

Functional medicine: how dysfunction leads to disease

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Abstract

Functional medicine is part of integrative medicine. There are three phases in the movement from health to disease. The first phase concerns lifestyle and how poor lifestyle choices move the system into increasing dysfunction. If the changes are rapid and severe then this is called acute disorder, and if slow and persistent then this is called chronic disorder. In the early phase of dysfunction there may be few symptoms and signs but the symptoms and signs rapidly or slowly become more obvious. The symptoms and signs at first are only recording the fact that the system as a whole is under stress and not functioning well. Over time dysfunction may lead to disease. The conventional model of medicine tends to focus its management on treating symptoms or treating the disease if possible. The integrative model pays attention to lifestyle changes, moving the dysfunction back to optimum function and only treating the disease if indicated.

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Introduction

Worldwide, many alternative systems of medicine function alongside scientific medicine. These include many traditional systems, such as homeopathy, chiropractic, herbal medicine, energy medicine and many others. Each system has its own basic philosophy and emphasis.

The medicine taught to medical students in Western societies is characterised as scientific, which generally means that what is scientifically real is physically measurable, despite the fact that so much of medicine is based on the doctor's experience, hearsay, good advertising by pharmaceutical companies, the manipulation of data, and the use of statistics to highlight and exaggerate small benefits.

Despite the limitations of science, there is nevertheless an enormous amount of valuable data that may be gained using the scientific method. Therefore, while forecasting the weather remains just a forecast, the study of weather using scientific principles, data and machines is helpful, and can improve and refine forecast, especially in the hands of someone who is sensitive and experienced.

Functional medicine is part of integrative medicine, and in this article I wish to define and expand on the way this aspect of integrative medicine is understood and practised. It should perhaps be added that the study of disease and

treatment with drugs and surgery is regarded as part of integrative medicine, and should not be seen as something different. Integrative medicine encompasses lifestyle management, functional medicine, and the treatment of disease with drugs or surgery if indicated.

In the United States of America, many doctors prefer the term functional medicine to integrative medicine as they regard this phase as the most important aspect of the healing process. The Textbook of Functional Medicine defines functional medicine as a dynamic approach to assessing, preventing, and treating complex chronic disease: "Functional medicine helps clinicians identify and ameliorate dysfunctions in the physiology and biochemistry of the human body as a primary method of improving patient health."¹

The three phases

There are three phases in the movement from health to disease. The first phase has to do with lifestyle. The second phase has to do with the fast or slow movement towards increasing dysfunction. If it is rapid it is called an acute disorder, and if it is slow and progressive it is called a chronic disorder. The third phase is reached when a "disease" appears. Disease is an end-point diagnosis and is always preceded by dysfunction on a biochemical level, which may have been present for months or even years.

This dysfunction cannot usually be localised in the way the disease is localised for the simple reason that a human being is not a machine, but a complex system with feedback loops within loops trying to maintain homeostasis. George Engel, a systems theorist, points out that reality consists of a hierarchy of systems of increasing complexity, starting with the atom and continuing with the cell, the organ, the organism, and on to the psychological and social systems.²

Deep within the system, a level of increasing stress appears which cannot be identified by any known tests we have today. By the time evidence of distress appears in the system, a great deal of time may have passed. Even in what appears as an acute onset there has probably been an increasing dysfunction within the system preceding the acute onset of the condition. Type 2 diabetes is a good example of this process. With increasing understanding and research, it is now clear that it is often preceded by metabolic disturbances, which include insulin resistance. Insulin resistance itself will be preceded by a range of disturbing signals within the system. The endpoint or disease is diabetes, which, over time, leads to other endpoint conditions, such as arteriosclerosis, peripheral neuropathy and changes in the eyes leading to blindness.

The first phase: lifestyle

Lifestyle is made up of those factors that can contribute to health and well-being or move the system into increasing disorder and disease. Heart disease and type 2 diabetes are now clearly recognised as being strongly related to lifestyle, with the genetic component being less important.

There is a number of well-recognised lifestyle factors that contribute to ill health, for example:

- Incorrect food choices
- Being overweight
- No or too little exercise
- Stress
- Nutritional insufficiencies
- Toxins in the environment
- Drugs
- Electromagnetic pollution
- Poor sleep patterns

Each one of the above factors contributes to ill health and it is probably true to say that in each person with ill health many of the above factors are present to a greater or lesser degree. Toxins are present everywhere: in the water we drink, the air we breathe, the food we eat, toothpaste, cosmetic creams, cleaning solutions, buildings, mattresses, etc.³ Many toxic chemicals are carried by wind. They are also present in swimming pools and in the sea (polluting the

fish we eat). The drugs that people take in ever increasing amounts are also chemicals, which disturb function, and may give rise to iatrogenic disease, which is today regarded as the third most common cause of ill health.⁴

The burden of electromagnetic pollution is still being debated but it is highly unlikely that the sensitive human biological system is not affected by it in some way, contributing to the increasing dysfunctional load. To this load is added the chemicals of emotional stress and autotoxins induced in the liver and other parts of the body by the organs and tissues as they become more dysfunctional because of the increasing load of toxins that cannot be removed sufficiently fast enough.

The second phase: dysfunction

All ill health is preceded by a short or more prolonged period of declining functional integrity of one or more of the biological systems. At some point, symptoms and signs begin to appear. The symptoms and signs are indications that the system as a whole is no longer in perfect balance, and it is now stressed. This may be only a temporary indication of stress as the system readjusts, or may be the beginning of a long-term chronic dysfunction, which, over time, will lead to a diagnosis of disease.

All diseases are preceded by a disturbance in function. What is the nature of this dysfunction?

- Insufficient nutrients to maximise function
- Toxic overload
- Insulin dysregulation
- Hypothalamic-pituitary-adrenal axis disturbance
- Poor hydration
- Hormonal imbalance
- Drugs interfering with function
- Acidic imbalance. In the intensive care unit it is well recognised that acid-base equilibrium may be disrupted in a wide variety of chronic and critical illnesses, and that this disequilibrium has its own associated morbidity and mortality. Integrative doctors have found that even mild shifts towards acidity are already the harbinger of and contributors to increasing stress within the system, eventually leading to disease.
- Immune dysfunction and disorganisation
- Energy stresses within the electromagnetic field of the body
- Allergies and intolerances
- Emotional stress affecting function
- Malfunctioning of organs of detoxification
- Leaky gut syndrome⁵
- Sleep deprivation, which may increase the severity of

chronic diseases⁶

- Gut flora disturbances
- Inflammation
- Enzyme blockage
- Reactive oxygen species⁷ and an excess of other free radicals

In trying to understand the complexity of function and the shift to dysfunction it is relevant to bear in mind that the biological system is a “web” of activity. The metaphor of seeing the body as a “machine” made up of parts is no longer tenable, but it seems that the conventional model of medicine still follows this deterministic approach. Medical science is partly responsible for this viewpoint because it tends to provide a viewpoint that is governed by clear guidelines and a scientific rationale for its management. The science of complexity, systems theory, and self-organising and self-regulatory systems are part of a “postmodern science” that is slowly creeping into medicine. Nevertheless, on the most practical level doctors still tend to follow a more reductionist and deterministic approach in clinical medicine.^{8,9}

No cell is an island, and while the increasing focus on the parts has yielded spectacular information about the functional integrity of the part it has not always played itself out into better approaches to healing. Instead, we have developed chemical isolates which interfere with the functional integrity of the cell, and thereby alleviate symptoms, but with little improvement of function. It is possible that using drugs to interfere with function (antihistamines, β blockers, serotonin reuptake inhibitors, etc.) may actually contribute to making the system more dysfunctional and therefore healing more difficult. For example, Chouinard noted that chronic use of neuroleptics would over time lead to a dopamine supersensitivity and that the dopaminergic pathways would become permanently dysfunctional.¹⁰ In a similar vein, all drugs that block physiological process tend to lead to compensatory responses in the body, causing some of the problems on withdrawal.¹¹ As indicated above, it is the increasing dysfunction that leads to disease, hence reversing dysfunction makes a real healing of the system possible. Most diseases are rarely the result of a single physiological problem localised in a small part of the body or a single organ,¹² but rather due to the interactions of multiple organ systems and multiple physiological and biochemical pathways, with environmental influences and genetic predisposition.¹³

Functional medicine has its focus at the level of dysfunction. Practitioners of functional medicine look at the disturbances

indicated above in the list of possible dysfunctions to decide how to manage the system and then restore it to better function.

In a complex system, the whole system always needs to be in constant communication with itself in order to maintain the whole in a homeostatic balance. The endpoint of a severe (acute) crisis or of a prolonged (chronic) dysfunction may seemingly have little to do with the underlying dysfunction, which may, for example, have started in the bowel ecosystem, as described by Professor Majid Ali in the first of his textbooks on integrative medicine. “Healthy ecosystems are sustained by stable turnovers of water, oxygen, nutrients, and hence energy. Ecosystem homeostasis over long periods of time is maintained by collective functions of system biots existing in an exceedingly complex but integrated environment.”¹⁴

The third phase: disease

“The concept of disease had its origin in the French Revolution of 1789. It provided a frame of reference, a foundation upon which the subsequent refinements in diagnosis and treatment were built. Attention was focused on diseases, their definition, classification, clinical forms, natural causes and the possibility of altering those natural courses. The birth of disease as an entity and its dissociation from the patient was truly the birth of modern medicine which, many find it hard to believe, is hardly more than 150 years old.”¹⁵

Modern medicine had its beginnings when doctors began to examine the body, dissect the body, and discover pathology: they then began to link the symptoms and signs to the pathology. Today doctors feel most comfortable dealing with a disease and when that disease is removed, as with, for example, cancer surgery, the patient is sent home and asked to return at frequent intervals for reassessment. Little effort is made to discuss lifestyle or to acknowledge that the cancer must have been preceded by a range of dysfunctions within the system as a whole. As Robert Heaney, Professor of Medicine at Creighton University in Nebraska, points out: “Inadequate intake of specific nutrients may produce more than one disease, may produce them by more than one mechanism, and may require several years for the consequent morbidity and mortality to be sufficiently evident to be clinically recognisable as disease.”¹⁶

Discussion

According to William Osler, “it is more important to know what person has the disease than which disease the person has.”¹⁷

Light has particle properties and wave properties, and when scientists measure either waves or particles the other component cannot be measured. It is not possible to measure both the wave and particle properties simultaneously.¹⁸ Perhaps this idea explains the problem of functional medicine and the conventional approach. The latter is much less comfortable with the idea of systems and webs of activity. The complexity of biological systems, with all the parts no longer parts but flowing dynamics, requires a very creative and decidedly non-linear way of thinking. In trying to understand the nature of disease we have perhaps focused too much on the parts (the disease model) when the underlying problem is really the functional dysregulation that precedes any pathology. The disease can be more easily identified, measured and separated from the whole. However, pathology is an endpoint diagnosis. Long before pathology appears the system is already under stress and malfunction occurs.

Even though many “diseases” are not pathological, every effort is made to find pathology, to satisfy the perceived need for diagnosis and treatment. Localising a problem does not define the full extent of the web of activity that has preceded the “disease”. Arthritis is defined as inflammation of a joint, which may sometimes be of a degenerative nature. However, this is a description of pathology, and while wear and tear seems a reasonable explanation, other factors, triggers, mediators, the biochemical individuality of that person and their genetic background all contribute to that problem, and all provide different possible approaches to management.

Cancer as a pathological entity is preceded by a cancerous process, which may include chronic inflammation generating inflammatory mediators such as metabolites of arachidonic acid, cytokines, chemokines and free radicals, leading to increased cell proliferation, mutagenesis, oncogenes activation and angiogenesis.¹⁹

Atherosclerosis is also considered to be an inflammatory disease.²⁰ While many other models may be considered, the point is that a range of underlying factors need to be considered that are beyond the local pathology, and include a range of inflammatory markers, dietary and other lifestyle factors, which contribute to shifting the web of activity within the system towards the atherosclerotic problem. This can be identified by changes in the cholesterol ratio, elevated homocysteine, C-reactive protein, fibrinogen, lipoprotein and interleukin 6.

As Petrovsky points out, “the nervous, endocrine and immune systems communicate bidirectionally via shared

messenger molecules variously called neurotransmitters, cytokines and hormones, and rather than these systems being discrete entities we would propose that they constitute, in reality, a single higher-order entity.”²¹

As indicated, we are dealing with an extremely complex system that will always be complex because of a person’s unique genetic and biochemical individuality. In this sense, naming the “disease” is not completing the process (as would be fixing a broken part of a motor car without doing a tune-up and speaking to the driver).

The concept of evidence-based medicine (EBM) was first postulated by Sackett and others in 1992.²² It is interesting to note that within four years the authors felt obliged to complain that the EBM concept had been highjacked by most medical scientists and now relied almost exclusively on evidence from randomised clinical trials for the determination of treatment and care regimen.²³ This is not what they had originally had in mind. EBM was originally intended to represent an analytical approach to medicine, which would include the results from clinical and basic research, clinical experience, observation and empathy with the patient, and even a patient’s experiences and preferences. This combination of information would then enable the doctor to provide the most appropriate treatment and care for the patient.

The problem with the present interpretation of EBM is that it tends to create the impression that medical science is a science based on investigations called double-blind, placebo-controlled studies, which are unbiased and impersonal. In this process, doctors sometimes forget that the map is not the territory. The patient is a unique being and will react or respond to the doctor, drug, diet, social circumstances and environment in unique ways. Medicine is much more complex than may appear, and making a diagnosis of disease and treating the disease only is like cutting the tail off a donkey and thinking one has the whole donkey. The movement of the tail is not independent of the rest of the animal.

Conclusion

The conventional medical paradigm appears to be mainly concerned about making a diagnosis of disease and then treating this disease with surgery or drugs. This approach, using this paradigm, is no longer tenable since the disease is only a late outward manifestation of several dysfunctional processes that have preceded the disease, and might have been amenable to modification were attention focused on them timeously, long before the appearance of the disease.

The incidence of chronic disease continues to increase, and with this comes an increasing burden on society as more and more people take increasing amounts of drugs, with little focus on lifestyle changes and moving the system back to better function and health.

Functional medicine points out the fallacy of this approach by reminding doctors that disease is preceded by a slow shift of the functional integrity of the whole system. Symptoms and signs are at first the early indication of a system not comfortable with itself. Giving these symptoms names like irritable bowel syndrome, headaches, migraine, etc. may be convenient and help communication (mapping) but they say very little about the nature of the unique way that a person's system is trying to deal with the stress factors (the territory). In this process, we may be missing something that may be crucial for that person. Functional medicine, while recognising the value of a medical diagnosis, has investigated ways in which it can define the underlying dysfunctions (dysbiosis, inflammation, deficiencies, toxicities, etc.). It is this dysfunctional process that is then managed, rather than the "disease" in isolation. As the dysfunction slowly returns to normal function, symptoms and signs also slowly improve, and health then becomes apparent. Healing is a natural ability present in every cell of the body provided that all the conditions are optimal for this to occur. Even when the person already has established chronic disease, supporting health and attempting to correct the dysfunction may make a difference to the quality of life, the amount of drugs and the dose required, and the functional integrity of the system as a whole. Spontaneous remission of disease should highlight the incredible ability of healing available within the system.

Case study

Judy is a 48-year-old African woman who does domestic work. She has been having severe pains in her back, neck, shoulders and feet. Over many months, she has regularly visited the local clinic and hospital outpatients and received repeated prescriptions of anti-inflammatories and antibiotics. She had become desperate as work was becoming more and more difficult and there had been no relief from the pain. In fact, she said that the pain was becoming worse.

As an integrative doctor, the diagnosis of rheumatoid arthritis was less important than deciding on the possible underlying causes and dysfunction in the system. Her diet was high in refined carbohydrates so she was instructed to eat only vegetables for the next few weeks. She was prescribed

5000 IU vitamin D and a vitamin/mineral supplement, together with omega 3 capsules. The herb *Boswellia*, which has anti-inflammatory and antiarthritic properties, was also given.

Within 10 days the pain had almost gone and she began to feel healthy again. Three weeks later she felt normal and her diet could now be expanded slowly.

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