Tolle Causum, Tolle
Totum, while following the Hierarchy of Health and the Therapeutic Order, models embraced by naturopathic medicine in order to restore optimal health.

Modern medicine, in its drive to be more efficient through managed care, often misses the opportunity to know both the patient and their disease state at the functional level. Following some routing laboratory tests, colonoscopy and perhaps a CT, it then becomes a matter of dispensing routine prescriptions to allay symptoms. Often these require additional prescriptions when the dysfunction adapts to previous ones or were incorrect to begin with. Professor Sandberg-Lewis addresses the effects that long term drugging has upon the GI tract noting its propensity to add to the many diseases encountered there, or create new ones. In contradistinction, the functional gastroenterology model allows the practitioner to make more specific and meaningful prescriptions to stimulate the vital force, thereby allowing the healing reaction to go to completion.

With his many years of clinical experience and scholarly contributions, Dr. Steven Sandberg-Lewis has produced a work that synthesizes the integrative approach to medicine, one that naturopathic clinicians have practiced and expounded for over 100 years. To this end, Dr. Sandberg-Lewis provides the reader with diagnostic tools, laboratory evaluations and therapeutic suggestions to help the practitioner better understand the cause of the dysfunction. Understanding the many things that can lead to disease and dysfunction of the gastrointestinal tract, utilizing many time tested diagnostic and therapeutic methodologies, and melding the art and science of medicine, provides practitioners with the tools to restore and maintain health for their patients. By writing this text, Professor Sandberg-Lewis sets a precedent and standard for other practitioners of naturopathic medicine to put down in written form the art and science of naturopathic medicine.

Thomas A. Kruzel, ND
Author of The Homeopathic Emergency Guide
Scottsdale, Arizona
August 2009
Introduction

The Medical Thought Process

Ramban, the physician (Rabbi Moshe ben Nachman—1194-1270) is credited with first saying “you are what you eat.” Someone a bit less thrifty with his words said “you are what you believe, think, feel, eat, drink, digest, absorb, tolerate or mount an immune response to, metabolize, circulate and eliminate.” The latter is my approach.

This book is designed to explain the use of assessment and treatment strategies for functional conditions. The focus will be on improving normal function of the GI tract and pathologies will be discussed only as they apply to function.

*How Doctors Think*, by Jerome Groopman, MD (Houghton Mifflin, Boston, NY 2007) is an excellent starting point in the discussion of the thought processes of physicians. Although Groopman’s work, which includes the input of researchers Amos Tversky and Daniel Kahneman, is based on the epistemology used by allopathic physicians, it has lessons for all schools of medicine. Groopman’s work motivated me to combine his findings with my own observations in the hope the reader will find this information valuable in approaching the assessment of both pathology and functional disorders.

Below are six common pitfalls in the medical thought process:

**Anchoring (Groopman)**

Finding a “reasonable” explanation for a patient’s state should not stop further consideration of alternative diagnoses. Anchoring is the tendency to latch on to a diagnosis and stick to it. Physicians often do this because it’s easy or because a particular explanation just seems “right”. Being convinced too soon can lead to missing the mark and treating the patient for the wrong disorder. Perhaps
the patient has more than one condition and anchoring to a single condition may prevent the consideration of a more serious co-morbidity.

Early in my career I had an office visit with a sexually active young woman complaining of vaginal itching and dyspareunia. The pelvic exam revealed a classic “strawberry cervix” and the wet prep showed Trichomoniasis. Had I looked further, I might have noticed a mucopurulent endocervical discharge. Had I been more thorough and cultured for Neisseria gonorrhoea, I would have found it (the available test in the 1970s.) I diagnosed Trichomoniasis and missed the gonorrhea. Another practitioner diagnosed it a week or two later when her dyspareunia failed to clear up.

**Diagnosis momentum (Groopman)**

Related to the concept of anchoring is the concept of diagnosis momentum. It is the tendency for a diagnostic label to build belief and power to the point that it is hard to stop. A diagnosis can have weight and influence on management and treatment that defies questioning. My suggestion is to always send for the labs, films, surgical notes and biopsy reports and to not blindly accept a diagnosis handed down from another health practitioner. Make sure it makes sense to you. The patient deserves this 2nd or 3rd opinion and it will help you be a better doctor. An example is a young girl who for many years had been institutionalized for psychotic episodes. Eventually her parents were able to prevail in searching for an alternative explanation and she had the good fortune to find a doctor who re-examined the diagnosis and tested for Lyme disease. The antimicrobial treatment reversed much of her Lyme encephalitis and she no longer needed antipsychotic medication.

**Confirmation Bias (Groopman)**

I have frequently seen physicians find confirmation by selecting and focusing only on information that fits a diagnosis or plan of action while throwing out (or failing to recognize) information that contradicts the presumed correct path. A good example of this type of thinking is found in the homeopathic repertorization process. More obscure (“small”) remedies may be ignored when going through a list of remedies. The doctor may not know the name or the
abbreviation of the remedy (ie. Arum t) and it will be treated as if it is invisible – completely left out of the remedy selection process. Had the remedy been one familiar to the physician, it would be considered and perhaps given extra weight as a remedy choice.

**Availability (from Tversky and Kahneman)**

This is a tendency to jump to a conclusion about a case based on a recent experience with similar case presentations or other easily available pattern of presentation. An example was a case seen in our teaching clinic several years ago. A woman in her early fifties presented with a severe sore throat, and symptoms/signs of low grade fever and malaise. Her daughter brought her to our clinic because she had been sick for almost two weeks, was not getting well and had developed the pain in the throat. A student intern took her history and performed an ENT exam and came to the conclusion that it was a viral pharyngitis. The intern based the initial diagnosis on the fact that it was winter in Portland, Oregon and her findings seemed to fit a prolonged pharyngitis. Taking the differential a bit deeper, we re-examined the woman and found that her external throat was intensely tender to palpation over the thyroid gland and the soreness was triggered by rotating the head. The thyroid gland was palpably enlarged. This was actually a case of granulomatous thyroiditis (DeQuervain thyroiditis.) This was confirmed by an abnormally low TSH level and a sedimentation rate of 70. Certainly, this uncommon cause of painful goiter is self-limiting over a six to eight week period, but we treated her with homeopathic Spongia tosta 30C which resulted in excellent pain control.

**Commission bias (Groopman)**

The rushed feeling that something must be done is something most of us will recognize. It may be more likely if the doctor has a special focus on a certain treatment approach, and more options are not immediately felt to be available. In any case, a quote from Linda Lewis, MD is apt – “Don’t just do something, stand there!” Slowing down and considering what is truly appropriate is better than the mindset of action for action’s sake.
Chapter 1
Functional Gastroenterology and Functional Gastrointestinal Disorders (FGID)

Functional gastroenterology is a term I use to describe my approach to digestive health. It is an approach focused on restoring optimal function. The assessment techniques and treatment modalities may be employed for symptomatic or asymptomatic persons. They may be used for early intervention, when no disease, but only dysfunction is present.

These methods are appropriate for both pathologies and functional disorders although diagnosis of pathology requires the addition of standard diagnostic procedures.

Organic disease (pathology) implies morphologic changes that can be diagnosed through history, physical exam, diagnostic imaging and lab testing. The techniques in this book do not supercede these standard methods.

The practice of functional gastroenterology requires the physician to:
• understand normal digestive function and ecology
• assess the structure, neurology, flora, motility, secretion, detoxification and psychoneuroimmunoendocrine aspects of the patient’s picture
• apply effective natural (and pharmaceutical) therapies aimed at restoring function

Functional gastrointestinal disorders (FGID) are considered to be distinct from pathology. In previous years, functional meant that there were no gross or microscopic demonstrable findings. More recent research into FGID has shown that when the proper investigations are performed, morphologic changes may be found. According to Rome III (the international congress on FGID):

(The functional gastrointestinal disorders)… are symptom-based diagnostic criteria that are not explained by other pathologically based disorders. However, in recent years histological findings have been identified that blur the distinction between “functional” and “organic”.

Reductionism as a model of the human body is still dominant in Western medicine. It is claimed that this perspective evolved from the struggle between Descarte and the Catholic church during the 17th century. Separation of mind from body—an impossible goal—was agreed upon in order to gain permission for physicians to dissect cadavers. The mind, as the seat of the soul, was to be left to the church. Physicians were to limit their study and care to the “body”. This was a great step forward for the study of anatomy and pathology and a giant step backward for the understanding and treatment of functional disorders.

In the last thirty years, an integrated biopsychosocial model of disease has emerged in allopathic medicine and has gone a long way to add acceptance to functional disorders.1 It is still a far cry from what is needed to understand optimal function and methods of assessment and treatment of functional GI disorders. This book is my attempt to fill that void.
Genetics and the prenatal environment may set the stage for FGID. Nutrition, and environment (physical, psychological and social) may enhance or diminish the health status acquired before birth. Prolonged breast feeding introduces the microflora and aids in the completion of the mucosal associated lymphatic tissue. The type of healthcare given may add a layer of suppression and lower the vitality—or ideally—allow for improved health.

All these factors of early life affect the risk for FGID in adulthood. The psychological state as well as nutrition, digestive physiology, habits, environmental exposures and physical integrity (spinal articulations, fascial elasticity and morphology) all work to mitigate early childhood risk factors, or allow them to promulgate adult FGID.

**Table 1.1 FGID – The Big Picture**

<table>
<thead>
<tr>
<th><strong>Early Life</strong></th>
<th><strong>Later life</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Genetics (miasma)</td>
<td>Digestive physiology</td>
</tr>
<tr>
<td>Prenatal Life</td>
<td></td>
</tr>
<tr>
<td>o Maternal stress</td>
<td></td>
</tr>
<tr>
<td>o Maternal diet and medical Rx</td>
<td></td>
</tr>
<tr>
<td>o Maternal alcohol/tobacco/drugs</td>
<td></td>
</tr>
<tr>
<td>o Maternal environmental exposures</td>
<td></td>
</tr>
<tr>
<td>o Maternal breathing patterns</td>
<td></td>
</tr>
<tr>
<td>Environment</td>
<td></td>
</tr>
<tr>
<td>o Air quality</td>
<td></td>
</tr>
<tr>
<td>o Water quality</td>
<td></td>
</tr>
<tr>
<td>o Toxic exposures</td>
<td></td>
</tr>
<tr>
<td>Psychosocial</td>
<td></td>
</tr>
<tr>
<td>o Bonding</td>
<td></td>
</tr>
<tr>
<td>o Nurturing</td>
<td></td>
</tr>
<tr>
<td>o Communication</td>
<td></td>
</tr>
<tr>
<td>o Stressors</td>
<td></td>
</tr>
<tr>
<td>o Coping/Habits</td>
<td></td>
</tr>
<tr>
<td>Nutrition</td>
<td></td>
</tr>
<tr>
<td>o Nursing or bottle feeding</td>
<td></td>
</tr>
<tr>
<td>o Solid food introduction</td>
<td></td>
</tr>
<tr>
<td>o Mastication</td>
<td></td>
</tr>
<tr>
<td>o Hydration</td>
<td></td>
</tr>
<tr>
<td>Medical orientation</td>
<td></td>
</tr>
<tr>
<td>o Vaccination</td>
<td></td>
</tr>
<tr>
<td>o Medication</td>
<td></td>
</tr>
<tr>
<td>o Disease suppression</td>
<td></td>
</tr>
<tr>
<td>Rest and exercise</td>
<td></td>
</tr>
<tr>
<td>Later life</td>
<td></td>
</tr>
<tr>
<td>Psychosocial function</td>
<td></td>
</tr>
<tr>
<td>o Nuturing</td>
<td></td>
</tr>
<tr>
<td>o Communication</td>
<td></td>
</tr>
<tr>
<td>o Life stress</td>
<td></td>
</tr>
<tr>
<td>o Coping/Habits</td>
<td></td>
</tr>
<tr>
<td>o Mindfulness</td>
<td></td>
</tr>
</tbody>
</table>

GI WELLNESS vs. FGID

Nutrition
Rest
Activity
Toxicity
Structural integrity
FACTORS INVOLVED IN THE ADAPTIVE PHYSIOLOGY OF FGID

**Genetics**

It is believed that patients with FGID may have polymorphisms leading to altered levels of cytokines (decreases in IL-10, leading to more GI inflammation), serotonin reuptake transporters (which may raise or lower serotonin levels), G-proteins (affecting CNS/enteric nervous system communication) or alpha 2 adrenoreceptors (changing motility.)

**Family of Origin Stress and Disease Coping Orientation**

Children learn to relate to illness from their parents. Adults with IBS tend to have offspring with a higher risk of IBS and significantly more healthcare visits for all causes including gastrointestinal symptoms. Outpatient health care costs are also significantly higher for IBS offspring than for control children. Childhood physical and emotional abuse are associated with an increased risk of adult IBS with a poor outcome. A history of abuse may lower the threshold at which these patients experience symptoms. Adults with IBS who do not seek healthcare treatment are less likely to have a history of childhood abuse. Animal studies show a significant increase in IBS following neonatal-maternal separation.

**Other Psychological Factors**

In human research, psychological stress can exacerbate symptoms of IBS (and IBD), decreasing visceral pain thresholds and altering mucosal barrier function. Stress also affects GI function to a lesser extent in non-IBS subjects. Psychological factors modify the experience of the disorder by the IBS patient and influence whether they seek medical care. An investigation into the psychological parameters of functional dyspepsia concluded that “symptom severity and weight loss in functional dyspepsia are determined by psychosocial factors (depression, abuse history) and somatization, and only to a lesser extent by gastric sensorimotor function.”

Stress often significantly increases the complaints in IBS and stress causes a shift in the host-gut microbial relationship (see Chapter 3).
Altered Motility

Both healthy subjects and patients with FGIDs will have increased motility in response to emotional or environmental stress. An example is that a wave of peristalsis occurs when a sudden loud noise (such as a loud clap) startles a person, but produces no perceptible symptoms. A person with a functional esophageal disorder has a stronger smooth muscle response and may experience it as pain. The greater motility responses to stress apply to the FGIDs generally.

Altered Inflammation

As many as 50% of IBS patients have increased activation of mucosal inflammatory cells. A 2002 immunohistology study showed various increases in intraepithelial lymphocytes, lamina propria CD3(+) cells and CD25(+) cells, neutrophils, mast cells and criteria for classic lymphocytic colitis in IBS patients compared with asymptomatic controls.10 A second study found that 23% of patients diagnosed with irritable bowel also had lymphocytic colitis. In the control group, 5% had lymphocytic colitis.11 These details give credence to the idea that FGID may coexist with pathology and that FGID are very general categories that may be misdiagnoses of occult infections, allergic conditions, etc. A small study from Annals of Allergy found that one or several foods or food additives induced the typical symptoms of IBS.12 Markers can be used to distinguish the low grade inflammation of IBS from the gross inflammation of IBD. These include fecal calprotectin and lactoferrin.13

Altered Visceral Sensitivity

People with FGID experience allodynia - pain in response to peristaltic smooth muscle activity. Normal enteric sensation includes distention and chemical irritation of the bowel, but there is no perception of the average peristaltic wave. In IBS research, patients also show a lower pain threshold to balloon distention of the bowel.14 This altered sensitivity may also be induced in response to psychological stress.15 PET scan studies suggest that visceral hypersensitivity in IBS relates to abnormal activation of brain circuits involved in emotional and cognitive modulation of sensory information. In controls, anticipation of distention leads to decreased
activity in centers that down regulate pain perception (insula, anterior cingulate cortex, amygdala, and dorsal brainstem). IBS patients showed less anticipatory inactivation and therefore felt more pain, as well as having increased activation of a vigilance network (dorsolateral prefrontal cortex.)

**Altered Intestinal Permeability**

The tight junctions between enterocytes play a major role in detoxification, barrier function, water and electrolyte balance. Depending on the type of IBS, small bowel and/or colonic hyperpermeability are present. Children with IBS have gastric, small bowel and colonic hyperpermeability. The permeability may be induced by stress. Neonatal maternal deprivation in rats induces these changes. There is evidence that this altered permeability is transferable between cells. A fascinating study involved culturing healthy colonocytes with a supernatant from colonic biopsy specimens of patients with IBS. Factors in the IBS supernatant induced paracellular hyperpermeability and a decreased permeability transcellularly within 48 hours! It is believed that the responsible factor is colonic lumenal serine protease.

**Food Allergy and Intolerance**

In adults and children chronic constipation may be caused by food hypersensitivity and an elimination diet is often effective.

**Altered Intestinal Flora**

See Chapter 3

**Brain-Gut Axis**

See Chapter 4

According to the Rome III criteria the six major adult categories of FGID are:

1) Esophageal
2) Gastroduodenal
3) Bowel
4) Functional Abdominal Pain
5) Biliary
6) Anorectal
Functional conditions – issues without an organic cause – are estimated to be found in as many as 40% of the diagnoses in the practice of gastroenterology. Naturopathic functional diagnosis and treatment are uniquely suited to good outcomes in working with patients with these disorders. In Functional Gastroenterology, Steven Sandberg-Lewis, ND, draws upon skills he has acquired through three decades of naturopathic practice and teaching to articulate clinical pearls, as well as a thorough review of the most recent literature on gastrointestinal physiology. This text focuses on the underlying causes of functional GI disorders as well as their diagnosis, treatment and management.