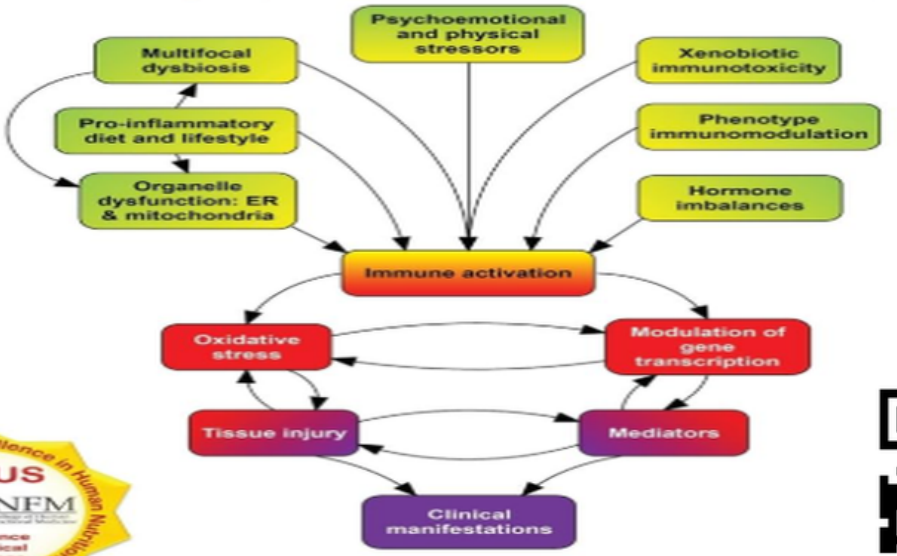
INFLAMMATION MASTERY

4TH EDITION

CLINICAL NUTRITION, FUNCTIONAL MEDICINE, MITOCHONDRIAL DYSFUNCTION, MICROBIOME & DYSBIOSIS, FUNCTIONAL INFLAMMOLOGY, PAIN MANAGEMENT, INTEGRATIVE RHEUMATOLOGY, NUTRITIONAL IMMUNOMODULATION, IMMUNONUTRITION & ANTIVIRAL STRATEGIES

The Colorful and Definitive Guide Toward Health and Vitality
and away from the Boredom, Risks, Costs, and Inefficacy of
Endless Analgesia, Immunosuppression, and Polypharmacy
3-Part Learning System of Text, Illustrations, and Video



DR. ALEX VASQUEZ

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INTERNATIONAL COLLEGE OF HUMAN NUTRITION AND FUNCTION

Inflammation Mastery

4th Edition

Clinical Nutrition, Functional Medicine, Mitochondrial Dysfunction, Microbiome & Dysbiosis, Functional Inflammology, Pain Management, Integrative Rheumatology, Nutritional Immunomodulation, Immunonutrition & Antiviral Strategies

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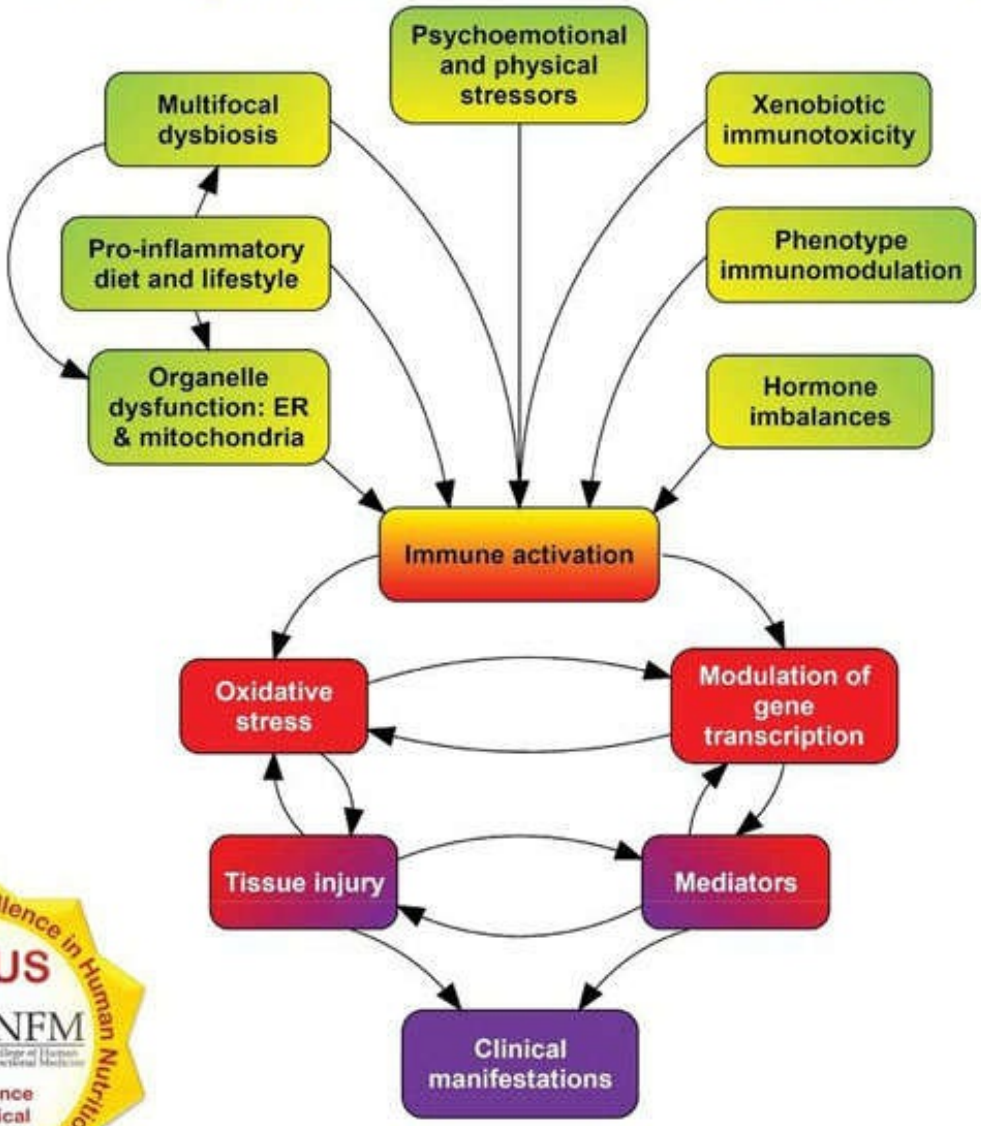

Dr. Alex Vasquez

ICHNFM.ORG

International College of Human Nutrition and Functional Medicine

INFLAMMATION MASTERY 4TH EDITION: THE COLORFUL AND DEFINITIVE GUIDE TOWARD HEALTH AND VITALITY AND AWAY FROM THE BOREDOM, RISKS, COSTS, AND INEFFICACY OF ENDLESS ANALGESIA, IMMUNOSUPPRESSION, AND POLYPHARMACY

A Three-Part Learning System of Text, Images, and Video

ALEX VASQUEZ D.C. N.D. D.O. F.A.C.N.

- Doctor of Osteopathic Medicine, graduate of University of North Texas Health Science Center, Texas College of Osteopathic Medicine (2010)
- Doctor of Naturopathic Medicine, graduate of Bastyr University (1999)
- Doctor of Chiropractic, graduate of University of Western States (1996)
- Fellow of the American College of Nutrition (2013-present)
- Former Overseas Fellow of the Royal Society of Medicine
- Editor, *International Journal of Human Nutrition and Functional Medicine* IntJHumNutrFunctMed.org. Former Editor, *Naturopathy Digest*; Former/Recent Reviewer for *Journal of Naturopathic Medicine, Alternative Therapies in Health and Medicine, Autoimmune Diseases, International Journal of Clinical Medicine, PLOS One* and *Neuropeptides*
- Private practice of integrative and functional medicine in Seattle,

Washington (2000-2001), Houston, Texas (2001-2006), Portland, Oregon (2011-2013), consulting practice (present)

- Consultant Researcher and Lecturer (2004-present), Biotics Research Corporation
- Teaching and Academics:
  - Director of Programs, International College/Conference on Human Nutrition and Functional Medicine ICHNFM.ORG
  - Founder and Former Program Director of the world's first accredited university-affiliated graduate-level program in Functional Medicine
  - Adjunct Professor, Integrative and Functional Nutrition in Immune Health, Doctor of Clinical Nutrition program
  - Former Adjunct Professor (2009-2013) of Laboratory Medicine, Master of Science in Advanced Clinical Practice
  - Former Faculty (2004-2005, 2010-2013) and Forum Consultant (2003-2007), The Institute for Functional Medicine
  - Former Professor (2011-2013) of Pharmacology, Evidence-Based Nutrition, Immune and Inflammatory Imbalances, Principles of Functional Medicine, Psychology of Wellness
  - Former Adjunct Professor of Orthopedics (2000), Radiographic Interpretation (2000), and Rheumatology (2001), Naturopathic Medicine Program, Bastyr University
- Author of more than 100 articles and letters published in *JAMA—Journal of the American Medical Association, BMJ—British Medical Journal, TheLancet.com, JAOA—Journal of the American Osteopathic Association, Annals of Pharmacotherapy, Journal of Clinical Endocrinology and Metabolism, Alternative Therapies in Health and Medicine, Nutritional Perspectives, Journal of Manipulative and Physiological Therapeutics, Integrative Medicine, Current Allergy and Asthma Reports, Nutritional Wellness, Evidence-based Complementary and Alternative Medicine, Nature Reviews Rheumatology* and *Arthritis & Rheumatism*: Official Journal of the American College of Rheumatology

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and to report violations, please contact admin@ichnfm.org.

Notices: The intended audiences for this book are health science students and doctorate-level licensed medical clinicians. This book has been written with every intention to make it as accurate as possible, and each section has undergone peer-review by an interdisciplinary group of clinicians. In view of the possibility of human error and as well as ongoing discoveries in the biomedical sciences, neither the author nor any party associated in any way with this text warrants that this text is perfect, accurate, or complete in every way, and all disclaim responsibility for harm or loss associated with the application of the material herein. Information and treatments applicable to a specific *condition* may not be appropriate for or applicable to a specific patient; this is especially true for patients with multiple comorbidities and those taking pharmaceutical medications, which are generally associated with multiple adverse effects and drug/nutrient/herb interactions. Given that this book is available on an open market, lay persons who read this material should discuss the information with a licensed medical provider before implementing any treatments and interventions described herein.

Chapter and Introduction

Preamble

Volume 1

1. Patient Assessments, Laboratory Interpretation, Clinical Concepts, Patient Management, Practice Management and Risk Reduction: *This chapter introduces/reviews/updates patient assessments, laboratory interpretation, musculoskeletal emergencies, healthcare paradigms; the common and important conditions hemochromatosis and hypothyroidism are also included in this chapter since these need to be considered on a frequent basis in clinical practice*
2. Wellness Promotion & Re-Establishing the Foundation for Health: *Reviewed here are diet, lifestyle, psychosocial health, and—given the pervasiveness of persistent organic pollutants and their increasingly recognized clinical importance—an introduction to environmental medicine*
3. Basic Concepts and Therapeutics in (Nondrug) Musculoskeletal Care and Integrative Pain Management: *Nonpharmacologic management of musculoskeletal problems is preferred over pharmacologic (e.g., NSAID, Coxib, steroid, opioid) management because of the collateral benefits, safety, and cost-effectiveness associated with manual, dietary, botanical, and nutritional treatments. A brief discussion of the current crisis in musculoskeletal medicine is provided for contextualization and emphasis of the importance of expanding clinicians' knowledge of effective nondrug treatments*
4. The Major Modifiable Factors in Sustained Inflammation: *Major components of the "Functional Inflammology Protocol" are reviewed here, from concepts and molecular biology to an emphasis on practical clinical applications*
    1) Food & Basic Nutrition
    2) Infections: Dysbiosis / Viral
    3) Nutritional Immunomodulation
    4) Dysmetabolism, Mitochondrial Dysfunction, ERS/UPR, mTOR
    5) Special Considerations: Sleep, Sociopsychology, Stress, Surgery
    6) Endocrine Imbalances
    7) Xenobiotic Immunotoxicity

Volume 2: Chapter 5—Clinical Applications of the Functional Inflammology Protocol

1) Hypertension
2) Diabetes Mellitus
3) Migraine & Headaches
4) Fibromyalgia
5) Allergic Inflammation
6) Rheumatoid Arthritis
7) Psoriasis and Psoriatic Arthritis
8) Systemic Lupus Erythematosus
9) Scleroderma & Systemic Sclerosis
10) Vasculitic Diseases
11) Spondyloarthropathies & Reactive Arthritis
12) Sjögren Syndrome/Disease
13) Raynaud's Syndrome/Phenomenon/Disorder

Index & Appendix

Dedications: I dedicate this book to the following people in appreciation for their works, their direct and indirect support of this work, and for their contributions to the advancement of true healthcare.

- **To the students and practitioners of naturopathic/functional medicine**, those who continue to learn so that they can provide the best possible care to their patients; **and to their oft-underpaid and underappreciated professors**
- **To the researchers** whose works are cited in this text
- **To Dr Alan Gaby and Dr Jeffrey Bland,** my most memorable and influential *personal* professors and mentors
  - Dr Gaby's diligent scholarship of the medical nutrition literature laid the evidence-based foundation for nearly all of us; his *Nutritional Medicine* is an excellent companion text to compliment this volume
  - Dr Bland deserves credit for being the primary developer of the American rendition of "functional medicine", a conceptual framework and clinical model used and discussed in this text. While development and continuous maturation of the functional medicine model has depended upon numerous researchers and clinicians, Dr Bland was clearly the pioneer for this concept circa 1993 and the nucleus around which many of us have worked (at least initially) in this regard.
- **To Henry Rollins**, in particular for his prose book *One from None*, which completely changed my life in 1991
- **To Dr Linus Pauling**, for modeling the combination of scientific scholarship (Nobel Prize in Chemistry 1954) and social engagement (Nobel Peace Prize 1962)
- **To Dr Friedrich Nietzsche and Dr Noam Chomsky,** my most memorable and influential *virtual* professors and mentors, both of whom exemplify profound scholarship and intellectual independence in favor of developing the highest possible human culture on earth
- **To Dr Robert Richard**, my clinical mentor in general outpatient medicine—a truly exemplary clinician
- **To Dr Bruce Ames**[1] **and Dr Roger J Williams**[2], for proving the importance of biochemical individuality
- **To Dr Chester Wilk**[3,4] **and important others**[5,6,7] for documenting and resisting the organized oppression of natural, non-pharmaceutical, non-surgical healthcare
- **To Jorge Strunz and Ardeshir Farah,** for daily artistic inspiration since my first listen of *Primal Magic* in 1992

Acknowledgments for Peer and Editorial Review of Earlier Versions of This Work: Most of the sections that comprise the current work have been previously reviewed/published/presented; peer/editorial reviews are acknowledged below. Acknowledgement here does not imply that the reviewer fully agrees with or endorses the material in this text but rather that they were willing to review specific sections of the book for clinical applicability and clarity and to make suggestions to their own level of satisfaction.

- 2016 Edition of *Inflammation Mastery* and the excerpt *Pain Revolution for Migraine and Fibromyalgia*: Sabrina Piper BSc (2016 ND candidate), John Bartemus DC BCIM CFMP DACBN, Elizabeth Busetto DC ND, Kenneth Cintron MD
- 2015 Edition of *Human Microbiome and Dysbiosis in Clinical Disease*: Julie Jean BS BSN RN, Joseph Iaccino DC MSc
- 2014 Edition of *Antiviral Strategies and Immune Nutrition*: Annette D'Armata ND, Elizabeth Busetto DC ND
- 2014 Edition of *Naturopathic Rheumatology*: Annette D'Armata ND
- 2012 Edition of *Fibromyalgia in a Nutshell*: Lisa Scholl BA, Annette D'Armata ND
- 2012 Edition of *Migraine Headaches, Hypothyroidism, and Fibromyalgia*: Holly Furlong DC
- 2011 Edition of *Integrative Chiropractic Management of High Blood Pressure and Chronic Hypertension*: Barry Morgan MD, Holly Furlong DC, Kris Young DC, Erika Mennerick DC, and J William Beakey DOM
- 2011 Edition of *Integrative Medicine and Functional Medicine for Chronic Hypertension*: Erika Mennerick DC, JoAnn Fawcett DC, Ileana Bourland MSOM LAc, James Bogash DC, J William Beakey DOM
- 2010 Edition of *Chiropractic Management of Chronic Hypertension*: Joseph Paun MS DC, David Candelario OMS4 (TCOM c/o 2010), James Bogash DC, Bill Beakey DOM, Robert Richard DO

- 2009 Edition of *Chiropractic and Naturopathic Mastery of Common Clinical Disorders*: Heather Kahn MD, Robert Richard DO, James Leiber DO, David Candelario (UNT-HSC TCOM OMS4)
- 2007 Edition of *Integrative Orthopedics*: Barry Morgan MD, Dennis Harris DC, Richard Brown DC (DACBI candidate), Ron Mariotti ND, Patrick Makarewich MBA, Reena Singh (SCNM ND4), Zachary Watkins DC, Charles Novak MS DC, Marnie Loomis ND, James Bogash DC, Sara Croteau DC, Kris Young DC, Joshua Levitt ND, Jack Powell III MD, Chad Kessler MD, Amy Neuzil ND
- 2006 Edition of *Integrative Rheumatology*: Amy Neuzil ND, Cathryn Harbor MD, Julian Vickers DC, Tamara Sachs MD, Bob Sager BSc MD DABFM (Clinical Instructor in the Department of Family Medicine, University of Kansas), Ron Mariotti ND, Titus Chiu (DC4), Zachary Watkins (DC4), Gilbert Manso MD, Bruce Milliman ND, William Groskopp DC, Robert Silverman DC, Matthew Breske (DC4), Dean Neary ND, Thomas Walton DC, Fraser Smith ND, Ladd Carlston DC, David Jones MD, Joshua Levitt ND
- 2004 Edition of *Integrative Orthopedics*: Peter Knight ND, Kent Littleton ND MS, Barry Morgan MD, Ron Hobbs ND, Joshua Levitt ND, John Neustadt (Bastyr ND4), Allison Gandre BS (Bastyr ND4), Peter Kimble ND, Jack Powell III MD, Chad Kessler MD, Mike Gruber MD, Deirdre O'Neill ND, Mary Webb ND, Leslie Charles ND, Amy Neuzil ND

Format and Layout: The format/layout of this book is designed to efficiently take the reader through the clinically relevant spectrum of considerations for each condition that is detailed. Important topics are given their own section within each chapter, while other less important or less common conditions are only described briefly in terms of the four "clinical essentials" of 1) definition/pathophysiology, 2) clinical presentation, 3) assessment/diagnosis, and 4) treatment/management. Each of the expanded sections that details the more important/common conditions maintains a consistent format, taking the reader through the spectrum of primary clinical considerations: definition/pathophysiology, clinical presentations, differential diagnoses, assessments (physical examination, laboratory, imaging), complications, management, and treatment. As my books have progressed, I am increasingly using an article-by-article review format (especially in the sections on management and treatment) so that readers have more direct access to the information so as to understand and ***incorporate*** more deeply what the research actually states; the goal and general approach here is to use a *representative sampling* of the research literature.

References and Citations: Citations to articles, abstracts, texts, and personal communications are footnoted throughout the text to provide supporting information and to provide interested readers the resources to find additional information. Many of the cited articles are available on-line for free, and often I have included the website addresses so that readers can easily access the complete article.

Peer-review and Quality Control: Peer-review is essential to help ensure accuracy and clinical applicability of health-related information. Consistent with the importance of these goals, I have employed several "checks and balances" to increase the accuracy and applicability of the information within my textbooks:

- Reliance upon authoritative references: Nearly all important statements are referenced to peer-reviewed biomedical journals or authoritative texts, examples of the latter include *The Merck Manual*, *Current Medical Diagnosis and Treatment*, and *5-Minute Clinical Consult*. Each citation is provided by a footnote at the bottom of each page so that readers will know quickly and easily exactly where the information was obtained.
- Extensive cross-referencing: Readers will notice the supranormal number of references and citations. Many important statements have several references. Many references (especially textbooks) are referenced several times even on the same page; the purpose of this extensive referencing is three-fold: 1) to guide you—the reader—to additional information, 2) to help me (as writer) stay organized, and 3) to help you and me (the practicing physicians) employ this information with confidence. In more recent updates/revisions, I have started shortening the number of listed authors by frequent use of *et al* with an interest in keeping each

citation to one line of text on the page, likewise reducing mental and eye strain; quite obviously I respect each of the authors—even those whose names are not listed in the citation—and am implementing this solely for the sake of efficient book formatting (aiming for one citation per line) and information density (fewer lines dedicated to citations allows more space for text and images). Given hundreds of pages and thousands of citations, formatting considerations such as these are summatively significant.

- Periodic revision: Any significant errors that are discovered will be posted at InflammationMastery.com/volume1 (…volume2, etc); please check these folders periodically to ensure that you are working with the most accurate information of which I am aware.
- Peer-review: The peer-review process for my books takes several forms. First, colleagues and students are invited to review new and revised sections of the text before publication; every section of the book that you are holding has been independently reviewed by health science students and/or practicing clinicians from various backgrounds: allopathic, chiropractic, osteopathic, naturopathic. Second, you - the reader - are invited to provide feedback about the information in the book, typographical errors, syntax, case reports, new research, etc. If your ideas truly change the nature of the material, I will be glad to acknowledge you in the text (with your permission, of course). If your contribution is hugely significant, such as reviewing three or more chapters or helping in some important way, I will be glad to not only acknowledge you, but to also send you the next edition at a discount or courtesy when your ideas take effect. Third, I keep abreast of new literature by constantly perusing new research and advancements in the health sciences. Having been successful in three separate doctoral programs in the health sciences, I have learned not only to master large amounts of material but to also separate and integrate different viewpoints as appropriate. I also "field test" my protocols with patients in the various clinical arenas in which I work and also with professionals and academicians via presentations and critical dialogue. By implementing these quality control steps, I hope to create a useful text and advance our professions and practices by improving the quality of care that we deliver to our patients.

Purpose, scope, recommended companion resources

The purpose of this book is not to serve as a stand-alone "recipe book" for the complete management of all reviewed conditions; rather the focus of this book is the delivery of clinically important concepts and facts to enhance the management of various clinical disorders, in particular by documenting and explicating this author's naturopathic, allopathic, integrative and functional medicine approach. Readers and instructors using this book are encouraged to use whichever additional resources they choose, including but not limited to the supporting videos at Vimeo.com/DrVasquez and Vimeo.com/ICHNFM; in particular, *5-Minute Clinical Consult* and *Epocrates* are excellent and strongly advised companion guides for overall medical diagnosis/management and clinical pharmacology/prescribing, respectively. Clinicians need to have a good understanding of clinical medicine before applying many of the approaches described in this book; cross-referencing and double-checking management strategies and drug doses are essential components of quality care. Both *5-Minute Clinical Consult* and *Epocrates* are available as point-of-care references, and their use is advised.

This work is best used with the relevant videos from DrV available online, some of which are linked and made password-accessible via this book; additional videos by Dr Vasquez are available online (occasionally with accompanying printed presentation slides); please see the following examples and locations:

- vimeo.com/ichnfm
- vimeo.com/drvasquez

How to Use This Book Most Effectively: Ideally, these books should be read cover-to-cover within a context of coursework that is supervised by a clinically experienced professor. For post-graduate professionals, they might consider forming a local or virtual "book club" and meeting for weekly or monthly discussions to check their understandings and share their clinical experiences to refine the application of clinical knowledge,

perceptions, and skills. Virtual groups and internet forums—such as those hosted by International College of Human Nutrition and Functional Medicine at ICHNFM.ORG—can provide access to an assembly of international professional peers wherein sharing of clinical questions and experiences are synergistic. This book is not intended to extensively cover all aspects of clinical medicine, such as clinical pharmacology and prescribing (for which I recommend *Epocrates.com* and its associated app) and medical management (for which I recommend *5-Minute Clinical Consult* via book, website, and app).

Video access: Video access is provided via notices and footnotes appropriately placed and indicated throughout the book. Readers actually have to read the book to access the information and gain knowledge.

- Sample: vimeo.com/ichnfm/drv-functional-inflammology-intro2013
- Password: DrVprotocol

Notices: The intention and scope of this text are to provide health science students and doctorate-level clinicians with useful information and a familiarity with available research and resources pertinent to the management of patients in integrative primary care and specialty care settings. Specifically, the information in this book is intended to be used by licensed healthcare professionals who have received hands-on/residential clinical training and supervision at accredited health science colleges. Additionally, information in this book should be used in conjunction with other resources, texts, and in combination with the clinician's best judgment and intention to "*first, do no harm*" and second to provide effective healthcare. Information and treatments applicable to a specific *condition* may not be appropriate for or applicable to a specific *patient* in your office; this is especially true for patients with multiple comorbidities and those taking pharmaceutical medications with potential for multiple adverse effects and drug/nutrient/herb interactions. In my books and articles, I describe treatments—manual, dietary, nutritional, botanical, pharmacologic, and occasionally surgical—and their research support for the clinical condition being discussed; each practitioner must determine appropriateness of these treatments for his/her individual patient and with consideration of the doctor's scope of practice, education, training, skill, and—occasionally—the appropriateness of "off label" use of medications and treatments. This book has been carefully written and checked for accuracy by the author and professional colleagues. However, in view of the possibility of human error and new discoveries in the biomedical sciences, neither the author nor any party associated in any way with this text warrants that this text is perfect, accurate, or complete in every way, and we disclaim responsibility for harm or loss associated with the application of the material herein. With all conditions/treatments described herein, each physician must be sure to consider the balance between what is best for the patient and the physician's own level of ability, expertise, and experience. When in doubt, or if the physician is not a specialist in the treatment of a given severe condition, referral is appropriate. These notes are written with the routine "outpatient" in mind and are not tailored to severely injured patients or "playing field" or "emergency response" situations; consult your First Aid and Emergency Response texts and course materials for appropriate information. These notes represent the author's perspective based on academic education, experience, and post-graduate continuing education and are not inclusive of every fact that a clinician may need to know. This is not an "entry level" book except when used in an academic setting with a knowledgeable professor who can explain the concepts, tests, physical exam procedures, and treatments; this book requires a certain level of knowledge from the reader and familiarity with clinical concepts, laboratory assessments, and physical examination procedures. Suggested doses—if any—are for adults (not infants and children) unless otherwise specified in context; the responsibility for appropriate dosing is of course that of the prescribing clinician in view of the patient's age, weight, overall state, hepatic and renal function, comorbidities, polypharmacy, etc.

Updates, Corrections, and Newsletter: When and if omissions, errata, and the need for important updates become clear, I will post these at the website InflammationMastery.com. A reader might access this page periodically to ensure staying informed of any corrections that might have clinical relevance. This book consists not only of the text in the printed pages you are holding, but also the footnotes and any updates at the website. If

any clinically important corrections are made, they will be distributed by newsletter InflammationMastery.com/join_email.html and/or placed in the folder http://FunctionalInflammology.com/volume1/ (with analogous folders for subsequent volumes, e.g., volume2, etc) for constant availability. Be alerted to new integrative clinical research, updates to this textbook and other news/publications/conferences/videos by registering for the free newsletter at ICHNFM.ORG.

Language, Semantics, and Perspective: As a diligent student who previously aspired to be an English professor, I have written this text with great (though inevitably imperfect) attention to detail. Individual words were chosen with care. I confess to knowing, pushing, and creatively breaking several rules of grammar and punctuation. With regard to the he/she and him/her debacle of the English language, I've occasionally mixed singular and plural pronouns for the sake of being efficient and so that the images remain gender-neutral to the extent reasonable. In several previous publications, the subtitle *The art of creating wellness while effectively managing acute and chronic musculoskeletal/health disorders* was chosen to emphasize the intentional creation of wellness rather than a limited focus on disease treatment and symptom suppression; for the 2009 printing of *Chiropractic and Naturopathic Mastery of Common Clinical Disorders*, this subtitle was slightly modified from "creating" to "co-creating" to emphasize the team effort required between physician and patient. *Managing* was chosen to emphasize the importance of treating-monitoring-referring-reassessing, rather than merely *treating*. *Disorders* was chosen to reflect the fact that a distinguishing characteristic of *life* is the ability to regularly create *organized structure* and *higher order* from chaos and *disorder*. For example, plants organize the randomly moving molecules of air and water into the organized structure of biomolecules which eventually take shape as plant structure—fiber, leaves, flowers, petals. Similarly, the human body creates organized structure of increased complexity from consumed plants and other foods; molecules ingested and inhaled from the environment are organized into specific biochemicals and tissue structures with distinct characteristics and definite functions. Injury and disease *result in* or *result from* a lack of order, hence my use of the word "disorders" to characterize human illness and disease. For example, a motor vehicle accident that results in bodily injury, for example, is an example of an external chaotic force, which, when imparted upon human body tissues, results in a disruption (disorder) of the normal structure and organization that previously defined and characterized the now-damaged tissues of the body; likewise, an autoimmune disease process that results in tissue destruction is an *anti-evolutionary* process that takes molecules of higher complexity and reverts them to simpler, fragmented, and non-functional forms. From the perspective of "health" as *organized structure and meaningful function* and "disease" as *the reversion to chaos, destruction of structure, and the loss of function*, the task of healthcare providers is essentially to restore order, and to acutely reduce and proactively prevent/eliminate clinical-biochemical-biomechanical-emotional chaos insofar as it adversely affects the patient's life experience as an individual and our collective experience as an interdependent society. What is required of clinicians then is the ability *first* to create conceptual order from what appears to be chaotic phenomena, and then *second* to materialize—make real and practically applied for patients/people seeking improved health—that conceptual order into our physical world; this is our task, and no small task it is. Also under this heading of Semantics and Language, I will make readers aware of the following additional facts. First, I tend to write very long sentences, both in general and at times when I want to connect two or more complex ideas; rather than be dismayed or discouraged by this occurrence, readers are encouraged to read these longer sentences more than just once and to engage actively, perhaps by asking, "*Why is DrV making an effort to connect these ideas*?" "***What is the conceptual advantage to the binding of these ideas together***?" I am aware of most of the rules of grammar, and I am generally—but not always—compliant. Second, I create new words and phrases as needed; an index of some of these is provided toward the back of the book, whereas some of these new terms are self-explanatory, e.g., *hypoinsulinreception*—underreception or lack of receptor responsiveness to insulin. When possible, I strongly prefer to use single words when discussing concepts, rather than multiple disparate words for singular concepts. I have started to prefer using *italics* rather than "quotation marks" when introducing new terms or when using terms/phrases/words with emphasis; the main purpose of this is to reduce the number of punctuation marks and character spaces, both of which over the course of a multi-volume work of 2,000 pages and hundreds of thousands of words are numerically significant. Last for this

section, the *colorization* process that I began in April 2014 for my (larger) books is intended to 1) bring out more detail in my increasingly complex diagrams, 2) bring emphasis and highlighting to areas of particular interest, 3) make the work more visually stimulating/pleasing over the previous black/white/grayscale versions, and—relatedly—4) to keep the work interesting as readers tread through a remarkable amount of complex and detailed information; I realize that some readers may at times find the colorization to be a small distraction, but I think this is better than the alternative of monotony induced by several hundred dense pages of grayscale.

Integrity and Creativity: I have endeavored to accurately represent the facts as they have been presented in texts and research, and to specifically resist any temptation to embellish or misrepresent data as others have done.[8,9] Conversely, I have not endeavored to make this book appeal to the "average" student or reader; my goal is to write and teach to the students at the top of the class, thereby affirming them and pulling the other students forward and upward. While I offer *explanations*, I intentionally resist *simplifications*, except when one simplification might facilitate the comprehension of a more complex phenomenon, or when such a simplification might facilitate the conveyance of information from clinician to patient. I have allowed this text to be unique in format, content, and style, so that the personality of this text can be contrasted with that of the instructor and reader, thus enabling the learner to at least benefit from an intentionally different – and intentionally honest – perspective and approach. Students using this text with the guidance of a qualified professor will benefit from the experience of "two teachers" rather than just one.

Linearity, Nonlinearity, Redundancy, Asynchronicity: Although the overall flow of the text is highly linear and sequential, occasionally I place a conclusion before its introduction for the sake of foreshadowing and therefore for preparing the reader for what is to come. The purpose of this is not simply one of preparation for the sake of allowing the reader to know what is already lying ahead on the path, but more to begin creating new "shelf space" in the reader's intellectual-neuronal "library" so that when the new—particularly if *neoparadigmatic*—information is encountered, a space will already exist for it; in other words: the intent is to make learning easier. Likewise, for the sake of *information retention*—or what is physiologically understood as synaptogenesis—important points are presented more than once, either identically or variantly. Given that "*No one ever reads the same book twice*"[10] (because the "person who starts" the reading of a meaningful book is changed into the "person who finishes" the reading of that book (assuming proper intentionality and application of one's "self"), the person reading these words might consider a second glace after the first. For the sake of efficient use of space I have tried to minimize redundancy; however, in a few locations, redundancy of text and images proved necessary as—for example—viewing the same diagram within two different conversations allows the reader to gain a more profound understanding of the concepts by viewing them from two different contexts.

Bon Voyage: All artists and scientists—regardless of genre—grapple with the divergent goals of *perfecting* their work and *presenting* their work; the former is impossible in the ultimate sense, while the latter is the only means by which the effort can create the desired effect in the world, whether that is pleasure, progress, or both. At some point, we must all agree that it is "good enough" and that it contains the essence of what needs to be communicated. While neither this nor any future edition of this book is likely to be "perfect", I am content with the literature reviewed, presented, and the new conclusions and implications which are described—many for the first time ever—in this text. Firstly in and progressively from my *Integrative Rheumatology* (2006), each chapter achieved/achieves a paradigm shift which distanced/distances us farther from the simplistic pathocentric and pharmacocentric model and toward one which authentically empowers both practitioners and patients. With time, I will make future editions more complete, consistently passionate, and either more or less polemical. I hope you are able to implement these conclusions and research findings *into your own life* and into the *treatment plans for your patients*. Hopefully this work's value and veracity will promote patients' vitality via the vigilant and virtuous clinicians viewing this volume; to the more attentive and thoroughgoing reader, more

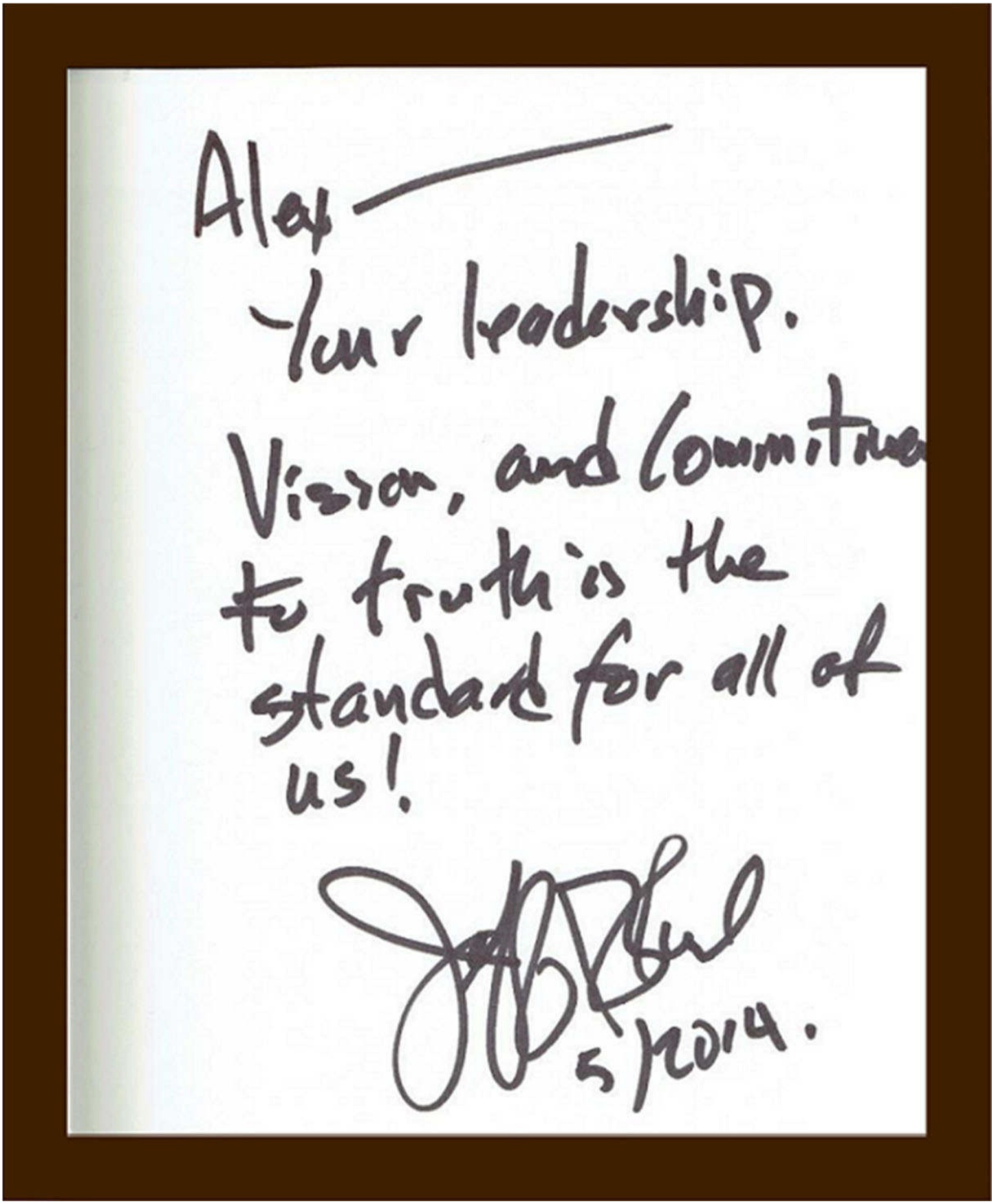
is revealed (for example, the last sentence is a reference to the descriptive and prophetic movie *V for Vendetta* (2006).

Thank you for engaging with this work, and I wish you and your patients the best of success and health.

Alex Vasquez, D.C., N.D., D.O., F.A.C.N.
March 23, 2016



Living color, more vitality: The "colorization" process for the interior of this book began in April 2014 in Bogota (above) and Cartagena Colombia (below).



<u>Pictured above—Personal inscription from Dr. Jeffrey Bland at a book signing event for his book *Disease Delusion*</u>: My inclusion of Dr Bland's personal note

above is not meant to imply that he is endorsing this book; he might very well reject any or all of it. Further, this inclusion does not imply that he carries those same sentiments beyond the day that he wrote them to me in May of 2014. Rather, my inclusion signifies our mutual respect as colleagues, and my personal respect for his thought and demeanor, and his influence on my life and work. I have respectfully honored him in this book as the founder of what most clinicians in America know as Functional Medicine, and I have developed and extended my own version of his concept—that disease states are *malleable* rather than *destined*—to the clinical management of inflammatory disorders under the name of Functional Inflammology. Importantly and personally—but not paradoxically if one understands the true goals of mentorship, affiliation, and friendship—due to the support of friends and colleagues, this book also represents a departure from concern that I had for endorsement from or agreement with other people, professions, universities, or organizations. In this book, I have presented the truth as I see it—without apology—and without any filtering other than as the limitations imposed by time, space, my own abilities, and limitations imposed by human physiology. This work—now published as *Inflammation Mastery, 4th Edition*—has been "in progress" since its origin as course notes for Orthopedics and Rheumatology which I taught at Bastyr University in Seattle in 2000-2001 and through its previous publications in many books starting with *Integrative Orthopedics* (2004) and *Integrative Rheumatology* (2006) and peer-reviewed publications in journals such as *Annals of Pharmacotherapy* (2005), *Alternative Therapies in Health and Medicine* (2004, 2014), *British Medical Journal* (2005), and *Nature Reviews Rheumatology* (2016). In addition to spanning more than 16 years, this work has also spanned various countries and cultures—including Houston, Fort Worth, Austin (Texas), Seattle (Washington), Portland (Oregon) in the United States, then to Bogota Colombia and Barcelona Spain. I consider this volume to be my highest presentation of truth, accuracy, clinical application and—most importantly for me: contextualization—that I could humanly muster while maintaining my own health, relationship, and other obligations. I will remain open to the correction and the updating of this work as the weight of evidence indicates. The goals of healthcare should be the optimization of physical health and psychosocial-intellectual freedom.

Reviews of previous and recent works:

- "Alex is the master of painful conditions and metabolic treatments." *Public comment by an award-winning neurosurgeon and functional medicine practitioner, 2016*
- "I love this course and your approach to the material. I am learning so much. Each article you assigned was strategically chosen and offered support and insight. I was pleasantly surprised by the exam and thought it was very fair. … Thank you for sharing your knowledge and experience with us!" *Doctorate Student under Dr Vasquez, 2016*

- "I appreciate the lecture yesterday and I am truly fascinated by your topic and your vast knowledge. ... I for one feel having people like you on our faculty can only strengthen the credibility of our school. ... I appreciate your education, knowledge and clearly you are the authority in your field. I have listened to all your lectures on YouTube - fantastic!" *University Faculty and Doctorate Student under Dr Vasquez, 2016*
- "Thank you most kindly for your incredible dedication and kindness in sharing your knowledge with us. I am due to start med school next semester and thanks to you and all those who have taught you, I'll be way ahead of the curve." *Premedical/Medical student 2015*
- "Dr Vasquez, I have followed your work extensively and admire your intellect and passion. Thank you for your passion for teaching with integrity!" *Chiropractic doctor 2015*
- "I just wanted to tell you how much I appreciate the information I have received from you. I am still digesting most of it. I feel I have learned quite a bit already yet also feel I have barely scratched the surface." *Doctor and Graduate student under Dr Vasquez, 2013*
- "Dr. Vasquez, Thank you for all you do. **Your conference was simply amazing**. No one wanted to leave the room. I met medical professionals and very interesting lay people who were stimulated and invigorated to change their lives and the lives of others. **I am in awe at your intellectual integrity and veracity**. Best of luck to you in all of your future endeavors." *Medical physician and ICHNFM 2013 Conference Attendee*
- **2014 review of Functional Inflammology, Volume 1: "A truly comprehensive text on the vast subject of inflammation. I consider this book to be an essential addition to any health care practitioner who wishes to operate within the realm of Function Medicine. Please be aware that this book is dense in its content, and its 700 plus pages are full of deeply insightful information. I think Dr. Vasquez is one of the most prolific functional medicine contributors and books such as this should cement his reputation as such."**
- "I attended the last ICHNFM conference in Portland (and am still basking in the amazing information received)." *Email from Clinical Oncology Dietitian, in late February 2014*
- "Thanks for a fantastic conference!" *ICHNFM 2013 Conference Attendee*
- "Your discourse today reflected not only your passion and commitment to the wellness of our planet but most importantly the clarity and sincerity of your spirit/ heart/ mind. Always good to be with you and look forward to seeing you soon. Hope we can spend more time then." *Medical physician attendee 2014*
- "I was so refreshed by the 'unfiltered excellence.' What humanness. Breaths of fresh air." *ICHNFM 2013 Attendee*
- "Keep in mind Alex, that humanity is a better place because of you. I know you can't undo it all, but think about how many people would be worse off if it wasn't for your wonderful knowledge being shared with all us docs. Things that I have learned from you have changed peoples' lives for the better." *Naturopathic physician, 2014*
- "Just got back to Guam. Great experience at the International Conference on Human Nutrition and Functional Medicine. Exciting concepts on functional medicine. Thanks Dr Alex Vasquez and team!" *ICHNFM 2013 Conference Attendee*
- "Already waiting in line to buy next year's ticket! **Dr. Vasquez you crushed it!** The future is looking fun already ☺" *ICHNFM 2013 Conference Attendee*
- "Had an incredible time at the 2013 International Conference on Human Nutrition and Functional Medicine. Got to meet some amazing people and hear from some of the top researchers/health professionals about human nutrition and functional medicine approaches. It was definitely worth every penny and can't wait to go back next year!" *ICHNFM 2013 Conference Attendee*
- "I miss you! Your confidence in a program you believed in. I miss your live classes where we would get off topic on a clinical pearl. I miss your way of teaching in a laid back atmosphere that made me feel comfortable, not intimidated. I just needed to let you know, this program is not the same, I am almost done, otherwise, I would have bailed out! I am grateful for the last 18 months I did have with you at the helm. ... You ignited in me my passion for learning again. You sparked the minds of all of us with your enthusiasm. Don't ever let anyone take that away. It has given birth to your new endeavor, and we will follow where you lead. Enjoy your new surroundings and celebrate your new beginnings. I know I look forward to what is ahead." *Doctor and Graduate student under Dr Vasquez, 2013*

- “Wonderful conference! Thanks so much.” *ICHNFM 2013 Conference Attendee*
- “Really wonderful conference! Lots of material ready to implement Monday morning! **Congrats to Alex Vasquez on a herculean job very well done**!” *ICHNFM 2013 Conference Attendee*
- "Thanks for a great conference. I really enjoyed all of the speakers, but your lectures were by far the most useful for implementing ideas into my clinical practice. And the most entertaining."*ICHNFM 2013 Conference Attendee*
- "Thank you for your life-changing work." *Physician, 2011*
- "I want Dr. Vasquez to know that I have just received his book, *Chiropractic and Naturopathic Mastery of Common Clinical Disorders*. **It is a treasure. The best book in my library**. Thank you for the contribution that you are giving to the world of health care." *Clinician, 2010*
- "I appreciate the resources you offer the profession. I use your books and articles regularly." *Doctor, 2011*
- "Dr. Vasquez, I greatly appreciate your efforts. I am a student at ___, 8th trimester, and would like to express my gratitude for your research and works. After coming across your texts in the library**, I quickly found your insight and explanations of the current health care crisis, and in depth coverage and algorithms for inflammatory diseases as a profound inspiration and call to action. I appreciate your attention to detail, and have been taken back several times by the potency and meaning of your sentences. Thank you for your hard work, I will enjoy these books and will surely share with those that have the same drive for true and competent patient care.**" *Health Sciences Student, 2008*
- "I never told you this, but whenever I need to research a particular disease, **besides going on Pubmed and checking some classic Pathophysiology and Clinical Nutrition books, I use your books and I find them extremely well organized, concise, and up-to-date and with the functional/integrative medicine thinking I enjoy and believe it is the future of Health Care**." *Nutrition Research Consultant and University Faculty in Europe, 2009*
- "Thanks so much. You are a great asset to our profession." *Doctor, 2010*
- "As a 7th trimester student quickly approaching 8th trimester and student clinic, I know I will be utilizing your books often. **Your "Chiropractic and Naturopathic Mastery of Common Clinical Disorders" book is referenced very frequently by many clinicians and faculty members at [our university]. Your work is highly regarded**, and I look forward to clinically utilizing the information I will obtain from your writings." *Health Sciences Student, 2011*
- "I am a chiropractic student at ___ Chiropractic College. I just wanted to drop a quick line thanking you for your thorough and accessible textbook Integrative Orthopedics. We are using it in our Differential Diagnosis class, and **it is the best book I’ve come across in Chiropractic College bar none. The writing is concise, informative and refreshingly eloquent. The material is super practical. I hope you continue putting out great resources.**" *Health Sciences Student, 2011*
- "I appreciate the resources you offer the profession. **I use your books and articles regularly**." *Doctor, 2011*
- "**Your Integrated Orthopedics book is magnificent**. I wish all textbooks were structured and as thoughtful as that one." *Health Sciences Student, 2008*
- "By reading the introduction I realize that calling it an orthopedics book; does not do it justice. **It is far more than that. It looks to me that you have created, or are creating, the bible of Integrative Orthopedics and physical medicine**. *Physician, 2007*
- "First of all let me say how honored I am that you have allowed me to review this work. You have done an amazing job! In my opinion **every healthcare provider SHOULD have this on their bookshelf**." *Physician, 2007*
- "Your work on Chapter 12: Hip and Thigh is very good. The chapter is inclusive of the typical pathologies seen in private practice and I particularly liked the separation of juvenile from adult pathologies. Your choice of tests to assess hip and thigh pathology on page 320 is very nice and inclusive. I appreciate your use of algorithms and find them very useful in teaching and in practice. In general, **I thought this chapter represents a quality, state of the art presentation**!" *Clinician and Professor in Clinical Sciences, 2007*
- "I saw your books in a colleague’s office and was really impressed. Really appreciate the thoroughness you’ve put into them." *Doctor, 2010*

- "**It is with great interest and fascination that I have been reading your material both in your two books (Integrative Orthopedics and Integrative Rheumatology) and online. I consider myself very fortunate to have come across your work**, as many of the basic elements of health which you discuss I never learnt or even heard about while in chiropractic college." *Doctor, 2010*
- "I appreciate the resources you offer the profession. I use your books and articles regularly." *Doctor, 2011*
- "**I'm so pleased with your books and was inspired to let you know they have already been incredibly useful! Good index; well organized algorithms. Sometimes I buy educational material and it just sort of sits there... Your books now live on my main desk. Thanks**." *Physician and Journal Editor, 2009*
- "I just wanted to let you know how much I am enjoying reading **your book Integrative Rheumatology. It is having an extremely positive impact in the way I view health and am having a tough time putting it down. It is very inspirational.** I have long felt that it is very important to set a good example for your patients and now try my best to be one for my future patients. I like how you stress this in your book. In order to be the best example for my patients I am going to need to address some problems with my own health. I look healthy from the outside but I have been suffering from fatigue for about 4 years. It has a very negative impact on my health. People say that doing the same thing and expecting different results is the definition of insanity so I think it is time that I attempt to make some changes. ... **Thanks again for writing such a great book. I feel it is a must have for anyone in a musculoskeletal practice**." *Health Sciences Student, 2010*
- "My name is [recent graduate], and I've been a fan of your books since I was in chiropractic college at [university] campus. Dr. [Author, Presenter] made your book, Integrative Rheumatology, required reading for his 9th quarter nutrition class. I never looked back, and have since purchased Chiropractic & Naturopathic Mastery of Common Clinical Disorders as well as Chiropractic Management of Chronic Hypertension." *Doctor, 2010*
- "I saw your books in a colleague's office and was really impressed. Really appreciate the thoroughness you've put into them." *Doctor, 2010*
- "Reading the new integrative management of high blood pressure book and I am thoroughly enjoying it; excellent job. **I am feeling so empowered I'm opening another office focusing on 'restoring the foundations of health' for the community** that I open it in. I am looking for a location and networking to find an internist and cardiologist that are forward thinking; I'm very excited!" *Doctor, 2011*
- "Thank you for the presentation at [the university] this past weekend. **My horizons about what can be done to help people were greatly expanded. I am now still studying the notes from the seminar and am looking forward to more study and learning on how to *correctly* manage diabetes and hypertension**." *Doctor, 2011*
- "Thank you for exposing so many people to the results of our research on the treatment of hypertension. I hope you can pay us a visit during your next trip to our area so we can give you the tour of our new 50+ bed inpatient facility." *Dr Alan Goldhamer, Chief of Health Promoting Clinic, 2010*
- "**I always enjoy reading your work**. I personally gain a lot of knowledge through being a peer-reviewer for you and am better because of it!" *Doctor, Faculty Member, and Postgraduate Instructor, 2011*
- "**I attended your seminar at [University] in June and have been utilizing your hypertension protocols. In that short time, I have seen some marked progress with various patients**." *Doctor, 2010*
- "I want to personally thank you for your expertise and books on...everything. I'm in my last year at SCNM (taking rheumatology right now) and I truly admire your research and ability to compile valuable information. Thank you." *Naturopathic Medical Student, 2014*
- "Doc, I really want to thank you for sharing some of the most important-relevant Facebook posts. **If we had more doctors, leaders and informed human beings (like yourself) our world would be a better place. Thank you for your commitment to truth and doing the right thing.**" *Doctorate Clinician, 2016*
- "I love your No BS approach to everything you do. I loved it in 2013 when you hosted the most informative conference I have ever had the opportunity to attend (because I could afford it at the time thank you). I wish there were more scientists/authors/academics/doctors like you! You are a breath of fresh air among the smell of BS and one can almost "smell" your intolerance to corruption. Please don't ever stop speaking your mind, disseminating information, and rebutting the "experts" because sadly, you're a rare breed." *Doctorate*

Work as love made tangible

"You work that you may keep pace with the earth and the soul of the earth.
For to be idle is to become a stranger unto the seasons, and to step out of life's procession. ...
Work is love made visible."

Kahlil Gibran (1883-1930). *The Prophet*, 1973

Begin at the beginning

"He who wishes one day to *fly*, must first learn *standing*
and *walking*
and *running*
and *climbing*
and *dancing*.
One does not *fly* into *flying*."

Friedrich Nietzsche (1845-1900). *Thus Spoke Zarathustra—A Book for All and None*, 1883-1885

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Neuroinflammation in fibromyalgia and CRPS is multifactorial

Alex Vasquez

In his Review article (Neurogenic neuroinflammation in fibromyalgia and complex regional pain syndrome. *Nat. Rev. Rheumatol.* **11**, 639–648; 2015)[1], Geoffrey Littlejohn ascribes neuroinflammation to a "neurogenic" origin, presumably triggered by pain and stress. However, attribution of neuroinflammation and central sensitization to a primary neurogenic origin is premature without integrating the well-documented coexistence of small intestine bacterial overgrowth (SIBO, one type of gastrointestinal dysbiosis), vitamin D deficiency, and mitochondrial dysfunction.

Littlejohn[1] notes that chronic pain has been associated with lipopolysaccharide (LPS)–stimulated proinflammatory cytokines (particularly IFN-γ and TNF); however, he does not pursue this line of thought to connect it to relevant literature showing clear evidence of gastrointestinal dysbiosis and increased intestinal permeability in patients with fibromyalgia and complex regional pain syndrome (CRPS). The gastrointestinal tract is the most abundant source of LPS, systemic absorption of which is increased by SIBO and increased intestinal permeability. In 1999, Pimentel *et al.*[2] showed that oral administration of antibiotics led to alleviation of pain and other clinical measures of fibromyalgia. In 2004, Pimentel *et al.*[3] showed that among 42 fibromyalgia patients, all (100%) showed laboratory evidence of SIBO, severity of which correlated positively with severity of fibromalgia. In that same year, Wallace and Hallegua[4] showed that eradication of SIBO with antimicrobial therapy led to clinical improvements in fibromyalgia patients in direct proportion to antimicrobial efficacy. In 2008, Goebel *et al.*[5] documented that patients with fibromyalgia and CRPS have intestinal hyperpermeability; mucosal "leakiness" was highest in patients with CRPS, indicating a strong gastrointestinal component to the illness. In 2013, Reichenberger *et al.*[6] showed that CRPS patients have a distinct alteration in their gastrointestinal microbiome characterized by reduced diversity and significantly increased levels of Proteobacteria. LPS from Gram-negative bacteria is powerfully proinflammatory and is known to trigger microglial activation via Toll-like receptor 4; experimental studies have shown that LPS promotes muscle mitochondrial impairment, peripheral hyperalgesia, and central sensitization[7].

Vitamin D deficiency is prevalent in chronic pain and fibromyalgia patients and promotes pain sensitization, myalgia and bone pain (osteomalacia)[8]. Human clinical trials have shown that vitamin D supplementation can alleviate inflammation[9], intestinal hyperpermeability[10], fibromyalgia pain[11] and other neuromusculoskeletal pain. Vitamin D reduces experimental microglial activation[12], a component of neuroinflammation and central sensitization.

Mitochondrial dysfunction, noted in fibromyalgia[13] and CRPS[14], may be triggered by gastrointestinal dysbiosis via LPS, D-lactate, hydrogen sulfide, and inflammation; mitochondrial dysfunction exacerbates and perpetuates microglial activation and glutaminergic neurotransmission[15], thereby promoting pain sensitization centrally while also contributing to muscle pain peripherally[7]. Treatment of mitochondrial dysfunction with ubiquinone alleviates many biochemical and clinical manifestations of fibromyalgia[13].

Thus, neuroinflammation in fibromyalgia and CRPS has biological contributions including gastrointestinal dysbiosis, vitamin D deficiency, and mitochondrial dysfunction. These independent contributions commonly coexist, and each of these is additive/synergistic with the others in the promotion of peripheral and central hyperalgesia. The consistent pain-alleviating benefits of treatments for intestinal dysbiosis (antibiotics), vitamin D deficiency (supplementation) and mitochondrial dysfunction (ubiquinone) establish that these painful conditions are multifactorial and maintained by ongoing physiologic insults, each of which is treatable.

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Competing interests statement
The author declares that he has worked as a consultant for Biotics Research Corporation (a nutraceutical company based in the USA), and that he has lectured and written for this company on various topics, including fibromyalgia.

2016 publication in *Nature Reviews Rheumatology* substantiating the model (at least partly, per the space

limitations) of fibromyalgia described in this text: Provided here in printed format in accord with publisher's copyright agreement ("Authors retain the following nonexclusive rights to reproduce the contribution in whole or in part in any printed book of which they are the author"). The article needed to be added to this preface rather than deeper into the text in order to avoid the massive task of renumbering/indexing the entire book, and it serves as a validating foreshadowing of several of the concepts and clinical approaches contained herein. *Citation details*: Vasquez A. Neuroinflammation in fibromyalgia and CRPS is multifactorial. *Nat Rev Rheumatol*. 2016 Mar 3. doi: 10.1038/nrrheum.2016.25. PMID: 26935282. *Publisher site*: nature.com/nrrheum/journal/vaop/ncurrent/full/nrrheum.2016.25.html

Examples of commonly used abbreviations:

- **25-OH-D** = serum 25-hydroxy-vitamin D(3)
- **ACEi** = angiotensin-2 converting enzyme inhibitor
- **Alpha-blocker** = alpha-adrenergic antagonist
- **ANA** = antinuclear antibodies
- **ARB** = angiotensin-2 receptor blocker/antagonist
- **ARF** = acute renal failure
- **BB** = beta blocker or beta-adrenergic antagonist
- **bHB, BHB** = beta-hydroxy-butyrate
- **BMP** = basic metabolic panel, includes serum Na, K, Cl, CO2, BUN, creatinine, and glucose
- **BP** = blood pressure, relatedly **HBP** = high blood pressure
- **BUN** = blood urea nitrogen
- **C and S** = culture and sensitivity
- **CAD** = coronary artery disease
- **CBC** = complete blood count
- **CCB** = calcium channel blocker/antagonist
- **CE** = cardiac enzymes, including creatine kinase (CK), creatine kinase myocardial band (CKMB), and troponin-1, with the latter being the most specific serologic marker for acute myocardial injury; for the evaluation of acute MI, these are generally tested 2-3 times at 6-hour intervals with ECG performed at least as often.
- **CHF** = congestive heart failure
- **CHO**, **carb** = carbohydrate
- **CK** = creatine kinase, historically named creatine phosphokinase (CPK)
- **CKD** = chronic kidney disease, generally stratified into five stages based on GFR of roughly <90, 90-60, 60-30, 30-15, and >15, respectively
- **CMP** = comprehensive metabolic panel, also called a chemistry panel, includes the BMP along with markers of hepatic status albumin, protein, ALT, AST, may also include alkaline phosphatase and rarely GGT; panels vary per laboratory and hospital.
- **CNS** = central nervous system
- **COPD** = chronic obstructive pulmonary disease
- **CRF, CRI** = chronic renal failure/insufficiency
- **CVD** = cardiovascular disease
- **CRP** = c-reactive protein, hsCRP = high-sensitivity c-reactive protein **CT** = computed tomography
- **CXR** = chest X-ray
- **DM** = diabetes mellitus
- **DMARD** = disease-modifying antirheumatic drugs
- **ECG** or **EKG** = electrocardiograph
- **Echo** = echocardiography
- **ERS** = endoplasmic reticulum stress
- **GFR** = glomerular filtration rate
- **HDL** = high density lipoprotein cholesterol
- **HTN** = hypertension
- **Ig** = immune globulin = antibodies of the G, A, M, E, or D classes.
- **IHD** = ischemic heart disease
- **I+D** = incision and drainage
- **IM, IV** = intramuscular, intravenous
- **LPS** = bacterial lipopolysaccharide, endotoxin

- **MCV** = mean cell volume
- **MI** = myocardial infarction
- **Mito** = mitochondria(l)
- **MRI** = magnetic resonance imaging, **MRA** = magnetic resonance angiography
- **mTOR** = mechanistic or mammalian receptor of rapamycin; **TOR** is also reasonable
- **NFkB** = nuclear transcription factor kappa beta
- **PNS** = peripheral nervous system
- **PRN** = from the Latin "pro re nata" meaning “on occasion” or "when necessary"
- **PTH** = parathyroid hormone, iPTH = intact parathyroid hormone
- **PVD** = peripheral vascular disease
- **RA** = rheumatoid arthritis
- **RAD** = reactive airway disease, asthma
- **SIBO** = small intestine bacterial overgrowth
- **SLE** = systemic lupus erythematosus
- **TLR** = Toll-like receptor
- **TRIG(s)** = serum triglycerides
- **UA** = urinalysis
- **UPR** = unfolded protein response
- **US** = ultrasound

Dosing shorthand:
- **bid** = twice daily
- **cc** = with meals
- **hs** = at bedtime
- **ic** = between meals
- **po** = per os = by mouth
- **prn** = as needed (additional details above)
- **q** = each
- **qd** = each day, also /d or /day
- **qid** = four times per day
- **tid** = thrice daily
- **yo** = years old

Seagulls in Sitges, Spain (2016 photo by DrV): "Most gulls don't bother to learn more than the simplest facts of flight—how to get from shore to food and back again." … "One school is finished, and the time has come for another to begin." … "We can lift ourselves out of ignorance, we can find ourselves as creatures of excellence and intelligence and skill." Richard Bach. *Jonathan Livingston Seagull*. 1972

In 2016, ICHNFM initiated several new means by which students, clinicians, and benefactors can contribute to our ongoing efforts, ranging from supporting the Editorial and Review Staff of the *International Journal of Human Nutrition and Functional Medicine* (IntJHumNutrFunctMed.Org) to continue the free distribution of our publication and associated videos and interviews, to underwriting our ongoing certification efforts and joining as members to access the growing video archive and attend our webinars of case reports and research reviews. Support can also be sent directly via PayPal.com account admin@ichnfm.org; additionally, all of the ICHNFM print and ebook publications are available on Amazon.com listed under International College of Human Nutrition and Functional Medicine.


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Chapter 1:
Initial Considerations in Patient Assessment and Management:
An Overview of Key Concepts and Facts in Patient History, Physical Examination, Laboratory Interpretation, Risk Management and Clinical Approach, Common Clinical Considerations

Overview of this chapter

Reviewed herein are the three essential components of patient assessment:

1. History
2. Physical examination
3. Laboratory assessment

Additional concepts and perspectives are provided that will help facilitate risk management and promote and contextualize optimal patient care.

This chapter concludes with two new sections under the title of "Common Clinical Considerations", since these topics—hemochromatosis and hypothyroidism—are both commonly encountered in clinical practice and need to be considered in the routine evaluation of essentially all patients and especially those who present with disorders such as diabetes, depression, fatigue, and musculoskeletal pain. Previously, I had published these as separate chapters in various books, but—again—at this time I think these need to be integrated into basic/daily/routine clinical consideration.

Topics:

- **Moving past disease- and drug-centered medicine toward patient-centered health optimization: the goal is *wellness***
- **Acute Care and Musculoskeletal Care as Opportunities for Health Optimization**
- **Clinical Assessments**
  - History taking & physical examination
  - Orthopedic/musculoskeletal examination: Concepts and goals
  - Neurologic assessment: Review
  - Laboratory assessments: General considerations of commonly used tests

i. Routine tests: Chemistry/metabolic panel, lipid panel, CBC, 25(OH)-vitamin D, ferritin, thyroid stimulating hormone, CRP, ESR
ii. Rheumatology/inflammation: ANA (antinuclear antibodies), ANCA (antineutrophilic cytoplasmic antibodies), RF (rheumatoid factor), CCP (cyclic citrullinated protein antibodies), complement proteins, HLA-B27, additional tests for various immune/inflammatory disorders, tests for chronic infections/dysbiosis
iii. Functional assessments: Lactulose-mannitol assay, comprehensive stool analysis and comprehensive parasitology

- **High-Risk Pain Patients**
- **Clinical Concepts**
  - Not all injury-related problems are injury-related problems
  - Safe patient + safe treatment = safe outcome
  - Four clues to underlying problems
  - Special considerations in the evaluation of children
  - No errors allowed: Differences between primary healthcare and spectator sports
  - "Disease treatment" is different from "patient management"
  - Clinical practice involves much more than "diagnosis and treatment"
  - Clinical Management of Patients with Systemic Inflammatory/Autoimmune Diseases
  - Risk Management, Charting, and Avoiding Medical Errors: Useful Reminders and Acronyms
  - Risk Management: A note especially to students and recent licensees
- **Musculoskeletal Emergencies**
  - Acute compartment syndrome
  - Acute red eye, including acute iritis and scleritis
  - Atlantoaxial subluxation and instability
  - Cauda equina syndrome
  - Giant cell arteritis, temporal arteritis
  - Myelopathy, spinal cord compression
  - Neuropsychiatric lupus
  - Osteomyelitis
  - Septic arthritis, acute nontraumatic monoarthritis
- **Brief Overview of Integrative Healthcare Disciplines**
  - Naturopathic Medicine
  - Functional Medicine
  - Osteopathic Medicine
  - Chiropractic
- **Common Clinical Considerations**
  - Hemochromatosis and Iron Overload
  - Hypothyroidism, particularly Functional/Metabolic/Peripheral

Moving past diagnosis/disease/drug-centered medicine toward patient-centered health optimization: The goal is *wellness—optimal physical and psychosocial functioning*

Written for students and experienced clinicians, this chapter introduces and reviews many new and common terms, procedures, and concepts relevant to the management of patients with musculoskeletal disorders. Especially for students, the reading of this chapter is essential to understanding the extensive material in this book and will facilitate the clinical assessment and management of patients with various clinical presentations.

Healthcare is currently in a time of significant fluctuation and is ready for changes in the balance of power and the paradigms which direct our therapeutic interventions. For nearly a century, allopathic medicine has hailed itself as "the gold standard", and other professions have either submitted to or been crushed by their ongoing political/scientific manipulations and their continual proclamation of intellectual and therapeutic superiority[1,2,3,4,5,6,7,8,9,10,11,12,13] despite 180,000-220,000 iatrogenic *medically-induced* deaths per year (500-600 iatrogenic deaths per day)[14,15] and consistent documentation that most medical/allopathic physicians are unable to provide accurate musculoskeletal diagnoses due to pervasive inadequacies in medical training.[16,17,18,19] Increasing disenchantment with allopathic *heroic medicine* and its adverse outcomes of inefficacy, exorbitant expenses, and unnecessary death are fostering change, such that allopathic medicine has been dethroned as the leading paradigm among American patients, who spend the majority of their discretionary healthcare dollars on consultations and treatments provided by "alternative" healthcare providers.[20,21] With the ever-increasing utilization of integrative medical services, we must see that our paradigms and interventions keep pace with the evolving research literature and our increasing professional responsibilities so that we can deliver the highest possible quality of care.

Medical iatrogenesis kills 493 Americans per day

"Recent estimates suggest that each year more than 1 million patients are injured while in the hospital and approximately 180,000 die because of these injuries. Furthermore, drug-related morbidity and mortality are common and are estimated to cost more than $136 billion a year."

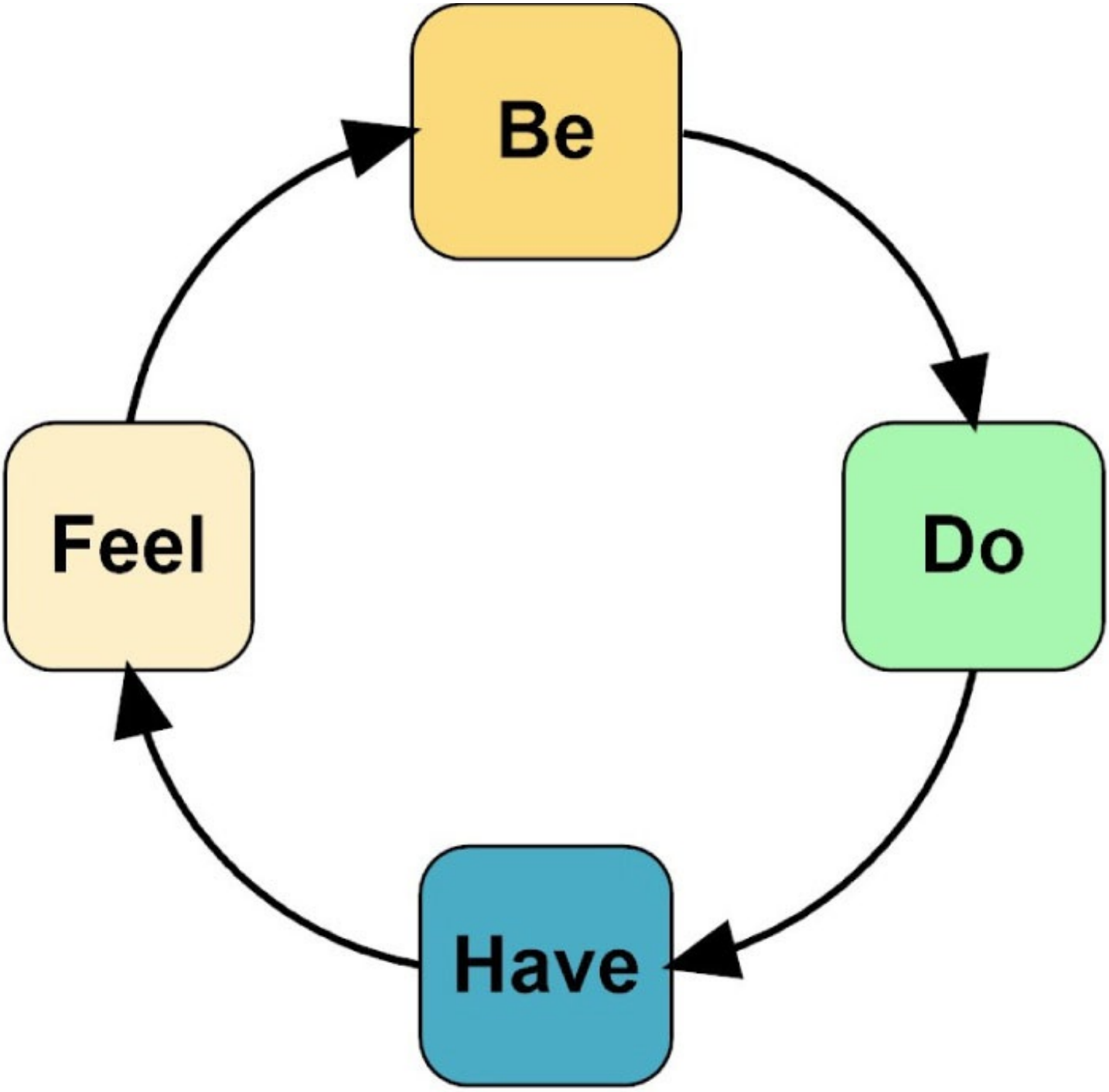
Holland, Degruy. *Am Fam Physician*. 1997 Nov

While we all readily acknowledge the importance of emergency care for emergency situations, those of us who advocate and practice a more complete approach to healthcare and life readily see the shortcomings of a limited and mechanical approach to healthcare, and we aspire to do more than simply fix problems. The implementation of *multidimensional* (i.e., *comprehensive* and *multifaceted*) treatment plans that address many aspects of pathophysiologic phenomena is a huge step forward in creating improved health and preventing future illness in the patients who seek our professional assistance. However, even complete multidimensional treatment plans still fall short of the goal of creating wellness, if for no other reasons than 1) they are still disease- and problem-oriented, rather than health-oriented, 2) they are prescribed from outside ("The doctor told me to do it.") rather than originating internally and spontaneously by the patient's own direction and affirmation ("I *do* this because I *am* this."), and, finally and most difficult to relay, 3) they are mechanistic rather than organic, they can do no better than the sum of their parts, they flow exclusively from the mind ("do") and not also from the body-soul ("am"). The art of creating wellness takes time to understand, longer to implement clinically, and even longer to apply to one's own life. Wellness is a state of being rather than a checklist of activities in a "preventive health program." The subtle differences that distinguish "wellness" from any "program" or "prescription" are the differences between *leading* versus *following* and *flowing* versus *performing*. Wellness transcends mere health (e.g., vitality and absence of disease) and health (e.g., beyond physical, mental, and psychosocial wellbeing). **True and fully developed authentic wellness is the embodiment of multidimensional health; it is as-complete-as-possible (e.g., asymptotic) self-actualization, full integration of one's life—present, past, and future; it must ultimately be and manifest in physical, mental, emotional, spiritual, sociopolitical, transpersonal and multigenerational dimensions, inclusive of one's shadow**[22], **work**[23], **feelings, thoughts, and goals into a cohesive living whole – "a wheel rolling from its own center"**[24] **and beyond itself, beyond—ultimately—its own place and time.**

Ever-increasing popularity of nonallopathic medicine

"…Americans made an estimated 425 million visits to providers of unconventional therapy. This number exceeds the number of visits to all U.S. primary care physicians (388 million)."

Eisenberg et al. Unconventional medicine in the United States. Prevalence, costs, and patterns of use. *N Engl J Med* 1993 Jan



Self-reinforcing cycles of perception, manifestation, action, actualization, and reflection which reinforces (or changes) perception: "Reciprocal causality" is the term popularized by psychologist Nathaniel Branden in his excellent works such as *Psychology of Self-Esteem*. Relatedly, "reciprocal determinism" is the psychosocial theory set forth by psychologist Albert Bandura that a person's behavior both influences and is influenced by personal factors and the social environment.

Authentic Selfhood, Internal Locus of Control, Creativity, Self-Direction

"Innocence is the child, and forgetfulness,
a new beginning, a game,
a self-rolling wheel,
a first movement, a holy *Yea*.
Surely, for the game of creating, there is needed a holy *Yea* unto life."

Acute Care and Musculoskeletal Care: Opportunities for Health Optimization

Clinicians should appreciate that every patient encounter is an opportunity for comprehensive care, disease prevention, and health optimization. This is true whether the presenting complaint is acne, psoriasis, a respiratory infection, or musculoskeletal pain. Given the relatively high frequency of musculoskeletal complaints in clinical practice in general and chiropractic and osteopathic practices in particular, the following section will emphasize the clinical presentation of musculoskeletal complaints as an underappreciated opportunity for wellness care.

Since **approximately 1 of every 7 (14% of total) visits to a primary healthcare provider is for the treatment of musculoskeletal pain or dysfunction**[25], every healthcare provider needs to have 1) knowledge of important concepts related to musculoskeletal medicine, 2) the ability to recognize urgent and emergency conditions, 3) the ability to competently perform orthopedic examination procedures and interpret laboratory assessments, and 4) the knowledge and ability to design and implement effective treatment plans and to coordinate patient management.

Allopathic medicine has been described (ie, has described itself) as "scientific" since a time when this was clearly not the case

"…only about 15% of medical interventions are supported by solid scientific evidence…"

Smith R. Where is the wisdom...? The poverty of medical evidence. *BMJ*. 1991 Oct

In pharmacosurgical allopathic medicine, the goal of musculoskeletal treatment is to address the patient's injury or disorder by alleviating pain with the use of drugs, preventing further injury, and returning the patient to his/her previous status and activities. The most commonly employed interventions are 1) rest and "watchful waiting", 2) non-steroidal anti-inflammatory drugs (NSAIDS) and cyclooxygenase-2-inhibitors (COX-2 inhibitors, or "coxibs"), and 3) surgery. The more action-oriented approaches used by many chiropractic, naturopathic, and osteopathic physicians differs from the allopathic approach because, although avoidance of and "rest" from damaging activities is reasonable and valuable, too much rest without an emphasis on active preventive rehabilitation ❶ encourages patient passivity and the ❷ assumption of the sick role, and it ❸ fails to actively

promote tissue healing and ❹ fails to address the underlying proprioceptive deficits that are common in patients with chronic musculoskeletal pain and recurrent injuries.[26,27,28] NSAIDs are considered "first line" therapy for musculoskeletal disorders by allopaths despite the data showing that "There is no evidence that widely used NSAIDs have any long-term benefit on osteoarthritis."[29] What is worse than this lack of efficacy is the evidence showing that NSAIDs *exacerbate* musculoskeletal disease (rather than *cure* it). NSAIDs are known to inhibit cartilage formation and to promote bone necrosis and joint degradation with long-term use[30,31,32,33] and NSAIDs are responsible for more than 16,000 gastrohemorrhagic deaths and 100,000 hospitalizations each year.[34] The "coxibs" were supposed to provide anti-inflammatory benefits with an enhanced safety profile, but the gastrocentric focus of the drug developers failed to appreciate that COX-2 is necessary for the formation of prostacyclin, a prostaglandin created from arachidonic acid via COX-2 that plays an important role in vasodilation and antithrombosis; not surprisingly therefore, use of COX-2-inhibiting drugs has consistently been associated with increased risk for adverse cardiovascular effects including myocardial infarction, unstable angina, cardiac thrombus, resuscitated cardiac arrest, sudden or unexplained death, ischemic stroke, and transient ischemic attacks.[35] Additionally, the use of a COX-2 inhibiting treatment in patients who overconsume arachidonic acid (i.e., most people in America and other industrialized nations[36]) would be expected to shunt bioavailable arachidonate into the formation of leukotrienes, a group of inflammatory mediators known to promote atherogenesis.[37] Thus, the outcome was entirely predictable: overuse of COX-2 inhibitors should have been expected to create a catastrophe of iatrogenic cardiovascular death, and this is exactly what was allowed to occur—clearly indicating independent but synergistic failures on the part of pharmaceutical companies, the FDA, and the medical profession.[38,39,40,41] According to statements by David J. Graham, MD, MPH, (Associate Director for Science, Office of Drug Safety, FDA) in 2005, an estimated 139,000 Americans who took Vioxx suffered serious complications including stroke or myocardial infarction; between 26,000 and 55,000 Americans died as a result of their doctors' prescribing Vioxx.[42] Additionally, the surgical procedures employed by allopaths for the treatment of musculoskeletal pain do not consistently show evidence of efficacy, safety, or cost-effectiveness. Arthroscopic surgery for osteoarthritis of the knee, for example, costs thousands of dollars to each individual and billions of dollars to the American healthcare system but is no more effective than placebo.[43,44,45] In a review which also noted that only 15% of medical procedures are supported by literature references and that only 1% of such references are deemed scientifically valid,

Rosner[46] showed that the risks of serious injury (i.e., cauda equina syndrome or vertebral artery dissection) associated with spinal manipulation are "*400 times* ***lower*** than the death rates observed from gastrointestinal bleeding due to the use of nonsteroidal anti-inflammatory drugs and *700 times* ***lower*** than the overall mortality rate for spinal surgery."

In integrative/functional medicine, the goal and means of musculoskeletal treatment is to address the patient's injury or disorder by simultaneously alleviating pain with the use of natural, noninvasive, low-cost, and low-risk interventions while improving the patient's overall health, preventing future health problems, and "upgrading" the patient's overall paradigm of health maintenance and disease prevention from one that is passive and reactive to one that is empowered and pro-active. Commonly employed therapeutics include spinal manipulation[47,48,49], exercise[50] and the use of nutritional supplements and botanical medicines[51,52] which have been demonstrated in peer-reviewed clinical trials to be safe and effective for the alleviation of musculoskeletal pain. In order to deliver competent drug-free pain management and to help patients who use nutritional supplements, today's clinicians need to be well-versed in the clinical utilization of such treatments as niacinamide[53], glucosamine and chondroitin sulfates[54], vitamin D[55], vitamin B-12[56], anti-inflammatory diets[57,58], balanced and complete fatty acid therapy[59], proteolytic/pancreatic enzymes[60], and botanical medicines such as *Boswellia*[61], *Harpagophytum*[62], *Uncaria*, and willow bark[63,64]—each of these interventions has been validated in peer-reviewed research for safety and effectiveness.[65] Furthermore, from the perspective of progressive/functional medicine, aiming for such a limited accomplishment as mere "returning the patient to previous status and activities" would be considered substandard, since the patient's overall health was neither addressed nor improved and since returning the patient to his/her previous status and activities would be a direct invitation for the problem to recur indefinitely. Astute physicians should appreciate that, especially regarding "~~chronic~~" (i.e., sustained) health problems, any treatment plan that allows the patient to resume his/her previous lifestyle is by definition doomed to fail because a return to the patient's previous lifestyle and activities that allowed the onset of the disease/disorder in the first place will most certainly result in the perpetuation and recurrence of the illness or disorder. **Stated more directly: for *healing* to truly be effective, the comprehensive treatment plan must generally result in a permanent and profound change in the patient's lifestyle and emotional climate, which are the primary modifiable determinants of either health or disease.**

Barcelona's tradition of honoring intellectuals—Plaça de George Orwell: George Orwell is best known for his brilliant books *1984* and *Animal Farm* which creatively tell complex tales of herd mentality, politics, and various forms of social control and the manufacture of public consent and conformity. Less well-known is his *Homage to Catalonia*, in which he describes his experience as a volunteer in the Spanish Civil War (during which he was shot in the neck by a sniper) against the fascist regime of Francisco Franco, then supported by Hitler's Nazi Germany and Mussolini's Fascist Italy. His required-reading book *1984* has recently been summarized in a brilliant audio version[66] (and a short free video[67]) to increase its accessibility. In 2014, people protesting government surveillance and unjust imprisonments in Thailand were arrested for reading *1984*.[68]

Clinical Assessments: Brief Review of Essential Concepts

The clinical assessments reviewed in the following sections are history-taking, orthopedic/musculoskeletal, and neurologic examinations, and commonly used laboratory tests. **History taking is the art of conducting an *informative* and *collaborative* patient interview.**

The role of the doctor during the interview process is not merely that of a data-collecting machine, spewing out questions and receiving responses. Patient

interviews can be a creative, enjoyable, comforting opportunity to build rapport and to establish meaningful connection with another human being. Patients are not simply people with health problems – they are first and foremost our fellow human beings, not so dissimilar from ourselves perhaps, and always full of complexity. Our task is not to fully understand their complexity nor to solve all of their mysteries, but rather to help orchestrate these dynamics into a coordinated if not unified direction that promotes health and healing.

Beyond its diagnostic value, the interview process also provides a key opportunity to gain insight into the patient's psychoepistimology—the patient's operating system for interacting with data and the world and internalizing and metabolizing external inputs in such a way as to merge these with internal experiences (i.e., emotions, feelings, preferences, responses). Epistemology is the branch of philosophy concerned with the nature and scope of knowledge. Per Rand[69], psychoepistimology is a person's "method of awareness"; a person's psychoepistimology creates a "corollary view of existence" and in turn, "A man's method of using his consciousness determines his method of survival." By understanding how the patient views him/herself in the world, understanding his/her goals, and—in essence—what "drives" the patient and what "makes him/her tick", clinicians can shape the nuances of the conversation and the treatment plan to promote the desired cognitive-conceptual-behavioral changes in behavior that are prerequisite for the attainment of optimized health outcomes.

History & Assessment

History of the primary complaint: "D.O.P.P. Q.R.S.T."
- Description/location
- Onset
- Provocation: exacerbates
- Palliation: alleviates
- Quality
- Radiation of pain
- Severity
- Timing

Associated complaints
- Additional manifestations
- Concomitant diseases

Review of systems
- Head-to-toe inventory of health status, associated health problems, and complications

Past health history
- Surgeries
- Hospitalizations
- Traumas
- Vaccinations and medications
- Successful and failed treatments for the current complaint(s)

Family health history

- Genotropic illnesses and predispositions
- Lifestyle patterns
- Emotional expectations

Social history

- Hobbies, work, exposures
- Relationships and emotional experiences
- Interpersonal support
- Malpractice litigation

Health Habits

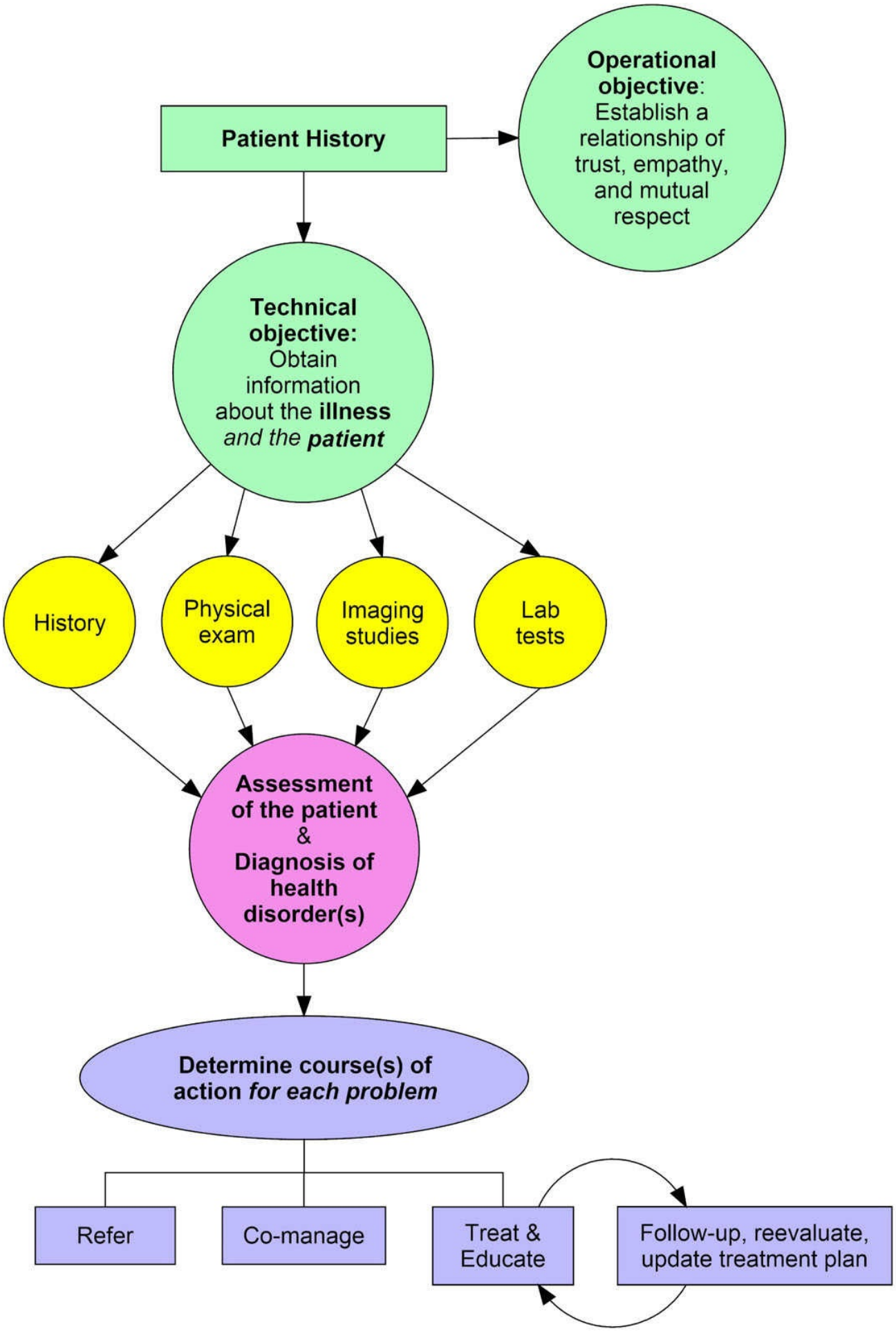
- Diet: appropriate intake of protein, fruits, vegetables, fats, sugars
- Sleep
- Stress management
- Exercise / Sedentary Lifestyle
- Spirituality / Centeredness
- Caffeine and tobacco
- Ethanol and recreational drugs

Medication and supplements

- Reason, doses, duration, cost
- Side-effects
- Interactions

Responsibility and Compliance

- Ability and willingness to comply with prescribed treatment plan and to incorporate the necessary diet-exercise-relationship-emotional-lifestyle modifications
- *Internal* versus *external* locus of control


Patient History
Operational objective: Establish a relationship of trust, empathy, and mutual respect
Technical objective: Obtain information about the illness and the patient
History
Physical exam
Imaging studies
Lab tests
Assessment of the patient & Diagnosis of health disorder(s)
Determine course(s) of action for each problem
Refer
Co-manage
Treat & Educate
Follow-up, reevaluate, update treatment plan

Key components of patient assessment and management: Patient assessment and management is an on-going process that begins with the initial history taken at the first clinical encounter and continues through the physical examination and laboratory assessments and thereafter by monitoring the patient's implementation of and response to the treatment plan. The plan is complete *not simply when it is designed and delivered*; the treatment plan is complete when the desired outcome of health optimization is achieved and sustained.

Clinical acronyms: Outlined here are some of my preferred and—in the case of D.I.R.T. and F.I.N.D.S.E.X.™—unique acronyms which help all of us—students and seasoned clinicians alike—to develop a system of thought which then frees us to apply our higher intellectual functions to the nuances of the clinical case/condition/situation we are considering. Interestingly (and with a bit of Dionysian humor), the sequential use of DIRT, SOAP, and FINDSEX creates an intuitive image to which most adults can relate; from a more Apollonian perspective, we can apply this structure of thought to direct our behavior and attain higher levels of clinical care with greater ease and consistency. These considerations will be outlined and developed in sections that follow.

Risk management acronym—DIRT or DDIRRT: Start with the intention to practice defensively and effectively.

- Defensive mindset: Risk management must be pro-active,
- Duration of treatment: Define and limit the duration of each component of the treatment plan; define the next steps of care (e.g., continued care or laboratory tests) and the date of the return visit,
- Interactions—drugs and diseases: Double-check for interactions of the treatment plan with drugs and the patient's disease(s), especially renal insufficiency. Several commonly encountered clinical examples follow:
    - High-potassium diet ≠ renal insufficiency
    - Vitamin D ≠ hydrochlorothiazide or other hypercalcemic predisposition/state
    - Calcium and magnesium ≠ tetracycline antibiotics
    - Vitamin K ≠ warfarin
- Referral: Determine the need for additional consultation,
- Return visit: Specify and chart timeframe or date of next visit,
- Treatment plan, charted, dated, signed: Treatment plan must be archived in chart and should be given to patient; the clinician must sign and date the chart note and treatment plan.

Patient management acronym—SOAP: Competent care starts with an open-minded, compassionate, information-seeking excellence-aspiring clinician.

- Subjective: History of presenting complaints; patient's concerns,
- Objective: Physical exam, lab tests: always assess renal function and other basic

biochemical parameters; more complex cases require evaluation of more sensitive markers of metabolic and immune imbalance, imaging, biopsy, procedures—as necessary,

- Assessment: Reach an assessment of the entire constellation of patient's situation; diagnosis and appropriate management of each true disease and concern,
- Plan: Informed consent (PARBQ): procedures, alternatives, risks, benefits, questions answered; treatments; follow-up, rescheduling, referral, co-management.

Functional medicine/inflammology treatment acronym—FINDSEX®

- Food: Diet and nutrition: input, metabolism, utilization, unique needs, excretion,
- Infections: Persistent microbial colonization, dysbiosis,
- Nutritional Immunomodulation: Integrative "shaping" of the immune system in favor of Treg at the expense of Th1/2/17. This clinical system has been organized and refined by Dr Vasquez since its first publication in *Functional Immunology and Nutritional Immunomodulation* (2012)
- Dysmetabolism and dysfunctional organelles: Originally in this protocol, dysfunctional mitochondrial was the focus; this has since been expanded to include much broader considerations of dysmetabolism in general and endoplasmic reticulum stress in particular.
- Special considerations, sleep, style of living: This section is intended to cover the basics of sleep, stress management, social considerations, special supplementation, surgery, somatic medicine and spinal manipulation, spirituality, etc.
- Endocrine: Hormonal imbalances must be assessed and corrected/optimized if metabolic and inflammatory balance are to be restored.
- Xenobiotics: Due mostly to the synergistic effects of failure of governmental regulatory agencies combined with careless and reckless corporate production of pollution and toxic chemicals, our world has become highly contaminated with chemicals that alter our hormonal, neurological, reproductive, and immune health. Because this phenomena is subtle, nonacute, and ubiquitous, it is easily overlooked despite its importance.

Components of a Complete Patient History: "D.O.P.P. Q.R.S.T."

Category	Patient history questions and implications
Description, Location:	• ***What is it like for you?*** • *What do you experience?* • *What are you feeling?*

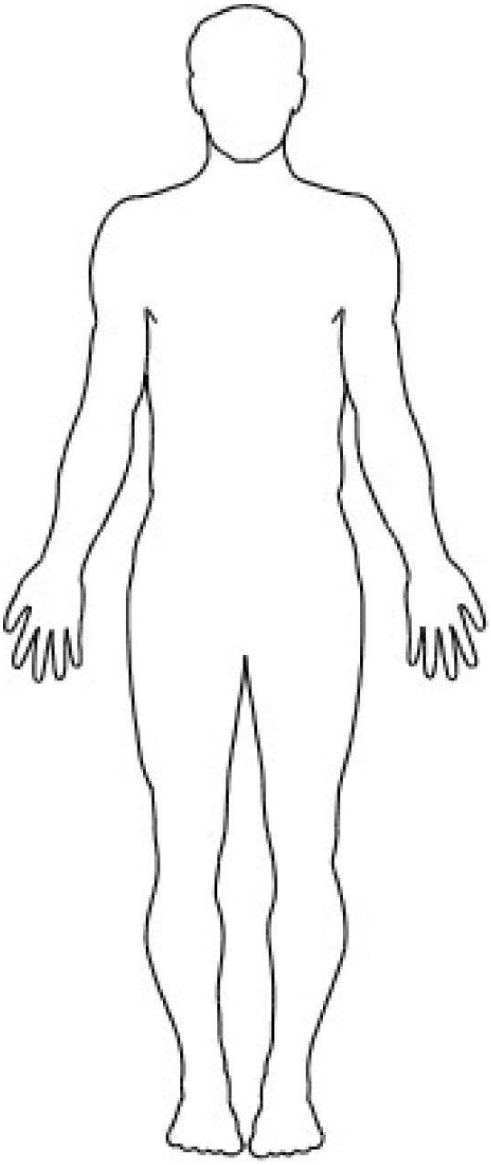
Always start with open-ended questions	• *Where is the pain/sensation/problem?* • Ask about specifics: **Pain, numbness, weakness, tingling**, fatigue, recent or chronic infections, burning, aching, dull, sharp, cramping, stretching, pins and needles, weakness, changes in function (i.e., bowel and bladder continence, sexual function).
Onset	• *When did it begin? Have you ever had anything like this before?* • *Was there a specific event associated with the onset of the problem, such as an injury or an illness, or did the problem start gradually or insidiously?* • *How has it changed over time?* • *Prior injuries to site?* • *Why are you seeking care for this now (rather than last week or last month)?* • *What has changed? How is the pain/problem developing over time—getting worse or getting better?*
Palliation	• *How have you tried treating it? Does anything make it go away?* • *What makes it better? What relieves the pain?* • Ask about prior and current treatments, radiographs, medications, supplements (herbs, vitamins, minerals), injections, surgery, massage, manipulation, and counseling. • Knowing response/resistance to previous treatments can provide clinical insight.
Provocation	• *Are your symptoms constant, or does the problem come and go?* • *What makes it worse? What makes the pain worse?* • *When during the day/week/month/year are your symptoms the worst?*
Quality	• *Can you describe the pain to me?* • *What does it feel like?* • *What do you experience?* • Get a clear understanding of the type of sensation(s): stabbing, shooting pain, pins and needles, sharp pain, electric sensation, numbness, burning, aching, throbbing, weakness, tingling, gel phenomenon (stiffness worsened by inactivity), dizziness, confusion, fatigue, shortness of breath.
Radiation	• *Does the pain stay localized or does it move to your arm/leg/head/face?* • *Do you feel pain in other areas of your body?*
Severity	• *How bad is it? How would you rate it on a scale of one to ten if one were almost no pain and ten was the worst pain you could imagine?* Use the validated VAS—visual analog scale—to quantify the level of pain and impairment. • *Does this problem prevent you from engaging in your daily activities, such as work, exercise, or hobbies?* This is a very important question for determining functional impairment and internal consistency; if the patient is "too injured to work" yet is still able to fully participate in recreational activities that are physically challenging, then malingering is likely.
Timing	• *When do you notice this problem?* • *Is it constant, or does it come and go? Where are you when you notice it the most?* • *Is it worse in the morning, or worse in the evening?* • *Does anyone else in your [home/office/worksite] have this same problem?* • *What times of the day or what days of the week is it the worst?*

Associated manifestations and constitutional symptoms	• *Have you noticed any other problems associated with this problem?* • ***Fatigue****?* • ***Fever****?* • ***Weight loss****? Weight gain?* • *Night**sweats**?* • ***Diarrhea****? **Constipation**?* • ***Weakness****?* • *Nausea?* • *Bowel or bladder difficulties or changes? Difficulty with sexual function?* These could be related to hormonal imbalances, drug side-effects, relationship problems, nutritional deficiencies, nerve compression, and/or depression. • *Change in sensation near your anus/genitals?* Cauda equina syndrome is an important consideration in patients with low-back pain. • *Loss of appetite?* • *Difficulty sleeping?* • *Skin rash or change in pigmentation?*
ROS: review of systems	• **General constitution**: fatigue, malaise, fever, chills, weight gain/loss… • ***"Now we are going to conduct a head-to-toe inventory just to make sure that we have covered everything."*** • **Head**: headaches, head pain, pressure inside head, difficulty concentrating, difficulty remembering, mental function • **Ears:** ringing in ears, dizziness, hearing loss, hypersensitivity to noise, ear pain, discharge from ear, pressure in ears • **Eyes:** eye pain, loss of vision or decreased vision or ability to focus, redness or irritation, seeing flashing lights or spots, double vision • **Nose**: sinus problems, chronically stuffy nose, difficulty smelling things, nose bleeds, change or decrease in sense of smell or taste • **Mouth**, teeth, TMJ, pain or sores in mouth, difficulty chewing, sensitive teeth, bleeding gums, pain in jaw joint, change or decrease in sense of taste • **Neck:** pain at the base of skull, pain in neck, stiffness • **Throat:** difficulty swallowing, pain in throat, feeling like things get stuck in throat, change in voice, difficulty getting air or food in or out • **Chest and breasts**: any chest pain, difficult breathing, wheezing, coughing, pain, lumps, or discharge from nipple • **Shoulders:** pain or aching in your shoulders, restricted motion or stiffness • **Arms, elbows, hands:** pain or problems with your arms, elbows, hands …in the joints or the muscles…, numbness, tingling, weakness, swelling, changes in fingernails, cold hands? • **Stomach, abdomen, pelvis, genitals, urinary tract, rectum,:** pain in stomach or abdomen, difficulty with digestion, gas, bloating, regurgitation, ulcer, any problems lower down in your abdomen—near your lower intestines? Pain, lumps, swelling, difficulty passing stool, pain or itching near your anus, genitalia; any genital pain, burning, discharge, redness, irritation, sexual dysfunction or impotence, loss of bowel or bladder control? Diarrhea or constipation? How often do you have a bowel movement? • **Hips, legs, knees, ankles, feet:** numbness, weakness, pain or tingling in the hips, knees, ankles, or feet; pain in calves with walking, swelling of ankles, cold feet • ***Are you aware of anything else that you think I should know in order to help you?***

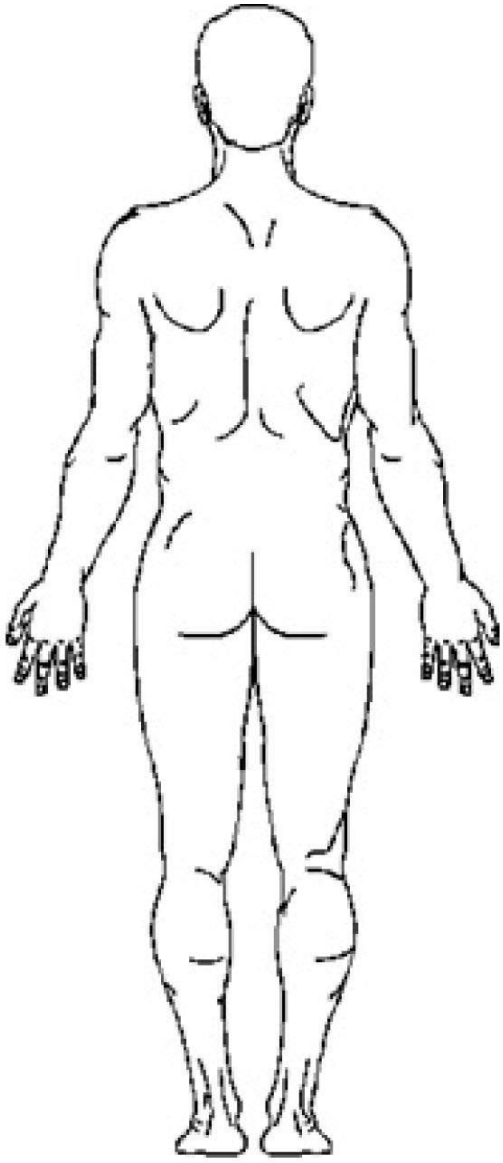
Medical history	• *Are you taking any **medications**? What medications have you taken in the past few years?* Finding out that your new patient recently discontinued his 20-year regimen of valproic acid, lithium, and risperidone may significantly change your interpretation of the clinical interview. Likewise, a patient may not be taking immunosuppressive drugs on the day of your first clinical encounter—he or she may have discontinued such drugs against medical advice (AMA) the week prior to consulting with you. • *Have you been **treated for any medical conditions** or health problems?* • *Have you ever been **hospitalized**?* • *Have you ever had **surgery**?* • *Have you ever been **diagnosed with any health problems** such as high blood pressure or diabetes?* • Investigate for specific problems in the past health history that would be a major oversight to miss: ○ Current or past diseases: cancer, diabetes, psychosis, infections, immune disorders ○ Hypertension or high cholesterol ○ Medications, especially corticosteroids ○ Surgeries, hospitalizations, trauma or previous injuries
Social history	• **Work**—*What do you do for work? Are you exposed to chemicals or fumes at your workplace?* • **Hobbies**—*What do you do for recreation or hobbies? Are you exposed to chemicals or fumes at home or with your hobbies (e.g., painting, gardening)?* • **Eat**—*Tell me about your breakfast, lunch, dinner, snacks… Do you consume foods or drinks that contain aspartame* (linked to increased incidence of brain tumors[70]) *or carrageenan* (possibly linked to increased risk of breast cancer and inflammatory bowel disease[71,72])? • **Exercise**—*What do you do for exercise or physical activity?* • **Drink**—*Do you **drink alcohol**? Coffee/caffeine? Water?* • **Drugs**—*Do you use recreational **drugs**? **Now or in the past?*** • **Smoke**—*Do you **smoke**? Have you ever smoked on a regular basis?* • **Sex**—*Are you **sex**ually active? If so, do you practice safer sex practices?* For all women: *Is there any chance you could be pregnant right now? A "yes" reply may contraindicate radiographic assessment and the use of certain nutrients, botanicals, and/or drugs*. • **Emotional support, family contact, relationships**: The typical American has no-one in whom to confide and has a social network of two people[73]; in all; Americans are the most medicated/drugged and most socially isolated society that has ever existed.
Family health history	• *Does anyone in your family have any health problems, especially your parents and siblings?* • *Do you have any children? Do they have any health problems?* • *Do any diseases "run in the family" such as cancer, diabetes, arthritis, heart disease?*
Additional questions	• *Do you have any other information for me? Is there anything that I did not ask?* • *What is your opinion as to why you are having this health problem?* • *Are you in litigation for your illness or injuries?*

Patients can be asked to <u>localize</u> and <u>describe</u> their pain/discomfort on drawings such as these.
Examples of descriptions:

- Numb
- Hypersensitive
- Tingling
- Shooting pain
- Electrical pain
- Stabbing pain
- Burning pain
- Dull ache
- Muscle weakness



FRONT OF BODY



BACK OF BODY

Review of Systems—checklist: Patients/clients are asked to provide more information by the arrow "→", also at the bottom of each page, and/or whereever more detail is warranted. This form can be completed by the clinician and/or by the client.

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